LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

Volume 3

2015

Bate Stamp Numbers
00215957 – 00216812

Prepared for
Department of the Army
Longhorn Army Ammunition Plant

1976 – 2015

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

VOLUME 3

2015

A.	Title:	Meeting Minutes – Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
	Author(s):	AECOM Technical Services
	Recipient:	All Stakeholders
	Date:	June 18, 2015
	Bate Stamp:	00215957 – 00215985
B.	Title:	Meeting Minutes – Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
	Author(s):	AECOM Technical Services
	Recipient:	All Stakeholders
	Date:	July 14, 2015
	Bate Stamp:	00215986 – 00216010
C.	Title:	Letter - Certificate of Completion for Remedial Action at LHAAP-46, Plant Area 2, Longhorn Army Ammunition Plant, Karnack, Texas
	Author(s):	U.S. Environmental Protection Agency
	Recipient:	Army BRAC Office
	Date:	July 20, 2015
	Bate Stamp:	002160011 – 00216012
D.	Title:	Report - 2015 Installation Action Plan, Longhorn Army Ammunition Plant, Karnack, Texas
	Author(s):	U.S. Army Corps of Engineers
	Recipient:	U.S. Environmental Protection Agency, Texas Commission on Environmental Quality
	Date:	July 21, 2015
	Bate Stamp:	002160013 – 00216109
E.	Title:	Memorandum for File - Surface Water Data Transmittal 1 Q 2015, Longhorn Army Ammunition Plant, Karnack, TX
	Author(s):	AECOM Technical Services
	Recipient:	All Stakeholders
	Date:	August 4, 2015
	Bate Stamp:	00216110 – 00216275

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VOLUME 3

2015

F.	Title:	Meeting Minutes – Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
	Author(s):	AECOM Technical Services
	Recipient:	All Stakeholders
	Date:	August 11, 2015
	Bate Stamp:	00216276 – 00216303
G.	Title:	Letter - Certificate of Completion for Remedial Action at LHAAP-35A (58), Shops Area, Longhorn Army Ammunition Plant, Karnack, Texas
	Author(s):	U.S. Environmental Protection Agency
	Recipient:	Army BRAC Office
	Date:	August 11, 2015
	Bate Stamp:	00216304 – 00216305
H.	Title:	Report - Draft Final Remedial Action Operation Report for LHAAP-12, Landfill 12, Longhorn Army Ammunition Plant, Karnack, Texas
	Author(s):	AECOM Technical Services
	Recipient:	U.S. Army Corps of Engineers
	Date:	August 12, 2015
	Bate Stamp:	00216306 – 00216375
I.	Title:	Report - Final Decision Document for LHAAP-05, LHAAP-09, LHAAP-15, LHAAP-34, LHAAP-52, LHAAP-57, LHAAP-61, LHAAP-63, LHAAP-70 and LHAAP-71 Sites, Longhorn Army Ammunition Plant, Karnack, Texas
	Author(s):	U.S. Army Corps of Engineers, Tulsa District
	Recipient:	All Stakeholders
	Date:	September 1, 2015
	Bate Stamp:	00216376 – 00216421
J.	Title:	Report - Comprehensive Land Use Control (LUC) Management Plan, Former Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas
	Author(s):	U.S. Army Corps of Engineers
	Recipient:	All Stakeholders
	Date:	September 14, 2015
	Bate Stamp:	00216422 – 00216812

Subject:	**Final Minutes, Monthly Managers' Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**Teleconference – 866-203-6896, passcode 8603914725**
Date of Meeting:	**June 18, 2015 – 10:00 AM**

Attendees:

Army BRAC:	Rose Zeiler (RMZ)
EPA:	Rich Mayer (RM); Kent Becher (KB), Paul Torcoletti
TCEQ:	April Palmie (AP), Dale Vodak (DV)
USACE:	Aaron Williams (AW)
AECOM:	Mark Heaston (MH), Marwan Salameh (MS), JoLynn Snow (JS)
AEC:	Nicholas Smith (NS),
USFWS:	Paul Bruckwicki (PB)

Welcome **AECOM**

Action Items

AECOM

- Develop with Army the path forward for submitting proposed changes to GWTP sampling requirements.
  - Generate a red-line of the 2007 GWTP SAP to reflect the desired sampling and analysis plan, in anticipation of generating a new SAP. **Complete**
- Develop revised 1,4-dioxane sampling memo and sampling plan for next event. **In Progress**-targeting October 2015 for next round of sampling.
- Prior to next RAB meeting, examine RAB handouts to identify charts plotting elevated detections levels that appear to be actual detections. Revise charts to plot only actual detections, not detection levels. **Complete**
  - RMZ and MH discuss what handouts/material is being provided for the RAB meeting.
- AECOM to send out an updated Master Sampling Plan. **Complete**

Army

- No outstanding action items

EPA

- Provide proposed schedule for upcoming EPA sampling (potential split sampling).
  - RM will get with Scott Beesinger about the four wells they will be sampling. AECOM has already sampled those wells. RM will discuss at the RAB meeting.

TCEQ

- No outstanding action items

AEC

- No outstanding action items

USFWS

- No outstanding action items

Defense Environmental Restoration Program (DERP) PBR Update AECOM

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

Item 1 (GWTP Quarterly Report) – Q4 2014 sent to Agencies on 4/8/15. TCEQ comments received on 4/28/15. EPA comments received on 5/21/15. Q1 2015 submitted for Army review on 6/11/15.

- AP discusses irrigating near ICT-2 and requests that irrigation be spread out and not so much at low spot. Also requests that irrigation locations be included in Quarterly reports.
- AW suggests/asks about proceeding with discharge to Harrison Bayou based on the sampling protocol identified in the Revised GWTP SAP
  - RM, AW, RMZ MH and MS discuss updated sampling plan, tech memo for optimizing metals sampling, and proposed sampling protocol demonstrate achievement of the new discharge criteria for 1,4-dioxane.
  - MS and MH discuss a preference to hold off on discharge until initial effluent sample results for 1,4-dioxane are received and it can be confirmed below the new discharge limit.
- RMZ requests that AECOM sends out email to notify when they begin discharging at GWTP.
- AP asks what processes at the GWTP are capable of treating 1,4-dioxane. MH indicates 1,4-dioxane is very recalcitrant and will not likely be treated by the current process. RMZ states that it is an ongoing topic of discussion

Item 2 (LHAAP-18/24 Revised FS) – TCEQ comments received 4/27/15. EPA comments received 5/1/15. Formal extension notice will be sent out by RMZ on 6/22. Will be discussed at afternoon meeting on 6/18/2015.

Item 3 (LHAAP-37 RACR) – Draft Final submitted to agencies on 4/3/15. Received RTRTCs from EPA on 4/7/15.

- Army considering EPA comments from 5/8/18 conference call.
- RMZ says Army is currently considering contractual issues. AW says contracting officer is considering contract modification from AECOM. Final decision estimated by end of July.

Item 4 (LHAAP-37 LUC) – LUC recordation is complete.

Item 5 (LHAAP-46 RACR) – AECOM provided RTRTC table with footnote indicating issues were resolved during 4/2 conference call as insertion pages to Draft Final document-Draft Final is considered Final version-Hard copies sent out 5/7/15-Hard copies received 5/11/15. Certificate of Completion from EPA was expected on or before 6/10/15 (30 days from Draft Final going Final).

- RM, AP and RMZ discuss differing connotations of remedial action completion vs. construction completion in the context of the Certificate of Completion. EPA estimated to provide Certificate of Completion within the next week.

Item 6 (LHAAP-46 LUC) – LUC recordation is complete.

Item 7 (LHAAP-50 RACR) – Draft RTC sent to Army for review 4/22. RTCs sent to Agencies 4/27/15. Submission of Draft Final once LUC Recordation is received.

Item 8 (LHAAP-50 LUC) – TCEQ concurrence on proposed LUC boundaries received on 3/13/15. EPA concurrence on proposed LUC boundaries received on 4/6/15. LUC survey completed 4/29/15 and 4/30/15. Proposed LUC recordation documents transmitted to TCEQ for review 6/2/15. Received comments from TCEQ on 6/5/15. LUC recordation package to be notarized 6/18/15. Projected recordation by end of June.

Item 9 (LHAAP-58 RACR) – Amended RTCs indicating concurrence on issues and that Draft Final will be considered Final submitted on 5/28/15. Certificate of completion to be received from EPA by 6/29/15 (30 days from Draft Final going Final).

Item 10 (LHAAP-58 LUC) – LUC recordation is complete.

Item 11 (LHAAP-67 RACR) – Amended RTC table indicating EPA remaining comments should be/will be addressed in Yr #1 RAO Report submitted 3/17/15. Conference calls w/agencies were held on 4/2 (TCEQ and EPA) and 4/10 (EPA) to discuss finalizing RACR. EPA requiring a commitment to install an additional well in the western portion of the plume and periodic intermediate zone monitoring. Army contracting officer is considering contract modification from AECOM. Final decision estimated by end of July.

Item 12 (LHAAP-67 LUC) – LUC recordation is complete.

Item 13 (LHAAP-12 LTM Report) – Incorporating Army comments. Projected for submittal to agencies in June.

Item 14 (LHAAP-46 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

Item 15 (LHAAP-67 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

Item 16 (LHAAP-50 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

Item 17 (LHAAP-58 RAO Report) – Submitted to Army for review on 4/7/15. Received first round of Army comments on 5/1/15. Revised Army Draft submitted back to Army on 5/14/15. Received Army comments on revised Army Draft on 5/21/15. Submitted response to Army comments 6/15/15. Draft to be submitted to agencies upon Army concurrence and receipt of Certificate of Completion from EPA for LHAAP-58 RACR.

Item 18 (Monthly Managers' Meeting) – Next MMM scheduled for 10AM, Tuesday, July 14th.

Item 19 (LHAAP-29 Amended RI/FS) – Biotrap treatability study data has been received and is being incorporated in document. AECOM submitted a Remedial Alternatives Analysis ahead of submittal of RI/FS addendum for Army feedback on 5/11/15.

Item 20 (LHAAP-17 PDI WP, LHAAP-16 RD WP, LHAAP-03 RD/RAWP, LHAAP-04 RD, LHAAP-47 RD) – Placeholder for sites on hold due to dispute. No new progress.

Item 21 (RAB/Website) – Website updated with new maps 5/19/15.

- There was discussion about changing the schedule for next RAB meeting. Possible dates in September or late October.

Item 22 (GWTP O&M) – Continued O&M. Flow rates are way up due to rain. MS discusses elevated perchlorate readings believed to be associated with increased flow. 1,4-dioxane sampling discussed earlier in meeting. Revised sampling plan discussed earlier in meeting. Discharge discussed earlier in meeting. Discussed that gauging will not be conducted this month on the four wells with PDBs present.

Item 23 (Administrative Record Update) –4th quarter AR Update submitted on 4/21/15. 1st Quarter 2015 Update in progress. Projected submission to Army by end of July.

Item 24 (CRP/CIP) – FFA parties to submit updated questions for survey by 5/29/15. Compiled list of questions sent to TCEQ/EPA 6/2/15.

- There was discussion about how best to provide information to the public. Possible mailing, but need to get a mailing list.

- Upcoming field work
  - July sampling at LHAAP-58 and continued monthly water level gauging at LHAAP-12
  - August sampling at LHAAP-46 (8th [last] quarterly sampling) and LHAAP-50 (7th quarterly sampling)

MMRP Update **Army**

- Update – no update.

Other Environmental Restoration **Army**

- Site 37 Bioplug Update
  - RMZ noted that the Army had recently received a draft of the final Biopug technology demonstration report but they need to get additional information from AEC's contractor regarding system abandonment and decomissioning activities.
- Quarterly Reporting and Requirements
  - GWTP Evaluation with air monitoring data
    - MS indicated that all air monitoring results continue to meet limits
  - Surface Water/Perimeter Well Quarterly Update
    - Perimeter Wells
      - RMZ shares handouts for RAB meeting
  - Administrative Record Update – discussed earlier in the meeting.
  - Website Update (quarterly) – discussed earlier in the meeting. Website has been updated to include the schedule for EPAs sampling at 18/24 and to include the RAB meeting agenda.
- Annual Reporting
  - LUC Management Plan Update (schedule for September 2014) – discussed earlier in the meeting.
  - CRP/CIP Update (Biennial) and questionnaire October 2015
    - Status of questionnaire development-

Discussed earlier in meeting.

Programmatic Issues **RMZ/RM/AP**

- Status of Dispute – No update since last meeting.
- Interim Path Forward – No update since last meeting.

USFWS Update **RMZ/PB**

- PB provided an update regarding the transfer of water rights.

Schedule Next Managers' Meeting – 10AM, Tuesday, July 14th by teleconference.

Adjourn

ACRONYM LIST

AEC	United States Army Environmental Command
AECOM	AECOM Technology Services, Inc.
AP	April Palmie
AR	Administrative Record
AW	Aaron Williams
BRAC	Base Realignment and Closure
CRP/CIP	Community Relations Plan/Community Involvement Plan
DERP	Defense Environmental Restoration Program
DV	Dale Vodak
EPA	United States Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
GWTP	Ground Water Treatment Plant
JS	JoLynn Snow
KB	Kent Becher
LHAAP	Longhorn Army Ammunition Plant
LUC	Land Use Control
MH	Mark Heaston
MMM	Monthly Managers' Meeting
MMRP	Military Munitions Response Program
MS	Marwan Salameh
NS	Nicholas Smith
O&M	Operation and Maintenance
PB	Paul Bruckwicki
PBR	Performance-Based Remediation
PDI	Pre-Design Investigation
PID	Photo Ionization Detector
RAB	Restoration Advisory Board
RACR	Remedial Action Completion Report
RAO	Remedial Action Operation
RAWP	Remedial Action Work Plan
RD	Remedial Design
RDWP	Remedial Design Work Plan
RI/FS	Remedial Investigation / Feasibility Study

RM	Rich Mayer
RMZ	Rose M. Zeiler
RP	Robin Paul
RTC	Response to Comments
RTRTC	Response to Response to Comments
SAP	Sampling and Analysis Plan
TCEQ	Texas Commission on Environmental Quality
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service
WP	Work Plan

LHAAP Data Validated
May 2015

GWTP Effluent and Influent

Weekly, Biweekly, Monthly and Quarterly - February/March 2015

Ammonia (350.1)
VOC (8260B)
Ortho-Phosphate (365.2)
Inorganic Anions (9056)
Total Organic Carbon (415.1)
Metals (6010C)
Metals (6020A)
Perchlorate (6850)
Hexavalent Chromium (7196A)
Oil and Grease (1664A)
Chemical Oxygen Demand (410.4)

Site 46

Quarterly MNA Sampling - May 2015

Alkalinity (310.2)
Phosphorus (365.4)
Total Organic Carbon (415.1)
Metals (6010C)
Metals (6020A)
VOC (8260B)
Inorganic Anions (9056)
Dissolved Gases (RSK-175)
Sulfide (SM4500-S-(-2)-F-2000)

Site 58

Quarterly MNA Sampling - April 2015

Alkalinity (310.2)
Phosphorus (365.4)
Total Organic Carbon (415.1)
Metals (6010C)
Metals (6020A)
VOC (8260B)
Inorganic Anions (9056)
Dissolved Gases (RSK-175)
Ferrous Iron (SM3500FE)
Sulfide (SM4500-S-(-2)-F-2000)

Site 67

Quarterly MNA Sampling - May 2015

Total Carbon (415.1)
VOC (8260B)
Inorganic Anions (9056)
Dissolved Gases (RSK-175)
Ferrous Iron (SM3500FE)
Sulfide (SM4500-S-(-2)-F-2000)

GWTP Effluent Weekly Sampling - March 2015

Sample ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6257-GRAB 3/2/2015	LH18/24-SP650-6259-GRAB 3/9/2015	LH18/24-SP650-6260-GRAB 3/16/2015	LH18/24-SP650-6262-GRAB 3/23/2015	LH18/24-SP650-6263-GRAB 3/30/2015
Location Description:			GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.
Ammonia-N (350.1)							
AMMONIA AS N	mg/L		2.33	4.32	0.872	2.64	3.93
Ortho-Phosphate (365.2)							
ORTHO-PHOSPHATE	mg/L		0.13	0.684	<0.05 U	0.136	0.717
Total Organic Carbon (415.1)							
TOTAL ORGANIC CARBON (TOC)	mg/L		51.1	38.5	30.3	24	31.9
Perchlorate (6850)							
PERCHLORATE	ug/L	13	<0.2 U	2.71	0.86	<0.2 U	<0.2 U

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

GWTP Effluent Biweekly Sampling - March 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6258-COMP 3/9/2015	LH18/24-SP650-6258-GRAB 3/9/2015	LH18/24-SP650-6261-COMP 3/23/2015	LH18/24-SP650-6261-GRAB 3/23/2015
Location Description:			GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Biweekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly.	GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Biweekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly.
Metals (6010C)						
SELENIUM	mg/L	0.012	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Metals (6020A)						
LEAD	mg/L	0.0046	<0.001 U	<0.001 U	<0.001 U	<0.001 U
SILVER	mg/L	0.003	<0.001 U	<0.001 U	<0.001 U	<0.001 U
Perchlorate (6850)						
PERCHLORATE	ug/L	13	4.48	3.43	<0.2 U	<0.2 U
Hexavalent Chromium (7196A)						
HEXAVALENT CHROMIUM	mg/L	0.124	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Volatile Organic Compounds (8260B)						
1,1,1,2-TETRACHLOROETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	7230	N/A	<0.5 U	N/A	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		N/A	<0.4 U	N/A	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	216.9	N/A	<0.5 U	N/A	<0.5 U
1,1-DICHLOROETHANE	ug/L	14032	N/A	<0.25 U	N/A	<0.25 U
1,1-DICHLOROETHENE	ug/L	253	N/A	<1 U	N/A	<1 U
1,1-DICHLOROPROPENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		N/A	<0.3 U	N/A	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		N/A	<1 U	N/A	<1 U
1,2,4-TRICHLOROBENZENE	ug/L		N/A	<0.4 U	N/A	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U

GWTP Effluent Biweekly Sampling - March 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6258-COMP 3/9/2015	LH18/24-SP650-6258-GRAB 3/9/2015	LH18/24-SP650-6261-COMP 3/23/2015	LH18/24-SP650-6261-GRAB 3/23/2015
1,2-DIBROMO-3-CHLOROPROPANE	ug/L		N/A	<2 U	N/A	<2 U
1,2-DIBROMOETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U
1,2-DICHLOROBENZENE	ug/L		N/A	<0.25 U	N/A	<0.25 U
1,2-DICHLOROETHANE	ug/L	181	N/A	<0.5 U	N/A	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U	N/A	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
1,3-DICHLOROBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
1,3-DICHLOROPROPANE	ug/L		N/A	<0.4 U	N/A	<0.4 U
1,4-DICHLOROBENZENE	ug/L		N/A	<0.25 U	N/A	<0.25 U
2,2-DICHLOROPROPANE	ug/L		N/A	<0.5 U	N/A	<0.5 U
2-BUTANONE	ug/L		N/A	<5 U	N/A	<5 U
2-CHLOROTOLUENE	ug/L		N/A	<0.25 U	N/A	<0.25 U
2-HEXANONE	ug/L		N/A	<5 U	N/A	<5 U
4-CHLOROTOLUENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
4-METHYL-2-PENTANONE	ug/L		N/A	<5 U	N/A	<5 U
ACETONE	ug/L	2395	N/A	<5 U	N/A	<5 U
BENZENE	ug/L	181	N/A	<0.25 U	N/A	<0.25 U
BROMOBENZENE	ug/L		N/A	<0.25 U	N/A	<0.25 U
BROMOCHLOROMETHANE	ug/L		N/A	<0.4 U	N/A	<0.4 U
BROMODICHLOROMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U
BROMOFORM	ug/L		N/A	<1 U	N/A	<1 U
BROMOMETHANE	ug/L		N/A	<1 U	N/A	<1 U
CARBON DISULFIDE	ug/L		N/A	<1 U	N/A	3.28
CARBON TETRACHLORIDE	ug/L	181	N/A	<0.5 U	N/A	<0.5 U
CHLOROBENZENE	ug/L	47180	N/A	<0.25 U	N/A	<0.25 U
CHLOROETHANE	ug/L		N/A	<1 U	N/A	<1 U
CHLOROFORM	ug/L	3615	N/A	<0.25 U	N/A	<0.25 U
CHLOROMETHANE	ug/L		N/A	<1 U	N/A	<1 U
CIS-1,2-DICHLOROETHENE	ug/L		N/A	1.17	N/A	1.2
CIS-1,3-DICHLOROPROPENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
DIBROMOCHLOROMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U
DIBROMOMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U
ETHYLBENZENE	ug/L	57025	N/A	<0.5 U	N/A	<0.5 U
HEXACHLOROBUTADIENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
ISOPROPYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U

GWTP Effluent Biweekly Sampling - March 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6258-COMP 3/9/2015	LH18/24-SP650-6258-GRAB 3/9/2015	LH18/24-SP650-6261-COMP 3/23/2015	LH18/24-SP650-6261-GRAB 3/23/2015
M,P-XYLENE	ug/L	83.6	N/A	<1 U	N/A	<1 U
METHYLENE CHLORIDE	ug/L	1699	N/A	<0.5 U	N/A	<0.5 U
NAPHTHALENE	ug/L		N/A	<0.4 U	N/A	<0.4 U
N-BUTYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
N-PROPYLBENZENE	ug/L		N/A	<0.25 U	N/A	<0.25 U
O-XYLENE	ug/L	83.6	N/A	<0.5 U	N/A	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
SEC-BUTYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
STYRENE	ug/L	5987	N/A	<0.25 U	N/A	<0.25 U
TERT-BUTYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
TETRACHLOROETHENE	ug/L	180.7	N/A	<0.5 U	N/A	<0.5 U
TOLUENE	ug/L	4189	N/A	<0.5 U	N/A	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L		N/A	<0.5 U	N/A	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		N/A	<1 U	N/A	<1 U
TRICHLOROETHENE	ug/L	181	N/A	1.12	N/A	1.44
TRICHLOROFLUOROMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U
VINYL CHLORIDE	ug/L	72	N/A	<0.5 U	N/A	<0.5 U
Anions (9056)						
CHLORIDE	mg/L		450	450	538	351
SULFATE	mg/L		15.9	17.6	41.5	35.4

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

GWTP Effluent Monthly Sampling - March 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6256-GRAB 3/2/2015
Location Description:			GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Monthly.
Metals (6010C)			
ALUMINUM	mg/L	1.644	<0.1 U
IRON	mg/L	2.395	0.119 J
SELENIUM	mg/L	0.012	<0.01 U
Metals (6020A)			
ANTIMONY	mg/L		<0.001 U
ARSENIC	mg/L	0.722	0.00272
BARIUM	mg/L	2	0.237
CADMIUM	mg/L	0.0034	<0.0006 U
CHROMIUM	mg/L	0.752	0.00334 J
COBALT	mg/L	11.495	0.00172 J
LEAD	mg/L	0.0046	<0.001 U
MANGANESE	mg/L	15.494	0.268
NICKEL	mg/L	0.184	0.00467 J
SILVER	mg/L	0.003	<0.001 U
THALLIUM	mg/L		<0.0002 U
VANADIUM	mg/L	3.592	<0.001 U
ZINC	mg/L	0.31	0.0245 J

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

GWTP Influent Monthly Sampling - March 2015

Location ID: Sample Date:	Units	LH18/24-SP140-7256-GRAB 3/2/2015
Location Description:		GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Quarterly.
Perchlorate (6850)		
PERCHLORATE	ug/L	14200
Volatile Organic Compounds (8260B)		
1,1,1,2-TETRACHLOROETHANE	ug/L	<25 U
1,1,1-TRICHLOROETHANE	ug/L	<25 U
1,1,2,2-TETRACHLOROETHANE	ug/L	<20 U
1,1,2-TRICHLOROETHANE	ug/L	<25 U
1,1-DICHLOROETHANE	ug/L	<12.5 U
1,1-DICHLOROETHENE	ug/L	51.8 J
1,1-DICHLOROPROPENE	ug/L	<25 U
1,2,3-TRICHLOROBENZENE	ug/L	<15 U
1,2,3-TRICHLOROPROPANE	ug/L	<50 U
1,2,4-TRICHLOROBENZENE	ug/L	<20 U
1,2,4-TRIMETHYLBENZENE	ug/L	<25 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	<100 U
1,2-DIBROMOETHANE	ug/L	<25 U
1,2-DICHLOROBENZENE	ug/L	<12.5 U
1,2-DICHLOROETHANE	ug/L	49.5 J
1,2-DICHLOROPROPANE	ug/L	<20 U
1,3,5-TRIMETHYLBENZENE	ug/L	<25 U
1,3-DICHLOROBENZENE	ug/L	<25 U
1,3-DICHLOROPROPANE	ug/L	<20 U
1,4-DICHLOROBENZENE	ug/L	<12.5 U
2,2-DICHLOROPROPANE	ug/L	<25 U
2-BUTANONE	ug/L	<250 U
2-CHLOROTOLUENE	ug/L	<12.5 U
2-HEXANONE	ug/L	<250 U
4-CHLOROTOLUENE	ug/L	<25 U
4-METHYL-2-PENTANONE	ug/L	<250 U
ACETONE	ug/L	<250 U
BENZENE	ug/L	<12.5 U
BROMOBENZENE	ug/L	<12.5 U
BROMOCHLOROMETHANE	ug/L	<20 U
BROMODICHLOROMETHANE	ug/L	<25 U
BROMOFORM	ug/L	<50 U
BROMOMETHANE	ug/L	<50 UJ
CARBON DISULFIDE	ug/L	<50 U
CARBON TETRACHLORIDE	ug/L	<25 U
CHLOROBENZENE	ug/L	<12.5 U
CHLOROETHANE	ug/L	<50 U
CHLOROFORM	ug/L	14 J
CHLOROMETHANE	ug/L	<50 U

GWTP Influent Monthly Sampling - March 2015

Location ID: Sample Date:	Units	LH18/24-SP140-7256-GRAB 3/2/2015
CIS-1,2-DICHLOROETHENE	ug/L	2750
CIS-1,3-DICHLOROPROPENE	ug/L	<25 U
DIBROMOCHLOROMETHANE	ug/L	<25 U
DIBROMOMETHANE	ug/L	<25 U
DICHLORODIFLUOROMETHANE	ug/L	<25 U
ETHYLBENZENE	ug/L	<25 U
HEXACHLOROBUTADIENE	ug/L	<25 U
ISOPROPYLBENZENE	ug/L	<25 U
M,P-XYLENE	ug/L	<50 U
METHYLENE CHLORIDE	ug/L	1030
NAPHTHALENE	ug/L	<20 U
N-BUTYLBENZENE	ug/L	<25 U
N-PROPYLBENZENE	ug/L	<12.5 U
O-XYLENE	ug/L	<25 U
P-ISOPROPYLTOLUENE	ug/L	<25 U
SEC-BUTYLBENZENE	ug/L	<25 U
STYRENE	ug/L	<12.5 U
TERT-BUTYLBENZENE	ug/L	<25 U
TETRACHLOROETHENE	ug/L	<25 U
TOLUENE	ug/L	<25 U
TRANS-1,2-DICHLOROETHENE	ug/L	<25 U
TRANS-1,3-DICHLOROPROPENE	ug/L	<50 U
TRICHLOROETHENE	ug/L	8930
TRICHLOROFLUOROMETHANE	ug/L	<25 U
VINYL CHLORIDE	ug/L	61.2

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

NA - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

GWTP Effluent Quarterly Sampling - February 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6252-COMP 2/16/2015	LH18/24-SP650-6252-GRAB 2/16/2015
Location Description:			GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Quarterly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Quarterly.
Oil and Grease (1664A)				
OIL & GREASE	mg/L	15	9.8	<2.8 U
Chemical Oxygen Demand (410.4)				
CHEMICAL OXYGEN DEMAND	mg/L	200	116	131
Metals (6010C)				
ALUMINUM	mg/L	1.644	<0.1 U	<0.1 U
IRON	mg/L	2.395	0.0836 J	0.0571 J
SELENIUM	mg/L	0.012	<0.01 U	<0.01 U
Metals (6020A)				
ANTIMONY	mg/L		<0.001 U	<0.001 U
ARSENIC	mg/L	0.722	0.00225	0.00215
BARIUM	mg/L	2	0.244	0.218
CADMIUM	mg/L	0.0034	<0.0006 U	<0.0006 U
CHROMIUM	mg/L	0.752	0.00344 J	0.00231 J
COBALT	mg/L	11.495	0.00121 J	0.00119 J
LEAD	mg/L	0.0046	<0.001 U	<0.001 U
MANGANESE	mg/L	15.494	0.345	0.322
NICKEL	mg/L	0.184	0.00465 J	0.00379 J
SILVER	mg/L	0.003	<0.001 U	<0.001 U
THALLIUM	mg/L		<0.0002 U	<0.0002 U
VANADIUM	mg/L	3.592	<0.001 U	<0.001 U
ZINC	mg/L	0.31	0.0267 J	0.0173 J
Perchlorate (6850)				
PERCHLORATE	ug/L	13	1.24	0.604
Hexavalent Chromium (7196A)				
HEXAVALENT CHROMIUM	mg/L	0.124	<0.01 U	<0.01 U
Volatile Organic Compounds (8260B)				
1,1,1,2-TETRACHLOROETHANE	ug/L		N/A	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	7230	N/A	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		N/A	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	216.9	N/A	<0.5 U
1,1-DICHLOROETHANE	ug/L	14032	N/A	<0.25 U
1,1-DICHLOROETHENE	ug/L	253	N/A	<1 U

GWTP Effluent Quarterly Sampling - February 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6252-COMP 2/16/2015	LH18/24-SP650-6252-GRAB 2/16/2015
1,1-DICHLOROPROPENE	ug/L		N/A	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		N/A	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		N/A	<1 U
1,2,4-TRICHLOROBENZENE	ug/L		N/A	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		N/A	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L		N/A	<2 U
1,2-DIBROMOETHANE	ug/L		N/A	<0.5 U
1,2-DICHLOROBENZENE	ug/L		N/A	<0.25 U
1,2-DICHLOROETHANE	ug/L	181	N/A	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		N/A	<0.5 U
1,3-DICHLOROBENZENE	ug/L		N/A	<0.5 U
1,3-DICHLOROPROPANE	ug/L		N/A	<0.4 U
1,4-DICHLOROBENZENE	ug/L		N/A	<0.25 U
2,2-DICHLOROPROPANE	ug/L		N/A	<0.5 U
2-BUTANONE	ug/L		N/A	<5 U
2-CHLOROTOLUENE	ug/L		N/A	<0.25 U
2-HEXANONE	ug/L		N/A	<5 U
4-CHLOROTOLUENE	ug/L		N/A	<0.5 U
4-METHYL-2-PENTANONE	ug/L		N/A	<5 U
ACETONE	ug/L	2395	N/A	<5 U
BENZENE	ug/L	181	N/A	<0.25 U
BROMOBENZENE	ug/L		N/A	<0.25 U
BROMOCHLOROMETHANE	ug/L		N/A	<0.4 U
BROMODICHLOROMETHANE	ug/L		N/A	<0.5 U
BROMOFORM	ug/L		N/A	<1 U
BROMOMETHANE	ug/L		N/A	<1 U
CARBON DISULFIDE	ug/L		N/A	2.88
CARBON TETRACHLORIDE	ug/L	181	N/A	<0.5 U
CHLOROBENZENE	ug/L	47180	N/A	<0.25 U
CHLOROETHANE	ug/L		N/A	<1 U
CHLOROFORM	ug/L	3615	N/A	<0.25 U
CHLOROMETHANE	ug/L		N/A	<1 U
CIS-1,2-DICHLOROETHENE	ug/L		N/A	1.16
CIS-1,3-DICHLOROPROPENE	ug/L		N/A	<0.5 U
DIBROMOCHLOROMETHANE	ug/L		N/A	<0.5 U
DIBROMOMETHANE	ug/L		N/A	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		N/A	<0.5 U
ETHYLBENZENE	ug/L	57025	N/A	<0.5 U
HEXACHLOROBUTADIENE	ug/L		N/A	<0.5 U
ISOPROPYLBENZENE	ug/L		N/A	<0.5 U
M,P-XYLENE	ug/L	83.6	N/A	<1 U
METHYLENE CHLORIDE	ug/L	1699	N/A	<0.5 U
NAPHTHALENE	ug/L		N/A	<0.4 U
N-BUTYLBENZENE	ug/L		N/A	<0.5 U
N-PROPYLBENZENE	ug/L		N/A	<0.25 U
O-XYLENE	ug/L	83.6	N/A	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		N/A	<0.5 U
SEC-BUTYLBENZENE	ug/L		N/A	<0.5 U
STYRENE	ug/L	5987	N/A	<0.25 U
TERT-BUTYLBENZENE	ug/L		N/A	<0.5 U

GWTP Effluent Quarterly Sampling - February 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6252-COMP 2/16/2015	LH18/24-SP650-6252-GRAB 2/16/2015
TETRACHLOROETHENE	ug/L	180.7	N/A	<0.5 U
TOLUENE	ug/L	4189	N/A	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L		N/A	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		N/A	<1 U
TRICHLOROETHENE	ug/L	181	N/A	1.16
TRICHLOROFLUOROMETHANE	ug/L		N/A	<0.5 U
VINYL CHLORIDE	ug/L	72	N/A	<0.5 U
Anions (9056)				
CHLORIDE	mg/L		601	590
SULFATE	mg/L		92.4	93.3

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

LHAAP-46 Quarterly MNA Sampling - May 2015

Location ID: Sample Date:	Units	MCL/ MSC	46WW02-050615 5/6/2015	46WW02FF-050615 5/6/2015	46WW03-050615 5/6/2015	46WW04-050615 5/6/2015	46WW05-050515 5/5/2015	46WW05F-050515 5/5/2015	46WW05FF-050515 5/5/2015	46WW09-050515 5/5/2015	46WW09F-050515 5/5/2015	46WW09FF-050515 5/5/2015	46WW10-050615 5/6/2015	46WW10FD-050615 5/6/2015	46WW11-050615 5/6/2015
Location Description:			Site 46 - Central, inside site boundary. Intermediate zone. Sampled quarterly.	Site 46 - Central, inside site boundary. Intermediate zone. Sampled quarterly. Field filtered with 0.45 micron filter.	Site 46 - Central, inside site boundary. Sampled quarterly.	Site 46 - W, inside site boundary. Sampled quarterly.	Site 46 - N, inside site boundary. Intermediate zone. Sampled quarterly.	Site 46 - N, inside site boundary. Intermediate zone. Sampled quarterly. Field filtered with 10 micron filter.	Site 46 - N, inside site boundary. Intermediate zone. Sampled quarterly. Field filtered with 0.45 micron filter.	Site 46 - Central, within site boundary. Intermediate zone. Sampled quarterly.	Site 46 - Central, within site boundary. Intermediate zone. Sampled quarterly. Field filtered with 10 micron filter.	Site 46 - Central, within site boundary. Intermediate zone. Sampled quarterly. Field filtered with 0.45 micron filter.	Site 46 - W, within site boundary. Sampled quarterly.	Site 46 - W, within site boundary. Sampled quarterly. Field Duplicate	Site 46 - Central, within site boundary. Sampled quarterly.
Alkalinity (310.2)															
ALKALINITY, TOTAL	mg/L		24.3 J	N/A	N/A	N/A	50.9	N/A	N/A	170	N/A	N/A	N/A	N/A	41.8
Phosphorus (365.4)															
PHOSPHORUS	mg/L		1.23	N/A	N/A	N/A	N/A	N/A	N/A	0.772	N/A	N/A	N/A	N/A	1.2
Total Organic Carbon (415.1)															
TOTAL ORGANIC CARBON (TOC)	mg/L		12.1	N/A	N/A	N/A	29.1	N/A	N/A	5.84	N/A	N/A	N/A	N/A	4.93 J
Metals (6010C)															
IRON	mg/L		1.43	0.881	N/A	N/A	N/A	28.1	27.5	N/A	0.617	<0.1 U	N/A	N/A	0.0691 J
Metals (6020A)															
MANGANESE	mg/L	14	N/A	0.214	N/A	N/A	N/A	N/A	17.1	N/A	N/A	1.7	N/A	N/A	N/A
Volatile Organic Compounds (8260B)															
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	N/A	<0.25 U	<0.25 U	0.687 J	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	1.34 J	N/A	<1 U	<1 U	4.8	N/A	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	N/A	<0.3 U	<0.3 U	<0.3 U	N/A	N/A	<0.3 U	N/A	N/A	<0.3 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 UJ	N/A	<2 UJ	<2 UJ	<2 U	N/A	N/A	<2 U	N/A	N/A	<2 UJ	<2 UJ	<2 UJ
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 UJ	N/A	<5 UJ	<5 UJ	<5 U	N/A	N/A	<5 U	N/A	N/A	<5 UJ	<5 UJ	<5 UJ
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 UJ	N/A	<5 UJ	<5 UJ	<5 U	N/A	N/A	<5 U	N/A	N/A	<5 UJ	<5 UJ	<5 UJ
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 UJ	N/A	<5 UJ	<5 UJ	<5 U	N/A	N/A	<5 U	N/A	N/A	<5 UJ	<5 UJ	<5 UJ
ACETONE	ug/L	92000	<5 U	N/A	<5 U	<5 U	<5 U	N/A	N/A	<5 U	N/A	N/A	<5 U	<5 U	<5 U
BENZENE	ug/L	5	<0.25 U	N/A	<0.25 U	<0.25 U	0.144 J	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	N/A	<1 U	<1 U	<1 UJ	N/A	N/A	<1 UJ	N/A	N/A	<1 U	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U

LHAAP-46 Quarterly MNA Sampling - May 2015

Location ID: / Sample Date:	Units	MCL/ MSC	46WW02-050615 5/6/2015	46WW02FF-050615 5/6/2015	46WW03-050615 5/6/2015	46WW04-050615 5/6/2015	46WW05-050515 5/5/2015	46WW05F-050515 5/5/2015	46WW05FF-050515 5/5/2015	46WW09-050515 5/5/2015	46WW09F-050515 5/5/2015	46WW09FF-050515 5/5/2015	46WW10-050615 5/6/2015	46WW10FD-050615 5/6/2015	46WW11-050615 5/6/2015
CHLOROFORM	ug/L	1000	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	1.44	N/A	<0.5 U	<0.5 U	7	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	1.4
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	24	N/A	<0.5 U	<0.5 U	80.5	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	45.3
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	N/A	<0.5 U	<0.5 U	0.956 J	N/A	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U
Anions (9056)															
CHLORIDE	mg/L		24.5	N/A	N/A	N/A	293	N/A	N/A	424	N/A	N/A	N/A	N/A	210
NITRATE	mg/L	10	<0.4 U	N/A	N/A	N/A	<10 U	N/A	N/A	<10 U	N/A	N/A	N/A	N/A	<1 U
NITRITE	mg/L	1	<0.4 U	N/A	N/A	N/A	<10 U	N/A	N/A	<10 U	N/A	N/A	N/A	N/A	<1 U
SULFATE	mg/L		217	N/A	N/A	N/A	4240	N/A	N/A	2140	N/A	N/A	N/A	N/A	517
Dissolved Gases (RSK-175)															
CARBON DIOXIDE	ug/L		369000	N/A	N/A	N/A	705000	N/A	N/A	98500	N/A	N/A	N/A	N/A	670000
ETHANE	ug/L		<2 U	N/A	N/A	N/A	<2 U	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	<2 U
ETHENE	ug/L		<2 U	N/A	N/A	N/A	<2 U	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	<2 U
METHANE	ug/L		<2 U	N/A	N/A	N/A	12	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	3.89 J
Sulfide (SM4500-S-(-2)-F-2000)															
SULFIDE	mg/L		<1 U	N/A	N/A	N/A	<1 U	N/A	N/A	<1 U	N/A	N/A	N/A	N/A	<1 U

Blue Highlighting Indicates concentrations above Daily Maximum Concentration

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-46 Quarterly MNA Sampling - May 2015

Location ID: Sample Date:	Units	MCL/ MSC	46WW11FF-050615 5/6/2015	46WW14-050515 5/5/2015	46WW14FF-050515 5/5/2015	46WW16-050515 5/5/2015	46WW16F-050515 5/5/2015	46WW16FF-050515 5/5/2015	LHSMW19-050615 5/6/2015	LHSMW19FF-050615 5/6/2015
Location Description:			Site 46 - Central, within site boundary. Sampled quarterly. Field filtered with 0.45 micron filter.	Site 46 - NE, within site boundary. Intermediate zone. Sampled quarterly.	Site 46 - NE, within site boundary. Intermediate zone. Sampled quarterly. Field filtered with 0.45 micron filter.	Site 46 - N, within site boundary. Intermediate zone. Sampled quarterly.	Site 46 - N, within site boundary. Intermediate zone. Sampled quarterly. Field filtered with 10 micron filter.	Site 46 - N, within site boundary. Intermediate zone. Sampled quarterly. Field filtered with 0.45 micron filter.	Site 46 - Central, within site boundary. Sampled quarterly.	Site 46 - Central, within site boundary. Sampled quarterly. Field filtered with 0.45 micron filter.
Alkalinity (310.2)										
ALKALINITY, TOTAL	mg/L		N/A	290	N/A	614	N/A	N/A	381	N/A
Phosphorus (365.4)										
PHOSPHORUS	mg/L		N/A	0.3 J	N/A	0.555	N/A	N/A	1.99	N/A
Total Organic Carbon (415.1)										
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	25.3	N/A	28.6	N/A	N/A	7.47 J	N/A
Metals (6010C)										
IRON	mg/L		<0.1 U	1.5	1.12	N/A	16	15.2	0.143 J	<0.1 U
Metals (6020A)										
MANGANESE	mg/L	14	0.0586	N/A	0.45	N/A	N/A	1.58	N/A	0.0282
Volatile Organic Compounds (8260B)										
1,1,1,2-TETRACHLOROETHANE	ug/L	110	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,1,1-TRICHLOROETHANE	ug/L	200	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,1,2,2-TETRACHLOROETHANE	ug/L	14	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	N/A
1,1,2-TRICHLOROETHANE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,1-DICHLOROETHANE	ug/L	10000	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
1,1-DICHLOROETHENE	ug/L	7	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	N/A
1,1-DICHLOROPROPENE	ug/L	2.9	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,2,3-TRICHLOROBENZENE	ug/L	310	N/A	<0.3 U	N/A	<0.3 U	N/A	N/A	<0.3 U	N/A
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	N/A
1,2,4-TRICHLOROBENZENE	ug/L	70	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	N/A
1,2,4-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	N/A	<2 U	N/A	<2 U	N/A	N/A	<2 UJ	N/A
1,2-DIBROMOETHANE	ug/L	0.005	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,2-DICHLOROBENZENE	ug/L	600	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
1,2-DICHLOROETHANE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	N/A
1,3,5-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,3-DICHLOROBENZENE	ug/L	3100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
1,3-DICHLOROPROPANE	ug/L	29	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	N/A
1,4-DICHLOROBENZENE	ug/L	75	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
2,2-DICHLOROPROPANE	ug/L	42	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
2-BUTANONE	ug/L	61000	N/A	<5 U	N/A	4.96 J	N/A	N/A	<5 UJ	N/A
2-CHLOROTOLUENE	ug/L	2000	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
2-HEXANONE	ug/L	6100	N/A	<5 U	N/A	<5 U	N/A	N/A	<5 UJ	N/A
4-CHLOROTOLUENE	ug/L	2000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
4-METHYL-2-PENTANONE	ug/L	8200	N/A	<5 U	N/A	<5 U	N/A	N/A	<5 UJ	N/A
ACETONE	ug/L	92000	N/A	<5 U	N/A	3.86 J	N/A	N/A	<5 U	N/A
BENZENE	ug/L	5	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
BROMOBENZENE	ug/L	2000	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
BROMOCHLOROMETHANE	ug/L	4100	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	N/A
BROMODICHLOROMETHANE	ug/L	4.6	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
BROMOFORM	ug/L	36	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	N/A
BROMOMETHANE	ug/L	140	N/A	<1 UJ	N/A	<1 UJ	N/A	N/A	<1 U	N/A
CARBON DISULFIDE	ug/L	10000	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	N/A
CARBON TETRACHLORIDE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
CHLOROBENZENE	ug/L	100	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
CHLOROETHANE	ug/L	41000	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	N/A

LHAAP-46 Quarterly MNA Sampling - May 2015

Location ID: / Sample Date:	Units	MCL/ MSC	46WW11FF-050615 5/6/2015	46WW14-050515 5/5/2015	46WW14FF-050515 5/5/2015	46WW16-050515 5/5/2015	46WW16F-050515 5/5/2015	46WW16FF-050515 5/5/2015	LHSMW19-050615 5/6/2015	LHSMW19FF-050615 5/6/2015
CHLOROFORM	ug/L	1000	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
CHLOROMETHANE	ug/L	220	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	N/A
CIS-1,2-DICHLOROETHENE	ug/L	70	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	0.944 J	N/A
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
DIBROMOCHLOROMETHANE	ug/L	34	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
DIBROMOMETHANE	ug/L	380	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
DICHLORODIFLUOROMETHANE	ug/L	20000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
ETHYLBENZENE	ug/L	700	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
HEXACHLOROBUTADIENE	ug/L	20	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
ISOPROPYLBENZENE	ug/L	1000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
M,P-XYLENE	ug/L	10000	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	N/A
METHYLENE CHLORIDE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
NAPHTHALENE	ug/L	2000	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	N/A
N-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
N-PROPYLBENZENE	ug/L	4100	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
O-XYLENE	ug/L	10000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
P-ISOPROPYLTOLUENE	ug/L	10000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
SEC-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
STYRENE	ug/L	100	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	N/A
TERT-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
TETRACHLOROETHENE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
TOLUENE	ug/L	1000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
TRANS-1,2-DICHLOROETHENE	ug/L	100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
TRANS-1,3-DICHLOROPROPENE	ug/L	29	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	N/A
TRICHLOROETHENE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	13.4	N/A
TRICHLOROFLUOROMETHANE	ug/L	31000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
VINYL CHLORIDE	ug/L	2	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	N/A
Anions (9056)										
CHLORIDE	mg/L		N/A	111	N/A	302	N/A	N/A	237	N/A
NITRATE	mg/L	10	N/A	0.27 J	N/A	<2 U	N/A	N/A	<0.2 U	N/A
NITRITE	mg/L	1	N/A	<0.2 U	N/A	<2 U	N/A	N/A	<0.2 U	N/A
SULFATE	mg/L		N/A	26.6	N/A	914	N/A	N/A	1190	N/A
Dissolved Gases (RSK-175)										
CARBON DIOXIDE	ug/L		N/A	711000	N/A	731000	N/A	N/A	453000	N/A
ETHANE	ug/L		N/A	<2 U	N/A	<2 U	N/A	N/A	<2 U	N/A
ETHENE	ug/L		N/A	<2 U	N/A	<2 U	N/A	N/A	<2 U	N/A
METHANE	ug/L		N/A	795	N/A	<2 U	N/A	N/A	<2 U	N/A
Sulfide (SM4500-S-(-2)-F-2000)										
SULFIDE	mg/L		N/A	<1 U	N/A	0.596 J	N/A	N/A	<1 U	N/A

Blue Highlighting Indicates concentrations above Daily Maximum Concentration

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-58 Quarterly MNA Sampling - April 2015

Sample ID: / Sample Date:	Units	MCL/ MSC	03WW01-041515 4/15/2015	03WW01F-041515 4/15/2015	03WW01FF-041515 4/15/2015	35ASW03-041015 4/10/2015	35AWW01-041015 4/10/2015	35AWW01FD-041015 4/10/2015	35AWW05-040815 4/8/2015	35AWW06-041515 4/15/2015	35AWW06FF-041515 4/15/2015	35AWW08-041515 4/15/2015	35AWW08F-041515 4/15/2015	35AWW08FF-041515 4/15/2015	35AWW09-041415 4/14/2015	35AWW09F-041415 4/14/2015
Location Description:			Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly
Alkalinity (310.2)																
ALKALINITY, TOTAL	mg/L		24100	N/A	N/A	N/A	N/A	N/A	N/A	700	N/A	18800 J	N/A	N/A	237	N/A
Phosphorus (365.4)																
PHOSPHORUS	mg/L		12.9	N/A	N/A	N/A	N/A	N/A	N/A	0.907	N/A	10.2	N/A	N/A	1.05	N/A
Total Organic Carbon (415.1)																
TOTAL ORGANIC CARBON (TOC)	mg/L		7800	N/A	N/A	N/A	N/A	N/A	N/A	81.8	N/A	8330	N/A	N/A	7.12	N/A
Metals (6010C)																
IRON	mg/L		N/A	138	N/A	N/A	N/A	N/A	N/A	1.09	N/A	N/A	22.4	N/A	N/A	0.0591 J
Metals (6020A)																
MANGANESE	mg/L	14	N/A	37.5	35.8	N/A	N/A	N/A	N/A	0.442	0.389	N/A	21.5	22.9	N/A	0.118
Volatile Organic Carbon (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,1,1-TRICHLOROETHANE	ug/L	200	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<20 U	N/A	N/A	<0.4 UJ	<0.4 UJ	<0.4 UJ	<0.4 U	<0.4 U	N/A	<20 U	N/A	N/A	<0.4 U	N/A
1,1,2-TRICHLOROETHANE	ug/L	5	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,1-DICHLOROETHANE	ug/L	10000	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	1.01	N/A	<12.5 U	N/A	N/A	0.56 J	N/A
1,1-DICHLOROETHENE	ug/L	7	<50 U	N/A	N/A	1	1	1	<1 U	4.17	N/A	<50 U	N/A	N/A	<1 U	N/A
1,1-DICHLOROPROPENE	ug/L	2.9	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,2,3-TRICHLOROBENZENE	ug/L	310	<15 U	N/A	N/A	0.3	0.3	0.3	<0.3 U	<0.3 U	N/A	<15 U	N/A	N/A	<0.3 U	N/A
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<50 U	N/A	N/A	1	1	1	<1 U	<1 U	N/A	<50 U	N/A	N/A	<1 U	N/A
1,2,4-TRICHLOROBENZENE	ug/L	70	<20 U	N/A	N/A	0.4	0.4	0.4	<0.4 U	<0.4 U	N/A	<20 U	N/A	N/A	<0.4 U	N/A
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<100 U	N/A	N/A	2	2	2	<2 U	<2 U	N/A	<100 U	N/A	N/A	<2 U	N/A
1,2-DIBROMOETHANE	ug/L	0.005	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,2-DICHLOROBENZENE	ug/L	600	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
1,2-DICHLOROETHANE	ug/L	5	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,2-DICHLOROPROPANE	ug/L	5	<20 U	N/A	N/A	0.4	0.4	0.4	<0.4 U	<0.4 U	N/A	<20 U	N/A	N/A	<0.4 U	N/A
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,3-DICHLOROBENZENE	ug/L	3100	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
1,3-DICHLOROPROPANE	ug/L	29	<20 U	N/A	N/A	0.4	0.4	0.4	<0.4 U	<0.4 U	N/A	<20 U	N/A	N/A	<0.4 U	N/A
1,4-DICHLOROBENZENE	ug/L	75	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
2,2-DICHLOROPROPANE	ug/L	42	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
2-BUTANONE	ug/L	61000	8470	N/A	N/A	5	5	5	<5 U	<5 U	N/A	4840	N/A	N/A	<5 U	N/A
2-CHLOROTOLUENE	ug/L	2000	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
2-HEXANONE	ug/L	6100	<250 U	N/A	N/A	<5 UJ	<5 UJ	<5 UJ	<5 U	<5 U	N/A	<250 U	N/A	N/A	<5 U	N/A
4-CHLOROTOLUENE	ug/L	2000	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
4-METHYL-2-PENTANONE	ug/L	8200	<250 U	N/A	N/A	5	5	5	<5 U	<5 U	N/A	<250 U	N/A	N/A	<5 U	N/A
ACETONE	ug/L	92000	7390	N/A	N/A	2.66 J	5	5	<5 U	<5 U	N/A	8210	N/A	N/A	<5 U	N/A
BENZENE	ug/L	5	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
BROMOBENZENE	ug/L	2000	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
BROMOCHLOROMETHANE	ug/L	4100	<20 U	N/A	N/A	0.4	0.4	0.4	<0.4 U	<0.4 U	N/A	<20 U	N/A	N/A	<0.4 U	N/A
BROMODICHLOROMETHANE	ug/L	4.6	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
BROMOFORM	ug/L	36	<50 U	N/A	N/A	1	1	1	<1 U	<1 U	N/A	<50 U	N/A	N/A	<1 U	N/A
BROMOMETHANE	ug/L	140	<50 U	N/A	N/A	1	1	1	<1 U	<1 U	N/A	<50 U	N/A	N/A	<1 U	N/A
CARBON DISULFIDE	ug/L	10000	<50 U	N/A	N/A	1	1	1	<1 U	<1 U	N/A	<50 U	N/A	N/A	<1 U	N/A
CARBON TETRACHLORIDE	ug/L	5	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
CHLOROBENZENE	ug/L	100	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
CHLOROETHANE	ug/L	41000	<50 U	N/A	N/A	1	1	1	<1 U	<1 U	N/A	<50 U	N/A	N/A	<1 U	N/A
CHLOROFORM	ug/L	1000	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
CHLOROMETHANE	ug/L	220	<50 U	N/A	N/A	1	1	1	<1 U	<1 U	N/A	<50 U	N/A	N/A	<1 U	N/A

LHAAP-58 Quarterly MNA Sampling - April 2015

Sample ID: / Sample Date:	Units	MCL/ MSC	03WW01-041515 4/15/2015	03WW01F-041515 4/15/2015	03WW01FF-041515 4/15/2015	35ASW03-041015 4/10/2015	35AWW01-041015 4/10/2015	35AWW01FD-041015 4/10/2015	35AWW05-040815 4/8/2015	35AWW06-041515 4/15/2015	35AWW06FF-041515 4/15/2015	35AWW08-041515 4/15/2015	35AWW08F-041515 4/15/2015	35AWW08FF-041515 4/15/2015	35AWW09-041415 4/14/2015	35AWW09F-041415 4/14/2015
CIS-1,2-DICHLOROETHENE	ug/L	70	21.4 J	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	30.7 J	N/A	N/A	0.483 J	N/A
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
DIBROMOCHLOROMETHANE	ug/L	34	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
DIBROMOMETHANE	ug/L	380	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
DICHLORODIFLUOROMETHANE	ug/L	20000	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
ETHYLBENZENE	ug/L	700	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
HEXACHLOROBUTADIENE	ug/L	20	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
ISOPROPYLBENZENE	ug/L	1000	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
M,P-XYLENE	ug/L	10000	<50 U	N/A	N/A	1	1	1	<1 U	<1 U	N/A	<50 U	N/A	N/A	<1 U	N/A
METHYLENE CHLORIDE	ug/L	5	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
NAPHTHALENE	ug/L	2000	<20 U	N/A	N/A	0.4	0.4	0.4	<0.4 U	<0.4 U	N/A	<20 U	N/A	N/A	<0.4 U	N/A
N-BUTYLBENZENE	ug/L	4100	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
N-PROPYLBENZENE	ug/L	4100	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
O-XYLENE	ug/L	10000	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
P-ISOPROPYLTOLUENE	ug/L	10000	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
SEC-BUTYLBENZENE	ug/L	4100	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
STYRENE	ug/L	100	<12.5 U	N/A	N/A	0.25	0.25	0.25	<0.25 U	<0.25 U	N/A	<12.5 U	N/A	N/A	<0.25 U	N/A
TERT-BUTYLBENZENE	ug/L	4100	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
TETRACHLOROETHENE	ug/L	5	15.9 J	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	110	N/A	N/A	155	N/A
TOLUENE	ug/L	1000	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
TRANS-1,2-DICHLOROETHENE	ug/L	100	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<50 U	N/A	N/A	1	1	1	<1 U	<1 U	N/A	<50 U	N/A	N/A	<1 U	N/A
TRICHLOROETHENE	ug/L	5	131	N/A	N/A	0.259 J	0.5	0.5	<0.5 U	<0.5 U	N/A	607	N/A	N/A	45	N/A
TRICHLOROFLUOROMETHANE	ug/L	31000	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
VINYL CHLORIDE	ug/L	2	<25 U	N/A	N/A	0.5	0.5	0.5	<0.5 U	<0.5 U	N/A	<25 U	N/A	N/A	<0.5 U	N/A
Anions (9056)																
CHLORIDE	mg/L		976	N/A	N/A	N/A	N/A	N/A	N/A	1120	N/A	2250	N/A	N/A	1450	N/A
NITRATE	mg/L	10	<1 U	N/A	N/A	N/A	N/A	N/A	N/A	<10 U	N/A	<2 U	N/A	N/A	<2 U	N/A
NITRITE	mg/L	1	<1 U	N/A	N/A	N/A	N/A	N/A	N/A	<10 U	N/A	<2 U	N/A	N/A	2.4 J	N/A
SULFATE	mg/L		18	N/A	N/A	N/A	N/A	N/A	N/A	1380	N/A	<10 U	N/A	N/A	1090	N/A
Dissolved Gases (RSK-175)																
CARBON DIOXIDE	ug/L		396000	N/A	N/A	N/A	N/A	N/A	N/A	633000	N/A	249000	N/A	N/A	334000	N/A
ETHANE	ug/L		<20 U	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	<20 U	N/A	N/A	<2 U	N/A
ETHENE	ug/L		<20 U	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	<20 U	N/A	N/A	<2 U	N/A
METHANE	ug/L		3170	N/A	N/A	N/A	N/A	N/A	N/A	1.06 J	N/A	3380	N/A	N/A	5.31	N/A
Ferrous Iron (SM3500FE)																
FERROUS IRON	mg/L		27.8 J	N/A	N/A	N/A	N/A	N/A	N/A	<0.04 U	N/A	<80 U	N/A	N/A	<0.04 U	N/A
Sulfide (SM4500-S-(-2)-F-2000)																
SULFIDE	mg/L		<1 U	N/A	N/A	N/A	N/A	N/A	N/A	<1 U	N/A	2.67	N/A	N/A	0.511 J	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-58 Quarterly MNA Sampling - April 2015

Sample ID: Sample Date:	Units	MCL/ MSC	35AWW09FF-041415 4/14/2015	35AWW10-041415 4/14/2015	35AWW10FF-041415 4/14/2015	35AWW11-041415 4/14/2015	35AWW11F-041415 4/14/2015	35AWW11FF-041415 4/14/2015	35AWW12-040715 4/7/2015	35AWW12FD-040715 4/7/2015	35AWW13-040815 4/8/2015	35AWW14-040715 4/7/2015	35AWW15-041015 4/10/2015	35AWW16-040715 4/7/2015	35AWW17-041015 4/10/2015	35AWW18-041015 4/10/2015
Location Description:			Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - ESE, inside site boundary. Sampled quarterly	Site 58 - ESE, inside site boundary. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly	Site 58 - E, outside site boundary. Sampled quarterly	Site 58 - E, outside site boundary. Sampled quarterly	Site 58 - NE, inside site boundary. Sampled quarterly	Site 58 - SE, outside site boundary. Sampled quarterly	Site 58 - W, inside site boundary. Sampled quarterly	Site 58 - SW, outside site boundary, near Building 744-A. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly	Site 58 - SSW, outside site boundary. Sampled quarterly
Alkalinity (310.2)																
ALKALINITY, TOTAL	mg/L		N/A	97.6	N/A	383	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Phosphorus (365.4)																
PHOSPHORUS	mg/L		N/A	1.85	N/A	1.34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Organic Carbon (415.1)																
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	13.4	N/A	15.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Metals (6010C)																
IRON	mg/L		N/A	0.867	N/A	N/A	0.13 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Metals (6020A)																
MANGANESE	mg/L	14	0.125	0.0764	0.0616	N/A	0.661	0.589	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Volatile Organic Carbon (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,1,1-TRICHLOROETHANE	ug/L	200	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,1,2,2-TETRACHLOROETHANE	ug/L	14	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 UJ	<0.4 U	<0.4 UJ	<0.4 UJ
1,1,2-TRICHLOROETHANE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,1-DICHLOROETHANE	ug/L	10000	N/A	<0.25 U	N/A	0.45 J	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	4.12	0.25	<0.25 U	0.25	0.706 J
1,1-DICHLOROETHENE	ug/L	7	N/A	<1 U	N/A	13.5	N/A	N/A	<1 U	<1 U	<1 U	1.78 J	1	<1 U	1	0.78 J
1,1-DICHLOROPROPENE	ug/L	2.9	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,2,3-TRICHLOROBENZENE	ug/L	310	N/A	<0.3 U	N/A	<0.3 U	N/A	N/A	<0.3 U	<0.3 U	<0.3 U	<0.3 U	0.3	<0.3 U	0.3	0.3
1,2,3-TRICHLOROPROPANE	ug/L	0.004	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U	<1 U	1	<1 U	1	1
1,2,4-TRICHLOROBENZENE	ug/L	70	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	<0.4 U	0.4	0.4
1,2,4-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	N/A	<2 U	N/A	<2 U	N/A	N/A	<2 U	<2 U	<2 U	<2 U	2	<2 U	2	2
1,2-DIBROMOETHANE	ug/L	0.005	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,2-DICHLOROBENZENE	ug/L	600	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
1,2-DICHLOROETHANE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	<0.4 U	0.4	0.4
1,3,5-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,3-DICHLOROBENZENE	ug/L	3100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
1,3-DICHLOROPROPANE	ug/L	29	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	<0.4 U	0.4	0.4
1,4-DICHLOROBENZENE	ug/L	75	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
2,2-DICHLOROPROPANE	ug/L	42	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
2-BUTANONE	ug/L	61000	N/A	<5 U	N/A	<5 U	N/A	N/A	<5 U	<5 U	<5 U	<5 U	5	<5 U	5	5
2-CHLOROTOLUENE	ug/L	2000	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
2-HEXANONE	ug/L	6100	N/A	<5 U	N/A	<5 U	N/A	N/A	<5 U	<5 U	<5 U	<5 U	<5 UJ	<5 U	<5 UJ	<5 UJ
4-CHLOROTOLUENE	ug/L	2000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
4-METHYL-2-PENTANONE	ug/L	8200	N/A	<5 U	N/A	<5 U	N/A	N/A	<5 U	<5 U	<5 U	<5 U	5	<5 U	5	5
ACETONE	ug/L	92000	N/A	<5 U	N/A	<5 U	N/A	N/A	<5 U	<5 U	7.98 J	<5 U	5	<5 U	5	5
BENZENE	ug/L	5	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
BROMOBENZENE	ug/L	2000	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
BROMOCHLOROMETHANE	ug/L	4100	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	<0.4 U	0.4	0.4
BROMODICHLOROMETHANE	ug/L	4.6	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
BROMOFORM	ug/L	36	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U	<1 U	1	<1 U	1	1
BROMOMETHANE	ug/L	140	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U	<1 U	1	<1 U	1	1
CARBON DISULFIDE	ug/L	10000	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U	<1 U	1	<1 U	1	1
CARBON TETRACHLORIDE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
CHLOROBENZENE	ug/L	100	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
CHLOROETHANE	ug/L	41000	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U	<1 U	1	<1 U	1	1
CHLOROFORM	ug/L	1000	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
CHLOROMETHANE	ug/L	220	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U	<1 U	1	<1 U	1	1

LHAAP-58 Quarterly MNA Sampling - April 2015

Sample ID: Sample Date:	Units	MCL/ MSC	35AWW09FF-041415 4/14/2015	35AWW10-041415 4/14/2015	35AWW10FF-041415 4/14/2015	35AWW11-041415 4/14/2015	35AWW11F-041415 4/14/2015	35AWW11FF-041415 4/14/2015	35AWW12-040715 4/7/2015	35AWW12FD-040715 4/7/2015	35AWW13-040815 4/8/2015	35AWW14-040715 4/7/2015	35AWW15-041015 4/10/2015	35AWW16-040715 4/7/2015	35AWW17-041015 4/10/2015	35AWW18-041015 4/10/2015
CIS-1,2-DICHLOROETHENE	ug/L	70	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	2.08	0.5	<0.5 U	0.5	0.5
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
DIBROMOCHLOROMETHANE	ug/L	34	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
DIBROMOMETHANE	ug/L	380	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
DICHLORODIFLUOROMETHANE	ug/L	20000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
ETHYLBENZENE	ug/L	700	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
HEXACHLOROBUTADIENE	ug/L	20	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
ISOPROPYLBENZENE	ug/L	1000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
M,P-XYLENE	ug/L	10000	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U	<1 U	1	<1 U	1	1
METHYLENE CHLORIDE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
NAPHTHALENE	ug/L	2000	N/A	<0.4 U	N/A	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	<0.4 U	0.4	0.4
N-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
N-PROPYLBENZENE	ug/L	4100	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
O-XYLENE	ug/L	10000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
P-ISOPROPYLTOLUENE	ug/L	10000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
SEC-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
STYRENE	ug/L	100	N/A	<0.25 U	N/A	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	<0.25 U	0.25	0.25
TERT-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
TETRACHLOROETHENE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	0.279 J	0.251 J	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
TOLUENE	ug/L	1000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
TRANS-1,2-DICHLOROETHENE	ug/L	100	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
TRANS-1,3-DICHLOROPROPENE	ug/L	29	N/A	<1 U	N/A	<1 U	N/A	N/A	<1 U	<1 U	<1 U	<1 U	1	<1 U	1	1
TRICHLOROETHENE	ug/L	5	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	0.786 J	0.5	<0.5 U	0.5	0.5
TRICHLOROFLUOROMETHANE	ug/L	31000	N/A	<0.5 U	N/A	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
VINYL CHLORIDE	ug/L	2	N/A	<0.5 U	N/A	0.273 J	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	<0.5 U	0.5	0.5
Anions (9056)																
CHLORIDE	mg/L		N/A	6.22	N/A	2310	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NITRATE	mg/L	10	N/A	<0.2 U	N/A	<4 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NITRITE	mg/L	1	N/A	<0.2 U	N/A	4.06 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	mg/L		N/A	78.3	N/A	1170	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dissolved Gases (RSK-175)																
CARBON DIOXIDE	ug/L		N/A	361000	N/A	304000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ETHANE	ug/L		N/A	<2 U	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ETHENE	ug/L		N/A	<2 U	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
METHANE	ug/L		N/A	<2 U	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron (SM3500FE)																
FERROUS IRON	mg/L		N/A	<0.04 U	N/A	<0.04 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sulfide (SM4500-S-(-2)-F-2000)																
SULFIDE	mg/L		N/A	<1 U	N/A	<1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-58 Quarterly MNA Sampling - April 2015

Sample ID: Sample Date:	Units	MCL/ MSC	35AWW19-040715 4/7/2015	35AWW20-041515 4/15/2015	35AWW20FF-041515 4/15/2015	35AWW21-040815 4/8/2015	35AWW22-040715 4/7/2015	LHSMW06-040715 4/7/2015	LHSMW07-041515 4/15/2015	LHSMW07FF-041515 4/15/2015
Location Description:			Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - SW, inside site boundary, between Building 716 and 113. Sampled quarterly	Site 58 - SW, inside site boundary, between Building 716 and 113. Sampled quarterly	Site 58 - ESE, outside site boundary, beside Building 725. Sampled quarterly	Site 58 - ENE, outside site boundary. Sampled quarterly	Site 58 - SW, inside site boundary, beside Building 715. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly
Alkalinity (310.2)										
ALKALINITY, TOTAL	mg/L		N/A	807	N/A	N/A	N/A	N/A	732	N/A
Phosphorus (365.4)										
PHOSPHORUS	mg/L		N/A	1.39	N/A	N/A	N/A	N/A	1.38	N/A
Total Organic Carbon (415.1)										
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	14.2	N/A	N/A	N/A	N/A	7.42	N/A
Metals (6010C)										
IRON	mg/L		N/A	0.514	N/A	N/A	N/A	N/A	0.902	N/A
Metals (6020A)										
MANGANESE	mg/L	14	N/A	1.46	1.3	N/A	N/A	N/A	0.149	0.148
Volatile Organic Carbon (8260B)										
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<10 U	N/A	<0.4 U	<0.4 U	<0.4 U	<4 U	N/A
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	54.1	N/A	<0.5 U	<0.5 U	<0.5 U	8.88 J	N/A
1,1-DICHLOROETHANE	ug/L	10000	3.46	429	N/A	<0.25 U	<0.25 U	2.93	167	N/A
1,1-DICHLOROETHENE	ug/L	7	17.5	4640	N/A	<1 U	<1 U	5.95	1660	N/A
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<7.5 U	N/A	<0.3 U	<0.3 U	<0.3 U	<3 U	N/A
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<25 U	N/A	<1 U	<1 U	<1 U	<10 U	N/A
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<10 U	N/A	<0.4 U	<0.4 U	<0.4 U	<4 U	N/A
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<50 U	N/A	<2 U	<2 U	<2 U	<20 U	N/A
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	7.13 J	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
1,2-DICHLOROETHANE	ug/L	5	3.78	16.4 J	N/A	<0.5 U	<0.5 U	<0.5 U	2.86 J	N/A
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<10 U	N/A	<0.4 U	<0.4 U	<0.4 U	<4 U	N/A
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<10 U	N/A	<0.4 U	<0.4 U	<0.4 U	<4 U	N/A
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<6.26 U	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
2-BUTANONE	ug/L	61000	<5 U	<125 U	N/A	<5 U	<5 U	<5 U	<50 U	N/A
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<6.26 U	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
2-HEXANONE	ug/L	6100	<5 U	<125 U	N/A	<5 U	<5 U	<5 U	<50 U	N/A
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<125 U	N/A	<5 U	<5 U	<5 U	<50 U	N/A
ACETONE	ug/L	92000	<5 U	<125 U	N/A	<5 U	<5 U	<5 U	<50 U	N/A
BENZENE	ug/L	5	<0.25 U	5.52 J	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
BROMOBENZENE	ug/L	2000	<0.25 U	<6.26 U	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<10 U	N/A	<0.4 U	<0.4 U	<0.4 U	<4 U	N/A
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
BROMOFORM	ug/L	36	<1 U	<25 U	N/A	<1 U	<1 U	<1 U	<10 U	N/A
BROMOMETHANE	ug/L	140	<1 U	<25 U	N/A	<1 U	<1 U	<1 U	<10 U	N/A
CARBON DISULFIDE	ug/L	10000	<1 U	<25 U	N/A	<1 U	<1 U	<1 U	<10 U	N/A
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
CHLOROBENZENE	ug/L	100	<0.25 U	<6.26 U	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
CHLOROETHANE	ug/L	41000	<1 U	<25 U	N/A	<1 U	<1 U	<1 U	<10 U	N/A
CHLOROFORM	ug/L	1000	<0.25 U	<6.26 U	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
CHLOROMETHANE	ug/L	220	<1 U	<25 U	N/A	<1 U	<1 U	<1 U	<10 U	N/A

LHAAP-58 Quarterly MNA Sampling - April 2015

Sample ID: Sample Date:	Units	MCL/ MSC	35AWW19-040715 4/7/2015	35AWW20-041515 4/15/2015	35AWW20FF-041515 4/15/2015	35AWW21-040815 4/8/2015	35AWW22-040715 4/7/2015	LHSMW06-040715 4/7/2015	LHSMW07-041515 4/15/2015	LHSMW07FF-041515 4/15/2015
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	120	N/A	<0.5 U	<0.5 U	5.52	31.4	N/A
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
DIBROMOMETHANE	ug/L	380	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
ETHYLBENZENE	ug/L	700	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
M,P-XYLENE	ug/L	10000	<1 U	<25 U	N/A	<1 U	<1 U	<1 U	<10 U	N/A
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
NAPHTHALENE	ug/L	2000	<0.4 U	<10 U	N/A	<0.4 U	<0.4 U	<0.4 U	<4 U	N/A
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<6.26 U	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
O-XYLENE	ug/L	10000	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
STYRENE	ug/L	100	<0.25 U	<6.26 U	N/A	<0.25 U	<0.25 U	<0.25 U	<2.5 U	N/A
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
TETRACHLOROETHENE	ug/L	5	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	0.454 J	<5 U	N/A
TOLUENE	ug/L	1000	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<25 U	N/A	<1 U	<1 U	<1 U	<10 U	N/A
TRICHLOROETHENE	ug/L	5	1.13	718	N/A	<0.5 U	<0.5 U	3.02	82.1	N/A
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<12.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<5 U	N/A
VINYL CHLORIDE	ug/L	2	<0.5 U	90.6	N/A	<0.5 U	<0.5 U	0.967 J	34.1	N/A
Anions (9056)										
CHLORIDE	mg/L		N/A	1730	N/A	N/A	N/A	N/A	2420	N/A
NITRATE	mg/L	10	N/A	<10 U	N/A	N/A	N/A	N/A	<10 U	N/A
NITRITE	mg/L	1	N/A	<10 U	N/A	N/A	N/A	N/A	<10 U	N/A
SULFATE	mg/L		N/A	2090	N/A	N/A	N/A	N/A	2580	N/A
Dissolved Gases (RSK-175)										
CARBON DIOXIDE	ug/L		N/A	291000	N/A	N/A	N/A	N/A	377000	N/A
ETHANE	ug/L		N/A	<2 U	N/A	N/A	N/A	N/A	<2 U	N/A
ETHENE	ug/L		N/A	<2 U	N/A	N/A	N/A	N/A	<2 U	N/A
METHANE	ug/L		N/A	74.2	N/A	N/A	N/A	N/A	31.8	N/A
Ferrous Iron (SM3500FE)										
FERROUS IRON	mg/L		N/A	<0.04 U	N/A	N/A	N/A	N/A	<0.04 U	N/A
Sulfide (SM4500-S-(-2)-F-2000)										
SULFIDE	mg/L		N/A	<1 U	N/A	N/A	N/A	N/A	<1 U	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-67 Quarterly MNA Sampling - May 2015

Location ID: / Sample Date:	Units	MCL/ MSC	67WW02-051215 5/12/2015	67WW02FD-051215 5/12/2015	67WW03-051215 5/12/2015	67WW05-051215 5/12/2015	67WW07-051215 5/12/2015	67WW09A-051215 5/12/2015	67WW10-051215 5/12/2015	67WW12-051215 5/12/2015	67WW13-032515 3/25/2015	67WW14-051215 5/12/2015	67WW14FD-051215 5/12/2015
Location Description:			Site 67 - NW, within site boundary. Sampled quarterly.	Site 67 - NW, within site boundary. Sampled quarterly. Field Duplicate	Site 67 - NNE, within site boundary. Sampled quarterly.	Site 67 - WNW, outside site boundary. Sampled quarterly.	Site 67 - E, outside site boundary. Sampled quarterly.	Site 67 - S, outside site boundary. Sampled quarterly.	Site 67 - SE, outside site boundary. Sampled quarterly.	Site 67 - NNE, outside site boundary. Sampled quarterly.	Site 67 - WSW, within site boundary. Sampled quarterly.	Site 67 - SW, outside the site boundary beside Ignatius Avenue. Sampled quarterly.	Site 67 - SW, outside the site boundary beside Ignatius Avenue. Sampled quarterly. Field Duplicate
Total Carbon (415.1)													
TOTAL INORGANIC CARBON (TIC)	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	144	N/A	N/A
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16.8 J	N/A	N/A
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	0.883 J	0.873 J	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	0.418 J	0.427 J
1,1-DICHLOROETHENE	ug/L	7	13.2	13	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	2.77	2.93
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	N/A	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	N/A	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.817 J	<0.5 U	<0.5 U	<0.5 U	N/A	0.799 J	0.815 J
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 UJ	<5 UJ	<5 UJ	<5 UJ	<5 UJ	<5 U	<5 UJ	<5 UJ	N/A	<5 UJ	<5 UJ
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 UJ	<5 UJ	<5 UJ	<5 UJ	3.18 J	<5 U	<5 UJ	<5 UJ	N/A	<5 UJ	<5 UJ
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 UJ	<5 UJ	<5 UJ	<5 UJ	<5 UJ	<5 U	<5 UJ	<5 UJ	N/A	<5 UJ	<5 UJ
ACETONE	ug/L	92000	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 UJ	<5 U	N/A	4 J	<5 U
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U

LHAAP-67 Quarterly MNA Sampling - May 2015

Location ID: / Sample Date:	Units	MCL/ MSC	67WW02-051215 5/12/2015	67WW02FD-051215 5/12/2015	67WW03-051215 5/12/2015	67WW05-051215 5/12/2015	67WW07-051215 5/12/2015	67WW09A-051215 5/12/2015	67WW10-051215 5/12/2015	67WW12-051215 5/12/2015	67WW13-032515 3/25/2015	67WW14-051215 5/12/2015	67WW14FD-051215 5/12/2015
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	0.411 J	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
Anions (9056)													
CHLORIDE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1820	N/A	N/A
NITRATE	mg/L	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
NITRITE	mg/L	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
SULFATE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	334	N/A	N/A
Dissolved Gases (RSK-175)													
ETHANE	ug/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
ETHENE	ug/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
METHANE	ug/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
SM3500FE													
FERROUS IRON	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.04 U	N/A	N/A
SM4500-S-(-2)-F-2000													
SULFIDE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1 U	N/A	N/A

Blue Highlighting Indicates concentrations above Daily Maximum Concentration

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

Subject:	**Final Minutes, Monthly Managers' Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**Teleconference – 866-203-6896, passcode 8603914725**
Date of Meeting:	**July 14, 2015 – 10:00 AM**

Attendees:

Army BRAC:	Rose Zeiler (RMZ)
EPA:	Rich Mayer (RM), Kent Becher (KB), Jenetta Coats (JC)
TCEQ:	April Palmie (AP), Dale Vodak (DV)
USACE:	Aaron Williams (AW)
AECOM:	Mark Heaston (MH), Marwan Salameh (MS), JoLynn Snow (JS), Rodney Croslen (RC)
AEC:	Nicholas Smith (NS)
USFWS:	Paul Bruckwicki (PB)

Welcome **AECOM**

Action Items

AECOM

- Develop revised 1,4-dioxane sampling memo and sampling plan for next event. This action item will be replaced with development of a sampling plan focusing on evaluating the extent of 1,4-dioxane at LHAAP-18/24 in support of revising the FS. **In Progress**
    - RMZ states that we are waiting on technical direction.
- AECOM to send out an email to notify group when GWTP effluent discharge to Harrison Bayou begins.
    - MH states that we have not started discharge yet.

Army

- No outstanding action items

EPA

- Confirm schedule for PDB removal at LHAAP-18/24.
    - RM states that they will be going out on 7/27/2015 to sample four wells. KB confirms that there are 20 sampling bags and 20 rigid samplers in those 4 wells. RM says they may take a sample from Fire Station production well while they are out there. KB says they should be receiving sample results from the first round in the next week or so.
- Update regarding sampling and geophysics work performed at LHAAP-18/24
    - KB says they will include geophysics in the final report. Preliminary results show there is not much clay in the southwest corner and some channels in northwest corner. KB will send RMZ electronic original Bud Jones Paleochannel report and maps. RMZ says Fay Duke had a scanned copy of that report.
- Status update regarding Certificates of Completion for LHAAP-46 and 58
    - RM says they are going through EPA concurrence process. Should be signed this week.
- Review red-line GWTP SAP. **In Process.**

TCEQ

- Review red-line GWTP SAP
    - AP completed review but wants to discuss a couple of things before submitting comments.

AEC

- Provide completion information for Bioplug study system abandonment and decommissioning activities
    - NS waiting for contractor to compile. Estimated by the week of July 20, 2015.
        - Data validation already included in status reports. Working on 3 Plugging Reports that need correction. Installation Completion Reports already included in report NS already sent.
    - AP needs something in writing that shows installation date, plugging date, etc. Something that shows that they are completely decommissioned.
    - RMZ needs to see utility line closures/decommission as well.

USFWS

Defense Environmental Restoration Program (DERP) PBR Update **AECOM**

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

  Item 1 (GWTP Quarterly Report) –Q1 2015 submitted for Army review on 6/11/15. Army comments received 6/16/15. Responses to Army comments submitted 7/13/15. Army concurrence on Draft received 7/13/15. Q1 2015 submitted to Agencies on 7/13/15.

  Item 2a (LHAAP-18/24 Revised PSI) – Responses to Agency comments for Army review estimated by 7/21/15. Responses to comments on Draft PSI estimated by 8/21/15.

    - RMZ brings up discussion about 1,4-Dioxane data gaps at LHAAP-18/24. (Only talking about when we can revise the FS, not talking about confirmation sampling or extent necessarily). With full round of sampling should be able to confirm first limited data set and know more about whether there is a problem that will require a separate remedy.
    - Plan is to sample the list of wells that are regularly sampled plus the wells that were previously sampled for 1,4-Dioxane plus possibly some others. May not need to sample all wells but need to confirm extent.
    - NS indicated AEC would require extent determination before proceeding with future phases of work.
    - AP asks if wells outside the ICTs will be sampled.
        - RMZ says if extent has to be determined, wells outside the ICTs may need to be sampled as well.
        - RM says that PDB samples were taken outside the ICT by EPA.
    - MS discusses 1,4-Dioxane results from GWTP Effluent in June 2015.
        - Results have been below 20 ug/L (6/15/15 = 14.6 ug/L; 6/22/15 = 6.66 ug/L)
        - RM says that sounds favorable, that 1,4-Dioxane may be limited.
        - MS says contribution from LHAAP-16 to the effluent is minimal (1:15 – 1:20 ratio).
            - AP asks if LHAAP-16 is going to be sampled.

- RMZ says they will consider LHAAP-16 in future confirmation sampling.

Item 2b (LHAAP-18/24 1,4-Dioxane Sampling Memo) – To Army for review estimated by 7/31/15. Pending technical direction from USACE.

Item 2c (LHAAP-18/24 Revised FS) – Prepare after finalizing PSI and determining data gaps. Estimated January 2016.

Item 3 (LHAAP-37 RACR) – Draft Final submitted to agencies on 4/3/15. Received RTRTCs from EPA on 4/7/15.

- Army considering EPA comments from 5/8/18 conference call.
- AW says contract modification for AECOM is ready and just needs signatures from COR on technical direction. Final signature estimated in the next couple weeks.

Item 4 (LHAAP-37 LUC) – LUC recordation is complete.

Item 5 (LHAAP-46 RACR) – AECOM provided RTRTC table with footnote indicating issues were resolved during 4/2 conference call as insertion pages to Draft Final document-Draft Final is considered Final version-Hard copies sent out 5/7/15-Hard copies received 5/11/15. Certificate of Completion from EPA was expected on or before 6/10/15 (30 days from Draft Final going Final).

Item 6 (LHAAP-46 LUC) – LUC recordation is complete.

Item 7 (LHAAP-50 RACR) – Draft RTC sent to Army for review 4/22. RTCs sent to Agencies 4/27/15. LUC Recordation received. Draft Final submitted for Army review on 7/13/15.

Item 8 (LHAAP-50 LUC) – LUC recordation is complete.

Item 9 (LHAAP-58 RACR) – Amended RTCs indicating concurrence on issues and that Draft Final will be considered Final submitted on 5/28/15. Certificate of completion to be received from EPA by 6/29/15 (30 days from Draft Final going Final).

Item 10 (LHAAP-58 LUC) – LUC recordation is complete.

Item 11 (LHAAP-67 RACR) – Amended RTC table indicating EPA remaining comments should be/will be addressed in Yr #1 RAO Report submitted 3/17/15. Conference calls w/agencies were held on 4/2 (TCEQ and EPA) and 4/10 (EPA) to discuss finalizing RACR. EPA requiring a commitment to install an additional well in the western portion of the plume and periodic intermediate zone monitoring. Army contracting officer is considering contract modification from AECOM. Further discussion needed between Army and AECOM.

Item 12 (LHAAP-67 LUC) – LUC recordation is complete.

Item 13 (LHAAP-12 LTM Report) – Incorporating Agency comments. Projected submittal for Army review 7/22/15.

Item 14 (LHAAP-46 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

Item 15 (LHAAP-67 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

Item 16 (LHAAP-50 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

Item 17 (LHAAP-58 RAO Report) – Submitted to Army for review on 4/7/15. Received first round of Army comments on 5/1/15. Revised Army Draft submitted back to Army on 5/14/15. Received Army comments on revised Army Draft on 5/21/15. Submitted response to Army comments 6/15/15. Draft to be submitted to agencies upon Army concurrence and receipt of Certificate of Completion from EPA for LHAAP-58 RACR.

- AP brings up discussion about RAO Reports being on hold due to Certificates of Completion and for finalization of the RACRs. Says that TCEQ needs to agree to reduction in sampling frequency on sites where eight quarters of sampling have been completed before that happens and that can't happen if RAOs are on hold.
    - RM and AP ask if sampling results could be submitted prior to RAO. RMZ says they will discuss that.
    - RMZ asks if a Provisional Certificate of Completion could be issued from EPA on LHAAP-50. RM says he will look into it.
    - MH discusses which sites have completed eight quarters of sampling or are soon to be completed.

Item 18 (Monthly Managers' Meeting) – Next MMM scheduled for 10AM, Tuesday, August 11th.

Item 19 (LHAAP-29 Amended RI/FS) – Biotrap treatability study data has been received and is being incorporated in document. AECOM submitted a Remedial Alternatives Analysis ahead of submittal of RI/FS addendum for Army feedback on 5/11/15.

Item 20 (LHAAP-17 PDI WP, LHAAP-16 RD WP, LHAAP-03 RD/RAWP, LHAAP-04 RD, LHAAP-47 RD) – Placeholder for sites on hold due to dispute. RM says EPA has sent a letter to OMB. RMZ asks if that letter is for open distribution. AP asks that letter can be sent to TCEQ upper management. RM will look into it.

Item 21 (RAB/Website) – Next RAB meeting scheduled for October 29, 2015.
- Minutes from July RAB meeting in progress.

Item 22 (GWTP O&M) – Continued O&M. There were issues with air stripper feed pump beginning on 6/29/15. Incorrect replacement pump received therefore existing pump was repaired and back in operation 7/6/15. Extraction now back online and working well. Continued in recirculation mode while feed pump was down until 7/6/15. Were not discharging while pump was down. Should have sample results back soon that will show if there were any effects on perchlorate. Will not begin discharging to Harrison Bayou until comfortable with perchlorate and 1,4-Dioxane results.

Item 23 (Administrative Record Update) –4th quarter AR Update submitted on 4/21/15. 1st Quarter 2015 Update in progress. Projected submission to Army by end of July.

Item 24 (CRP/CIP) – FFA parties to submit updated questions for survey by 5/29/15. Compiled list of questions sent to TCEQ/EPA 6/2/15.

- Ongoing discussion about how best to provide information to the public. Possible mailing, but need to get a mailing list.
  - RMZ states that they were expecting a comprehensive list from Judy Vandeventer but did not receive that. Comments that we don't want just a select group but an inclusive list from the community. JC suggests possibly driving the major streets in the immediate area and writing down addresses to add to the mailing list.
  - JC asks if we could put together an information bulletin (site update) for the general public (to be sent out to the existing mailing list). RMZ says she will look into that.

- Upcoming field work
  - 8th Quarterly Sampling at LHAAP-46, 7th Quarterly Sampling at LHAAP-50 and water levels at LHAAP-12 in August 2015
- Monthly data package
- Groundwater Treatment Plant
  - Sampling frequency discussion (Actual vs Proposed vs Required)
    - AP talks about what sampling we are/have been supposed to be doing: default is to do quarterly influent and effluent sampling; hex chrom, total silver, and total selenium monthly sampling; biweekly influent and effluent sampling for perchlorate; biweekly effluent sampling for methylene chloride, trichloroethene, total barium, total lead, chloride and sulfate. Some we are sampling more often that we should have been and some less often that should have been. AP says this will be in her comments to the revised GWTP Sampling Plan.
    - RMZ asks AP if there is latitude on frequency. AP says that default is quarterly sampling but depends on site history. RMZ wonders if the original plan was less or more stringent that default. AP says it is site specific.
    - AP would like to revise Appendix B as soon as possible (before the rest of the SAP revision) so she can get approval on that by the time the SAP is done.
  - MS discusses sprinkler system at GWTP. Did not use eastern system during week of heavy rain so runoff didn't happen. Only used western system at that time which led to some ponding. Ponding is not ideal, but decided that was the better option at the time. Discharging to INF pond is not happening because not able to pump back to GWTP if limits are exceeded.
    - AP says that vegetative evidence indicates that ponding isn't a one-time event. Also expresses concern that there may be runoff to the west as well. Says there were only two sprinklers on the west side and that it is a large area and could use more sprinklers to spread it out more. MS will check into more sprinklers. AP states that land application (sprinkling) is a good option but need to make sure there is no ponding or runoff. RM agrees. AP brings up that new discharge limits that will be determined once dispute is resolved and remedy is evaluated will include land application evaluation.
    - RMZ agrees to evaluate current land application and possible revision.

MMRP Update **Army**

- Update – no update.

Other Environmental Restoration **Army**

- Quarterly Reporting and Requirements
  - GWTP Evaluation with air monitoring data
  - Surface Water/Perimeter Well Quarterly Update
  - Administrative Record Update
  - Website Update
- Annual Reporting
  - LUC Management Plan Update (due September 2015)
  - CRP/CIP Revision (Biennial) and questionnaire October 2015
  - Status of questionnaire development

Programmatic Issues **RMZ/RM/AP**

- Status of Dispute – RM to look into EPA letter to OMB distribution.

USFWS Update **RMZ/PB**

- PB has sent NS application paperwork for SUP. NS received and is working on it.
- Is gas pipeline on refuge that feeds GWTP being used? Says Scott Beesinger told him that it is not. Shutoff valve has been sheared off and looking into it being fixed.

Schedule Next Managers' Meeting – 10AM, Tuesday, August 11th by teleconference.

Adjourn

ACRONYM LIST

ug/L	micrograms per liter
AEC	United States Army Environmental Command
AECOM	AECOM Technology Services, Inc.
AP	April Palmie
AR	Administrative Record
AW	Aaron Williams
BRAC	Base Realignment and Closure
CRP/CIP	Community Relations Plan/Community Involvement Plan
DERP	Defense Environmental Restoration Program
DV	Dale Vodak
EPA	United States Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
GWTP	Ground Water Treatment Plant
ICT	Interceptor Collection Trench
JC	Jenetta Coats
JS	JoLynn Snow
KB	Kent Becher
LHAAP	Longhorn Army Ammunition Plant
LTM	Long-Term Monitoring

LUC	Land Use Control
MH	Mark Heaston
MMM	Monthly Managers' Meeting
MMRP	Military Munitions Response Program
MS	Marwan Salameh
NS	Nicholas Smith
O&M	Operation and Maintenance
OMB	Office of Management and Budget
PB	Paul Bruckwicki
PBR	Performance-Based Remediation
PDI	Pre-Design Investigation
PDB	Passive Diffusion Bag
PSI	Post-Screening Investigation
RAB	Restoration Advisory Board
RACR	Remedial Action Completion Report
RAO	Remedial Action Operation
RAWP	Remedial Action Work Plan
RC	Rodney Croslen
RD	Remedial Design
RDWP	Remedial Design Work Plan
RI/FS	Remedial Investigation / Feasibility Study
RM	Rich Mayer
RMZ	Rose M. Zeiler
RTC	Response to Comments
RTRTC	Response to Response to Comments
SAP	Sampling and Analysis Plan
SUP	Supplemental Use Permit
TCEQ	Texas Commission on Environmental Quality
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service
WP	Work Plan

LHAAP Data Validated
June 2015

GWTP Effluent and Influent

Weekly, Biweekly and Monthly - April 2015

Ammonia (350.1)
VOC (8260B)
Ortho-Phosphate (365.2)
Inorganic Anions (9056)
Total Organic Carbon (415.1)
Metals (6010C)
Metals (6020A)
Perchlorate (6850)
Hexavalent Chromium (7196A)

Site 50

Quarterly MNA Sampling - May 2015

Alkalinity (310.2)
Phosphorus (365.4)
Total Organic Carbon (415.1)
Metals (6010C)
Metals (6020A)
VOC (8260B)
Inorganic Anions (9056)
Dissolved Gases (RSK-175)
Sulfide (SM4500-S-(-2)-F-2000)

Site 67

Quarterly MNA Sampling - May 2015

Total Carbon (415.1)
VOC (8260B)
Inorganic Anions (9056)
Dissolved Gases (RSK-175)
Ferrous Iron (SM3500FE)
Sulfide (SM4500-S-(-2)-F-2000)

GWTP Effluent Weekly Sampling - April 2015

Sample ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6265-GRAB 4/6/2015	LH18/24-SP650-6267-GRAB 4/13/2015	LH18/24-SP650-6269-GRAB 4/20/2015	LH18/24-SP650-6270-GRAB 4/27/2015
Location Description:			GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.
Ammonia-N (350.1)						
AMMONIA AS N	mg/L		2.98	5.15	3.39	4.53
Ortho-Phosphate (365.2)						
ORTHO-PHOSPHATE	mg/L		0.645	1.04	0.761	1.04
Total Organic Carbon (415.1)						
TOTAL ORGANIC CARBON (TOC)	mg/L		25.4	19.6	20.7	20.4
Perchlorate (6850)						
PERCHLORATE	ug/L	13	<0.2 U	<0.2 U	1.01	18.7

Blue Highlighting Indicates concentrations above Daily Maximum Concentration

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

GWTP Effluent Biweekly Sampling - April 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6264-COMP 4/6/2015	LH18/24-SP650-6264-GRAB 4/6/2015	LH18/24-SP650-6268-COMP 4/20/2015	LH18/24-SP650-6268-GRAB 4/20/2015
Location Description:			GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Biweekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly.	GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Biweekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly.
Metals (6010C)						
SELENIUM	mg/L	0.012	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Metals (6020A)						
LEAD	mg/L	0.0046	<0.001 U	<0.001 U	<0.001 U	<0.001 U
SILVER	mg/L	0.003	<0.001 U	<0.001 U	<0.001 U	<0.001 U
Perchlorate (6850)						
PERCHLORATE	ug/L	13	<0.2 U	<0.2 U	5.28	3.23
Hexavalent Chromium (7196A)						
HEXAVALENT CHROMIUM	mg/L	0.124	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Volatile Organic Compounds (8260B)						
1,1,1,2-TETRACHLOROETHANE	ug/L		NA	<0.5 U	NA	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	7230	NA	<0.5 U	NA	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		NA	<0.4 U	NA	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	216.9	NA	<0.5 U	NA	<0.5 U
1,1-DICHLOROETHANE	ug/L	14032	NA	<0.25 U	NA	<0.25 U
1,1-DICHLOROETHENE	ug/L	253	NA	<1 U	NA	<1 U
1,1-DICHLOROPROPENE	ug/L		NA	<0.5 U	NA	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		NA	<0.3 U	NA	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		NA	<1 U	NA	<1 U
1,2,4-TRICHLOROBENZENE	ug/L		NA	<0.4 U	NA	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L		NA	<2 U	NA	<2 U
1,2-DIBROMOETHANE	ug/L		NA	<0.5 U	NA	<0.5 U
1,2-DICHLOROBENZENE	ug/L		NA	<0.25 U	NA	<0.25 U
1,2-DICHLOROETHANE	ug/L	181	NA	<0.5 U	NA	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	NA	<0.4 U	NA	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U
1,3-DICHLOROBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U
1,3-DICHLOROPROPANE	ug/L		NA	<0.4 U	NA	<0.4 U
1,4-DICHLOROBENZENE	ug/L		NA	<0.25 U	NA	<0.25 U
2,2-DICHLOROPROPANE	ug/L		NA	<0.5 U	NA	<0.5 U
2-BUTANONE	ug/L		NA	<5 UJ	NA	<5 U
2-CHLOROTOLUENE	ug/L		NA	<0.25 U	NA	<0.25 U
2-HEXANONE	ug/L		NA	<5 UJ	NA	<5 U
4-CHLOROTOLUENE	ug/L		NA	<0.5 U	NA	<0.5 U
4-METHYL-2-PENTANONE	ug/L		NA	<5 U	NA	<5 U
ACETONE	ug/L	2395	NA	<5 U	NA	<5 U
BENZENE	ug/L	181	NA	<0.25 U	NA	<0.25 U
BROMOBENZENE	ug/L		NA	<0.25 U	NA	<0.25 U
BROMOCHLOROMETHANE	ug/L		NA	<0.4 U	NA	<0.4 U
BROMODICHLOROMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U
BROMOFORM	ug/L		NA	<1 U	NA	<1 U
BROMOMETHANE	ug/L		NA	<1 U	NA	<1 U
CARBON DISULFIDE	ug/L		NA	<1 U	NA	6.8
CARBON TETRACHLORIDE	ug/L	181	NA	<0.5 U	NA	<0.5 U

GWTP Effluent Biweekly Sampling - April 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6264-COMP 4/6/2015	LH18/24-SP650-6264-GRAB 4/6/2015	LH18/24-SP650-6268-COMP 4/20/2015	LH18/24-SP650-6268-GRAB 4/20/2015
CHLOROBENZENE	ug/L	47180	NA	<0.25 U	NA	<0.25 U
CHLOROETHANE	ug/L		NA	<1 U	NA	<1 U
CHLOROFORM	ug/L	3615	NA	<0.25 U	NA	<0.25 U
CHLOROMETHANE	ug/L		NA	<1 U	NA	<1 U
CIS-1,2-DICHLOROETHENE	ug/L		NA	1.21	NA	1.12
CIS-1,3-DICHLOROPROPENE	ug/L		NA	<0.5 U	NA	<0.5 U
DIBROMOCHLOROMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U
DIBROMOMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U
ETHYLBENZENE	ug/L	57025	NA	<0.5 U	NA	<0.5 U
HEXACHLOROBUTADIENE	ug/L		NA	<0.5 U	NA	<0.5 U
ISOPROPYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U
M,P-XYLENE	ug/L	83.6	NA	<1 U	NA	<1 U
METHYLENE CHLORIDE	ug/L	1699	NA	<0.5 U	NA	<0.5 U
NAPHTHALENE	ug/L		NA	<0.4 U	NA	<0.4 U
N-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U
N-PROPYLBENZENE	ug/L		NA	<0.25 U	NA	<0.25 U
O-XYLENE	ug/L	83.6	NA	<0.5 U	NA	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		NA	<0.5 U	NA	<0.5 U
SEC-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U
STYRENE	ug/L	5987	NA	<0.25 U	NA	<0.25 U
TERT-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U
TETRACHLOROETHENE	ug/L	180.7	NA	<0.5 U	NA	<0.5 U
TOLUENE	ug/L	4189	NA	<0.5 U	NA	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L		NA	<0.5 U	NA	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		NA	<1 U	NA	<1 U
TRICHLOROETHENE	ug/L	181	NA	1.38	NA	1.21
TRICHLOROFLUOROMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U
VINYL CHLORIDE	ug/L	72	NA	<0.5 U	NA	<0.5 U
Anions (9056)						
CHLORIDE	mg/L		448	457	417	427
SULFATE	mg/L		31.5	25.3	22.7	24.4

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

GWTP Effluent Monthly Sampling - April 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6266-GRAB 4/13/2015
Location Description:			GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Monthly.
Metals (6010C)			
ALUMINUM	mg/L	1.644	<0.1 U
IRON	mg/L	2.395	0.159 J
SELENIUM	mg/L	0.012	0.00568 J
Metals (6020A)			
ANTIMONY	mg/L		<0.001 U
ARSENIC	mg/L	0.722	0.0029
BARIUM	mg/L	2	0.333
CADMIUM	mg/L	0.0034	<0.0006 U
CHROMIUM	mg/L	0.752	0.0021 J
COBALT	mg/L	11.495	0.00154 J
LEAD	mg/L	0.0046	<0.001 U
MANGANESE	mg/L	15.494	0.283
NICKEL	mg/L	0.184	0.00458 J
SILVER	mg/L	0.003	<0.001 U
THALLIUM	mg/L		<0.0002 U
VANADIUM	mg/L	3.592	<0.001 U
ZINC	mg/L	0.31	0.0136 J

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

GWTP Influent Monthly Sampling - April 2015

Location ID: Sample Date:	Units	LH18/24-SP140-7266-GRAB 4/13/2015
Location Description:		GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly.
Perchlorate (6850)		
PERCHLORATE	ug/L	10900
Volatile Organic Compounds (8260B)		
1,1,1,2-TETRACHLOROETHANE	ug/L	<25 U
1,1,1-TRICHLOROETHANE	ug/L	<25 U
1,1,2,2-TETRACHLOROETHANE	ug/L	<20 U
1,1,2-TRICHLOROETHANE	ug/L	<25 U
1,1-DICHLOROETHANE	ug/L	9.48 J
1,1-DICHLOROETHENE	ug/L	99.7 J
1,1-DICHLOROPROPENE	ug/L	<25 U
1,2,3-TRICHLOROBENZENE	ug/L	<15 U
1,2,3-TRICHLOROPROPANE	ug/L	<50 U
1,2,4-TRICHLOROBENZENE	ug/L	<20 U
1,2,4-TRIMETHYLBENZENE	ug/L	<25 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	<100 U
1,2-DIBROMOETHANE	ug/L	<25 U
1,2-DICHLOROBENZENE	ug/L	<12.5 U
1,2-DICHLOROETHANE	ug/L	58.5
1,2-DICHLOROPROPANE	ug/L	<20 U
1,3,5-TRIMETHYLBENZENE	ug/L	<25 U
1,3-DICHLOROBENZENE	ug/L	<25 U
1,3-DICHLOROPROPANE	ug/L	<20 U
1,4-DICHLOROBENZENE	ug/L	<12.5 U
2,2-DICHLOROPROPANE	ug/L	<25 U
2-BUTANONE	ug/L	<250 UJ
2-CHLOROTOLUENE	ug/L	<12.5 U
2-HEXANONE	ug/L	<250 U
4-CHLOROTOLUENE	ug/L	<25 U
4-METHYL-2-PENTANONE	ug/L	<250 UJ
ACETONE	ug/L	<250 UJ
BENZENE	ug/L	<12.5 U
BROMOBENZENE	ug/L	<12.5 U
BROMOCHLOROMETHANE	ug/L	15.8 J
BROMODICHLOROMETHANE	ug/L	<25 U
BROMOFORM	ug/L	<50 U
BROMOMETHANE	ug/L	<50 U
CARBON DISULFIDE	ug/L	<50 U
CARBON TETRACHLORIDE	ug/L	<25 U
CHLOROBENZENE	ug/L	<12.5 U
CHLOROETHANE	ug/L	<50 U
CHLOROFORM	ug/L	20.2 J
CHLOROMETHANE	ug/L	<50 U
CIS-1,2-DICHLOROETHENE	ug/L	4180

GWTP Influent Monthly Sampling - April 2015

Location ID: Sample Date:	Units	LH18/24-SP140-7266-GRAB 4/13/2015
CIS-1,3-DICHLOROPROPENE	ug/L	<25 U
DIBROMOCHLOROMETHANE	ug/L	<25 U
DIBROMOMETHANE	ug/L	<25 U
DICHLORODIFLUOROMETHANE	ug/L	<25 U
ETHYLBENZENE	ug/L	<25 U
HEXACHLOROBUTADIENE	ug/L	<25 UJ
ISOPROPYLBENZENE	ug/L	<25 U
M,P-XYLENE	ug/L	<50 U
METHYLENE CHLORIDE	ug/L	14100
NAPHTHALENE	ug/L	<20 U
N-BUTYLBENZENE	ug/L	<25 U
N-PROPYLBENZENE	ug/L	<12.5 U
O-XYLENE	ug/L	<25 U
P-ISOPROPYLTOLUENE	ug/L	<25 U
SEC-BUTYLBENZENE	ug/L	<25 U
STYRENE	ug/L	<12.5 U
TERT-BUTYLBENZENE	ug/L	<25 U
TETRACHLOROETHENE	ug/L	51.8
TOLUENE	ug/L	<25 U
TRANS-1,2-DICHLOROETHENE	ug/L	16.3 J
TRANS-1,3-DICHLOROPROPENE	ug/L	<50 U
TRICHLOROETHENE	ug/L	9460
TRICHLOROFLUOROMETHANE	ug/L	<25 U
VINYL CHLORIDE	ug/L	74.9

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-50 Quarterly MNA Sampling - May 2015

Sample ID: / Sample Date:	Units	MCL/ MSC	47WW38-052715 5/27/2015	50SW06-052215 5/22/2015	50WW01-052715 5/27/2015	50WW05-052615 5/26/2015	50WW06-052015 5/20/2015	50WW06FF-052015 5/20/2015	50WW07-052615 5/26/2015	50WW08-052115 5/21/2015	50WW08FF-052115 5/21/2015	50WW09-052315 5/23/2015	50WW10-052315 5/23/2015	50WW11-052015 5/20/2015	50WW11FF-052015 5/20/2015	50WW12-052015 5/20/2015
Location Description:			Site 47 - N, upper shallow, outside site boundary. Sampled quarterly	Tributary of Goose Prairie Creek - ~350 ft downstream from Crockett Avenue bridge Sampled quarterly	Site 50 - NW, upper shallow, outside site boundary. Sampled quarterly	Site 50 - NE, lower shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, outside site boundary. Sampled quarterly	Site 50 - ENE, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Filtered. Sampled quarterly	Site 50 - E, lower shallow, inside site boundary. Sampled quarterly	Site 50 - E, intermediate, inside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly
Alkalinity (310.2)																
ALKALINITY, TOTAL	mg/L		NA	NA	NA	NA	282	NA	NA	429	NA	NA	NA	308	NA	189
Phosphours (365.4)																
PHOSPHORUS	mg/L		NA	NA	NA	NA	1.29	NA	NA	<0.2 U	NA	NA	NA	0.665	NA	1.1
SM4500-S-(-2)-F-2000																
SULFIDE	mg/L		NA	NA	NA	NA	1	NA	NA	<1 U	NA	NA	NA	1	NA	1
Total Organic Carbon (415.1)																
TOTAL ORGANIC CARBON (TOC)	mg/L		NA	NA	NA	NA	7.51	NA	NA	3.68	NA	NA	NA	64.2	NA	5.38 J
Iron (6010C)																
IRON	mg/L		NA	NA	NA	NA	NA	0.1	NA	NA	<0.1 U	NA	NA	NA	0.1	NA
Manganese (6020A)																
MANGANESE	mg/L	14	NA	NA	NA	NA	NA	0.192	NA	NA	0.0391	NA	NA	NA	0.14	NA
Perchlorate (6850)																
PERCHLORATE	ug/L	72	18	0.218 J	<0.2 U	<0.2 U	3000	NA	<0.2 U	200	NA	0.196 J	<0.2 U	1140	NA	59200
Volatile Organic Compounds (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	NA	<0.4 U	<1 U	NA	<0.4 U	<0.4 U	0.4	NA	0.4
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	<0.25 U	<0.25 U	0.152 J	0.25	NA	<0.25 U	1.49 J	NA	0.349 J	<0.25 U	0.3 J	NA	0.283 J
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U	<1 U	1.77 J	1	NA	<1 U	<2.5 U	NA	<1 U	<1 U	1.03 J	NA	0.878 J
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U	<0.3 U	0.3	NA	<0.3 U	<0.75 U	NA	<0.3 U	<0.3 U	0.3	NA	0.3
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<1 U	<1 U	<1 U	1	NA	<1 U	<2.5 U	NA	<1 U	<1 U	1	NA	1
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	NA	<0.4 U	<1 U	NA	<0.4 U	<0.4 U	0.4	NA	0.4
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	2	NA	<2 U	<5 U	NA	<2 U	<2 U	2	NA	2
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	0.132 J	<0.25 U	0.25	NA	<0.25 U	<0.626 U	NA	<0.25 U	<0.25 U	0.25	NA	0.25
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	1.9	0.5	NA	<0.5 U	3.6	NA	1.11	<0.5 U	1.2	NA	0.389 J
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	NA	<0.4 U	<1 U	NA	<0.4 U	<0.4 U	0.4	NA	0.4
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	NA	<0.4 U	<1 U	NA	<0.4 U	<0.4 U	0.4	NA	0.4
1,4-DICHLOROBENZENE	ug/L	75	0.155 J	<0.25 U	0.351 J	<0.25 U	0.25	NA	<0.25 U	<0.626 U	NA	<0.25 U	<0.25 U	0.25	NA	0.25
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
2-BUTANONE	ug/L	61000	<5 U	<5 U	<5 U	<5 U	5	NA	<5 U	<12.5 U	NA	<5 U	<5 U	5	NA	5
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 UJ	NA	<0.25 U	<0.626 U	NA	<0.25 U	<0.25 U	<0.25 UJ	NA	0.25
2-HEXANONE	ug/L	6100	<5 U	<5 U	<5 U	<5 U	5	NA	<5 U	<12.5 U	NA	<5 U	<5 U	5	NA	5
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
4-METHYL-2-PENTANONE	ug/L	8200	<5 UJ	<5 U	<5 UJ	<5 UJ	5	NA	<5 UJ	<12.5 U	NA	<5 UJ	<5 U	5	NA	5
ACETONE	ug/L	92000	<5 U	2.97 J	<5 U	<5 U	3.59 J	NA	2.79 J	<12.5 U	NA	<5 U	<5 U	5	NA	5
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	NA	<0.25 U	<0.626 U	NA	<0.25 U	<0.25 U	0.25	NA	0.25
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	NA	<0.25 U	<0.626 U	NA	<0.25 U	<0.25 U	0.25	NA	0.25
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	NA	<0.4 U	<1 U	NA	<0.4 U	<0.4 U	0.4	NA	0.4
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U	<1 U	1	NA	<1 U	<2.5 U	NA	<1 U	<1 U	1	NA	1
BROMOMETHANE	ug/L	140	<1 UJ	<1 U	<1 UJ	<1 U	1	NA	<1 U	<2.5 U	NA	<1 U	<1 U	1	NA	1

LHAAP-50 Quarterly MNA Sampling - May 2015

Sample ID: / Sample Date:	Units	MCL/ MSC	47WW38-052715 5/27/2015	50SW06-052215 5/22/2015	50WW01-052715 5/27/2015	50WW05-052615 5/26/2015	50WW06-052015 5/20/2015	50WW06FF-052015 5/20/2015	50WW07-052615 5/26/2015	50WW08-052115 5/21/2015	50WW08FF-052115 5/21/2015	50WW09-052315 5/23/2015	50WW10-052315 5/23/2015	50WW11-052015 5/20/2015	50WW11FF-052015 5/20/2015	50WW12-052015 5/20/2015
CARBON DISULFIDE	ug/L	10000	<1 UJ	<1 UJ	<1 UJ	<1 UJ	1	NA	<1 UJ	<2.5 U	NA	<1 UJ	1.38 J	1	NA	1
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
CHLOROBENZENE	ug/L	100	0.198 J	<0.25 U	0.427 J	<0.25 U	0.25	NA	<0.25 U	<0.626 U	NA	<0.25 U	<0.25 U	0.25	NA	0.25
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U	<1 U	1	NA	<1 U	<2.5 U	NA	<1 U	<1 U	1	NA	1
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	NA	<0.25 U	0.606 J	NA	0.272 J	<0.25 U	0.25	NA	0.25
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U	<1 U	1	NA	<1 U	<2.5 U	NA	<1 U	<1 U	1	NA	1
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U	0.372 J	9.81	0.637 J	NA	<0.5 U	62.1	NA	19.7	<0.5 U	2.4	NA	0.5
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	1	NA	<1 U	<2.5 U	NA	<1 U	<1 U	1	NA	1
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	<0.4 U	<0.4 U	0.4	NA	<0.4 U	<1 U	NA	<0.4 U	<0.4 U	0.4	NA	0.4
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	NA	<0.25 U	<0.626 U	NA	<0.25 U	<0.25 U	0.25	NA	0.25
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.25	NA	<0.25 U	<0.626 U	NA	<0.25 U	<0.25 U	0.25	NA	0.25
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	0.86 J	0.5	NA	<0.5 U	2 J	NA	0.423 J	<0.5 U	0.275 J	NA	0.5
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U	<1 U	1	NA	<1 U	<2.5 U	NA	<1 U	<1 U	1	NA	1
TRICHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	0.685 J	197	49.1	NA	0.42 J	712	NA	202	0.549 J	230	NA	33.9
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.5	NA	<0.5 U	<1.25 U	NA	<0.5 U	<0.5 U	0.5	NA	0.5
Inorganic Anions (9056)																
CHLORIDE	mg/L		NA	NA	NA	NA	218	NA	NA	322	NA	NA	NA	230	NA	1050
NITRATE	mg/L	10	NA	NA	NA	NA	1	NA	NA	<1 U	NA	NA	NA	0.6	NA	2
NITRITE	mg/L	1	NA	NA	NA	NA	0.65 J	NA	NA	0.545 J	NA	NA	NA	0.309 J	NA	2.84 J
SULFATE	mg/L		NA	NA	NA	NA	157	NA	NA	293	NA	NA	NA	305	NA	547
Dissolved Gases (RSK-175)																
CARBON DIOXIDE	ug/L		NA	NA	NA	NA	244000	NA	NA	331000	NA	NA	NA	515000	NA	152000
ETHANE	ug/L		NA	NA	NA	NA	2	NA	NA	<2 U	NA	NA	NA	2	NA	2
ETHENE	ug/L		NA	NA	NA	NA	2	NA	NA	<2 U	NA	NA	NA	2	NA	2
METHANE	ug/L		NA	NA	NA	NA	2	NA	NA	2 J	NA	NA	NA	3.82 J	NA	2

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP-50 Quarterly MNA Sampling - May 2015

Sample ID: / Sample Date:	Units	MCL/ MSC	50WW12FF-052015 5/20/2015	50WW13-052015 5/20/2015	50WW13FF-052015 5/20/2015	50WW14-052015 5/20/2015	50WW14FF-052015 5/20/2015	50WW15-052315 5/23/2015	50WW16-052215 5/22/2015	50WW17-052215 5/22/2015	50WW18-052815 5/28/2015	50WW18FF-052815 5/28/2015	50WW19-052215 5/22/2015	50WW19FD-052215 5/22/2015	50WW20-052615 5/26/2015	50WW21-052315 5/23/2015
Location Description:			Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave. Filtered. Sampled quarterly	Site 50 - NNE, upper shallow, outside site boundary, along Goose Prairie Creek bridge. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, fully-penetrating shallow, outside site boundary, near Goose Prairie Creek.. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Filtered. Sampled quarterly	Site 50 - ENE, fully-penetrating shallow, outside site boundary, near Site 67. Sampled quarterly	Site 50 - ENE, fully-penetrating shallow, outside site boundary, near Site 67. Sampled quarterly. Duplicate	Site 50 - E, fully-penetrating shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly
Alkalinity (310.2)																
ALKALINITY, TOTAL	mg/L		NA	318	NA	271	NA	NA	NA	NA	412	NA	NA	NA	NA	NA
Phosphours (365.4)																
PHOSPHORUS	mg/L		NA	0.228 J	NA	1.66	NA	NA	NA	NA	1.52	NA	NA	NA	NA	NA
SM4500-S-(-2)-F-2000																
SULFIDE	mg/L		NA	1	NA	1	NA	NA	NA	NA	<1 U	NA	NA	NA	NA	NA
Total Organic Carbon (415.1)																
TOTAL ORGANIC CARBON (TOC)	mg/L		NA	25.6	NA	36.8	NA	NA	NA	NA	<3 U	NA	NA	NA	NA	NA
Iron (6010C)																
IRON	mg/L		0.105 J	NA	0.242	NA	8.8	NA	NA	NA	NA	0.0757 J	NA	NA	NA	NA
Manganese (6020A)																
MANGANESE	mg/L	14	0.107	NA	0.133	NA	0.557	NA	NA	NA	NA	0.0609	NA	NA	NA	NA
Perchlorate (6850)																
PERCHLORATE	ug/L	72	NA	126	NA	2.06	NA	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NA	0.305 J	0.198 J	<0.2 U	0.502
Volatile Organic Compounds (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	NA	0.4	NA	0.4	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	NA	0.406 J	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	NA	0.978 J	NA	1	NA	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	NA	0.3	NA	0.3	NA	<0.3 U	<0.3 U	<0.3 U	<0.3 U	NA	<0.3 U	<0.3 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	NA	1	NA	1	NA	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	NA	0.4	NA	0.4	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	NA	2	NA	2	NA	<2 U	<2 U	<2 U	<2 U	NA	<2 U	<2 U	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	NA	0.25	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	NA	1.78	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	NA	0.4	NA	0.4	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	NA	0.4	NA	0.4	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	NA	0.25	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	NA	5	NA	5	NA	<5 U	<5 U	<5 U	<5 U	NA	<5 U	<5 U	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	NA	<0.25 UJ	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	NA	5	NA	5	NA	<5 U	<5 U	<5 U	<5 U	NA	<5 U	<5 U	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	NA	5	NA	5	NA	<5 U	<5 U	<5 U	<5 U	NA	<5 U	<5 U	<5 UJ	<5 UJ
ACETONE	ug/L	92000	NA	5	NA	5	NA	<5 U	4.49 J	<5 U	<5 U	NA	<5 U	<5 U	<5 U	<5 U
BENZENE	ug/L	5	NA	0.25	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	NA	0.25	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	NA	0.4	NA	0.4	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	NA	1	NA	1	NA	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U
BROMOMETHANE	ug/L	140	NA	1	NA	1	NA	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U

LHAAP-50 Quarterly MNA Sampling - May 2015

Sample ID: Sample Date:	Units	MCL/ MSC	50WW12FF-052015 5/20/2015	50WW13-052015 5/20/2015	50WW13FF-052015 5/20/2015	50WW14-052015 5/20/2015	50WW14FF-052015 5/20/2015	50WW15-052315 5/23/2015	50WW16-052215 5/22/2015	50WW17-052215 5/22/2015	50WW18-052815 5/28/2015	50WW18FF-052815 5/28/2015	50WW19-052215 5/22/2015	50WW19FD-052215 5/22/2015	50WW20-052615 5/26/2015	50WW21-052315 5/23/2015
CARBON DISULFIDE	ug/L	10000	NA	1	NA	1	NA	<1 UJ	<1 UJ	<1 UJ	<1 UJ	NA	<1 UJ	<1 UJ	<1 UJ	<1 UJ
CARBON TETRACHLORIDE	ug/L	5	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	NA	0.25	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	NA	1	NA	1	NA	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U
CHLOROFORM	ug/L	1000	NA	0.25	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	NA	1	NA	1	NA	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	NA	10.7	NA	5.66	NA	10.8	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	NA	1	NA	1	NA	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	NA	0.4	NA	0.4	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	NA	0.25	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	NA	0.25	NA	0.25	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	NA	0.554 J	NA	0.5	NA	2.96	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	NA	1	NA	1	NA	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	NA	433	NA	6.05	NA	13	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	0.447 J
TRICHLOROFLUOROMETHANE	ug/L	31000	NA	0.5	NA	0.5	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	NA	0.5	NA	0.5	NA	1.91	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Inorganic Anions (9056)																
CHLORIDE	mg/L		NA	360	NA	369	NA	NA	NA	NA	668	NA	NA	NA	NA	NA
NITRATE	mg/L	10	NA	1	NA	1	NA	NA	NA	NA	<0.6 U	NA	NA	NA	NA	NA
NITRITE	mg/L	1	NA	0.85 J	NA	0.73 J	NA	NA	NA	NA	0.999 J	NA	NA	NA	NA	NA
SULFATE	mg/L		NA	319	NA	378	NA	NA	NA	NA	152	NA	NA	NA	NA	NA
Dissolved Gases (RSK-175)																
CARBON DIOXIDE	ug/L		NA	121000	NA	416000	NA	NA	NA	NA	114000	NA	NA	NA	NA	NA
ETHANE	ug/L		NA	2	NA	2	NA	NA	NA	NA	<2 U	NA	NA	NA	NA	NA
ETHENE	ug/L		NA	2	NA	2	NA	NA	NA	NA	<2 U	NA	NA	NA	NA	NA
METHANE	ug/L		NA	2.71 J	NA	2.21 J	NA	NA	NA	NA	<2 U	NA	NA	NA	NA	NA

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP-50 Quarterly MNA Sampling - May 2015

Sample ID: / Sample Date:	Units	MCL/ MSC	50WW21FD-052315 5/23/2015	50WW22-052115 5/21/2015	50WW22FF-052115 5/21/2015	50WW23-052015 5/20/2015	50WW23FF-052015 5/20/2015	50WW24-052815 5/28/2015	50WW24FF-052815 5/28/2015	50WW25-052815 5/28/2015	50WW25FF-052815 5/28/2015	50WW26-052315 5/23/2015	50WW27-052315 5/23/2015	50WW28-052615 5/26/2015	50WW28FD-052615 5/26/2015	GPW1-050815 5/8/2015
Location Description:			Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly. Duplicate	Site 50 - SE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - SE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Filtered. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - N, upper shallow, outside site boundary, east of S. Crockett Ave. Sampled quarterly	Site 50 - N, upper shallow, outside site boundary, south of 51st St. Sampled quarterly	Site 50 - N, upper shallow, outside site boundary, south of 51st St. Sampled quarterly Duplicate	Goose Prairie Creek - collected off a bridge on the north side of LHAAP-50 Sampled quarterly
Alkalinity (310.2)																
ALKALINITY, TOTAL	mg/L		NA	346	NA	206	NA	278	NA	<20 U	NA	NA	NA	NA	NA	NA
Phosphours (365.4)																
PHOSPHORUS	mg/L		NA	0.854	NA	0.248 J	NA	<0.2 U	NA	1.72	NA	NA	NA	NA	NA	NA
SM4500-S-(-2)-F-2000																
SULFIDE	mg/L		NA	<1 U	NA	0.627 J	NA	<1 U	NA	<1 U	NA	NA	NA	NA	NA	NA
Total Organic Carbon (415.1)																
TOTAL ORGANIC CARBON (TOC)	mg/L		NA	15.6	NA	22.5	NA	<10 U	NA	3.27 J	NA	NA	NA	NA	NA	NA
Iron (6010C)																
IRON	mg/L		NA	NA	<0.1 U	NA	0.0973 J	NA	<0.1 U	NA	0.223	NA	NA	NA	NA	NA
Manganese (6020A)																
MANGANESE	mg/L	14	NA	NA	0.0466	NA	0.143	NA	0.017	NA	0.0393	NA	NA	NA	NA	NA
Perchlorate (6850)																
PERCHLORATE	ug/L	72	0.516	2.92	NA	23.3	NA	<0.2 U	NA	15	NA	<0.2 U	<0.2 U	1.04	1.05	0.156 J
Volatile Organic Compounds (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	NA	0.4	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U	NA	1	NA	<1 U	NA	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	NA	0.3	NA	<0.3 U	NA	<0.3 U	NA	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<1 U	NA	1	NA	<1 U	NA	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	NA	0.4	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	NA	2	NA	<2 U	NA	<2 U	NA	<2 U	<2 U	<2 U	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	NA	0.4	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	NA	0.4	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	NA	5	NA	<5 U	NA	<5 U	NA	<5 U	<5 U	<5 U	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	<5 U	NA	5	NA	<5 U	NA	<5 U	NA	<5 U	<5 U	<5 U	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 UJ	<5 U	NA	5	NA	<5 UJ	NA	<5 UJ	NA	<5 U	<5 U	<5 UJ	<5 U	<5 U
ACETONE	ug/L	92000	<5 U	<5 U	NA	5	NA	<5 U	NA	3.27 J	NA	<5 U	<5 U	<5 U	<5 U	5.18 J
BENZENE	ug/L	5	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	NA	0.4	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	NA	1	NA	<1 U	NA	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	NA	1	NA	<1 UJ	NA	<1 UJ	NA	<1 U	<1 U	<1 U	<1 U	<1 U

LHAAP-50 Quarterly MNA Sampling - May 2015

Sample ID: / Sample Date:	Units	MCL/ MSC	50WW21FD-052315 5/23/2015	50WW22-052115 5/21/2015	50WW22FF-052115 5/21/2015	50WW23-052015 5/20/2015	50WW23FF-052015 5/20/2015	50WW24-052815 5/28/2015	50WW24FF-052815 5/28/2015	50WW25-052815 5/28/2015	50WW25FF-052815 5/28/2015	50WW26-052315 5/23/2015	50WW27-052315 5/23/2015	50WW28-052615 5/26/2015	50WW28FD-052615 5/26/2015	GPW1-050815 5/8/2015
CARBON DISULFIDE	ug/L	10000	<1 UJ	<1 U	NA	1	NA	<1 UJ	NA	<1 UJ	NA	<1 UJ	<1 UJ	<1 UJ	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	NA	1	NA	<1 U	NA	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	NA	1	NA	<1 U	NA	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	0.709 J	<0.5 U	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	NA	1	NA	<1 U	NA	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	NA	0.4	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	NA	0.25	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.389 J
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	NA	1	NA	<1 U	NA	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	NA	0.5	NA	0.268 J	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	NA	0.5	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Inorganic Anions (9056)																
CHLORIDE	mg/L		NA	782	NA	1660	NA	342	NA	13.8	NA	NA	NA	NA	NA	NA
NITRATE	mg/L	10	NA	<2 U	NA	2	NA	<0.4 U	NA	<0.2 U	NA	NA	NA	NA	NA	NA
NITRITE	mg/L	1	NA	1.54 J	NA	3.65 J	NA	0.418 J	NA	<0.2 U	NA	NA	NA	NA	NA	NA
SULFATE	mg/L		NA	559	NA	72	NA	95	NA	69.4	NA	NA	NA	NA	NA	NA
Dissolved Gases (RSK-175)																
CARBON DIOXIDE	ug/L		NA	56300	NA	398000	NA	544000	NA	<5000 U	NA	NA	NA	NA	NA	NA
ETHANE	ug/L		NA	<2 U	NA	2	NA	<2 U	NA	<2 U	NA	NA	NA	NA	NA	NA
ETHENE	ug/L		NA	<2 U	NA	2	NA	<2 U	NA	<2 U	NA	NA	NA	NA	NA	NA
METHANE	ug/L		NA	<2 U	NA	2	NA	<2 U	NA	31.6	NA	NA	NA	NA	NA	NA

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP-50 Quarterly MNA Sampling - May 2015

Sample ID: Sample Date:	Units	MCL/ MSC	GPW1-052215 5/22/2015	GPW1A-050815 5/8/2015	LHSMW54-052715 5/27/2015
Location Description:			Goose Prairie Creek - collected off a bridge on the north side of LHAAP-50 Sampled quarterly	Goose Prairie Creek - collected north of culvert at NW corner of intersection of Crockett Avenue and 51st Street Sampled quarterly	Site 47 - NE, outside the site boundary, inside site 47. Sampled quarterly
Alkalinity (310.2)					
ALKALINITY, TOTAL	mg/L		NA	NA	NA
Phosphours (365.4)					
PHOSPHORUS	mg/L		NA	NA	NA
SM4500-S-(-2)-F-2000					
SULFIDE	mg/L		NA	NA	NA
Total Organic Carbon (415.1)					
TOTAL ORGANIC CARBON (TOC)	mg/L		NA	NA	NA
Iron (6010C)					
IRON	mg/L		NA	NA	NA
Manganese (6020A)					
MANGANESE	mg/L	14	NA	NA	NA
Perchlorate (6850)					
PERCHLORATE	ug/L	72	0.213 J	16	<0.2 U
Volatile Organic Compounds (8260B)					
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U	<5 UJ
ACETONE	ug/L	92000	2.97 J	2.55 J	3.5 J
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	<1 UJ

LHAAP-50 Quarterly MNA Sampling - May 2015

Sample ID: / Sample Date:	Units	MCL/ MSC	GPW1-052215 5/22/2015	GPW1A-050815 5/8/2015	LHSMW54-052715 5/27/2015
CARBON DISULFIDE	ug/L	10000	<1 UJ	<1 U	<1 UJ
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U	0.261 J
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	95.9
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	<0.5 U
Inorganic Anions (9056)					
CHLORIDE	mg/L		NA	NA	NA
NITRATE	mg/L	10	NA	NA	NA
NITRITE	mg/L	1	NA	NA	NA
SULFATE	mg/L		NA	NA	NA
Dissolved Gases (RSK-175)					
CARBON DIOXIDE	ug/L		NA	NA	NA
ETHANE	ug/L		NA	NA	NA
ETHENE	ug/L		NA	NA	NA
METHANE	ug/L		NA	NA	NA

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP-67 Quarterly MNA Sampling - May 2015

Location ID: Sample Date:	Units	MCL/ MSC	67WW01-051915 5/19/2015	67WW08-051915 5/19/2015	67WW09-051915 5/19/2015	67WW11-051915 5/19/2015	67WW13-051915 5/19/2015
Location Description:			Site 67 - SW, within site boundary. Sampled quarterly.	Site 67 - SSE, within the site boundary. Sampled quarterly.	Site 67 - WSW, within the site boundary. Sampled quarterly.	Site 67 - S, within the site boundary, outer region. Sampled quarterly.	Site 67 - WSW, within site boundary. Sampled quarterly.
Total Carbon (415.1)							
TOTAL INORGANIC CARBON (TIC)	mg/L		42.6	55.2	NA	NA	224
TOTAL ORGANIC CARBON (TOC)	mg/L		12.7	8.32	NA	NA	62.4
Volatile Organic Compounds (8260B)							
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
1,1,1-TRICHLOROETHANE	ug/L	200	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<1 U	<4 U	<0.4 U	<0.4 U	<1 U
1,1,2-TRICHLOROETHANE	ug/L	5	1.72 J	4.5 J	<0.5 U	<0.5 U	5.96
1,1-DICHLOROETHANE	ug/L	10000	23.5	52.1	1.56	8.25	30.2
1,1-DICHLOROETHENE	ug/L	7	631	1570	2.71	21.6	522
1,1-DICHLOROPROPENE	ug/L	2.9	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.75 U	<3 U	<0.3 U	<0.3 U	<0.75 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<2.5 U	<10 U	<1 U	<1 U	<2.5 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<1 U	<4 U	<0.4 U	<0.4 U	<1 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<5 U	<20 U	<2 U	<2 U	<5 U
1,2-DIBROMOETHANE	ug/L	0.005	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
1,2-DICHLOROBENZENE	ug/L	600	<0.626 U	<2.5 U	<0.25 U	<0.25 U	<0.626 U
1,2-DICHLOROETHANE	ug/L	5	31.4	85.6	<0.5 U	0.518 J	30.6
1,2-DICHLOROPROPANE	ug/L	5	<1 U	<4 U	<0.4 U	<0.4 U	<1 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
1,3-DICHLOROBENZENE	ug/L	3100	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
1,3-DICHLOROPROPANE	ug/L	29	<1 U	<4 U	<0.4 U	<0.4 U	<1 U
1,4-DICHLOROBENZENE	ug/L	75	<0.626 U	<2.5 U	<0.25 U	<0.25 U	<0.626 U
2,2-DICHLOROPROPANE	ug/L	42	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
2-BUTANONE	ug/L	61000	<12.5 U	<50 U	<5 U	<5 U	<12.5 U
2-CHLOROTOLUENE	ug/L	2000	<0.626 UJ	<2.5 U	<0.25 UJ	<0.25 UJ	<0.626 UJ
2-HEXANONE	ug/L	6100	<12.5 U	<50 U	<5 U	<5 U	<12.5 U
4-CHLOROTOLUENE	ug/L	2000	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U

LHAAP-67 Quarterly MNA Sampling - May 2015

Location ID: Sample Date:	Units	MCL/ MSC	67WW01-051915 5/19/2015	67WW08-051915 5/19/2015	67WW09-051915 5/19/2015	67WW11-051915 5/19/2015	67WW13-051915 5/19/2015
4-METHYL-2-PENTANONE	ug/L	8200	<12.5 U	<50 U	<5 U	<5 U	<12.5 U
ACETONE	ug/L	92000	<12.5 U	<50 U	<5 U	<5 U	<12.5 U
BENZENE	ug/L	5	<0.626 U	<2.5 U	<0.25 U	<0.25 U	<0.626 U
BROMOBENZENE	ug/L	2000	<0.626 U	<2.5 U	<0.25 U	<0.25 U	<0.626 U
BROMOCHLOROMETHANE	ug/L	4100	<1 U	<4 U	<0.4 U	<0.4 U	<1 U
BROMODICHLOROMETHANE	ug/L	4.6	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
BROMOFORM	ug/L	36	<2.5 U	<10 U	<1 U	<1 U	<2.5 U
BROMOMETHANE	ug/L	140	<2.5 U	<10 U	<1 U	<1 U	<2.5 U
CARBON DISULFIDE	ug/L	10000	<2.5 U	<10 U	<1 U	<1 U	<2.5 U
CARBON TETRACHLORIDE	ug/L	5	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
CHLOROBENZENE	ug/L	100	<0.626 U	<2.5 U	<0.25 U	<0.25 U	<0.626 U
CHLOROETHANE	ug/L	41000	<2.5 U	<10 U	<1 U	<1 U	<2.5 U
CHLOROFORM	ug/L	1000	<0.626 U	3.04 J	<0.25 U	<0.25 U	1.7 J
CHLOROMETHANE	ug/L	220	<2.5 U	<10 U	<1 U	<1 U	<2.5 U
CIS-1,2-DICHLOROETHENE	ug/L	70	1.54 J	<5 U	<0.5 U	<0.5 U	2.08 J
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
DIBROMOCHLOROMETHANE	ug/L	34	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
DIBROMOMETHANE	ug/L	380	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
ETHYLBENZENE	ug/L	700	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
HEXACHLOROBUTADIENE	ug/L	20	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
ISOPROPYLBENZENE	ug/L	1000	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
M,P-XYLENE	ug/L	10000	<2.5 U	<10 U	<1 U	<1 U	<2.5 U
METHYLENE CHLORIDE	ug/L	5	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
NAPHTHALENE	ug/L	2000	<1 U	<4 U	<0.4 U	<0.4 U	<1 U
N-BUTYLBENZENE	ug/L	4100	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
N-PROPYLBENZENE	ug/L	4100	<0.626 U	<2.5 U	<0.25 U	<0.25 U	<0.626 U
O-XYLENE	ug/L	10000	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
P-ISOPROPYLTOLUENE	ug/L	10000	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
SEC-BUTYLBENZENE	ug/L	4100	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
STYRENE	ug/L	100	<0.626 U	<2.5 U	<0.25 U	<0.25 U	<0.626 U
TERT-BUTYLBENZENE	ug/L	4100	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
TETRACHLOROETHENE	ug/L	5	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
TOLUENE	ug/L	1000	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<2.5 U	<10 U	<1 U	<1 U	<2.5 U
TRICHLOROETHENE	ug/L	5	3.03	<5 U	<0.5 U	<0.5 U	2.91

LHAAP-67 Quarterly MNA Sampling - May 2015

Location ID: Sample Date:	Units	MCL/ MSC	67WW01-051915 5/19/2015	67WW08-051915 5/19/2015	67WW09-051915 5/19/2015	67WW11-051915 5/19/2015	67WW13-051915 5/19/2015
TRICHLOROFLUOROMETHANE	ug/L	31000	<1.25 U	<5 U	<0.5 U	<0.5 U	<1.25 U
VINYL CHLORIDE	ug/L	2	1.86 J	<5 U	<0.5 U	<0.5 U	0.695 J
Anions (9056)							
CHLORIDE	mg/L		988	1750	NA	NA	1680
NITRATE	mg/L	10	<1 U	<2 U	NA	NA	<2 U
NITRITE	mg/L	1	2.02	3.95 J	NA	NA	3.4 J
SULFATE	mg/L		143	524	NA	NA	344
Dissolved Gases (RSK-175)							
ETHANE	ug/L		<2 U	<2 U	NA	NA	<2 U
ETHENE	ug/L		<2 U	<2 U	NA	NA	<2 U
METHANE	ug/L		20	5.16	NA	NA	<2 U
SM3500FE							
FERROUS IRON	mg/L		0.0539	0.944	NA	NA	<0.04 U
SM4500-S-(-2)-F-2000							
SULFIDE	mg/L		<1 U	<1 U	NA	NA	<1 U

Blue Highlighting Indicates concentrations above MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

JUL 20 2015

CERTIFIED MAIL-RETURN RECEIPT REQUESTED: 7014 0150 0000 2454 8003

Mr. Thomas E. Lederle, Chief
Army BRAC Office
ATTN: Tom Lederle (DAIM-ODB)
600 Army Pentagon
Washington, DC 20310-0600

RE: Longhorn Army Ammunition Plant
Remedial Action Completion
LHAAP-46, Plant 2 Area

Dear Mr. Lederle:

This letter is to document that the U.S. Environmental Protection Agency (EPA) finds that the Remedial Action at LHAAP-46, Plant 2 Area is complete. The EPA defines completion of an operable unit remedial action as: conclusion of construction activities, determination that the remedy is operational and functional, performance of a final inspection, and preparation of an operable unit Remedial Action Report.

In regards to the Remedial Action at LHAAP, the remedial action objective is restoration to EPA Maximum Contaminant Levels (MCLs). The estimated timeframe for contaminants to achieve MCLs is 23 years, via a Monitored Natural Attenuation Program (MNAP). The MCLs to be achieved are:

- Trichloroethylene: 0.005 mg/L MCL
- cis-1,2-Dichloroethylene: 0.070 mg/L MCL
- vinyl chloride: 0.002 mg/L MCL
- 1,1-Dichloroethylene: 0.007 mg/L MCL

The Remedial Action completed at LHAAP-46 included: installation of monitoring wells to implement the MNAP, implementing a surface water monitoring program to prevent contaminated groundwater from migrating into nearby surface water, and the implementation of land use controls to prevent human exposure to contaminated groundwater.

The Army completed construction activities on April 30, 2013, and the wells survey and deed notification were recorded in the county on December 9, 2014. A draft final Operable Unit Remedial Action Report was submitted by the Army on January 22, 2015, and EPA accepted the final Remedial Action Completion Report on April 7, 2015.

If you have any further questions, please feel free to contact Mr. Stephen Tzhone at (214) 665-8409, and via email: tzhone.stephen@epa.gov, or Mr. Richard Mayer at (214) 665-7442, and via email: mayer.richard@epa.gov.

Sincerely,

John C. Meyer
Acting Associate Director
Superfund Remedial Branch

cc: Ms. Rose Zeiler, Army
Ms. April Palmie, TCEQ

FY2015

LONGHORN ARMY AMMUNITION PLANT

Installation Action Plan

Printed 21 July 2015

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Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multiyear cleanup program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern (AOC), and proposes a comprehensive, installation-wide approach, along with the costs and schedules associated with conducting investigations and taking the necessary remedial actions (RA).

In an effort to coordinate planning information between the restoration manager, Base Realignment and Closure (BRAC), the US Army Environmental Command (USAEC), Longhorn Army Ammunition Plant (LHAAP), the executing agencies, regulatory agencies, and the public, an IAP was completed. The IAP is used to track requirements, schedules, and tentative budgets for all major Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

Acronyms

AEDB-R	Army Environmental Database- Restoration
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirements
AST	Aboveground Storage Tank
BIP	Blow in Place
Bldg	Building
BRAC	Base Realignment and Closure
BRACO	Base Realignment and Closure Office
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERFA	Community Environmental Response Facilitation Act
CLI	Caddo Lake Institute
CS	Confirmatory Sampling
cy	cubic yards
DD	Decision Document
DERPMIS	Defense Environmental Restoration Program Management Information System
DoD	Department of Defense
EBS	Environmental Baseline Survey
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
ER,A	Environmental Restoration, Army (formerly DERA)
ESS	Explosives Safety Submission
FFA	Federal Facility Agreement
FRA	Final Remedial Action
FS	Feasibility Study
FWS	(US) Fish and Wildlife Service
FY	Fiscal Year
GWTP	Groundwater Treatment Plan
HTRW	Hazardous, Toxic and Radioactive Waste
IAP	Installation Action Plan
INF	Intermediate-Range Nuclear Force
IRA	Interim Remedial Action
IRP	Installation Restoration Program
K	thousand
LAP	Load, Assemble, and Pack
LHAAP	Longhorn Army Ammunition Plant
LTM	Long-Term Management
LUC	Land Use Controls
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
mm	millimeters
MMRP	Military Munitions Response Program
MNA	Monitored Natural Attenuation
MOA	Memorandum of Agreement
MRSPP	Munitions Response Site Prioritization Protocol
MSCs	Medium-Specific Concentrations

Acronyms

N/A	Not Applicable
NA	No Action
NFA	No Further Action
NPL	National Priorities List
ORIS	Operational Range Inventory - Sustainment
PA	Preliminary Assessment
PBA	Performance-Based Acquisition
PBC	Performance-Based Contract
PCB	Polychlorinated Biphenyls
POL	Petroleum, Oil, and Lubricants
PP	Proposed Plan
ppm	parts per million
PSI	Post-Screening Investigation
QA	Quality Assurance
Qtr	quarter
RA	Remedial Action
RA(C)	Remedial Action - Construction
RA(O)	Remedial Actions - Operation
RAB	Restoration Advisory Board
RAWP	Remedial Action Work Plan
RC	Response Complete
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RIP	Remedy-in-Place
RMIS	Restoration Management Information System
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
RTC	Response to Comments
SI	Site Inspection
SWMU	Solid Waste Management Unit
TAPP	Technical Assistance for Public Participation
TBD	To Be Determined
TCE	Trichloroethylene
TCEQ	Texas Commission on Environmental Quality
TERC	Total Environmental Restoration Contract
TNT	Trinitrotoluene
TRC	Technical Review Committee
TWC	Texas Water Commission
TX	Texas
UEP	Unlined Evaporation Pond
ug/L	micrograms per liter
USACE	US Army Corps of Engineers
USACHPPM	US Army Center for Health, Promotion and Preventive Medicine
USAEC	US Army Environmental Command

Acronyms

USAEHA	US Army Environmental Hygiene Agency
USATHAMA	US Army Toxic and Hazardous Materials Agency
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
USSR	Union of Soviet Socialist Republics
VOC	Volatile Organic Compound
WP	White Phosphorous
WWII	World War II
WWTP	Wastewater Treatment Plant

Installation Information

Installation Locale

Installation Size (Acreage): 8,416.00
City: Marshall
County: Harrison
State: Texas
Other Locale Information

LHAAP is located in central east Texas, in the northeast corner of Harrison County, approximately 14 miles northeast of Marshall, Texas, and 40 miles west of Shreveport, Louisiana. The closed installation currently occupies approximately 1,400 of its original 8,416 acres between State Highway 43 and the western shore of Caddo Lake. The area surrounding LHAAP is primarily rural and consists of forest lands, the small towns of Karnack and Uncertain, Texas, Caddo Lake, and Caddo Lake State Park.

Installation Mission

The LHAAP was an Army Materiel Command installation which the Army declared excess to its needs in July 1997. While active, the installation's mission was the production of trinitrotoluene (TNT) [World War II (WWII) era only], pyrotechnic items, and rocket motors. In 2003, the BRAC Division was tasked with its disposal.

Lead Organization

Base Realignment and Closure Division

Lead Executing Agencies for Installation

US Army Corps of Engineers (USACE), Tulsa District

Regulator Participation

Federal	US Environmental Protection Agency (USEPA), Region VI
State	Texas Commission on Environmental Quality (TCEQ)

National Priorities List (NPL) Status

A score of 40 was recorded on 01-AUG-90.

Final RA(C) Completion Date: 201709

Date for NPL Deletion: TBD

Installation Restoration Advisory Board (RAB)/Technical Review Committee (TRC)/Technical Assistance for Public Participation (TAPP) Status

RAB established 2004

Installation Program Summaries

IRP

Primary Contaminants of Concern: Explosives, Metals, Munitions constituents (MC), Perchlorate, Petroleum, Oil and Lubricants (POL), Volatiles (VOC)

Affected Media of Concern: Groundwater, Sediment, Soil, Surface Water

MMRP

Primary Contaminants of Concern: Explosives

Affected Media of Concern: Groundwater, Soil

Cleanup Program Summary

Installation Historic Activity

The LHAAP was established in October 1942, with the primary mission of producing 2,4,6-TNT flake. Monsanto Chemical Company was the first contract operator of the plant. Production of 2,4,6-TNT continued through WWII until August 1945, when the plant went on standby status until February 1952. From then until 1956, Universal Match Corporation was the contracting operator, producing such pyrotechnic ammunition as photoflash bombs, simulators, hand signals, and tracers for 40 millimeter (mm) ammunition. With the departure of Universal Match Corporation in 1956, Thiokol assumed this responsibility, along with rocket motor production. 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.

Prior to 1994, operations consisted of compounding pyrotechnic and propellant mixtures, load, assemble, and pack (LAP) activities, accommodating receipt and shipment of containerized cargo, and maintenance and/or layaway of standby facilities and equipment as they apply to mobilization planning. The installation was also 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 US and the former Union of Soviet Socialist Republics (USSR). In October 1996, a lease in excess of 1,000 of the 8,416 acres was granted to the Caddo Lake Institute (CLI) for biological and ecological studies by local schools and universities.

In July 1997, the plant became inactive and excess to the Army's needs. In July 1998 the Army contracted EarthTech, Inc. to liquidate all personal property and specific installed property. That contract was completed in fiscal year (FY)2000. In 1999 the Army contracted with Project Development Corporation to demolish specified structurally unsafe buildings. In 2003 the demolition of all remaining buildings began. The demolition of the power plant was completed in 2009. Only the transformers remaining, all planned demolition has taken place. A memorandum of agreement (MOA) between the Army and the US Fish and Wildlife Service (USFWS), was signed on Oct. 21, 2000 designating an area, consisting of approximately 7,200 acres, for establishment of a wildlife refuge overlay at LHAAP. In October 2002 LHAAP was transferred to the Base Realignment and Closure Office (BRACO) to manage as an excess property. In April 2004, the Army and the USFWS entered into an MOA that set forth the transfer process of LHAAP acreage. Since May 2004, approximately 7,000 LHAAP acres have been transferred to the USFWS. The USFWS manages these acres as the Caddo Lake National Wildlife Refuge within the perimeter fence of the former installation. Although the perimeter fence and gates remain functional, guards are no longer posted since the Army's security contract expired on March 14, 2007. The CLI lease with the Army was transferred to the USFWS with the affected acreage.

On Aug. 9, 1990, the LHAAP was placed on the NPL. After being listed on the NPL, LHAAP, the USEPA, and the Texas Water Commission (TWC) (now called the TCEQ) entered into a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 Agreement for remedial activities at LHAAP. The CERCLA Section 120 agreement, referred to as the federal facility agreement (FFA), became effective Dec. 30, 1991. The installation applied for a Resource Conservation and Recovery Act (RCRA) Part A permit.

In February 1992, a RCRA Part B permit was signed. As a result, a RCRA facility assessment (RFA) identified 57 potential sites of concern. Since that time, scrubbing of the list [removal of non-Environmental Restoration, Army (ER,A) eligible sites, redundancies, etc.] has resulted in the current Army Environmental Database - Restoration (AEDB-R) list of 50 sites. In late 2007, the USEPA Region VI clarified their view of the NPL status of LHAAP as consisting of only those sites listed in the FFA and any additional sites with significant contamination. During a meeting between the Army, the USEPA and the TCEQ held in February 2008 at TCEQ headquarters, regulators and the Army agreed on the sites that will be addressed as NPL, including those listed and those considered to be NPL-caliber. The NPL sites are LHAAP-004, LHAAP-037, LHAAP-046, LHAAP-047, LHAAP-049, LHAAP-050, LHAAP-058, and LHAAP-067 as well as the following sites which are listed in the FFA: LHAAP-001, LHAAP-011, LHAAP-012, LHAAP-013, LHAAP-014, LHAAP-016, LHAAP-017, LHAAP-018, LHAAP-024, LHAAP-027, LHAAP-029, LHAAP-032, LHAAP-054. The USEPA will continue to provide review and concurrence on documents related to these sites and will co-sign records of decision (RODs). The schedule for each of these sites will be described in this IAP, which will serve as formal documentation of the resolution between the Army and USEPA.

The non-NPL sites will be addressed through CERCLA, with RCRA issues addressed, as necessary, as applicable or relevant and appropriate requirements (ARARs), with the TCEQ as lead regulator. The USEPA will provide review; however, the decision documents (DDs) will be signed by the Army alone with the TCEQ providing a letter of concurrence. In addition to the site listing of the FFA, an installation assessment by the Army in February 1980 and the RFA in April 1988 identified additional potential sites of concern. The information management system used in the early-1990s [Defense Environmental Restoration Program Management Information System (DERPMIS)] identified 59 sites at that time. In the mid-1990s, the tracking system being used at the time [the Restoration Management Information System (RMIS)] was updated to remove duplicate sites, sites contained within other sites, sites that were not a part of the restoration program, and sites that never existed.

Cleanup Program Summary

The following sites have been transferred: LHAAP-001, LHAAP-005, LHAAP-009, LHAAP-011, LHAAP-12, LHAAP-013, LHAAP-014, LHAAP-015, LHAAP-034, LHAAP-045, LHAAP-052, LHAAP-057, LHAAP-061, and LHAAP-063. Sites LHAAP-08, -32, -35/36, -35C(53), -48, -49, -55, -002-R-01 have been offered for transfer.

Installation Program Cleanup Progress

IRP

Prior Year Progress:

- LTM continues for LHAAP-012
- RA(O) underway for LHAAP-046
- RA(O) underway for LHAAP-050
- RA(O) underway for LHAAP-058
- RA(O) underway for LHAAP-067

Future Plan of Action:

- Remedial action (operations) [RA(O)]/long-term management (LTM) will be implemented for LHAAP-037 and will continue for LHAAP-12, LHAAP-046, LHAAP-050, LHAAP-058 and LHAAP-067
- A ROD will be completed for LHAAP-003, LHAAP-004, LHAAP-016, LHAAP-017, LHAAP-018/024, LHAAP-029, and LHAAP-047

MMRP

Prior Year Progress: None, awaiting resolution of dispute with the USEPA.

Future Plan of Action: A ROD will be completed for LHAAP-001-R-01 and LHAAP-003-R-01. The LTM phase will begin.

5-Year / Periodic Review Summary

5-Year / Periodic Review Summary

Status	Begin Date	End Date	End FY
Complete	201203	201405	2014
Complete	200706	200706	2007
Complete	200206	200206	2002
Planned	201703	201905	2019

Last Completed 5-Year / Periodic Review Details

Associated ROD/DD Name	Sites
BURNING GROUND #3(LHAAP-018 & LHAAP-024)	LHAAP-018, LHAAP-024
BURNING GROUND #3(LHAAP-018 & LHAAP-024)	LHAAP-018, LHAAP-024
CAPPING LANDFILLS 12 & 16	LHAAP-012, LHAAP-016
CAPPING LANDFILLS 12 & 16	LHAAP-012, LHAAP-016
Decision Document LHAAP-08, 48 & 53	LHAAP-008, LHAAP-053
Decision Document LHAAP-08, 48 & 53	LHAAP-008, LHAAP-053
Final ROD LHAAP-035B (037) & LHAAP-067	LHAAP-067
Final ROD LHAAP-035B (037) & LHAAP-067	LHAAP-067
Final ROD LHAAP-050, Former Sump Water..	LHAAP-050
Final ROD LHAAP-050, Former Sump Water..	LHAAP-050
Final ROD LHAAP-35A(058), Shops Area	LHAAP-058
Final ROD LHAAP-35A(058), Shops Area	LHAAP-058
Flashing Area/Burning Grnd No 2:LHAAP-17	LHAAP-017
Flashing Area/Burning Grnd No 2:LHAAP-17	LHAAP-017
Former TNT Waste Disposal Plant:LHAAP-32	LHAAP-032
Former TNT Waste Disposal Plant:LHAAP-32	LHAAP-032
LHAAP-02, Vacuum Truck Overnight Parking	LHAAP-002
LHAAP-02, Vacuum Truck Overnight Parking	LHAAP-002
LHAAP-12 Final ROD	LHAAP-012
LHAAP-12 Final ROD	LHAAP-012
NO ACTION ROD 1, 11, 27, 54	LHAAP-001, LHAAP-011, LHAAP-027, LHAAP-054
NO ACTION ROD 1, 11, 27, 54	LHAAP-001, LHAAP-011, LHAAP-027, LHAAP-054
NO ACTION ROD 13 & 14	LHAAP-013, LHAAP-014
NO ACTION ROD 13 & 14	LHAAP-013, LHAAP-014
ROD Former Pistol Range	PBC Longhorn
ROD Former Pistol Range	PBC Longhorn
ROD LHAAP-49, Former Acid Storage Area	PBC Longhorn
ROD LHAAP-49, Former Acid Storage Area	PBC Longhorn
SUMPS (145) VARIOUS	LHAAP-035, LHAAP-036
SUMPS (145) VARIOUS	LHAAP-035, LHAAP-036

Results LHAAP-12: Minor erosion & subsidence of landfill cap and well within plume dry

LHAAP-16: Need O&M plan for cap, minor erosion of cap and high concentrations of TCE detected

LHAAP-18/24: ICT issues and perchlorate discharge from plant exceedance

Actions LHAAP-12: Repaired erosion and backfilled and seeded subsidence area

LHAAP-16: Repaired erosion

Plans LHAAP-12: Install new well

5-Year / Periodic Review Summary

Plans LHAAP-16: Prepare O&M Plan for landfill cap and implement final remedy

LHAAP-18/24: The FS which is planned for 2014 will address the issues

Recommendations and Implementation Plans:
The draft revised feasibility study (FS) for LHAAP-18/24 was submitted for regulatory review in January 2015.

Land Use Control (LUC) Summary

LUC title: LHAAP-037 & 067 GW

Site(s): LHAAP-067

ROD/DD title: Final ROD LHAAP-035B (037) & LHAAP-067

Location of LUC

LHAAP-037 and LHAAP-067 groundwater

Land Use Restriction: Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater for agricultural/irrigation purposes

Types of Engineering Controls: None

Types of Institutional Controls: Restrictions on Groundwater Withdrawal

Date in Place: 201110

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: USACE District

Record of LUC: Master Plan or Equivalent

Documentation Date: N/A

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: VOC

Additional Information

N/A

LUC title: LUC for LHAAP-012 Capping

Site(s): LHAAP-012

ROD/DD title: LHAAP-12 Final ROD

Location of LUC

Site LHAAP-012

Land Use Restriction: Landfill restriction - Prohibit activities that would impact the LF cap (or cover system) and drainage system, Landfill restriction - Prohibit excavation on LF cap or cover system, Media specific restriction - prohibit use of groundwater for consumption or domestic purposes, Media specific restriction - restrict drinking water well installation, Media specific restriction - restrict withdrawal or use of groundwater for agricultural/irrigation purposes

Types of Engineering Controls: Fences, Signs

Types of Institutional Controls: Deed Restrictions, Dig Permits

Date in Place: 200706

Modification Date: N/A

Date Terminated: N/A

Inspecting Organization: USACE District

Record of LUC: Master Plan or Equivalent

Documentation Date: 200706

LUC Enforcement: Annual Inspections, 5 Year Reviews

Contaminants: VOC

Additional Information

N/A

LONGHORN ARMY AMMUNITION PLANT

Non-BRAC Excess
Installation Restoration Program

IRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 54/8

Installation Site Types with Future and/or Underway Phases

2 Above Ground Storage Tank
(LHAAP-049, LHAAP-067)
3 Burn Area
(LHAAP-001, LHAAP-017, LHAAP-018)
1 Contaminated Ground Water
(PBC Longhorn)
1 Disposal Pit/Dry Well
(LHAAP-063)
5 Landfill
(LHAAP-011, LHAAP-012, LHAAP-016, LHAAP-019, LHAAP-057)
1 Oil Water Separator
(LHAAP-056)
6 Spill Site Area
(LHAAP-051, LHAAP-052, LHAAP-058, LHAAP-066, LHAAP-070, LHAAP-071)
15 Storage Area
(LHAAP-002, LHAAP-003, LHAAP-006, LHAAP-007, LHAAP-009, LHAAP-015, LHAAP-034, LHAAP-036, LHAAP-037, LHAAP-045, LHAAP-059, LHAAP-060, LHAAP-064, LHAAP-065, LHAAP-068)
2 Surface Impoundment/Lagoon
(LHAAP-005, LHAAP-024)
2 Underground Storage Tank
(LHAAP-035, LHAAP-069)
4 Waste Lines
(LHAAP-029, LHAAP-046, LHAAP-047, LHAAP-050)
4 Waste Treatment Plant
(LHAAP-004, LHAAP-008, LHAAP-055, LHAAP-061)

Most Widespread Contaminants of Concern

Explosives, Metals, Munitions constituents (MC), Perchlorate, Petroleum, Oil and Lubricants (POL), Volatiles (VOC)

Media of Concern

Groundwater, Sediment, Soil, Surface Water

Completed Remedial Actions (Interim Remedial Actions / Final Remedial Actions (IRA/FRA))

Site ID	Site Name	Action	Remedy	FY	Cost
LHAAP-018	BURNING GROUND/WASHOUT POND(SWMU 18)	IRA	REMOVAL	1997	TBD
LHAAP-024	FORMER UNLINED EVAP POND (SWMU 24)	IRA	CAPPING	1997	TBD
LHAAP-024	FORMER UNLINED EVAP POND (SWMU 24)	IRA	REMOVAL	1997	TBD
LHAAP-012	ACTIVE LANDFILL (SWMU 12)	IRA	CAPPING	2005	$5.0 K
LHAAP-016	OLD LANDFILL (SWMU 16)	IRA	CAPPING	2005	$14.0 K
LHAAP-012	ACTIVE LANDFILL (SWMU 12)	FRA	NATURAL ATTENUATION	2007	TBD
LHAAP-012	ACTIVE LANDFILL (SWMU 12)	FRA	INSTITUTIONAL CONTROLS	2007	TBD
LHAAP-004	LHAAP PILOT WASTEWATER TREATMENT PLANT	IRA	WASTE REMOVAL - SOILS	2011	TBD
LHAAP-018	BURNING GROUND/WASHOUT POND(SWMU 18)	IRA	GROUND WATER TREATMENT	2011	TBD
LHAAP-024	FORMER UNLINED EVAP POND (SWMU 24)	IRA	GROUND WATER TREATMENT	2011	TBD

IRP Summary

Completed Remedial Actions (Interim Remedial Actions / Final Remedial Actions (IRA/FRA))

Site ID	Site Name	Action	Remedy	FY	Cost
LHAAP-035	SUMPS (145) VARIOUS	FRA	WASTE REMOVAL - SOILS	2011	TBD
LHAAP-046	PLANT 2 AREA	FRA	NATURAL ATTENUATION	2013	TBD
LHAAP-046	PLANT 2 AREA	FRA	INSTITUTIONAL CONTROLS	2013	TBD
LHAAP-050	FORMER WASTE DISPOSAL FACILITY	FRA	REMOVAL	2013	TBD
LHAAP-058	MAINTENANCE COMPLEX	FRA	BIOREMEDIATION - IN SITU GROUNDWATER	2013	TBD
LHAAP-067	ABOVE GROUND STORAGE TANK	FRA	NATURAL ATTENUATION	2013	TBD
LHAAP-067	ABOVE GROUND STORAGE TANK	FRA	INSTITUTIONAL CONTROLS	2013	TBD

Duration of IRP

Year of IRP Inception: 197906

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201709/209909

Date of IRP completion including Long Term Management (LTM): 209909

IRP Contamination Assessment

Contamination Assessment Overview

In early 2008, the installation-wide ecological risk assessment was completed. In 2012 it was discovered that explosives analysis data which had been deemed unusable was inadvertently included in the ecological risk assessment. The impact of removing the unusable data from the ecological risk assessment was evaluated with additional samples collected and an ecological risk assessment addendum completed in 2014. Work currently being conducted under a performance-based acquisition (PBA) includes conducting additional sampling activities at several sites and finalizing outstanding FSs, with proposed plans (PP) and a ROD to follow during calendar year 2015. Regulatory concurrence was obtained for reports recommending no action for these 11 sites: LHAAP-06, LHAAP-07, LHAAP-23, LHAAP-35, LHAAP-36, LHAAP-51, LHAAP-55, LHAAP-60, LHAAP-64, LHAAP-66, and LHAAP-68.

In 2008, DDs were signed for sites LHAAP-6, 7, 48, 51, 55, 60, 64, 66, and 68. Also in 2008 the FSs were completed for all applicable total environmental restoration contract (TERC) sites including the three TERC NPL sites (LHAAP-32, LHAAP-37, and LHAAP-67) and a ROD document was signed for TERC NPL site LHAAP-32 in 2008. No action DDs were signed in 2008 for the remaining TERC sites (LHAAP-8, LHAAP-48, LHAAP-53, and LHAAP-59) and in 2010 the RODs were signed for LHAAP-37, LHAAP-46, LHAAP-49, LHAAP-50, LHAAP-58, LHAAP-67 and Pistol Range. In 2014 a no further action (NFA) DD was completed for LHAAP-19, -56, -65 and -69. In 2015, an NFA DD will be completed for LHAAP-05, -09, -15, -34, -52, -57, -61, -63, -70, and -71. In 2012, the following IRP sites were added to AEDB-R: LHAAP-46, -47, -49, -56, -59, and -65.

Sediment samples collected by the Army from Caddo Lake near the mouths of two branches of Goose Prairie Creek indicated elevated lead and mercury concentrations. The sampling locations are outside of the installation boundary. In 2004, an investigation of contaminants in fish tissue from three Caddo Lake sites, one of which is upgradient at Clinton Lake, was funded by the USEPA Region 6 and performed by the TCEQ Region 5. It concluded that mercury was present at elevated levels from all three sites, dioxin was also present, but highest at Clinton Lake (a lake upstream from LHAAP), and pesticides, polychlorinated biphenyls (PCB) and perchlorate were not detected in either edible fish fillets or whole fish.

Approximately 7,000 acres of the plant have transferred to the USFWS and are being operated as the Caddo Lake National Wildlife Refuge. The remaining acreage is also expected to transfer to the USFWS as restoration activities are completed.

Cleanup Exit Strategy

As RODs are finalized and remedial designs (RDs) and RAs are implemented, long-term RA(O) and monitoring will continue until ramp-down.

Ramp-down/exit strategies at the sites will continue to be based on human and environmental exposure.

IRP Previous Studies

	Title	Author	Date
1979			
	Assessment of Contaminant Migration, Longhorn Army Ammunition Plant	Robert H. Balter Co	APR-1979
1980			
	Installation Assessment of Longhorn Army Ammunition Plant, Report No. 150	U.S. Army Toxic and Hazardous Materials Agency	FEB-1980
	Land Disposal Study No. 38-26-0104-81, LHAAP, 23 January - 8 February 1980	USAEHA	MAY-1980
1981			
	Wastewater Engineering Special Study No. 32-62-0182-82	Wastewater Engineering Special Study No. 32-62-0182-82	SEP-1981
1983			
	Phase II, Hazardous Waste Management Special Study No. 39-26-0147-83, DARCOM Open-Burning/Open-Detonation Grounds Evaluation, LHAAP, 31 July - 3 August 1981	USAEHA	SEP-1983
1984			
	Closure of Unlined Evaporation Pond	Kindle, Stone and Associates	JUN-1984
	Longhorn Army Ammunition Plant Contamination Survey, Contract # DAAA09-78-C-3004,	Environmental Protection Systems, Inc	JUN-1984
1986			
	Closure Report, Unlined Evaporation Pond, Longhorn Army Ammunition Plant	Army Corps of Engineers, Tulsa	JUN-1986
1994			
	Interim Risk Assessment for Burning Ground 3 & Unlined Evaporation Pond Sites (18 & 24)	Army Corps of Engineers, Tulsa	JAN-1994
	Soil and Groundwater Background Concentration Study	Army Corps of Engineers, Tulsa	MAY-1994
	Remedial Investigation /Feasibility Study Report for Areas 13 & 14	Army Corps of Engineers, Tulsa	JUN-1994
	Draft Final Workplan Addendum Soil and Groundwater Background Concentration Study	Army Corps of Engineers, Tulsa	JUN-1994
1995			
	Final Soil Background Concentration Report (Revised)	Army Corps of Engineers, Tulsa	MAR-1995
	Groundwater Background Concentration Report	Army Corps of Engineers, Tulsa	MAY-1995
	Final HydroGeologic Assessment Report	Army Corps of Engineers, Tulsa	MAY-1995
	Final Prop Plan of Action for Sites 13 & 14	Army Corps of Engineers, Tulsa	JUN-1995
	Groundwater Sampling Results-May 95, Interim Remedial Action-Phase III, Burning Ground 3 and UEP, LHAAP 18 & 24	Army Corps of Engineers, Tulsa	JUN-1995
	Remedial Investigation/Feasibility Study Report for Sites 13 & 14	Army Corps of Engineers, Tulsa	JUN-1995
	Final Record of Decision for Early Interim Remedial Action at Landfill Sites 12 & 16	Army Corps of Engineers, Tulsa	JUL-1995
1996			

IRP Previous Studies

	Title	Author	Date
1996			
	Final Work Plan for Phase III Interim Remedial Action at Burning Ground 3	Army Corps of Engineers, Tulsa	JAN-1996
	Group 4 Baseline Risk Assessment Work Plan	Army Corps of Engineers, Tulsa	FEB-1996
	Final Project Work Plans, Interim Remedial Action Landfills 12 & 16 Caps	Army Corps of Engineers, Tulsa	JUN-1996
	Group 4 Sumps Groundwater Monitoring Quarterly Report	Army Corps of Engineers	JUN-1996
	Draft Final Design Analysis Report for the Site 16 Time Critical Removal Action	Army Corps of Engineers	JUN-1996
	Draft Final Comprehensive Chemical Data Acquisition Plan for the RI/FS	Army Corps of Engineers, Tulsa	JUL-1996
	Draft Final Field Summary Report for the Phase II, Group 2 Sites Remedial Investigation	Army Corps of Engineers, Tulsa	JUL-1996
	Treatment Simulation and Toxicity Testing Results of Site 16 Groundwater	Army Corps of Engineers, Tulsa	AUG-1996
	Final Project Construction Drawings, Interim Remedial Action, Landfill 12 & 16 Caps	Army Corps of Engineers, Tulsa	AUG-1996
1997			
	Final Remedial Investigation Report Group 1 Sites (Sites 1, 11, 27, and XX) and Vol. 2 Baseline Risk Assessment	Army Corps of Engineers, Tulsa	APR-1997
1998			
	Final Record of Decision for Early Interim Remedial Action at Group 1 Sites	Army Corps of Engineers, Tulsa	FEB-1998
	Group 2 Final Workplan	Army Corps of Engineers, Tulsa	MAR-1998
	Environmental Baseline Study	Army Corps of Engineers, Tulsa	APR-1998
	Group 4 Final Workplan	Army Corps of Engineers, Tulsa	JUL-1998
2000			
	Site 16 Risk Assessment	Army Corps of Engineers, Tulsa	MAR-2000
	Hazardous and Medical Waste Study - Response Complete Verification and Relative Risk Site Evaluation for the Longhorn Army Ammunition Plant	USACHPPM	JUL-2000
	Final Site 16 Remedial Investigation Report	Army Corps of Engineers, Tulsa	OCT-2000
2001			
	Final Remedial Investigation Report for Group 2 Sites	Jacobs Engineering Group, Inc	APR-2001
	Baseline Risk Assessment: Human Health for Site 16 Landfill Remedial Investigation and Feasibility Study	Jacobs Engineering Group, Inc	JUN-2001
	Final Ecological Risk Assessment: Supplement to Site 16 Landfill Remedial Investigation Report	Jacobs Engineering Group, Inc	OCT-2001
2002			
	Final Group 4 Sites Remedial Investigation Report (Sites 35A, 35B, 46, 47, 48, 50, 60, and Goose Prairie Creek)	Jacobs Engineering Group, Inc	JAN-2002
	Final Group 4 Sites Remedial Investigation Addendum (Sites 04, 08, 67, and Hydrocarbon Study)	Jacobs Engineering Group, Inc	FEB-2002
	Final Group 2 Sites Remedial Investigation Report Addendum (Site 49)	Jacobs Engineering Group, Inc	FEB-2002

IRP Previous Studies

	Title	Author	Date
2002			
	Final Feasibility Study for Site 16	Jacobs Engineering Group, Inc	MAR-2002
	Final Five-Year Review for Sites 18 & 24 (Burning Ground No. 3), Site 16 (Old Landfill), and Site 12 (Sanitary Landfill)	Complete Environmental Service	AUG-2002
	Group 2 Sites Baseline Human Health and Screening Ecological Risk Assessment (Sites 12, 17, 18/24, 29, 32, 49, Harrison Bayou, and Caddo Lake)	Jacobs Engineering Group, Inc	AUG-2002
2004			
	Final Installation-Wide Background Study Workplan	Shaw Environmental and Infrastructure	JAN-2004
	Final Groundwater Data Gaps Investigation Workplan (Groups 2 and 4)	Shaw Environmental and Infrastructure	FEB-2004
	Final Technical Memorandum: Modeling Approach for Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment	Shaw Environmental and Infrastructure	MAR-2004
	Final Sediment Sampling Report for Caddo Lake and Clinton Lake	Shaw Environmental and Infrastructure	APR-2004
	Final Environmental Condition of Property I	Shaw Environmental and Infrastructure	MAY-2004
	Final Background Soil Study Report	Shaw Environmental and Infrastructure	JUL-2004
	Final Evaluation of LHAAP-45 Surface Soil Analytical Data	Shaw Environmental and Infrastructure	SEP-2004
	Final Groundwater Data Gaps Investigation Workplan (Groups 2 and 4), Addenda 1 and 2	Shaw Environmental and Infrastructure	SEP-2004
	Final Environmental Condition of Property II	Army Corps of Engineers, Tulsa	NOV-2004
2005			
	Final Site 12 Feasibility Study	Shaw Environmental and Infrastructure	JAN-2005
	Final Environmental Site Assessment Phase I and II Report	Plexus Scientific Corporation	FEB-2005
	Final Feasibility Report for Site 12 Addendum (Revision 2)	Shaw Environmental and Infrastructure	MAR-2005
	Final Proposed Plan for Landfill 12 (LHAAP-12),	Shaw Environmental and Infrastructure	MAR-2005
	Final Project Report Plant-Wide Perchlorate Investigation	Solutions To Environmental Problems (STEP)	APR-2005
	Final Site Inspection Report for the Military Munitions Response Program	Engineering-Environmental Management, Inc	JUN-2005
	Final Feasibility Study for LHAAP-67 (Aboveground Storage Tank Farm),	Shaw Environmental and Infrastructure	AUG-2005
	Final Feasibility Study for LHAAP-35B (37) (Chemical Laboratory)	Shaw Environmental and Infrastructure	OCT-2005
	Final Site Evaluation Report for LHAAP-32 (Former Waste TNT Disposal Plant)	Shaw Environmental and Infrastructure	NOV-2005
2006			
	Final Installation-Wide Work Plan	Shaw Environmental and Infrastructure	JAN-2006
	Decision Documentation for LHAAP-03 (Wastewater	Shaw Environmental and	JAN-2006

IRP Previous Studies

	Title	Author	Date
2006			
	Collection At Paint Shop), LHAAP-06 (Building 54F), and LHAAP-23 (Building 707-C Storage Area for PCBs),	Infrastructure	
	Final Work Plan for Engineering Evaluation / Cost Analysis for Military Munitions Response Program	Cape Environmental Management, Inc.	MAR-2006
	Final Background Surface Water and Sediment Study Report	Shaw Environmental and Infrastructure	JUL-2006
	Draft Final Proposed Plan, LHAAP-37 & 67	Shaw Environmental and Infrastructure	JUL-2006
	Final Record of Decision, LHAAP-12	US Army	JUL-2006
	Remainder of PBC docs that have been submitted :	Workplans; Summary report for 46 and pistol range (Draft); Evaluation Report for 02 (Draft)	SEP-2006
	Draft Final Site Evaluation Report, LHAAP-02; Work Plan Addenda for LHAAP-04, 07, 46, 51, 35/36, 29, Pistol Range, and Chromium Specification;	Shaw Environmental and Infrastructure	SEP-2006
	Draft Final Evaluation of Monitored Natural Attenuation, LHAAP-12, 37 & 67	Shaw Environmental and Infrastructure	DEC-2006
2007			
	Final Groundwater Monitoring Report Sites 12 and 16 (spring 2003, spring 2004 and winter 2004)	ALL Consulting	JAN-2007
	Final Modeling Report,Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment, Rev. 01	Shaw Environmental and Infrastructure	FEB-2007
	Final LHAAP-12 Well Abandonment and Installation Report Groundwater, Data Gaps Investigation Groups 2 and 4	Shaw Environmental, Inc.	APR-2007
	Final Site Evaluation Report, LHAAP-48 & 53	Shaw Environmental and Infrastructure	APR-2007
	Final Addendum 11 Monitored Natural Attenuation Sampling LHAAP-16, -17, -29, -46, -47, -50, 35A(58), Final Installation-Wide Work Plan	Shaw Environmental, Inc.	MAY-2007
	Legal Notice - Industrial Solid Waste Notice of Land Use Controls at LHAAP-12	Rose Zeiler, LHAAP Site Manager	JUN-2007
	Final Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12	Shaw Environmental, Inc.	JUN-2007
	Evaluation of Perimeter Well Data for Use as Groundwater Background	Shaw Environmental, Inc.	JUN-2007
	Final Natural Attenuation Evaluation LHAAP-12, LHAAP-35B(37) and LHAAP-67 (Report and Appendix A)	Shaw Environmental, Inc.	JUN-2007
	Remedial Design Addendum Landfill 12 (LHAAP-12)	Shaw Environmental, Inc.	JUN-2007
	Baseline Ecological Risk Assessment Surface Water Sampling Plan for Goose Prairie Creek, Revision 01	Shaw Environmental, Inc.	JUL-2007
	Final Results of Modeling for Natural Attenuation of Chlorinated Solvents in Groundwater at LHAAP-35B(37) & 67	Shaw Environmental, Inc.	JUL-2007
	Final LHAAP-59 Site Investigation Report	Shaw Environmental, Inc.	AUG-2007
	Draft Final Second Five year review Report, LHAAP-12, 16, 18 & 24	Shaw Environmental, Inc.	AUG-2007
	Memorandum: Supplemental Groundwater Activities at LHAAP-37	Shaw Environmental, Inc.	SEP-2007

IRP Previous Studies

	Title	Author	Date
2007			
	Final Landfill 12 (LHAAP-12) Operating Properly and Successfully Demonstration Report	Shaw Environmental, Inc.	SEP-2007
	Memorandum: Analysis of Soil Samples Collected from LHAAP-59 on September 14, 2007	Shaw Environmental, Inc.	OCT-2007
	Final Installation-Wide Baseline Ecological Risk Assessment Vols. I & II	Shaw Environmental, Inc.	NOV-2007
	Final Site Investigation Report: LHAAP-06, 07, 51, 55, 64, 66 and 68 (rev 1)	Shaw Environmental, Inc.	DEC-2007
2008			
	Final Proposed Plan, LHAAP-08	Shaw Environmental, Inc.	JAN-2008
	Final Data Evaluation Report Chemical Concentrations in soil Samples Associated with LHAAP-35/36 Sumps	Shaw Environmental, Inc.	JAN-2008
	Final Proposed Plan, LHAAP-32	Shaw Environmental, Inc.	JAN-2008
	Final Proposed Plan, LHAAP-48 & 53	Shaw Environmental, Inc.	JAN-2008
	Draft Final LHAAP-32 Record of Decision	Shaw Environmental, Inc.	MAR-2008
	Draft Final LHAAP-08, 48 & 53 Decision Document	Shaw Environmental, Inc.	MAR-2008
	Final Decision Document, LHAAP-6, 7, 51, 55, 64, 66 and 68	Shaw Environmental, Inc.	JUL-2008
	Final LHAAP-32 Record of Decision	Shaw Environmental, Inc.	AUG-2008
	Final LHAAP-59 Decision Document	Shaw Environmental, Inc.	SEP-2008
	Final Five-Year Review Second Five-Year Revise Report for LHAAP-12, 16 and 18/24	Shaw Environmental Inc.	SEP-2008
	Final LHAAP-60 Decision Document	Shaw Environmental, Inc.	OCT-2008
	Final LHAAP-8, 48, 53 and 002-R Decision Document	Shaw Environmental, Inc.	NOV-2008
2009			
	Draft Site Evaluation Report and Soil Removal Report for LHAAP-49	Shaw Environmental, Inc.	JAN-2009
	Draft Final LHAAP-37/67 Record of Decision	Shaw Environmental, Inc.	JAN-2009
	Final Site Investigation Report, LHAAP-2	Shaw Environmental, Inc.	JAN-2009
	Final Engineering Evaluation/Cost Analysis, LHAAP-4	Shaw Environmental, Inc.	MAR-2009
2010			
	Final Proposed Plan, LHAAP-46	Shaw Environmental, Inc.	JAN-2010
	Final Proposed Plan, LHAAP-35A(58)	Shaw Environmental, Inc.	JAN-2010
	Final Proposed Plan, LHAAP-50	Shaw Envronmental, Inc.	JAN-2010
	Final Proposed Plan, LHAAP-49	Shaw Environmental, Inc.	JAN-2010
	Final Proposed Plan, LHAAP-17	Shaw Environmental, Inc.	MAY-2010
	Final Record of Decision, LHAAP-37/67	US Army	JUN-2010
	Final Decision Document, LHAAP-02	Shaw Environmental, Inc.	JUL-2010
	Final Record of Decision, LHAAP-49	Shaw Environmental, Inc.	AUG-2010
	Final Cover Evaluation & Final Landfill Closure Report, LHAAP-19, C&D Landfill	ETTL Engineers & Consultants Inc.	SEP-2010
	Final Record of Decision, LHAAP-46	Shaw Environmental, Inc.	SEP-2010
	Final Record of Decision, LHAAP-50	Shaw Environmental, Inc.	SEP-2010

IRP Previous Studies

	Title	Author	Date
2010			
	Final Record of Decision, LHAAP-35A(58)	Shaw Environmental, Inc.	SEP-2010
	Final Proposed Plan, LHAAP-16	Shaw Environmental, Inc.	SEP-2010
	Final Decision Document, LHAAP-35/36	Shaw Environmental, Inc.	OCT-2010
2011			
	Final Proposed Plan, LHAAP-29	Shaw Environmental, Inc.	MAR-2011
	Final MC Summary Report, LHAAP-001-R-01 & LHAAP-003-R-01	Shaw Environmental, Inc.	JUN-2011
	Final Proposed Plan, LHAAP-001-R-01 & LHAAP-003-R-01	Shaw Environmental, Inc.	JUN-2011
	Final Feasibility Study, LHAAP-47	Shaw Environmental, Inc.	JUL-2011
	Final Remedial Design, LHAAP-35B(37) & LHAAP-67	US Army Corps of Engineers, Tulsa District	AUG-2011
	Final Remedial Design, LHAAP-46	Shaw Environmental, Inc.	SEP-2011
	Final Remedial Design, LHAAP-50	Shaw Environmental, Inc.	SEP-2011
	Final Remedial Design, LHAAP-35A(58)	Shaw Environmental, Inc.	SEP-2011
2012			
	Final Remedial Action Operation Summary Report, Years 1 and 2, Landfill-12	Shaw Environmental, Inc.	JUL-2012
	Final Remedial Action Operation Summary Report, Years 3 and 4, Landfill-12	Shaw Environmental, Inc.	JUL-2012
	Final Feasibility Study for Groundwater, LHAAP-04, Former Pilot Wastewater Treatment Plant	Shaw Environmental, Inc.	AUG-2012
2013			
	Final Remedial Action Work Plan for LHAAP-67, Aboveground Storage Tank Farm	AECOM Technical Services	MAR-2013
	Final Remedial Action Work Plan for LHAAP-46, Plant 2 Area	AECOM Technical Services	MAR-2013
	Final Remedial Investigation/Focused Feasibility Study for LHAAP-03, Former Waste Collection Pad near Building 722-P, Paint Shop	AECOM Technical Services	MAR-2013
	Final Proposed Plan for LHAAP-03, Former Waste Collection Pad Building 722-P Paint Shop	AECOM Technical Services	MAY-2013
	Final Remedial Action Work Plan for LHAAP-50, Former Sump Water Tank	AECOM Technical Services	JUN-2013
	Final Remedial Action Work Plan for LHAAP-35B(37), Chemical Laboratory	AECOM Technical Services	JUN-2013
	Final Remedial Action Work Plan, LHAAP-58	AECOM Technical Services	AUG-2013
	Final Proposed Plan for LHAAP-47, Plant 3 Area Solid Rocket Motor Fuel Production	AECOM Technical Services	DEC-2013
	Final Post-Screening Investigation Report for LHAAP-18/24, Burning Ground No. 3 and Evaporation Pond	AECOM Technical Services	DEC-2013
2014			
	Final Decision Document for LHAAP-19, LHAAP-56, LHAAP-65 and LHAAP-69 Sites	U.S. Army Corps of Engineers	JAN-2014
	Final Explanation of Significant Differences, Record of Decision for Early Interim Remedial Action at Burning Ground No. 3	AECOM Technical Services	FEB-2014
	Final 2013 Five-Year Review Report For LHAAP	AECOM Technical	MAY-2014

IRP Previous Studies

	Title	Author	Date
2014			
		Services	
	Final Post-Screening Investigation Work Plan Addendum, LHAAP-18/24	AECOM Technical Services	JUN-2014
	Final LHAAP-29 Remedial Investigation/Feasibility Addendum Work Plan	AECOM Technical Services	JUN-2014
	Final Baseline Ecological Risk Assessment Addendum, LHAAP	AGEISS Inc.	JUL-2014

LONGHORN ARMY AMMUNITION PLANT

Non-BRAC Excess

Installation Restoration Program

Site Descriptions

Site ID: LHAAP-001
Site Name: INERT BURNING GROUNDS (SWMU 1)

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: LOW

Phases	Start	End
PA	197906	198406
SI	197906	198406
RI/FS	199008	199801
LTM	201201	204509

RIP Date: N/A

RC Date: 199801

SITE DESCRIPTION

A no action ROD was signed by the USEPA in February 1998; the site is closed and suitable for non-residential use. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

The LTM in the form of five-year reviews is required and will continue.

Site ID: LHAAP-002
Site Name: VACCUM TRUCK OVERNITE PARKING LOT

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	197906	198705
RI/FS	200901	201007
LTM	201201	204509

RIP Date: N/A

RC Date: 201007

SITE DESCRIPTION

A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. Five-year review costs are captured with LHAAP-35A(58) five-year review costs because this site falls within the boundary of LHAAP-35A(58).

CLEANUP/EXIT STRATEGY

The LTM in the form of five-year reviews are required and will continue.

Site ID: LHAAP-003
Site Name: BUILDING 722-PAINT SHOP

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
PA	197906	198705
SI	200710	200909
RI/FS	200909	201512
RD	201210	201601
RA(C)	201210	201606

RIP Date: N/A

RC Date: 201606

SITE DESCRIPTION

LHAAP-03 was a waste collection site outside of the paint shop at Building 722-P. Building 722-P was used for paint spraying and polyurethane spray coating of various items. Heavy metal-based primers, other waste solvents and contaminated rags were collected in a 55-gallon drum on a gravel pad in an open-sided shed.

The site investigation report for LHAAP-03 was completed in August 2009. The site investigation identified soil contaminated with metals exceeding medium-specific concentrations (MSCs). A remedial investigation (RI)/FS was finalized to evaluate removal action alternatives for the metals-contaminated soil at LHAAP-03. A ROD is delayed until dispute is resolved with the USEPA. The RD and soil removal action will also be covered under the PBA. Five-year review costs for this site will be captured with LHAAP-35A(58) five-year review costs because this site falls within the boundary of LHAAP-35A(58).

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy being considered for this site is excavation and off-site disposal. Tasks to be completed before the PBA ends are completion of primary documents (ROD and RD), and accomplishment of remedy-in-place (RIP). At this time, it is expected that the post-PBA LTM will involve five-year reviews, which will be addressed as part of the remedial action for LHAAP-35A(58).

Site ID: LHAAP-004
Site Name: LHAAP PILOT WASTEWATER TREATMENT PLANT

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Perchlorate

Media of Concern: Groundwater

Phases	Start	End
PA	197906	198705
RI/FS	201112	201512
RD	201201	201602
IRA	200908	201108
RA(C)	201404	201609
RA(O)	201201	204509

RIP Date: 201609

RC Date: 204509

SITE DESCRIPTION

The LHAAP Pilot wastewater plant was closed under RCRA guidelines in November 1997. The installation-wide baseline ecological risk assessment in 2007 did not identify any potential risk to ecological receptors. Additional investigations after the risk assessment found unacceptable levels of mercury in soil, and perchlorate, an emerging contaminant, in soil at levels that could potentially migrate into the groundwater. A soil removal action was recommended in the 2009 engineering evaluation/cost analysis (EE/CA) for LHAAP-04. The soil removal was performed, and is documented in the final completion report, non-time critical removal action at LHAAP-04. As part of the removal action, a well was installed to sample groundwater beneath the backfilled excavation area. The results indicated that perchlorate was present in the groundwater at a concentration that exceeded the TCEQ groundwater industrial use value for perchlorate. The FS evaluating remedial alternatives for LHAAP-04 was finalized in August 2012. The RAs for this site have been funded under an existing contract. The ROD is delayed until the dispute is resolved with the USEPA. The costs for the ROD and RD are captured under the PBA. LTM and five-year reviews will be required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. Tasks to be completed before the PBA ends are completion of primary documents (ROD and RD), and accomplishment of RIP. The FS was completed in 2012. The remedy being considered for this site is: in situ bioremediation and monitored natural attenuation (MNA) for groundwater, and LTM. The final remedy has not been selected yet for this site. At this time, it is expected that the post-PBA long-term RA(O) will involve MNA and LUC.

Site ID: LHAAP-005
Site Name: POWER HOUSE BOILER POND

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	197906	198705
RI/FS	198705	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

This site was cleaned under RCRA guidelines; however, the DD will be finalized in 2015 under CERCLA. A notification (not a remedy or LUC) was filed in Harrison County, TX stating that the site is suitable for residential use.

CLEANUP/EXIT STRATEGY

A DD is to be finalized in 2015. A notification (not a remedy or LUC) was filed in Harrison County, TX stating that the site is suitable for residential use.

Site ID: LHAAP-006
Site Name: BUILDING 54F SOLVENT

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	197906	198705
RI/FS	200712	200812
LTM	201201	204509

RIP Date: N/A

RC Date: 200812

SITE DESCRIPTION

An NFA DD was signed in December 2008. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-007
Site Name: BUILDING 50G DRUM PROCESSING

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	197906	198705
RI/FS	200712	200812
LTM	201201	204509

RIP Date: N/A

RC Date: 200812

SITE DESCRIPTION

The site was originally closed under RCRA in 1987. An NFA DD under CERCLA was signed in December 2008. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-008
Site Name: SEWAGE TREATMENT PLANT

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	197906	198705
RI/FS	200202	200811
LTM	201201	204509

RIP Date: N/A

RC Date: 200811

SITE DESCRIPTION

The site was originally closed under RCRA in 1987. An NFA DD under CERCLA was signed in 2008. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-009
Site Name: BUILDING 31-W DRUM STORAGE

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	197906	198705
RI/FS	198705	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

This site was closed under RCRA guidelines; however, the DD will be finalized in 2015 under CERCLA. A notification (not a remedy or LUC) was filed in Harrison County, TX stating that the site is suitable for residential use. No further action is required.

CLEANUP/EXIT STRATEGY

A DD is to be finalized in 2015. A notification (not a remedy or LUC) was filed in Harrison County, TX stating that the site is suitable for residential use. No further action is required.

Site ID: LHAAP-011
Site Name: SUS TNT BURIAL SITE AT AVE P&Q(SWMU 11)

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: LOW

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	199008	199801
LTM	201201	204509

RIP Date: N/A

RC Date: 199801

SITE DESCRIPTION

An NFA ROD was signed by the USEPA by February 1998. The site is closed and suitable for industrial use. A five-year review report in the form of a memorandum report stating the use of the site remains industrial will be required for internal Army records. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-012
Site Name: ACTIVE LANDFILL (SWMU 12)

STATUS

Parcel: LANDFILL 12 (FWS) (51 acres)

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	199008	200607
RD	200509	200706
IRA	199509	200509
RA(C)	200509	200706
RA(O)	200509	209909

RIP Date: 200706

RC Date: 209909

SITE DESCRIPTION

Landfill 12 (previously called the Active Landfill), consisting of seven acres, was used for the disposal of nonhazardous industrial waste. The landfill had been used intermittently since 1963. Continuous use of the landfill began around 1978. Although the back section had been closed, the front section of the landfill continued to be used until its closure in March 1994. Site inspections (SI) conducted in 1993 concluded that an early IRA (landfill cap) was necessary to reduce further contamination to the groundwater. In 1997 the cap was completed, using treated soils from LHAAP-18 as subgrade fill. Cap maintenance started in 1998, and in 2002 the first five-year review was completed. The second five-year review was completed in 2008. The third five-year review was completed in 2013.

In 2002 the RI was completed. Groundwater analysis showed that some metals, chlorides, VOC, explosive compounds, and low levels of perchlorate were present. Surface water and sediment sample analysis showed similar contamination. Low levels of perchlorate were also detected in the soils. In three groundwater sampling rounds conducted in February 2003, February 2004, and December 2004, perchlorate was not detected with reporting limits of four micrograms per liter (ug/L) in the first two rounds, and only detected twice when a method with a lower reporting limit (0.2 ug/L) was used. Chromium in groundwater is now believed to be related to stainless steel well casings. In January 2006 the 12 wells with stainless steel casings and screen were removed. In 2006, five new wells were installed for long-term monitoring using polyvinyl chloride casing and screen. Results of subsequent groundwater sampling supported the postulation that the stainless steel casing in the monitoring wells was the source of the chromium.

In 2005 the FS was finalized. The recommended final remedy is MNA with LUCs consisting of cap protective provisions and groundwater restrictions. In August 2006 sampling to support MNA began. The PP addressed human and ecological risk. The ROD has been signed (July 2006), and in June 2007 the RD addendum was signed. The surrounding sediment and surface water were evaluated as part of the plant-wide ecological risk assessment and no chemicals of concern were identified.

Post-PBA (FY2017 and out-years) actions will include MNA with LUC consisting of cap protective provisions and groundwater restrictions. The expected duration of RA(O) is 118 years based on the groundwater model from the remedial design. Ten years of RA(O) will have been completed by the end of the PBA, leaving 108 years beyond FY17; however, AEDB-R limits phase schedule extension to 2099 thus 82 years are reported. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

Site ID: LHAAP-012
Site Name: ACTIVE LANDFILL (SWMU 12)

As a part of RA(O), cap maintenance, MNA, and five-year reviews will be funded under the PBA through September 2017. Post-PBA activities will be limited to long-term RA(O) and five-year reviews to review MNA progress and any new site information.

Site ID: LHAAP-015
Site Name: AREA 49W DRUM STORAGE

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	197906	198705
RI/FS	198705	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

An NFA DD is scheduled to be finalized in 2015. This site was classified as a CERFA Category 1 site, which describes areas where no release or disposal of hazardous substance has occurred. No further action is required for this site.

CLEANUP/EXIT STRATEGY

An NFA DD is scheduled to be finalized in 2015.

Site ID: LHAAP-016
Site Name: OLD LANDFILL (SWMU 16)

STATUS

Parcel: Burning Ground (FWS) (380 acres)

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Perchlorate, Volatiles (VOC)

Media of Concern: Groundwater, Soil, Surface Water

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	199008	201512
RD	200508	201603
IRA	199410	200509
RA(C)	200508	201606
RA(O)	200508	204509

RIP Date: 201606

RC Date: 204509

SITE DESCRIPTION

Landfill 16 (formally called the old landfill), consisting of about 22 acres, was originally used to dispose of products generated from the TNT wastewater treatment plant (WWTP); however, a variety of waste was disposed of in the landfill until the 1980s. This waste may have included burned rocket motor casings, substandard TNT, barrels of chemicals, oil, paint, scrap iron and wood. VOCs and metals above action levels have been found in the soil, surface water and groundwater around the site. Low levels of explosive compounds were detected in the groundwater.

SIs conducted in 1993 concluded that an early IRA (landfill cap) was necessary to reduce further contamination to the groundwater. The cap was completed in 1998, using treated soils from LHAAP-18 as subgrade fill. In late-1997, as part of the treatability study, eight extraction wells were installed to prevent contaminated groundwater from impacting Harrison Bayou. This system is still in operation; however, extracted water volume is low. Groundwater extracted from the Landfill 16 containment system is piped to the LHAAP-18 groundwater treatment plant (GWTP).

Perchlorate was first detected in groundwater at this site in 2000. VOCs and perchlorate have been detected in the surface water of Harrison Bayou.

In 2002 the RI was completed along with a five-year review. In March 2002 a final interim FS for Site 16 was issued. Under the PBC, a draft FS addendum to the March 2002 interim FS was submitted in February 2007. The FS was finalized in March 2010. A preliminary MNA evaluation was completed in 2007. The second five-year review was completed in 2008. The PP was finalized September 2010. Quarterly surface water sampling of the Harrison Bayou area has not shown significant contamination. The ROD is delayed until the dispute is resolved with the USEPA. The ROD will include cap maintenance, in situ bioremediation, biobarriers, MNA and LUCs.

An environmental security technology certification program research and development project for enhanced in situ bioremediation (VOCs, perchlorate and explosives in groundwater) was started in 2003 and continued to 2008. Ecological concerns most likely will be addressed with the final remedy at this site. Post-PBA actions will include RA(O) and groundwater monitoring. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy being considered for this site is passive

biobarriers, in situ bioremediation and MNA for groundwater, and LTM. Tasks to be completed before the PBA ends are completion of primary documents (ROD and RD), and accomplishment of remedy-in-place (RIP). At this time, it is expected that the post-PBA long-term RA(O)will involve MNA with maintenance of the cap and LUC.

Site ID: LHAAP-017
Site Name: NO 2 FLASHING AREA BRN GROUND(SWMU 17)

STATUS

Parcel: Burning Ground (FWS) (380 acres)

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Explosives, Perchlorate, Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	199008	201512
RD	200508	201603
RA(C)	201404	201606
RA(O)	201603	204509

RIP Date: 201606

RC Date: 204509

SITE DESCRIPTION

This site (about 500 by 600 feet) was used to burn bulk TNT, photoflash powder, and reject material from Universal Match Corporation's production processes. From 1959 until 1980 the site was operated as a burning ground. In 1959 buildings razed at Site 29 (the former TNT production area) were burned at Burning Ground No. 2/Flashing Area (LHAAP-17). This site is situated about 400-500 feet southwest of Burning Ground No. 3.

In 1984 waste residues were removed and the area grassed over. VOCs and explosive compounds were found in the groundwater. Explosive compounds were found in the soil. In 2000 perchlorate was detected at this site [in groundwater at 300 parts per million (ppm), but less in soil].

In 2002 the RI was completed and a draft FS was prepared. In 2004 additional data gap studies were completed. A revised draft FS was submitted in 2009 by the PBC and the FS was finalized in 2010. The PP was finalized in May 2010.The ROD is delayed until the dispute is resolved with the USEPA. The ROD will include soil removal, extraction and treatment of groundwater, MNA and LUCs.

A research and development project for enhanced in situ-bioremediation (VOCs, perchlorate and explosives in soil and groundwater) was started in 2002 and completed in 2004. Results indicate that perchlorate contamination was reduced. An additional intermediate well was installed at the site in February 2008.

Post-PBA actions during LTM will involve monitoring of MNA. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy being considered for this site is groundwater extraction, followed by MNA for groundwater, and excavation and disposal for soil. Tasks to be completed before September 2017 are completion of primary documents (ROD and RD), and accomplishment of RIP. At this time, it is expected that the post-PBC long-term RA(O) will involve MNA and LUC.

Site ID: LHAAP-018
Site Name: BURNING GROUND/WASHOUT POND(SWMU 18)

STATUS

Parcel: Burning Ground (FWS) (380 acres)

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals, Perchlorate, Volatiles (VOC)

Media of Concern: Groundwater, Soil, Surface Water

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	199008	201512
RD	200508	201603
IRA	199503	201108
RA(C)	200508	201605
RA(O)	200508	204509

RIP Date: 201605

RC Date: 204509

SITE DESCRIPTION

This 34.5 acre site, also known as Burning Ground No. 3, began operations in 1955. It was used for the treatment, storage, and disposal of solid and liquid explosives, pyrotechnics, and combustible solvent wastes by open burning, open detonation, and burial. The unlined evaporation pond (UEP) (LHAAP-024) was constructed in 1963 within Burning Ground No. 3. Explosive compounds, VOCs, and metals were detected in the soils and groundwater. In 1998 perchlorate was detected in the groundwater. In 1986 sludge from the UEP was removed and the area was capped. Quarterly monitoring has been conducted at the site since closure of the UEP.

In May 1995 an IRA ROD was signed. This IRA addressed soil and shallow groundwater contamination. In 1997, 30,000 cubic yards (cy) of soil were excavated and treated. The treated soil was used as fill in LHAAP-012 and -016. A GWTP, with approximately 5,000 feet of interception collection trenches, has been installed to control migration of contaminated groundwater. After treatment the extracted groundwater is discharged into Harrison Bayou. In 1999 perchlorate was detected at this site and a fluidized bed reactor treatment system was installed.

In 2002 the RI was completed, followed by a draft FS. In September 2007 the PBC contractor began an optimization pilot study for the groundwater extraction system with a report completed in February 2009. A post-screening investigation (PSI) work plan was finalized in 2013 to address site data gaps and support completion of the RI/FS. The PSI work has been completed and the revised FS is planned to be completed in 2015.

Post-PBA actions during RA(O) are expected to include review of MNA progress. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy being considered for this site is optimization of the groundwater extraction system, bioaugmentation, and MNA. Tasks to be completed before September 2017 are completion of primary documents (FS, PP, ROD, RD) and accomplishment of RIP and continued RA(O).

The final remedy has not been selected yet for this site. At this time, the post-PBC long-term RA(O) is expected to include groundwater extraction, bioremediation and five-year reviews.

Site ID: LHAAP-019
Site Name: CONSTRUCTION MATERIALS LANDFILL

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	201009	201401
LTM	201401	204509

RIP Date: N/A

RC Date: 201401

SITE DESCRIPTION

The site was originally closed under RCRA in 1987. A NFA DD under CERCLA was finalized in early 2014. A notification (not a remedy or LUC) was filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential will be required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

Post-PBA activities will be limited to five-year review reports in the form of a letter stating the use of the site remains non-residential.

Site ID: LHAAP-024
Site Name: FORMER UNLINED EVAP POND (SWMU 24)

STATUS

Parcel: Burning Ground (FWS) (380 acres)

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals, Perchlorate, Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	199005	199005
SI	199005	199008
RI/FS	199008	201512
RD	200508	201603
IRA	199503	201108
RA(C)	200508	201605
RA(O)	200508	204509

RIP Date: 201605

RC Date: 204509

SITE DESCRIPTION

This three-acre UEP was constructed in 1963 within Burning Ground No. 3. Explosive compounds, VOCs, and metals were detected in the soils and groundwater. In 1999, perchlorate was detected in the groundwater. In 1986, sludge from the UEP was removed and the area was capped. Quarterly monitoring has been conducted at the site since closure of the UEP.

In May 1995, an IRA ROD was signed. This IRA addressed soil and shallow groundwater contamination. In 1997, 30,000 cy of soil were excavated and treated. The treated soil was used as fill in LHAAP-012 and LHAAP-016. A GWTP, with approximately 5,000 feet of interception collection trenches, has been installed to control migration of contaminated groundwater. After treatment, the extracted groundwater is discharged into Harrison Bayou. In 1999 perchlorate was detected at this site and in 2001 a fluidized bed reactor treatment system was installed.

In 2002 the RI was completed, followed by a draft FS. In September 2007 the PBC contractor began an optimization study for the groundwater extraction system with a report on the results completed February 2009. A PSI work plan was finalized in 2013 to address site data gaps and support completion of the RI/FS. The PSI work has been completed and the revised FS is planned to be completed in 2015.

Post-PBA actions are currently expected to involve review of MNA progress. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. As with LHAAP-018, the remedy being considered for this site is optimization of the groundwater extraction system, bioaugmentation and MNA. Tasks to be completed before September 2017 are completion of primary documents (FS, PP, ROD, RD) and accomplishment of RIP and continued RA(O).

The final remedy has not been selected yet for this site but the post-PBC long-term RA(O) is expected to include groundwater extraction, bioremediation and five-year reviews.

Site ID: LHAAP-029
Site Name: FORMER TNT PRODUCTION AREA(SWMU 29)

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Munitions constituents (MC), Perchlorate, Volatiles (VOC)

Media of Concern: Groundwater, Sediment, Soil, Surface Water

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	199008	201512
RD	200508	201603
RA(C)	200508	201606
RA(O)	200508	204509

RIP Date: 201606

RC Date: 204509

SITE DESCRIPTION

The former TNT production area, consisting of about 85 acres, was in operation from April 1943 to August 1945 as a six-line plant, with a supporting acid plant. The plant produced 180 million kilograms of TNT throughout the period of operation. A bulk toluene storage area, servicing the TNT production area, was located adjacent to the production area. The TNT wastewater (red water) from the production of the TNT was sent through wooden pipelines to a storage tank and pump house, and then to the TNT WWTP (LHAAP-032). Cooling water (blue water) from the production area ran through main lines and into an open ditch. In 1959, the structures, except for the foundations, were demolished and removed. Through the late-1980s a portion of the northeast corner of the site (approximately two acres) was used for the washout of Pershing 1 and 2 rocket motor casings using trichloroethylene (TCE) and methylene chloride.

Explosive compounds have been detected in the soil, surface water, sediment, and groundwater samples. High concentrations of VOCs (including TCE and methylene chloride) have been detected in the groundwater with the highest concentrations in the intermediate hydrostratigraphic unit, and methylene chloride, dense non-aqueous phase liquid is suspected. In 2000 perchlorate was first detected in the soil and in the groundwater (at 88 ppm) at this site.

In 2002, the RI was completed and this site is included in the Group 2 draft FS. In FY2005 field sampling for soils was conducted. In FY2006, six wells were installed and sampled. Sediment samples were also collected from waste lines and outfall ditches. A revised draft FS was submitted by the PBC in 2008 and was finalized in 2010. The ROD is delayed until the dispute is resolved with the USEPA. The ROD currently includes soil removal, flushing and plugging lines, in situ chemical oxidation treatment of groundwater, MNA and LUCs. Fieldwork to support an addendum to the RI/FS for LHAAP-29 was completed in 2013 and the RI/FS addendum is underway. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

LHAAP-49, the former acid plant (also known as former acid storage), was originally funded under LHAAP-29 due to the association in plant function. This was the location where acids were received and prepared for use in the TNT manufacturing process. The final site evaluation was finalized in 2009 and the ROD was finalized in 2010.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy being considered for this site is in situ groundwater remediation followed by MNA, flushing and plugging lines, and excavation and disposal for soil and sediments. Tasks to be completed before September 2017 are completion of primary documents (ROD, RD), and accomplishment of RIP. The final remedy has not been selected yet for this site. At this time, the post-PBA RA(O) is expected to involve MNA and LUC.

Site ID: LHAAP-034
Site Name: BUILDING 701 PCB STORAGE

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	198705	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

LHAAP-034 consists of a building formerly used for storage of PCB-contaminated material from transformer spills, in operation from 1980 through 1984. An NFA DD is scheduled to be finalized in 2015. This site was classified as a CERFA Category 1 site, which describes areas where no release or disposal of hazardous substance has occurred, no further action is required for this site.

CLEANUP/EXIT STRATEGY

An NFA DD is scheduled to be finalized in 2015. This site was classified as a CERFA Category 1 site, which describes areas where no release or disposal of hazardous substance has occurred; no further action is required for this site.

Site ID: LHAAP-035
Site Name: SUMPS (145) VARIOUS

STATUS

Parcel: East FIA II(FWS) (175 acres),Production Area Ib (FWS) (107.59 acres),Production Area Ia (FWS) (456.72 acres)

Regulatory Driver: CERCLA

RRSE: HIGH

Contaminants of Concern: Perchlorate

Media of Concern: Soil

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	199301	201011
RD	200508	201011
RA(C)	200508	201011
LTM	201201	204509

RIP Date: N/A

RC Date: 201011

SITE DESCRIPTION

This site contained 125 industrial wastewater sumps. The sumps were located in different production areas within LHAAP. Many of the sumps were removed or closed in 1996.

Several buildings at sites where sumps were located have a history of perchlorate use. Perchlorate contamination at these sites has been identified in the soil, surface water and groundwater. Remedial action-construction RA(C) consisted of soil removal around sumps.

In 2002, the RI was completed and in late FY2003 the initial perchlorate assessment was completed. Additional soil sampling, for the sumps, was completed in fall 2006. The NFA DD was signed in November 2010. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

The following are associated with LHAAP-35 in AEDB-R because there were sumps at the sites; however, they are being addressed as separate sites for other environmental issues [i.e. five-year reviews, RA(O)/LTM]:
LHAAP-002 LHAAP-003 LHAAP-004 LHAAP-006 LHAAP-007 LHAAP-036
LHAAP-058 LHAAP-060 LHAAP-65 LHAAP-068 (PBC) LHAAP-008 LHAAP-037 (TERC)

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required. Soil that was found to be contaminated with perchlorate at sites where sumps were located is being addressed at those individual sites (i.e., LHAAP-047 and LHAAP-050).

Site ID: LHAAP-036
Site Name: EXPLOSIVE WASTE PADS (27)

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	197906	198705
SI	197906	198705
RI/FS	199301	201011
LTM	201201	204509

RIP Date: N/A

RC Date: 201011

SITE DESCRIPTION

This site consists of 20 waste pads made of metal roof over four by eight concrete pads. It is included in Group 4 RI/FS. The NFA DD was signed in November 2010. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-037
Site Name: CHEMICAL LABORATORY WASTE PAD

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	199005	199008
RI/FS	201003	201006
RD	201006	201108
RA(C)	201201	201309
RA(O)	201201	204509

RIP Date: 201309

RC Date: 204509

SITE DESCRIPTION

This site is a collection point for spent solvents from the quality assurance (QA) lab. It consists of one 55-gallon drum set on a concrete pad. The site is included in the Group 4 RI/FS. The ROD was finalized in August 2010 and included MNA and LUCs for the site. The RD was finalized in August 2011. The remedial action work plan (RAWP) was finalized in 2013. RIP was achieved in September 2013. The RA(O) is on hold while a two-year bioplug demonstration is implemented at the site beginning in March 2012. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. Actions to be completed before the PBA ends are accomplishment of RA(O) including institutional controls (LUC). The RD completed in 2011 includes the following remedies for this site: MNA for groundwater, and RA(O). At this time, it is expected that the post-PBA long-term RA(O) will involve MNA and LUC.

Site ID: LHAAP-045
Site Name: MAGAZINE AREA

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Perchlorate

Media of Concern: Soil

Phases	Start	End
PA	199005	199008
SI	200003	200409
RI/FS	200409	200409
LTM	201201	204509

RIP Date: N/A

RC Date: 200409

SITE DESCRIPTION

This site consists of 800 acres with 58 bunkers and two buildings used for storage of munitions. An SI conducted by US Army Center for Health, Promotion and Preventive Medicine (USACHPPM) (now know as the Public Health Command), determined perchlorate contamination. The RI was completed in September 2003. The final evaluation of LHAAP-45 surface soil analytical data was finalized in September 2004. The site received USEPA concurrence for no further environmental investigation necessary. The site is closed and suitable for industrial use. A five-year review report in the form of a memorandum report stating the use of the site remains industrial will be required for internal Army records. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-046
Site Name: PLANT 2 AREA

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	200201	200201
RI/FS	201006	201009
RD	201106	201109
RA(C)	201201	201304
RA(O)	201201	204509

RIP Date: 201304

RC Date: 204509

SITE DESCRIPTION

LHAAP-46, also known as Plant 2, had facilities for production of JB-2 propellant fuel from 1944-1945 and was used to produce pyrotechnic ammunition, such as photoflash bombs, simulators, hand signals, and tracers for 40mm ammo from 1952-1956. Plant 2 was reactivated to produce pyrotechnic and illuminating devices from 1964 to 1997. Site investigations determined that groundwater was contaminated with VOCs. The ROD was finalized in September 2010 and includes MNA and LUCs for the site. A notification (not a remedy or LUC) will be filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential will be required. The RD was finalized in September 2011. The RAWP was finalized in 2013 and RIP was achieved in April 2013. This site is in RA(O). The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy selected for this site is MNA for groundwater. Tasks to be completed before September 2017 are accomplishment of RA(O). The final remedy has been selected for this site. At this time, it is expected that the post-PBA RA(O) will involve monitoring MNA and LUC.

Site ID: LHAAP-047
Site Name: PLANT 3 AREA

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals, Perchlorate, Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	197906	198705
RI/FS	201201	201512
RD	201201	201602
RA(C)	201201	201610
RA(O)	201201	204509

RIP Date: 201610

RC Date: 204509

SITE DESCRIPTION

LHAAP-47, also known as Plant 3, was used from 1954 to the early-1980s to produce rocket motors. Some of the rocket motor facilities converted to produce pyrotechnic and illumination devices, and continued this operation until 1997. Site investigations determined that groundwater was contaminated with VOCs, perchlorate, and metals and a soil source for perchlorate was identified. The FS evaluating remedial alternatives for LHAAP-47 was finalized in July 2011. The RAs for this site have been funded under an existing contract. The ROD is delayed until the dispute is resolved with the USEPA. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy being considered for this site includes bioaugmentation, biobarriers and MNA. Tasks to be completed before September 2017 are completion of primary documents (ROD and RD) and accomplishment of RIP and continued RA(O).

The final remedy has not been selected yet for this site. At this time, the post-PBC long-term RA(O) is expected to include MNA and five-year reviews.

Site ID: LHAAP-049
Site Name: FORMER ACID STORAGE AREA

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	200903	200906
RI/FS	201005	201008
LTM	201201	204509

RIP Date: N/A

RC Date: 201008

SITE DESCRIPTION

LHAAP-49 is the former acid storage area, which was used from 1942 to 1945 for storage and formulation of acids and acid mixtures in support of TNT production during WWII. The NFA ROD was finalized in August 2010. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-050
Site Name: FORMER WASTE DISPOSAL FACILITY

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: HIGH

Contaminants of Concern: Metals, Perchlorate, Volatiles (VOC)

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	199005	199008
SI	199506	199707
RI/FS	199801	201001
RD	200508	201102
RA(C)	200508	201309
RA(O)	200508	204509

RIP Date: 201309

RC Date: 204509

SITE DESCRIPTION

This site of about one acre received wastewater from the sumps at Plants 2 and 3 from 1955 to the early-1970s. Washout of ammonium perchlorate containers was also performed on this site.

VOCs and perchlorate were detected in the soil samples. VOCs, metals and perchlorate were detected in groundwater. The VOCs and perchlorates in groundwater pose an unacceptable risk. In 2004 an additional data gap sampling was completed and in February 2008 an additional shallow well was installed downgradient of this site.

In 2002, the RI was completed and the FS was finalized in 2010. The ROD was finalized in 2010. The ROD includes soil removal, MNA and LUCs (groundwater use restriction) for the site. A notification (not a remedy or LUC) will be filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential will be required. The RD was finalized in September 2011. The RAWP was finalized in 2013. RIP was achieved in September 2013. This site is in RA(O). The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy selected for this site is MNA for groundwater, and excavation and disposal for soil. Tasks to be completed before September 2017 are accomplishment RA(O). The final remedy has been selected for this site. At this time, it is expected that the post-PBA RA(O) will involve MNA and LUC.

Site ID: LHAAP-051
Site Name: PHOTOGRAPHIC LABORATORY/BLDG #60B

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	199005	199008
RI/FS	200712	200812
LTM	201201	204509

RIP Date: N/A

RC Date: 200812

SITE DESCRIPTION

Building 60B was the location for processing x-ray film. It was closed under RCRA. A NFA DD was signed in December 2008 under CERCLA. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-052
Site Name: MAGAZINE AREA WASHOUT

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: LOW

Phases	Start	End
PA	199005	199008
SI	199506	199804
RI/FS	199706	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

A standpipe near the intersection of Avenue E and 19th was used to wash out trucks used for transport of TNT. An NFA DD will be finalized in 2015. The need for limited monitoring in the form of certification of proper land use every five years will be determined in the DD. Depending on the outcome of the DD, the costs for the installation-wide five-year reviews would be captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

Post-PBA activities will be limited to five-year review reports in the form of a letter stating the use of the site remains non-residential.

Site ID: LHAAP-055
Site Name: SEPTIC TANK (10)

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	199005	199008
RI/FS	199008	200812
LTM	201201	204509

RIP Date: N/A

RC Date: 200812

SITE DESCRIPTION

This site was closed under RCRA guidelines. An NFA DD was signed in December 2008 under CERCLA. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-056
Site Name: VEHICLE WASH RACK AND OIL/WATER SEP

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	199304	200801
RI/FS	201201	201401
LTM	201401	204509

RIP Date: N/A

RC Date: 201401

SITE DESCRIPTION

This site consisted of a concrete washrack sloped to drain, connected to an oil/water separator. The site had a permitted discharge to a drainage ditch. The site is located within the shop area. The sump on this site was investigated under LHAAP-035. The DD was finalized in early 2014. A notification will be filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. Because LHAAP-056 is entirely contained within the LHAAP-35A(58) land use control boundary, this requirement is being met under LHAAP-35A(58). A five-year review report in the form of a letter stating the use of the site remains non-residential will be required. Five-year review costs are captured with LHAAP-35A(58) because this site falls within the boundary of LHAAP-35A(58).

CLEANUP/EXIT STRATEGY

This is a zero cost site. An NFA DD was funded in 2012.

Site ID: LHAAP-057
Site Name: RUBBLE BURIAL SITE

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	199005	199008
RI/FS	199008	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

LHAAP-057 was used for burial of inert materials that were cleared from property records. An NFA DD is scheduled to be finalized in 2015. This site was classified as a CERFA Category 1 site, which describes areas where no release or disposal of hazardous substance has occurred. No further action is required for this site.

CLEANUP/EXIT STRATEGY

A DD is to be finalized in 2015. Site is anticipated to be a response complete site in 2015.

Site ID: LHAAP-058
Site Name: MAINTENANCE COMPLEX

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	199005	199008
SI	199502	199506
RI/FS	201006	201009
RD	201106	201109
RA(C)	201109	201309
RA(O)	201109	204509

RIP Date: 201309

RC Date: 204509

SITE DESCRIPTION

LHAAP-35A(58), also known as the shops area, was used to provide plant-operated laundry, automotive, woodworking, metalworking, painting, refrigeration, and electrical services. VOCs were detected in groundwater. The ROD was finalized in 2010 and includes in situ bioremediation for the eastern plume and MNA and LUCs (groundwater use restriction) for both the eastern and western groundwater plume for the site. A notification (not a remedy or LUC) will be filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential will be required. Five-year review costs for LHAAP-002, 003, 056, 059, 060, 065, 068, and 069 are captured with LHAAP-35A(58) because these sites fall within the boundary of LHAAP-35A(58). The RD was finalized in September 2011. The RAWP was finalized in 2013. RIP was achieved in September 2013. This site is in RA(O). The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. The remedy selected for this site is in situ bioremediation and MNA for groundwater. Tasks to be completed before September 2017 are accomplishment of RA(O), which will involve MNA and LUC.

Site ID: LHAAP-059
Site Name: BUILDING 725

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	200705	200708
RI/FS	200805	200808
LTM	201201	204509

RIP Date: N/A

RC Date: 200808

SITE DESCRIPTION

Building 725 at LHAAP-59 was constructed in 1984 to support maintenance activities at the plant as a pesticide storage building. It was determined through site investigations that no significant release had occurred at this site. The NFA DD was finalized in August 2008. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. Five-year review costs are captured with LHAAP-35A(58) five-year review costs because this site falls within the boundary of LHAAP-35A(58).

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-060
Site Name: FORMER STORAGE BUILDING #411 & #714

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Phases	Start	End
PA	199005	199008
SI	199506	199707
RI/FS	199801	200812
LTM	201201	204509

RIP Date: N/A

RC Date: 200812

SITE DESCRIPTION

This site consists of two buildings formerly used for storage of pesticides and herbicides. It is included in Group 4 for RD/RA efforts. An NFA DD was signed in December 2008. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. Five-year review costs are captured with LHAAP-35A(58) because this site falls within the boundary of LHAAP-35A(58).

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-061
Site Name: POTABLE WTP SEDIMENT POND

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	199005	199008
RI/FS	199008	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

LHAAP-061 is closed under RCRA guidelines. A DD is scheduled to be finalized in 2015. This site was classified as a CERFA Category 1 site, which describes areas where no release or disposal of hazardous substance has occurred. No further action is required for this site.

CLEANUP/EXIT STRATEGY

A DD is to be finalized in 2015. Site is anticipated to be a response complete site in 2015.

Site ID: LHAAP-063
Site Name: BURIAL PITS

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: LOW

Phases	Start	End
PA	199005	199008
SI	199506	199804
RI/FS	199804	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

LHAAP-063 was used in late-1950s for the detonation of Plant 3 reject material of unknown composition. An NFA DD is to be finalized in 2015. The need for limited monitoring in the form of certification of proper land use every five years will be determined in the DD. Depending on the outcome of the DD, the costs for the installation-wide five-year reviews would be captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

Post-PBA activities will be limited to five-year review reports in the form of a letter stating the use of the site remains non-residential.

Site ID: LHAAP-064
Site Name: TRANSFORMER STORAGE

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	199005	199008
SI	199502	199506
RI/FS	199506	200812
LTM	201201	204509

RIP Date: N/A

RC Date: 200812

SITE DESCRIPTION

LHAAP-064 was used for storage of non-PCB transformers. NFA was required and an NFA DD was signed in December 2008. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-065
Site Name: BUILDING 209

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	201103	201106
RI/FS	201201	201401
LTM	201401	204509

RIP Date: N/A

RC Date: 201401

SITE DESCRIPTION

Building 209 was used for chemical storage for items such as paint and solvents. This building has a concrete floor with floor drains connected to sumps. The site is located just off of 11th street near the fire station. A DD was finalized in early 2014. A notification will be filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. Because LHAAP-065 is entirely contained within the LHAAP-35A(58) land use control boundary, this requirement is being met under LHAAP-35A(58). A five-year review report in the form of a letter stating the use of the site remains non- residential will be required. Five-year review costs are captured with LHAAP-35A(58) five-year review costs because this site falls within the boundary of LHAAP-35A(58).

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-066
Site Name: TRANSFORMER AT BLDG 401

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	199005	199008
SI	199502	199506
RI/FS	199506	200812
LTM	201201	204509

RIP Date: N/A

RC Date: 200812

SITE DESCRIPTION

A transformer at Building 401 dripped oil for approximately one year. The transformer did not contain PCBs, so NFA was required. An NFA DD was signed in December 2008. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non- residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-067
Site Name: ABOVE GROUND STORAGE TANK

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: MEDIUM

Contaminants of Concern: Volatiles (VOC)

Media of Concern: Groundwater

Phases	Start	End
PA	199005	199008
SI	199809	199906
RI/FS	200110	201006
RD	201105	201108
RA(C)	201201	201304
RA(O)	201201	204509

RIP Date: 201304

RC Date: 204509

SITE DESCRIPTION

This site consisted of seven aboveground storage tanks (AST) containing No. 2 fuel oil, kerosene or solvents. The ASTs had earthen dikes sufficient to contain a potential spill. Motor fuel tanks were registered with the state and have been removed. Central Creek runs to the south of this site.

In 2001, VOCs (TCE, 1,1-dichloroethene, 1,2-dichloroethane, 1,1,2-trichloroethane) were detected in the groundwater. The data indicates that the impact is limited.

In 2002, the RI was completed and in 2004 additional sampling was conducted, with the final FS completed in August 2005. The ROD was finalized in August 2010 and included MNA and LUCs (groundwater use restriction) for the site. A notification (not a remedy or LUC) will be filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential will be required. The RD was finalized in August 2011. The RAWP was finalized in 2013 and RIP was achieved in April 2013. This site is in RA(O). The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

This site is being addressed under a PBA through September 2017. Actions to be completed before the PBA ends are accomplishment of RA(O). The ROD completed in 2010 selected the following remedies for this site: MNA for groundwater, and RA(O). At this time, it is expected that the post-PBA long-term RA(O) will involve MNA and LUC.

Site ID: LHAAP-068
Site Name: MOBILE STORAGE TANK PARKING AREA

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	199005	199008
RI/FS	199008	200812
LTM	201201	204509

RIP Date: N/A

RC Date: 200812

SITE DESCRIPTION

This site was corrected under RCRA guidelines in 1993. An NFA DD was signed in December 2008. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. Five-year review costs are captured with LHAAP-35A(58) five-year review costs because this site falls within the boundary of LHAAP-35A(58).

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

Site ID: LHAAP-069
Site Name: SERVICE STATION UST'S

STATUS

Parcel: NONE

Regulatory Driver: CERCLA

RRSE:

Phases	Start	End
PA	199005	199008
RI/FS	199008	201401
LTM	201401	204509

RIP Date: N/A

RC Date: 201401

SITE DESCRIPTION

LHAAP-069 was corrected under RCRA guidelines in 1993. A NFA DD was finalized in early 2014. A notification will be filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. Because LHAAP-069 is entirely contained within the LHAAP-35A(58) land use control boundary, this requirement is being met under LHAAP-35A(58). A five-year review report in the form of a letter stating the use of the site remains non-residential will be required. Five-year review costs are captured with LHAAP-35A(58) five-year review costs because this site falls within the boundary of LHAAP-35A(58).

CLEANUP/EXIT STRATEGY

Post-PBA activities will be limited to five-year review reports in the form of a letter stating the use of the site remains non-residential.

Site ID: LHAAP-070
Site Name: LOADING DOCK-MAGAZINE AREA

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	197906	198705
SI	199502	199506
RI/FS	199506	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

There was a report of spill of boxes of TNT at LHAAP-070; however, site inspections revealed no visual evidence of TNT contamination. NFA is required. A DD is scheduled to be finalized in 2015. The need for limited monitoring in the form of certification of proper land use every five years will be determined in the DD. Depending on the outcome of the DD, the costs for the installation-wide five-year reviews would be captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

Post-PBA activities will be limited to five-year review reports in the form of a letter stating the use of the site remains non-residential.

Site ID: LHAAP-071
Site Name: OIL SPILL, BLDG 813

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
RRSE: NOT EVALUATED

Phases	Start	End
PA	197906	198705
SI	199502	199506
RI/FS	199506	201509

RIP Date: N/A

RC Date: 201509

SITE DESCRIPTION

An oil tank spill occurred at Building (Bldg) 813 in 1978. The spill was contained before it could reach Central Creek. An NFA DD is scheduled to be finalized in 2015. The need for limited monitoring in the form of certification of proper land use every five years will be determined in the DD. Depending on the outcome of the DD, the costs for the installation-wide five-year reviews would be captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

Post-PBA activities will be limited to five-year review reports in the form of a letter stating the use of the site remains non-residential.

Site ID: PBC Longhorn
Site Name: PBC at Longhorn

STATUS

Parcel: Pistol Range (FWS) (1 acres),East FIA II(FWS) (175 acres),Production Area II (467 acres),Production Area Ib (FWS) (107.59 acres),Production Area Ia (FWS) (456.72 acres)

Regulatory Driver: CERCLA

RRSE: LOW

Phases	Start	End
PA	200501	200503
RD	201203	201609
RA(C)	201203	201709
RA(O)	201203	202009

RIP Date: 201709

RC Date: 202009

Contaminants of Concern: Explosives, Metals, Perchlorate, Volatiles (VOC)

Media of Concern: Groundwater

SITE DESCRIPTION

The PBC was awarded in March 2012. The goal was to achieve RIP by September 2013 for the following sites and RA(O)/LTM upon achievement:
- LHAAP-03: Building 722 paint shop
- LHAAP-04: Pilot WWTP
- LHAAP-16: Old landfill (solid waste management unit (SWMU) 16)
- LHAAP-17: No. 2 flashing area/burning ground (SWMU 17)
- LHAAP-18: Burning ground/washout pond (SWMU 18)
- LHAAP-24: Former UEP (SWMU 24)
- LHAAP-29: Former TNT production area (SWMU 29)
- LHAAP-37: Chemical laboratory
- LHAAP-46: Plant 2/pyrotechnic operation
- LHAAP-47: Plant 3 Area, solid rocket fuel motor production
- LHAAP-50: Former waste disposal facility
- LHAAP-58: Maintenance complex
- LHAAP-67: AST farm

The RIP is delayed for several sites until the dispute is resolved with the USEPA.

It is currently assumed that the period of performance for the PBC will be extended through FY20 to account for these delays.

The PBC also covers LTM and LUC maintenance for:
- LHAAP-12: Active landfill
- LHAAP-001-R-01: South test area
- LHAAP-003-R-01: Ground signal test area

The PBC also covers a CERCLA 121 (c) review in 2013 for all sites with RIP. The costs for the outyear installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

These sites are being addressed under a PBA through September 2017 with anticipation of potential period of performance

extension to September 2020. Any follow-on actions will be funded under a separate contract mechanism.

IRP Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
LHAAP-013	SUS TNT BET ACTIVE&OLD LANDFILL(SWMU 13)	199512	ROD for NFA signed in 1996.
LHAAP-014	AREA 54 BURIAL GRND (SWMU 14)	199512	ROD for NFA signed in 1996.
LHAAP-023	BUILDING 707-STORAGE AREA PCBS	200601	Decision Documentation for NFA in 2006, including a letter from TNRCC signed in September 2000 releasing the site from deed recordation and post-closure requirements.
LHAAP-027	SOUTH TEST AREA/BOMB TEST AREA(SWMU 27)	199801	ROD for NFA signed in 1998
LHAAP-032	FORMER TNT WASTEWATER PLT(SWMU 32)	200809	ROD for NFA - signed September 2008
LHAAP-039	25X WASHOUT PAD	199008	PP - September 1994; Combined with LHAAP-18/24 IRA - Capping Site 18 1986; IRA - Soil Removal and Capping 1986; LTM - Groundwater Monitoring System Installed 1989;
LHAAP-053	STATIC TEST AREA	200811	A no action decision document signed in 2008.
LHAAP-054	GRD SIGNAL TEST AREA (LHAAP-XX)	199801	ROD for NFA signed in 1998.

IRP Schedule

Date of IRP Inception: 197906

Past Phase Completion Milestones

1984	
SI	(LHAAP-001 - INERT BURNING GROUNDS (SWMU 1))
PA	(LHAAP-001 - INERT BURNING GROUNDS (SWMU 1))
1987	
PA	(LHAAP-002 - VACCUM TRUCK OVERNITE PARKING LOT, LHAAP-003 - BUILDING 722-PAINT SHOP, LHAAP-004 - LHAAP PILOT WASTEWATER TREATMENT PLANT, LHAAP-005 - POWER HOUSE BOILER POND, LHAAP-006 - BUILDING 54F SOLVENT, LHAAP-007 - BUILDING 50G DRUM PROCESSING, LHAAP-008 - SEWAGE TREATMENT PLANT, LHAAP-009 - BUILDING 31-W DRUM STORAGE, LHAAP-011 - SUS TNT BURIAL SITE AT AVE P&Q(SWMU 11), LHAAP-012 - ACTIVE LANDFILL (SWMU 12), LHAAP-013 - SUS TNT BET ACTIVE&OLD LANDFILL(SWMU 13), LHAAP-014 - AREA 54 BURIAL GRND (SWMU 14), LHAAP-015 - AREA 49W DRUM STORAGE, LHAAP-016 - OLD LANDFILL (SWMU 16), LHAAP-017 - NO 2 FLASHING AREA BRN GROUND(SWMU 17), LHAAP-018 - BURNING GROUND/WASHOUT POND(SWMU 18), LHAAP-019 - CONSTRUCTION MATERIALS LANDFILL, LHAAP-023 - BUILDING 707-STORAGE AREA PCBS, LHAAP-027 - SOUTH TEST AREA/BOMB TEST AREA(SWMU 27), LHAAP-029 - FORMER TNT PRODUCTION AREA(SWMU 29), LHAAP-032 - FORMER TNT WASTEWATER PLT(SWMU 32), LHAAP-034 - BUILDING 701 PCB STORAGE, LHAAP-035 - SUMPS (145) VARIOUS, LHAAP-036 - EXPLOSIVE WASTE PADS (27), LHAAP-070 - LOADING DOCK-MAGAZINE AREA, LHAAP-071 - OIL SPILL, BLDG 813, LHAAP-047 - PLANT 3 AREA)
SI	(LHAAP-011 - SUS TNT BURIAL SITE AT AVE P&Q(SWMU 11), LHAAP-012 - ACTIVE LANDFILL (SWMU 12), LHAAP-013 - SUS TNT BET ACTIVE&OLD LANDFILL(SWMU 13), LHAAP-014 - AREA 54 BURIAL GRND (SWMU 14), LHAAP-016 - OLD LANDFILL (SWMU 16), LHAAP-017 - NO 2 FLASHING AREA BRN GROUND(SWMU 17), LHAAP-018 - BURNING GROUND/WASHOUT POND(SWMU 18), LHAAP-019 - CONSTRUCTION MATERIALS LANDFILL, LHAAP-023 - BUILDING 707-STORAGE AREA PCBS, LHAAP-027 - SOUTH TEST AREA/BOMB TEST AREA(SWMU 27), LHAAP-029 - FORMER TNT PRODUCTION AREA(SWMU 29), LHAAP-032 - FORMER TNT WASTEWATER PLT(SWMU 32), LHAAP-034 - BUILDING 701 PCB STORAGE, LHAAP-035 - SUMPS (145) VARIOUS, LHAAP-036 - EXPLOSIVE WASTE PADS (27))
1990	
PA	(LHAAP-024 - FORMER UNLINED EVAP POND (SWMU 24), LHAAP-037 - CHEMICAL LABORATORY WASTE PAD, LHAAP-045 - MAGAZINE AREA, LHAAP-050 - FORMER WASTE DISPOSAL FACILITY, LHAAP-051 - PHOTOGRAPHIC LABORATORY/BLDG #60B, LHAAP-052 - MAGAZINE AREA WASHOUT, LHAAP-053 - STATIC TEST AREA, LHAAP-054 - GRD SIGNAL TEST AREA (LHAAP-XX), LHAAP-055 - SEPTIC TANK (10), LHAAP-057 - RUBBLE BURIAL SITE, LHAAP-058 - MAINTENANCE COMPLEX, LHAAP-060 - FORMER STORAGE BUILDING #411 & #714, LHAAP-061 - POTABLE WTP SEDIMENT POND, LHAAP-063 - BURIAL PITS, LHAAP-064 - TRANSFORMER STORAGE, LHAAP-066 - TRANSFORMER AT BLDG 401, LHAAP-067 - ABOVE GROUND STORAGE TANK, LHAAP-068 - MOBILE STORAGE TANK PARKING AREA, LHAAP-069 - SERVICE STATION UST'S)
SI	(LHAAP-024 - FORMER UNLINED EVAP POND (SWMU 24), LHAAP-054 - GRD SIGNAL TEST AREA (LHAAP-XX))
RFA	(LHAAP-039 - 25X WASHOUT PAD)
1995	
SI	(LHAAP-058 - MAINTENANCE COMPLEX, LHAAP-064 - TRANSFORMER STORAGE, LHAAP-066 - TRANSFORMER AT BLDG 401, LHAAP-070 - LOADING DOCK-MAGAZINE AREA, LHAAP-071 - OIL SPILL, BLDG 813)
1996	
RI/FS	(LHAAP-013 - SUS TNT BET ACTIVE&OLD LANDFILL(SWMU 13), LHAAP-014 - AREA 54 BURIAL GRND (SWMU 14))
1997	

1997	
SI	(LHAAP-050 - FORMER WASTE DISPOSAL FACILITY, LHAAP-060 - FORMER STORAGE BUILDING #411 & #714)
1998	
RI/FS	(LHAAP-001 - INERT BURNING GROUNDS (SWMU 1), LHAAP-011 - SUS TNT BURIAL SITE AT AVE P&Q(SWMU 11), LHAAP-027 - SOUTH TEST AREA/BOMB TEST AREA(SWMU 27), LHAAP-054 - GRD SIGNAL TEST AREA (LHAAP-XX))
SI	(LHAAP-052 - MAGAZINE AREA WASHOUT, LHAAP-063 - BURIAL PITS)
1999	
SI	(LHAAP-067 - ABOVE GROUND STORAGE TANK)
2002	
PA	(LHAAP-046 - PLANT 2 AREA)
2004	
SI	(LHAAP-045 - MAGAZINE AREA)
RI/FS	(LHAAP-045 - MAGAZINE AREA)
2005	
PA	(PBC Longhorn - PBC at Longhorn)
IRA	(LHAAP-012 - ACTIVE LANDFILL (SWMU 12), LHAAP-016 - OLD LANDFILL (SWMU 16))
2006	
RI/FS	(LHAAP-012 - ACTIVE LANDFILL (SWMU 12), LHAAP-023 - BUILDING 707-STORAGE AREA PCBS)
2007	
RI/FS	(LHAAP-032 - FORMER TNT WASTEWATER PLT(SWMU 32))
PA	(LHAAP-059 - BUILDING 725)
RD	(LHAAP-012 - ACTIVE LANDFILL (SWMU 12))
RA(C)	(LHAAP-012 - ACTIVE LANDFILL (SWMU 12))
2008	
PA	(LHAAP-056 - VEHICLE WASH RACK AND OIL/WATER SEP)
LTM	(LHAAP-032 - FORMER TNT WASTEWATER PLT(SWMU 32))
RI/FS	(LHAAP-059 - BUILDING 725)
2009	
PA	(LHAAP-049 - FORMER ACID STORAGE AREA)
SI	(LHAAP-003 - BUILDING 722-PAINT SHOP)
RI/FS	(LHAAP-006 - BUILDING 54F SOLVENT, LHAAP-007 - BUILDING 50G DRUM PROCESSING, LHAAP-008 - SEWAGE TREATMENT PLANT, LHAAP-051 - PHOTOGRAPHIC LABORATORY/BLDG #60B, LHAAP-053 - STATIC TEST AREA, LHAAP-055 - SEPTIC TANK (10), LHAAP-060 - FORMER STORAGE BUILDING #411 & #714, LHAAP-064 - TRANSFORMER STORAGE, LHAAP-066 - TRANSFORMER AT BLDG 401, LHAAP-068 - MOBILE STORAGE TANK PARKING AREA)
2010	
RI/FS	(LHAAP-002 - VACCUM TRUCK OVERNITE PARKING LOT, LHAAP-037 - CHEMICAL LABORATORY WASTE PAD, LHAAP-050 - FORMER WASTE DISPOSAL FACILITY, LHAAP-058 - MAINTENANCE COMPLEX, LHAAP-067 - ABOVE GROUND STORAGE TANK, LHAAP-046 - PLANT 2 AREA, LHAAP-049 - FORMER ACID STORAGE AREA)

IRP Schedule

2011

RA(C)	(LHAAP-035 - SUMPS (145) VARIOUS)
RD	(LHAAP-035 - SUMPS (145) VARIOUS, LHAAP-037 - CHEMICAL LABORATORY WASTE PAD, LHAAP-050 - FORMER WASTE DISPOSAL FACILITY, LHAAP-058 - MAINTENANCE COMPLEX, LHAAP-067 - ABOVE GROUND STORAGE TANK, LHAAP-046 - PLANT 2 AREA)
RI/FS	(LHAAP-035 - SUMPS (145) VARIOUS, LHAAP-036 - EXPLOSIVE WASTE PADS (27))
IRA	(LHAAP-004 - LHAAP PILOT WASTEWATER TREATMENT PLANT, LHAAP-018 - BURNING GROUND/WASHOUT POND(SWMU 18), LHAAP-024 - FORMER UNLINED EVAP POND (SWMU 24))
PA	(LHAAP-065 - BUILDING 209)

2013

RA(C)	(LHAAP-037 - CHEMICAL LABORATORY WASTE PAD, LHAAP-050 - FORMER WASTE DISPOSAL FACILITY, LHAAP-058 - MAINTENANCE COMPLEX, LHAAP-067 - ABOVE GROUND STORAGE TANK, LHAAP-046 - PLANT 2 AREA)

2014

RI/FS	(LHAAP-019 - CONSTRUCTION MATERIALS LANDFILL, LHAAP-069 - SERVICE STATION UST'S, LHAAP-056 - VEHICLE WASH RACK AND OIL/WATER SEP, LHAAP-065 - BUILDING 209)

Projected Phase Completion Milestones

See attached schedule

Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates

Site ID	Site Name	ROD/DD Title	ROD/DD Date
LHAAP-017	NO 2 FLASHING AREA BRN GROUND(SWMU 17)	Flashing Area/Burning Grnd No 2:LHAAP-17	20150930

Final RA(C) Completion Date: 201709

Schedule for Next Five-Year Review: 2019

Estimated Completion Date of IRP at Installation (including LTM phase): 209909

LONGHORN ARMY AMMUNITION PLANT IRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-001	INERT BURNING GROUNDS (SWMU 1)	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-002	VACCUM TRUCK OVERNITE PARKING LOT	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-003	BUILDING 722-PAINT SHOP	RI/FS						
		RD						
		RA(C)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-004	LHAAP PILOT WASTEWATER TREATMENT PLANT	RI/FS						
		RD						
		RA(C)						
		RA(O)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-006	BUILDING 54F SOLVENT	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-007	BUILDING 50G DRUM PROCESSING	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-008	SEWAGE TREATMENT PLANT	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-011	SUS TNT BURIAL SITE AT AVE P&Q(SWMU 11)	LTM						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-012	ACTIVE LANDFILL (SWMU 12)	RA(O)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-016	OLD LANDFILL (SWMU 16)	RI/FS						
		RD						
		RA(C)						
		RA(O)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-017	NO 2 FLASHING AREA BRN GROUND(SWMU 17)	RI/FS						
		RD						
		RA(C)						
		RA(O)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-018	BURNING GROUND/WASHOUT POND(SWMU 18)	RI/FS						
		RD						
		RA(C)						
		RA(O)						
SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-019	CONSTRUCTION MATERIALS LANDFILL	LTM						

LONGHORN ARMY AMMUNITION PLANT IRP Schedule

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-024	FORMER UNLINED EVAP POND (SWMU 24)	RI/FS						
		RD						
		RA(C)						
		RA(O)						
LHAAP-029	FORMER TNT PRODUCTION AREA(SWMU 29)	RI/FS						
		RD						
		RA(C)						
		RA(O)						
LHAAP-035	SUMPS (145) VARIOUS	LTM						
LHAAP-036	EXPLOSIVE WASTE PADS (27)	LTM						
LHAAP-037	CHEMICAL LABORATORY WASTE PAD	RA(O)						
LHAAP-045	MAGAZINE AREA	LTM						
LHAAP-046	PLANT 2 AREA	RA(O)						
LHAAP-047	PLANT 3 AREA	RI/FS						
		RD						
		RA(C)						
		RA(O)						
LHAAP-049	FORMER ACID STORAGE AREA	LTM						
LHAAP-050	FORMER WASTE DISPOSAL FACILITY	RA(O)						
LHAAP-051	PHOTOGRAPHIC LABORATORY/BLDG #60B	LTM						
LHAAP-055	SEPTIC TANK (10)	LTM						
LHAAP-056	VEHICLE WASH RACK AND OIL/WATER SEP	LTM						
LHAAP-058	MAINTENANCE COMPLEX	RA(O)						
LHAAP-059	BUILDING 725	LTM						
LHAAP-060	FORMER STORAGE BUILDING #411 & #714	LTM						
LHAAP-064	TRANSFORMER STORAGE	LTM						

LONGHORN ARMY AMMUNITION PLANT IRP Schedule

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-065	BUILDING 209	LTM						
LHAAP-066	TRANSFORMER AT BLDG 401	LTM						
LHAAP-067	ABOVE GROUND STORAGE TANK	RA(O)						
LHAAP-068	MOBILE STORAGE TANK PARKING AREA	LTM						
LHAAP-069	SERVICE STATION UST'S	LTM						
PBC Longhorn	PBC at Longhorn	RD						
		RA(C)						
		RA(O)						

LONGHORN ARMY AMMUNITION PLANT

Non-BRAC Excess
Military Munitions Response Program

MMRP Summary

Installation Total Army Environmental Database-Restoration (AEDB-R) Sites/Closeout Sites Count: 4/1

Installation Site Types with Future and/or Underway Phases

1 Explosive Ordnance Disposal Area
(LHAAP-003-R-01)
1 Pistol Range
(LHAAP-004-R-01)
1 Unexploded Munitions/Ordnance
(LHAAP-001-R-01)

Most Widespread Contaminants of Concern

Explosives

Media of Concern

Groundwater, Soil

Completed Remedial Actions (Interim Remedial Actions / Final Remedial Actions (IRA/FRA))

Site ID	Site Name	Action	Remedy	FY	Cost
LHAAP-001-R-01	SOUTH TEST AREA / BOMB TEST AREA	IRA	UXO CLEARANCE	2009	TBD
LHAAP-001-R-01	SOUTH TEST AREA / BOMB TEST AREA	IRA	INSTITUTIONAL CONTROLS	2009	TBD
LHAAP-004-R-01	PISTOL RANGE	IRA	WASTE REMOVAL - SOILS	2010	TBD

Duration of MMRP

Year of MMRP Inception: 200202

Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 201512/201512

Date of MMRP completion including Long Term Management (LTM): 204509

MMRP Contamination Assessment

Contamination Assessment Overview

In May 2003 the Phase 3 Army range inventory was completed at LHAAP. The inventory identified three sites as eligible for the Military Munitions Response Program (MMRP). The Phase 3 inventory serves as the preliminary assessment (PA) under CERCLA. In June 2005 an SI was completed. An EE/CA was finalized on the three sites in October 2007. The EE/CA indicated that no Department of Defense (DoD) action was required for LHAAP-002-R-01. An interim removal action was funded for the two other sites and was completed in 2009. In March 2008 an explosives safety submission (ESS) was finalized for the three sites. The final MC summary report was completed in 2011 for LHAAP-001-R-01 and LHAAP-003-R-01. In 2012 the Pistol Range (LHAAP-004-R-01) was added to the MMRP. A soil removal action was completed at LHAAP-004-R-01 and an NFA ROD was signed in September 2010.

Cleanup Exit Strategy

Limited groundwater monitoring for perchlorate and five-year reviews are planned for LHAAP-001-R-01 and LHAAP-003-R-01. Five-year reviews are planned for LHAAP-004-R-01. The five-year reviews will ensure that the site is inspected, LUCs are still in place and that any new data regarding the condition of the site is reviewed.

MMRP Previous Studies

	Title	Author	Date
2001			
	U.S. Army Active/Inactive Range Inventory, Longhorn AAP	Army Materiel Command	AUG-2001
2002			
	CTT Range Inventory	e2M	JAN-2002
2003			
	Phase 3 Army Range Inventory at Longhorn Army Ammunition Plant	e2M	MAY-2003
2005			
	Final Site Inspection Report, Military Munitions Response Program Site Inspection, Munitions Response Sites	e2M	JUN-2005
2006			
	Final Work Plan Engineering Evaluation/Cost Analysis at the Longhorn Army Ammunition Plant	Cape Environmental Management, Inc.	MAR-2006
	Draft Operational Range Inventory Sustainment (ORIS) for Longhorn AAP	US Army	NOV-2006
2007			
	Final Engineering Evaluation/Cost Analysis at the Longhorn Army Ammunition Plant	Cape Environmental Management, Inc.	OCT-2007
2008			
	Final Explosives Safety Submission - Munitions and Explosives of Concern Removal Action	USACE, Huntsville	FEB-2008
	Final Work Plan for MEC Removal Action at Former LHAAP LHAAP-001-R(Site 27) and LHAAP-003-R(Site 54)	EOD Technology, Inc.	JUL-2008
2009			
	Final EE/CA Former Pistol Range	Shaw Environmental, Inc.	FEB-2009
	Final Site-specific Final Report for MEC Removal Action, LHAAP-001-R(Site 27) and LHAAP-003-R(Site 54)	EOD Technology, Inc.	SEP-2009
2010			
	Final Completion Report Non-Time Critical Removal Action at the Former Pistol Range	Shaw Environmental, Inc.	JAN-2010
	Final Proposed Plan for the Former Pistol Range	Shaw Environmental, Inc.	JAN-2010
	Final ROD, Former Pistol Range	Shaw Environmental, Inc.	SEP-2010
2011			
	Final Proposed Plan for South Test Area/Bomb Test Area, LHAAP-001-R and Ground Signal Test Area, LHAAP-003-R	Shaw Environmental Inc.	JUN-2011

LONGHORN ARMY AMMUNITION PLANT

Non-BRAC Excess

Military Munitions Response Program

Site Descriptions

Site ID: LHAAP-001-R-01
Site Name: SOUTH TEST AREA / BOMB TEST AREA

STATUS

Parcel: South Test/Bomb (FWS) (72 acres)

Regulatory Driver: CERCLA

MRSPP Score: 04

Contaminants of Concern: Explosives

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	200202	200305
SI	200402	200506
RI/FS	200503	201512
IRA	200710	200904
LTM	201512	204509

RIP Date: N/A

RC Date: 201512

SITE DESCRIPTION

This site of approximately 79 acres is also known as environmental site LHAAP-027 and is located southeast of Avenue P and the magazine area, at the end of 70th street, near the southern boundary of LHAAP. The site was constructed in 1954 and used by Universal Match Corporation to test photoflash bombs that were produced at the facility until about 1956. The bombs were tested by exploding them in the air over an elevated, semi-elliptical earthen test pad. Bombs awaiting testing were apparently stored in three earth-covered concrete bunkers. The bombs tested were 150-pound M120/M120A photoflash bombs, filled with photoflash powder and containing a black powder booster charge for bursting the bomb with a timed nose fuse.

The location of the site, for this purpose, was not ideally suited to the task, as fragments from this testing landed beyond the installation boundary. By June 1954, static testing of photoflash bombs had been discontinued because of the possibility of damage and injuries beyond the installation boundary. During the late-1950s, illuminating signal devices were also demilitarized within pits at this site. During the early-1960s, leaking production items were demilitarized in the area. The May 1997 final RI report for Group I sites indicates approximately 52,000 one-half and one-pound photoflash cartridges were demilitarized at the site in the early-1980s.

In 1982, investigations included installation and sampling of two wells and three shallow soil samples. Explosives, metals, chloride and sulfate were detected above background levels in the soil samples. In January 1998, an NFA ROD was signed by the USEPA, based upon the site-specific risk analysis for human and ecological exposure to the contaminants of potential concern for the site.

In 2004, the Explosive Ordnance Disposal (EOD) unit at Fort Polk blew in place (BIP) one 155 mm white phosphorous (WP) round. The identification of this round as a live 155 mm WP round is suspect. Plexus, in the 2005 environmental baseline survey (EBS) (page 46), states that "confirmatory sampling (CS) WP operations at LHAAP were assembly and packout operations only; no loading of these materials was conducted at the site. The WP rounds were stored and worked in the east line area of Plant 2 [US Army Toxic and Hazardous Materials Agency (USATHAMA), 1980]." Testing of the payload at LHAAP would not be part of the mission, since it was not manufactured at Longhorn. Others indicate that it was a 105 or 81 mm smoke round.

A reported demolition site was identified on the northwest perimeter of this site. This was added to the investigation. In FY2008 an EE/CA report was completed, approved and signed. In October 2007 the report was finalized. An IRA has been funded with the final ESS completed in March 2008. The removal action was completed in 2009. The ROD is delayed until the dispute is resolved with the USEPA. The ROD will include limited groundwater monitoring for perchlorate and LUCs of restrictions against digging and residential use and sign maintenance. The costs for the ROD and RD are captured under the PBA. Five-year reviews are required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

Site ID: LHAAP-001-R-01
Site Name: SOUTH TEST AREA / BOMB TEST AREA

CLEANUP/EXIT STRATEGY

Five-year reviews are planned for this site. These five-year reviews will ensure that the site is inspected and that any new data regarding the condition of the site is reviewed. The LUCs are in place and will be formally enforced upon ROD signature.

Site ID: LHAAP-003-R-01
Site Name: GROUND SIGNAL TEST AREA

STATUS

Parcel: Ground Signal Test (FWS) (80 acres)

Regulatory Driver: CERCLA
MRSPP Score: 04

Contaminants of Concern: Explosives

Media of Concern: Groundwater, Soil

Phases	Start	End
PA	200202	200305
SI	200402	200506
RI/FS	200503	201512
IRA	200710	200904
LTM	201512	204509

RIP Date: N/A

RC Date: 201512

SITE DESCRIPTION

This site, also known as environmental site LHAAP-054, encompasses approximately 80 acres and is located in the southeastern portion of LHAAP. Starting in April 1963 the site was used intermittently for aerial and on-ground testing and destruction of a variety of devices, including red phosphorus smoke wedges, infrared flares, illuminating 60 and 81 mm mortar shells, illuminating 40 to 155 mm cartridges, button bombs, and various types of explosive simulators. The site was also used intermittently over a 20-year period for testing and burnout of rocket motors from Nike-Hercules, Pershing, and Sergeant missiles. Around 1970, one of the Sergeant rocket motors exploded in an excavated pit near the center of the site. Debris was reportedly placed in the resulting crater and backfilled. From late-1988 through 1991, the site was also used for burnout of rocket motors in Pershing missiles destroyed in accordance with the INF Treaty between the United States (US) and the former Soviet Union. In January 1998 an NFA ROD for hazardous, toxic and radioactive waste (HTRW) under CERCLA was signed. The site is currently undeveloped.

In December 2004, the EOD unit at Fort Polk BIP 105 mm and 81 mm rounds. In FY2008 an EE/CA report was completed, approved and signed. In October 2007 the report was finalized. An IRA has been funded with the final ESS completed in March 2008. The removal action was completed in 2009. The ROD is delayed until the dispute is resolved with the USEPA. The ROD will include limited groundwater monitoring for perchlorate LUCs of restrictions against digging and residential use and sign maintenance. The costs for the ROD and RD are captured under the PBA. Five-year reviews are required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

Five-year reviews are planned for this site. These five-year reviews will ensure that the site is inspected and that any new data regarding the condition of the site is reviewed. The LUCs are in place and will be formally enforced upon ROD signature.

Site ID: LHAAP-004-R-01
Site Name: PISTOL RANGE

STATUS

Parcel: NONE

Regulatory Driver: CERCLA
MRSPP Score: No longer required

Contaminants of Concern: Metals

Media of Concern: Soil

Phases	Start	End
PA	200809	200902
RI/FS	201005	201008
IRA	200912	201001
LTM	201201	204509

RIP Date: N/A

RC Date: 201008

SITE DESCRIPTION

The former pistol range was known to have been used by LHAAP security personnel for small arms target qualification and recertification. The pistol range was established in the 1950s and used intermittently through 2004. Site investigation results identified areas where the surface and near surface soil was contaminated with lead at concentrations that exceeded the TCEQ soil MSCC for industrial use. A non-time critical removal action was completed. The IRA for this site became the FRA. An NFA ROD was finalized in August 2010. A notification (not a remedy or LUC) has been filed in Harrison County, TX stating that the site is suitable for non-residential use in accordance with Texas Administrative Code Title 30 §335.566. A five-year review report in the form of a letter stating the use of the site remains non-residential is required. The costs for the installation-wide five-year reviews are captured under LHAAP-058.

CLEANUP/EXIT STRATEGY

LTM in the form of five-year reviews is required.

MMRP Site Closeout (No Further Action) Summary

Site ID	Site Name	NFA Date	Documentation
LHAAP-002-R-01	STATIC TEST AREA	200811	A no action decision document signed in 2008.

MMRP Schedule

Date of MMRP Inception 200202

Past Phase Completion Milestones

2003	
PA	(LHAAP-001-R-01 - SOUTH TEST AREA / BOMB TEST AREA, LHAAP-002-R-01 - STATIC TEST AREA, LHAAP-003-R-01 - GROUND SIGNAL TEST AREA)
2005	
SI	(LHAAP-001-R-01 - SOUTH TEST AREA / BOMB TEST AREA, LHAAP-002-R-01 - STATIC TEST AREA, LHAAP-003-R-01 - GROUND SIGNAL TEST AREA)
2008	
RI/FS	(LHAAP-002-R-01 - STATIC TEST AREA)
2009	
PA	(LHAAP-004-R-01 - PISTOL RANGE)
IRA	(LHAAP-001-R-01 - SOUTH TEST AREA / BOMB TEST AREA, LHAAP-003-R-01 - GROUND SIGNAL TEST AREA)
2010	
RI/FS	(LHAAP-004-R-01 - PISTOL RANGE)
IRA	(LHAAP-004-R-01 - PISTOL RANGE)

Projected Phase Completion Milestones

See attached schedule

Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates

To Be Determined

Final RA(C) Completion Date:

Schedule for Next Five-Year Review: 2019

Estimated Completion Date of MMRP at Installation (including LTM phase): 204509

LONGHORN ARMY AMMUNITION PLANT MMRP Schedule

= phase underway

SITE ID	SITE NAME	PHASE	FY16	FY17	FY18	FY19	FY20	FY21+
LHAAP-001-R-0	SOUTH TEST AREA / BOMB TEST AREA	RI/FS						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21+**
LHAAP-003-R-0	GROUND SIGNAL TEST AREA	RI/FS						
		LTM						
SITE ID	**SITE NAME**	**PHASE**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21+**
LHAAP-004-R-0	PISTOL RANGE	LTM						

Community Involvement

Technical Review Committee (TRC): 199203

Community Involvement Plan (Date Published): 201311

Restoration Advisory Board (RAB): RAB established 2004

RAB Adjournment Date:

RAB Adjournment Reason:

Additional Community Involvement Information

While the Army leads the Installation Restoration Program (IRP) at LHAAP, a close working relationship with the regulatory community has been developed. The local public community has been involved in the past through the TRC process.

In April 1996 and in 1998 formation of a RAB was attempted; however, community involvement in the TRC process was determined to be sufficient for community needs. In September 2004, in response to public notices and private mailings, a group of citizens attended a RAB-interest meeting. Enthusiastic support resulted in the first RAB meeting in December 2004. It was well attended. The RAB has created its own symbol, finalized its charter, and elected a co-chair. The RAB meets quarterly and public meetings are held for each PP. These will continue as needed.

An update to the community involvement plan was finalized in 2013.

Administrative Record is located at

Longhorn Army Trailer
Groundwater Treatment Plant Compound
Highway 134 and Spur 449
Karnack, TX 75661

Information Repository is located at

Marshall Texas Library
300 South Alamo
Marshall, TX 75670

Current Technical Assistance for Public Participation (TAPP): 199909

TAPP Title: Grnd/surf water migration

Current Technical Assistance for Public Participation (TAPP): 200103

TAPP Title: TAPP2

Potential TAPP: N/A

AECOM

MEMORANDUM FOR FILE

DATE: August 4, 2015

PROJECT NAME: Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Karnack, TX

TO: Rose Zeiler — Site Manager

Rick Smith — Project Manager

Aaron Williams — Project Engineer

FROM: Mark Heaston — AECOM PM, (402) 643-9823

SUBJECT: **Surface Water Data Transmittal 1 Q 2015**
Perimeter Well Data Transmittal Not Sampled in 1 Q 2015
Longhorn Army Ammunition Plant, Karnack, TX
(Contract: W912DY-09-D-0059, Task Order DS01)

REMARKS

Surface Water and Perimeter well sampling data is currently collected at the following frequencies except when locations are dry:

Perimeter Wells	**Frequency**
PW108	Annually
PW110	Annually
PW111	Annually
PW112	Annually
PW133	Semi-Annually
PW134	Semi-Annually
Surface Water	**Frequency**
HBW-1	Harrison Bayou , quarterly
HBW-7	Harrison Bayou , quarterly
HBW-10	Harrison Bayou , quarterly
GPW-1	Goose Prairie Creek, quarterly
GPW-3	Goose Prairie Creek, quarterly

Data associated with sampling events for the subject periods including the data validation report (Quality Control Summary Report) for the samples are attached for your file. Note all surface water locations were sampled during the surface water sampling event in February 2015.

All Perimeter Well and Surface Water sampling data is updated and reported to the regulatory agencies and to the public as it is available through handouts reviewed and distributed in association with the quarterly Restoration Advisory Board (RAB) meetings, and included in the Administrative Record along with other RAB meeting materials. The attached handouts were distributed at the June 2015 RAB meeting.

List of Attachments:

Harrison Bayou and Goose Prairie Creek Perchlorate Data Handout

LHAAP Perimeter Well Monitoring Perchlorate Data Handout

Quality Control Summary Report

Laboratory Analytical Data Reports

Harrison Bayou and Goose Prairie Creek – Perchlorate Data

Surface water samples are collected quarterly from each location in Harrison Bayou and Goose Prairie Creek, unless the sampling location is dry.

Historic Surface Water Sample Data
(in micrograms per liter)

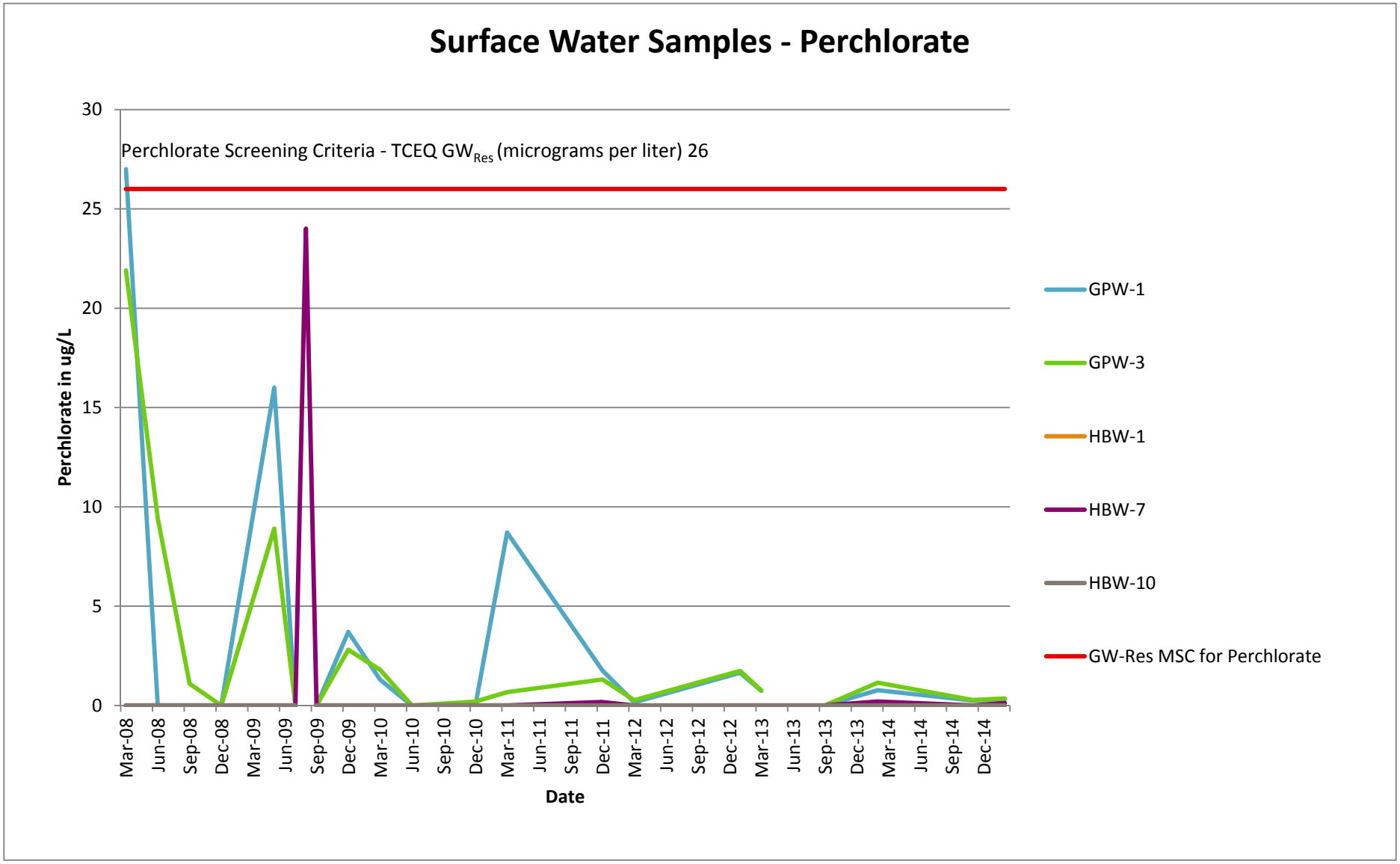
Quarter	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
Creek Sample ID	Jul 1999	Sep 1999	Feb 2000	Apr 2000	Aug 2000	Dec 2000	Feb 2001	Apr 2001	Jul 2001	Oct 2001	Jan 2002
GPW-1	<1.0U	-	4	<4.0 U	<4.0 U	<4.0 U	-	2.65	<4.0 U	<4.0 U	<4.0 U
GPW-3	<1.0U	<4.0 U	17	8	<4.0 U	<4.0 U	-	2.28	<4.0 U	<4.0 U	<4.0 U
HBW-1	-	<80.0 U	310	23	-	-	<4.0 U	-	<4.0 U	<4.0 U	<4.0 U
HBW-7	-	<8.0 U	370	110	-	-	<4.0 U	-	<4.0 U	<4.0 U	<4.0 U
HBW-10	-	<8.0 U	905	650	<4.0 U	-	<4.0 U	-	<4.0 U	-	-

Quarter	2nd	3rd	4th	1st	2nd	3rd	3rd	4th	2nd	3rd	4th
Creek Sample ID	Jun 2002	Sept 2002	Dec 2002	Feb 2003	Jun 2003	Aug 2003	Jul 2004	Dec 2006	May 2007	Aug 2007	Dec 2007
GPW-1	<4.0 U	<4.0 U	18.3	18.6	59.9	-	2.25	-	<1.0 U	<1.0 U	10.7
GPW-3	<4.0 U	<4.0 U	5.49	12.6	14.7	-	2.2	-	<1.0 U	<1.0 U	7.48
HBW-1	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	99.3	<0.2U	<1.0 U	<1.0 U	122	<1.0 U
HBW-7	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	<4.0 U	<0.2U	<1.0 U	<1.0 U	1.02	<1.0 U
HBW-10	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	-	<0.2U	<1.0 U	<1.0 U	<1.0 U	<1.0 U

Quarter	1st	2nd	3rd	4th	2nd	3rd	3rd	3rd	4th	1st	2nd
Creek Sample ID	Mar 2008	Jun 2008	Sep 2008	Dec 2008	May 2009	Jul 2009	Aug 2009	Sep 2009	Dec 2009	Mar 2010	Jun 2010
GPW-1	27	<0.5U	<0.5U	<0.22U	16	<4U	NS	<1.2U	3.7	1.3J	<0.6U
GPW-3	21.9	9.42	1.1	<0.22U	8.9	<4U	NS	<0.6U	2.8	1.8J	<0.6U
HBW-1	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	NS	<1.5U	<0.275U	1.5U	<0.6U
HBW-7	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	24	<1.2U	<0.275U	1.5U	<0.6U
HBW-10	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	NS	<1.5U	<0.275U	1.2U	<0.6U

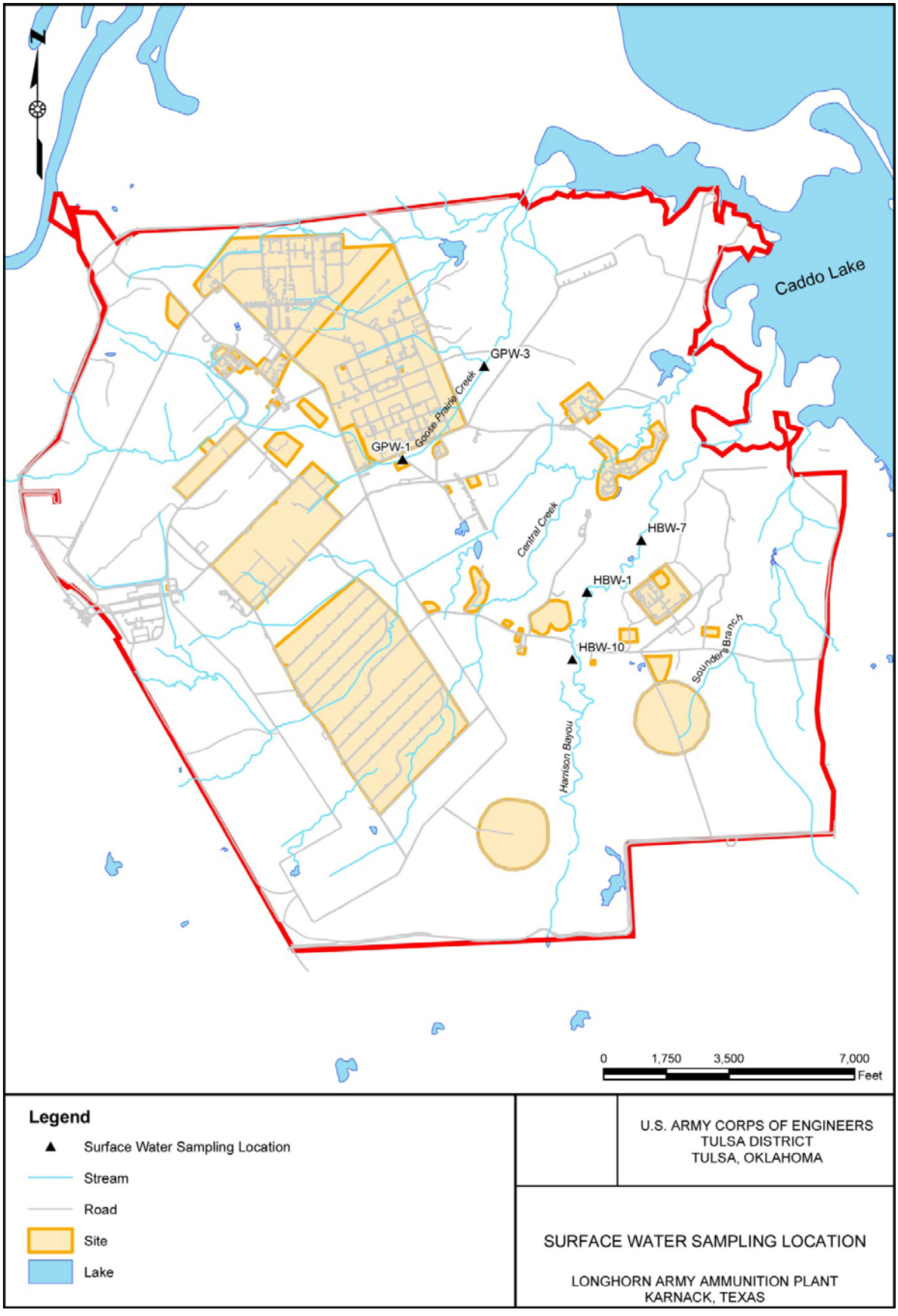
Quarter	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
Creek Sample ID	Sep 2010	Dec 2010	Mar 2011	Jun 2011	Sep 2011	Dec 2011	Mar 2012	Jun 2012	Not Applicable	Jan & Feb 2013	Mar 2013
GPW-1	dry	<0.1U	8.7	dry	dry	1.76	0.163J	dry	NC	1.65	0.735
GPW-3	dry	0.199J	0.673	dry	dry	1.31	0.261	dry	NC	1.74	0.754
HBW-1	dry	<0.1U	<0.2U	dry	dry	<0.1U	0.1U	dry	NC	<0.2U	<0.2U
HBW-7	dry	<0.1U	<0.2U	dry	dry	0.171J	0.1U	dry	NC	<0.2U	<0.2U
HBW-10	dry	<0.1U	<0.2U	dry	dry	<0.1U	0.1U	dry	NC	<0.2U	<0.2U

Quarter	2nd	3rd	4th	1st	2nd	3nd	4th	1st
Creek Sample ID	Jun 2013	Sept 2013	Dec 2013	Feb 2014	May 2014	Aug 2014	Nov 2014	Feb 2015
GPW-1	dry	<0.2 U	dry	0.766	dry	dry	0.244 J	0.311 J
GPW-3	dry	<0.2 U	dry	1.15	dry	dry	0.276 J	0.344 J
HBW-1	<0.2U	<0.2 U	dry	<0.2 U	dry	dry	<0.2 U	<0.2 U
HBW-7	<0.2U	<0.2 U	dry	0.201 J	dry	dry	<0.2 U	0.124 J
HBW-10	<0.2U	<0.2 U	dry	<0.2 U	dry	dry	<0.2 U	<0.2 U


Surface Water Samples - Perchlorate
Perchlorate Screening Criteria - TCEQ GWRes (micrograms per liter) 26
Perchlorate in ug/L
30
25
20
15
10
5
0
Mar-08
Jun-08
Sep-08
Dec-08
Mar-09
Jun-09
Sep-09
Dec-09
Mar-10
Jun-10
Sep-10
Dec-10
Mar-11
Jun-11
Sep-11
Dec-11
Mar-12
Jun-12
Sep-12
Dec-12
Mar-13
Jun-13
Sep-13
Dec-13
Mar-14
Jun-14
Sep-14
Dec-14
Date
GPW-1
GPW-3
HBW-1
HBW-7
HBW-10
GW-Res MSC for Perchlorate

00216113

Longhorn Army Ammuntion Plant Creek Sampling Locations



LHAAP Perimeter Well Monitoring – Perchlorate Data

Groundwater samples are currently collected annually from four wells and semi-annually from two wells on the LHAAP perimeter.

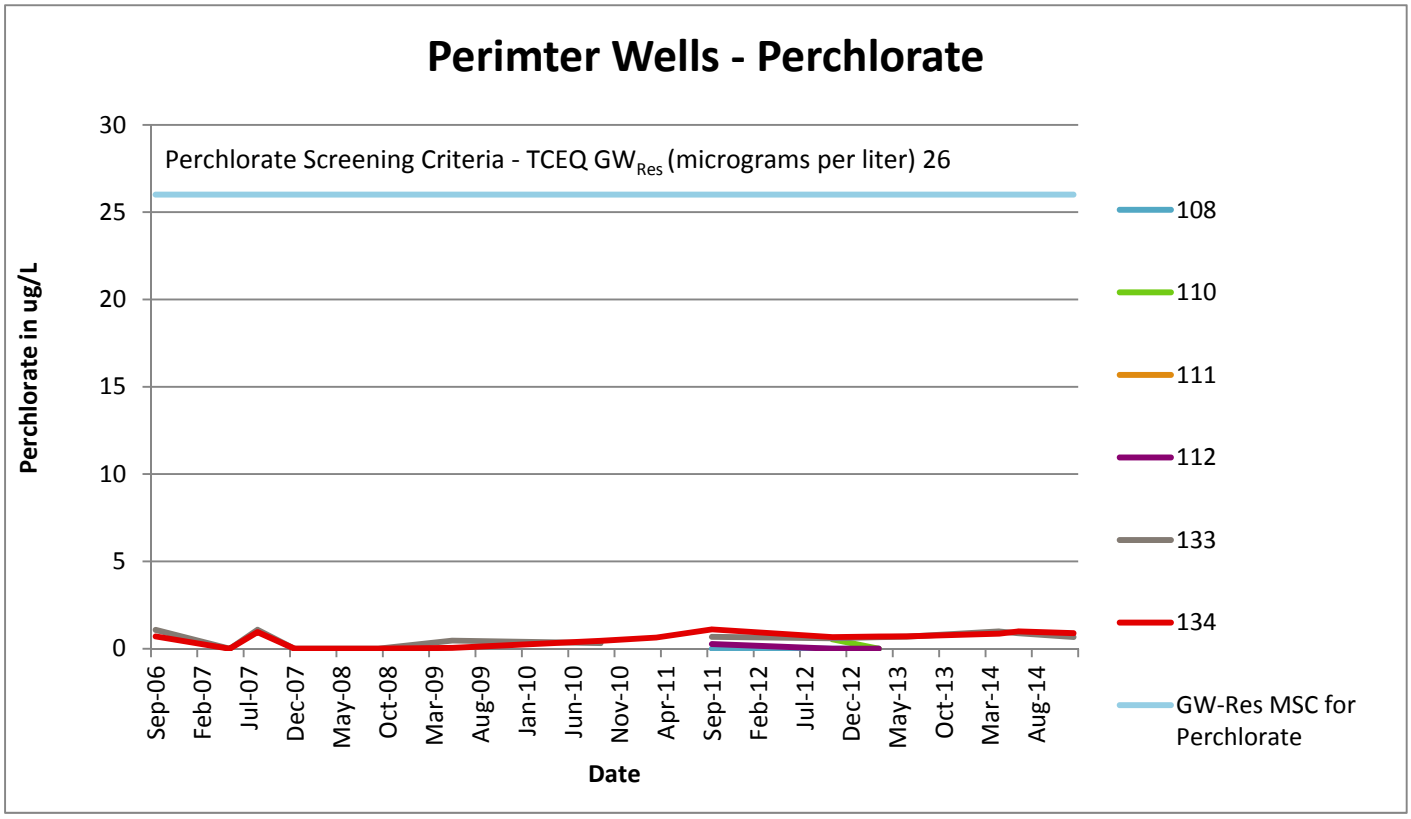
Historic Perimeter Well Sample Data
(in micrograms per liter)

Well ID	June 2005	Sep 2005	Sep 2006	May 2007	Aug 2007	Dec 2007	Mar 2008	Sep 2008	May 2009	Sep 2009	Mar 2010
108	Dry	Dry	10 U	Dry	0.5 U	Dry	Dry	2.5 U	Dry	1.2 U	Dry
110	Dry	Dry	10 U	Dry	10 U	Dry	Dry	5.0 U	Dry	6 U	Dry
111	Dry	Dry	4 U	Dry	0.5 U	Dry	Dry	0.5 U	Dry	0.3 U	Dry
112	Dry	Dry	5 U	Dry	3 U	Dry	Dry	2.0 U	Dry	3 U	Dry
133	0.541	0.597	1.08	1 U	1.09	0.5 U	0.5 U	0.5 U	0.47 J	0.32	Dry
134	0.881	0.725	0.708 J	1 U	0.949 J	0.5 U	0.5 U	0.829 U	0.04 J	0.3 U	0.3 U

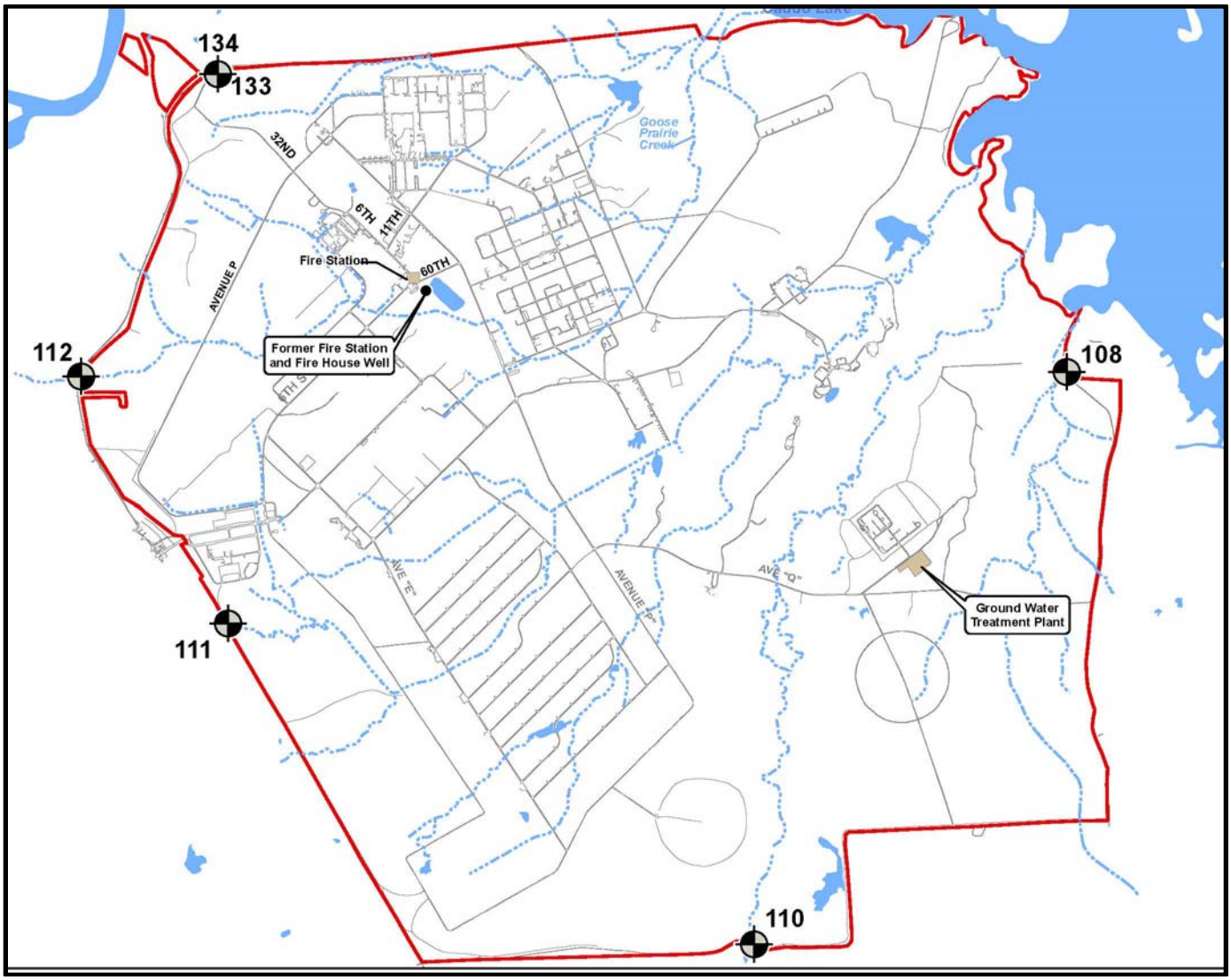
Well ID	Sep 2010	Mar 2011	Sep 2011	Oct 2012	Mar 2013	June 2013	Apr 2014	Jun 2014	Dec 2014
108	3 U	Dry	0.1 U	0.2 U	0.2 U	Dry	Dry	0.2 U	Dry
110	Dry	Dry	Dry	0.535	0.2 U	Dry	Dry	0.2 U	Dry
111	Dry	Dry	Dry	Dry	1.32	Dry	Dry	Dry	Dry
112	3 U	Dry	0.26	0.2 U	0.2 U	Dry	Dry	0.458	Dry
133	0.32	Dry	0.68	0.598	0.655	0.685	0.988	0.887	0.665
134	0.45	0.636	1.11	0.671	0.698	0.706	0.863	0.989	0.890

Notes:

J	Estimated
U	Non-Detect
Dry	Well Dry



Longhorn Army Ammuntion Plant Map with Perimeter Well Locations



QUALITY CONTROL SUMMARY REPORT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

June 2015

Table of Contents

List of Tables

1 INTRODUCTION

AECOM reviewed one data package from Microbac Laboratory Services, Marietta, OH. Surface water samples were collected February 23, 2015 at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. Data were reviewed for conformance to the requirements of the following guidance documents: Automated Data Review by Laboratory Data Consultants (ADR.net), United States Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, (EPA, July 2002), and EPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, (EPA, June 2001).

1.1 Intended Use of Data

Groundwater treatment activities consist of monitoring of treated water to ensure compliance with the discharge limitations.

Analyses requested included:

- SW6850 – Perchlorates by LC/MS/MS

Table 2 lists the sample identifications and their associated laboratory identifications. **Table 3** lists qualified results with the associated quality control parameter that was exceeded.

1.2 Preservation and Holding Times

Sample identification data were evaluated for agreement with the chain-of-custody (COC). All samples were received in appropriate containers, within the proper temperature range, in good condition, and with the required signatures.

1.3 Calibrations

Initial calibration criteria modification includes RSD< or = to 30%, two compounds allowed up to 40%. If the continuing calibration verification (CCV) compound exceeds 30% drift, the compound is checked in the LCS, if both are outside recovery limits, the compound is rejected, R. If only the CCV exceeds recovery criteria and is less than ± 40% drift, then the compound is qualified J or UJ.

1.3.1 Continuing Calibration Verifications (CCV)

All CCVs are within criteria.

1.3.2 Blanks

Where contamination by a target analyte of one of the various blanks was found, if the sample result for an associated sample was non-detect or less than 5X (10X for common laboratory contaminants) the analyte concentration in the blank, the corresponding sample result for the analyte was qualified B. Where the sample result for the affected analyte was greater than 5X the amount in the blank, no qualifier was applied.

No blank contamination found.

1.3.3 Surrogates

All surrogates are within criteria.

1.3.4 Laboratory Control Sample (LCS)

All LCS are within criteria.

2 DATA USABILITY SUMMARY

The data are usable for the intended purposes of the project. The data quality objectives have been met for the project.

Table 1: Completeness by Method

Method	Total Analytes	No. of Rejected Results	% Completeness
SW6850	5	0	100

Table 2: Field Sample Identification and Laboratory Identification

Client Sample ID	Lab Sample ID	Collected	SW6850
HBW7-020514	L15021217-01	2/23/2015	X
HBW10-020514	L15021217-02	2/23/2015	X
HBW1-020514	L15021217-03	2/23/2015	X
GPW1-020514	L15021217-04	2/23/2015	X
GPW3-020514	L15021217-05	2/23/2015	X

Microbac

Laboratory Report Number: L15021217

Kayla Teague
AECOM Technical Services, Inc.
16000 Dallas Parkway
Dallas, TX 75248

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Stephanie Mossburg – Team Chemist/Data Specialist
(740) 373-4071
Stephanie.Mossburg@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on March 09 2015

David Vandenberg – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L15021217
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00112194	I	0.0		J2317161263	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	NA
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L15021217
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
HBW 7-022315	L15021217-01	02/23/2015 09:00	02/25/2015 09:46
HBW 10-022315	L15021217-02	02/23/2015 09:15	02/25/2015 09:46
HBW 1-022315	L15021217-03	02/23/2015 09:35	02/25/2015 09:46
GPW 1-022315	L15021217-04	02/23/2015 09:50	02/25/2015 09:46
GPW 3-022315	L15021217-05	02/23/2015 10:05	02/25/2015 09:46

Microbac REPORT L15021217
PREPARED FOR AECOM Technical Services, Inc.
WORK ID:

1.0 Summary Data

1.1 Narratives

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L15021217
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG514217	**Reviewer Name:**	Eric Lawson
LRC Date:	2015-03-09 00:00:00		

Laboratory Data Package Cover Page

X	R1	Field chain-of-custody documentation;
X	R2	Sample identification cross-reference;
X	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
X	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
X	R5	Test reports/summary forms for blank samples;
X	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
X	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
X	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
X	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
X	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2015-03-09 17:30:38

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L15021217
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG514217	**Reviewer Name:**	Eric Lawson
LRC Date:	2015-03-09 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L15021217
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG514217	**Reviewer Name:**	Eric Lawson
LRC Date:	2015-03-09 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L15021217
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG514217	**Reviewer Name:**	Eric Lawson
LRC Date:	2015-03-09 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?			X		
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L15021217
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG514217	**Reviewer Name:**	Eric Lawson
LRC Date:	2015-03-09 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L15021217
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG514217	**Reviewer Name:**	Eric Lawson
LRC Date:	2015-03-09 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

1.2 Certificate of Analysis

Certificate of Analysis

Sample #:	L15021217-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 16:38
Collect Date:	02/23/2015 09:00	**Dilution:**	1	**File ID:**	1LM.LM29107
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.124	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Certificate of Analysis

Sample #:	L15021217-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 17:34
Collect Date:	02/23/2015 09:15	**Dilution:**	1	**File ID:**	1LM.LM29110
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Certificate of Analysis

Sample #:	L15021217-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 17:53
Collect Date:	02/23/2015 09:35	**Dilution:**	1	**File ID:**	1LM.LM29111
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Certificate of Analysis

Sample #:	L15021217-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 18:12
Collect Date:	02/23/2015 09:50	**Dilution:**	1	**File ID:**	1LM.LM29112
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.311	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Certificate of Analysis

Sample #:	L15021217-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 18:31
Collect Date:	02/23/2015 10:05	**Dilution:**	1	**File ID:**	1LM.LM29113
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.344	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

2.0 Full Sample Data Package

2.1 General Chromatography Data

2.1.1 6850 LC/MS Data

2.1.1.1 Summary Data

Certificate of Analysis

Sample #:	L15021217-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 16:38
Collect Date:	02/23/2015 09:00	**Dilution:**	1	**File ID:**	1LM.LM29107
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.124	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Certificate of Analysis

Sample #:	L15021217-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 17:34
Collect Date:	02/23/2015 09:15	**Dilution:**	1	**File ID:**	1LM.LM29110
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Certificate of Analysis

Sample #:	L15021217-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 17:53
Collect Date:	02/23/2015 09:35	**Dilution:**	1	**File ID:**	1LM.LM29111
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Certificate of Analysis

Sample #:	L15021217-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 18:12
Collect Date:	02/23/2015 09:50	**Dilution:**	1	**File ID:**	1LM.LM29112
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.311	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Certificate of Analysis

Sample #:	L15021217-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3-022315	**Prep Method:**	6850	**Prep Date:**	03/04/2015 14:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	11/17/2014 14:53
Workgroup #:	WG514217	**Analyst:**	JWR	**Run Date:**	03/04/2015 18:31
Collect Date:	02/23/2015 10:05	**Dilution:**	1	**File ID:**	1LM.LM29113
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.344	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Perchlorate Conductivity Check
(perchlorate1)

Conductivity Probe Calibration Check: 1480 /1410 µs/cm

Working MCT Level: 10,000 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
WG514217-01 MCT	10,600.	
-02 Blank	0.77	
-03 LCS	0.84	
L15021217-01	137.9	
-02	133.5	
-03	132.3	
-04	42.8	
-05	42.4	
L15021234-01	3,020.	
L15021237-01	3,040.	
-02	3,010.	
L15030047-01 (NR)		
L15030051-01	1,473.	

Analyst: John Richards

Date/Time: 03/06/15 / 11:00

DCN#108990

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 111714_ADC.TXT

Analyst1: ADC Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 6

Maintenance Log ID: Syringe Filter Lot#: 130818254-1

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG501261

Internal STD: COA17578 Surrogate STD: NA Calibration STD STD67080 (11/17/2014)

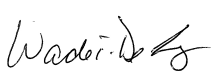
CCV STD: STD67080 LCS STD: STD67080 MS/MSD STD: STD67080

Comments: ICAL WG501146 : Alternate Source :STD67082

Diluted samples in this analytical workgroup were ran according to sample's historical data.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM27603	WG501146-01 CCB	1	1		11/17/14 12:41
2	1LM.LM27604	WG501146-02 STD (0.1 ug/L)	1	1	STD67080	11/17/14 13:00
3	1LM.LM27605	WG501146-03 STD (0.2 ug/L)	1	1	STD67080	11/17/14 13:19
4	1LM.LM27606	WG501146-04 STD (0.5 ug/L)	1	1	STD67080	11/17/14 13:38
5	1LM.LM27607	WG501146-05 STD (1.0 ug/L)	1	1	STD67080	11/17/14 13:56
6	1LM.LM27608	WG501146-06 STD (2.0 ug/L)	1	1	STD67080	11/17/14 14:15
7	1LM.LM27609	WG501146-07 STD (5.0 ug/L)	1	1	STD67080	11/17/14 14:34
8	1LM.LM27610	WG501146-08 STD (10 ug/L)	1	1	STD67080	11/17/14 14:53
9	1LM.LM27611	WG501146-09 SSCV (1.0 ug/L)	1	1	STD67082	11/17/14 15:12
10	1LM.LM27612	WG501260-01 CCB	1	1		11/17/14 15:31
11	1LM.LM27613	WG501260-02 CCV (1.0ug/L)	1	1	STD67080	11/17/14 15:50
12	1LM.LM27614	WG501261-07 MRL (0.2ug/L)	1	1	STD67080	11/17/14 16:09
13	1LM.LM27615	WG501261-01 MCT (0.2ug/L)	1	1	STD67080	11/17/14 16:28
14	1LM.LM27616	WG501261-02 BLANK	1	1		11/17/14 16:47
15	1LM.LM27617	WG501261-03 LCS (0.2ug/L)	1	1	STD67080	11/17/14 17:06
16	1LM.LM27618	L14110479-26	1	1		11/17/14 17:25
17	1LM.LM27619	L14110648-01	1	1		11/17/14 17:44
18	1LM.LM27620	L14110438-01 100X	1	100		11/17/14 18:03
19	1LM.LM27621	L14110438-03	1	1		11/17/14 18:22
20	1LM.LM27622	L14110438-05 10X	1	10		11/17/14 18:40
21	1LM.LM27623	L14110618-01	1	1		11/17/14 18:59
22	1LM.LM27624	L14110635-01 10,000X	1	10000		11/17/14 19:18
23	1LM.LM27625	WG501260-03 CCV (1.0ug/L)	1	1	STD67080	11/17/14 19:37
24	1LM.LM27626	WG501261-08 MRL (0.2ug/L)	1	1	STD67080	11/17/14 19:56
25	1LM.LM27627	WG501260-04 CCB	1	1		11/17/14 20:15
26	1LM.LM27628	L14110626-03 RS	1	1		11/17/14 20:34
27	1LM.LM27629	L14110626-04 MS	1	1	STD67080	11/17/14 20:53
28	1LM.LM27630	L14110626-05 MSD	1	1	STD67080	11/17/14 21:12
29	1LM.LM27631	L14110626-01	1	1	STD67080	11/17/14 21:31
30	1LM.LM27632	L14110626-02	1	1	STD67080	11/17/14 21:50
31	1LM.LM27633	L14110626-06	1	1	STD67080	11/17/14 22:09
32	1LM.LM27634	WG501260-05 CCV (1.0ug/L)	1	1	STD67080	11/17/14 22:28
33	1LM.LM27635	WG501261-09 MRL (0.2ug/L)	1	1	STD67080	11/17/14 22:47

Page: 1 Approved: 19-NOV-14



Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 111714_ADC.TXT

Analyst1: ADC Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 6

Maintenance Log ID: Syringe Filter Lot#: 130818254-1

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG501261

Internal STD: COA17578 Surrogate STD: NA STD67080 (11/17/2014)

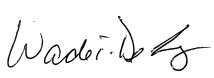
CCV STD: STD67080 LCS STD: STD67080 STD67080

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM27636	WG501260-06 CCB	1	1		11/17/14 23:06

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Approved: 19-NOV-14



Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 030415_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 6

Maintenance Log ID: Syringe Filter Lot#: 140701254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG514217 (waters)
Internal STD: COA18071 Surrogate STD: NA Calibration STD STD67080 (11/17/2014)
CCV STD: STD67080 LCS STD: STD67080 MS/MSD STD: STD67080

Comments: Sample L15030051-01 was analyzed at a dilution based on its historical results.
Sample L115030047-01 will be reprepped and reanalyzed at a dilution on another day. This sample was removed from this analytical batch.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM29101	WG514223-01 CCB	1	1		03/04/15 14:44
2	1LM.LM29102	WG514223-02 CCV (1.0ug/L)	1	1	STD67080	03/04/15 15:03
3	1LM.LM29103	WG514217-07 MRL (0.2ug/L)	1	1	STD67080	03/04/15 15:22
4	1LM.LM29104	WG514217-01 MCT (0.2ug/L)	1	1	STD67080	03/04/15 15:41
5	1LM.LM29105	WG514217-02 BLANK	1	1		03/04/15 16:00
6	1LM.LM29106	WG514217-03 LCS (0.2ug/L)	1	1	STD67080	03/04/15 16:19
7	1LM.LM29107	L15021217-01 REF	1	1		03/04/15 16:38
8	1LM.LM29108	L15021217-01 MS	1	1	STD67080	03/04/15 16:57
9	1LM.LM29109	L15021217-01 MSD	1	1	STD67080	03/04/15 17:16
10	1LM.LM29110	L15021217-02	1	1		03/04/15 17:34
11	1LM.LM29111	L15021217-03	1	1		03/04/15 17:53
12	1LM.LM29112	L15021217-04	1	1		03/04/15 18:12
13	1LM.LM29113	L15021217-05	1	1		03/04/15 18:31
14	1LM.LM29114	WG514223-03 CCV (1.0ug/L)	1	1	STD67080	03/04/15 18:50
15	1LM.LM29115	WG514217-08 MRL (0.2ug/L)	1	1	STD67080	03/04/15 19:09
16	1LM.LM29116	WG514223-04 CCB	1	1		03/04/15 19:28
17	1LM.LM29117	L15021234-01	1	1		03/04/15 19:47
18	1LM.LM29118	L15021237-01	1	1		03/04/15 20:06
19	1LM.LM29119	L15021237-02	1	1		03/04/15 20:25
20	1LM.LM29120	L15030047-01 (NR)	1	1		03/04/15 20:44
21	1LM.LM29121	L15030051-01 (10,000x)	1	10000		03/04/15 21:03
22	1LM.LM29122	WG514223-05 CCV (1.0ug/L)	1	1	STD67080	03/04/15 21:22
23	1LM.LM29123	WG514217-09 MRL (0.2ug/L)	1	1	STD67080	03/04/15 21:41
24	1LM.LM29124	WG514223-06 CCB	1	1		03/04/15 22:00

Comments

Seq.	Rerun	Dil.	Reason	Analytes
20				
	L15030047-01 (NR) : This sample will be reprepped and reanalyzed at a dilution on another day. This sample was removed from this analytical batch.			

Page: 1 Approved: 09-MAR-15

Microbac Laboratories Inc.

Data Checklist

Date: 17-NOV-2014
Analyst: ADC
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG501146
Runlog ID: 64764
Analytical Workgroups: L14110438, 0479, 0618, 0626, 0635, 0648

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	X
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	ADC
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
19-NOV-2014

Secondary Reviewer:
19-NOV-2014

CHECKLIST1 - Modified 03/05/2008
Generated: NOV-19-2014 16:22:21

Microbac Laboratories Inc.

Data Checklist

Date: 04-MAR-2015
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 66678
Analytical Workgroups: L15021217, 1234, 1237 L15030051-01

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	NA
Average RF	NA
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	NA
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	X
Reruns	NO
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
06-MAR-2015

Secondary Reviewer:
09-MAR-2015

CHECKLIST1 - Modified 03/05/2008
Generated: MAR-09-2015 12:56:29

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG514217

Login Number: L15021217

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
HBW 7-022315	01	02/23/15					03/04/2015	9.2	28		03/04/15	.1	28	
HBW 10-022315	02	02/23/15					03/04/2015	9.2	28		03/04/15	.1	28	
HBW 1-022315	03	02/23/15					03/04/2015	9.2	28		03/04/15	.2	28	
GPW 1-022315	04	02/23/15					03/04/2015	9.2	28		03/04/15	.2	28	
GPW 3-022315	05	02/23/15					03/04/2015	9.2	28		03/04/15	.2	28	

*** = SEE PROJECT QAPP REQUIREMENTS**

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 4050106
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

METHOD BLANK SUMMARY

Login Number: L15021217
Work Group: WG514217
Blank File ID: 1LM.LM29105
Blank Sample ID: WG514217-02
Prep Date: 03/04/15 14:00
Instrument ID: LCMS1
Analyzed Date: 03/04/15 16:00
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG514217-07	1LM.LM29103	03/04/15 15:22	01
MCT	WG514217-01	1LM.LM29104	03/04/15 15:41	01
LCS	WG514217-03	1LM.LM29106	03/04/15 16:19	01
HBW 7-022315	L15021217-01	1LM.LM29107	03/04/15 16:38	01
HBW 10-022315	L15021217-02	1LM.LM29110	03/04/15 17:34	01
HBW 1-022315	L15021217-03	1LM.LM29111	03/04/15 17:53	01
GPW 1-022315	L15021217-04	1LM.LM29112	03/04/15 18:12	01
GPW 3-022315	L15021217-05	1LM.LM29113	03/04/15 18:31	01
QCMRL	WG514217-08	1LM.LM29115	03/04/15 19:09	01
QCMRL	WG514217-09	1LM.LM29123	03/04/15 21:41	01

Report Name: BLANK_SUMMARY
PDF File ID: 4050107
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L15021217 Prep Date: 03/04/15 14:00 Sample ID: WG514217-02
Instrument ID: LCMS1 Run Date: 03/04/15 16:00 Prep Method: 6850
File ID: 1LM.LM29105 Analyst: JWR Method: 6850
Workgroup (AAB#): WG514217 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-17-NOV-14

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 4050108
09-MAR-2015 13:15

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514217-03
Instrument ID: LCMS1 Run Time: 16:19 Prep Method: 6850
File ID: 1LM.LM29106 Analyst: JWR Method: 6850
Workgroup (AAB#): WG514217 Matrix: Water Units: ug/L
QC Key: DOD4 Lot#: STD67080 Cal ID: LCMS1-17-NOV-14

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.196	98.0	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 4050109
Report generated: 03/09/2015 13:15

Microbac Laboratories Inc.

MATRIX SPIKE AND MATRIX SPIKE DUP (MS/MSD)

Loginnum:L15021217 Cal ID:LCMS1- Worknum:WG514217

Instrument ID:LCMS1 Contract #: Method:6850

Parent ID:WG514217-04 File ID:1LM.LM29107 Dil:1 Matrix:WATER

Sample ID:WG514217-05 MS File ID:1LM.LM29108 Dil:1 Units:ug/L

Sample ID:WG514217-06 MSD File ID:1LM.LM29109 Dil:1

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	0.124	0.200	0.323	99.5	0.200	0.323	99.5	0	80 - 120	15	

* FAILS %REC LIMIT

FAILS RPD LIMIT

NOTE: This is an internal quality control sample.

WG_MS_MSD_DRYWT - Modified 05/26/2011

PDF File ID: 4050110

Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

INITIAL CALIBRATION SUMMARY

Login Number: L15021217
Instrument ID: LCMS1
Analytical Method: 6850
Initial Calibration Date: 17-NOV-14 14:53
ICAL Workgroup: WG501146
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.387	10.9	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 4052704
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number: L15021217
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 17-NOV-14 14:53
Column ID: F

Analyte	WG501146-02			WG501146-03			WG501146-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	11100.0000	1.719	0.200	17300.0000	1.339	0.500	44100.0000	1.338

INT_CAL - Modified 03/06/2008
PDF File ID: 4052704
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number: L15021217
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 17-NOV-14 14:53
Column ID: F

Analyte	WG501146-05			WG501146-06			WG501146-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	84400.0000	1.290	2.00	173000.000	1.337	5.00	420000.000	1.337

INT_CAL - Modified 03/06/2008
PDF File ID: 4052704
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number: L15021217
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 17-NOV-14 14:53
Column ID: F

Analyte	WG501146-08		
	CONC	RESP	RF
Perchlorate	10.0	841000.000	1.347

INT_CAL - Modified 03/06/2008
PDF File ID: 4052704
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L15021217 Run Date: 11/17/2014 Sample ID: WG501146-09
Instrument ID: LCMS1 Run Time: 15:12 Method: 6850
File ID: 1LM.LM27611 Analyst: ADC QC Key: DOD4
ICal Workgroup: WG501146 Cal ID: LCMS1 - 17-NOV-14

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	1.01	ug/L	1.36	1.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 4052705
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514223-01

Instrument ID: LCMS1 Run Time: 14:44 Method: 6850

File ID: 1LM.LM29101 Analyst: JWR Units: ug/L

Workgroup (AAB#): WG514217 Cal ID: LCMS1 - 17-NOV-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4050113
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514223-04

Instrument ID: LCMS1 Run Time: 19:28 Method: 6850

File ID: 1LM.LM29116 Analyst: JWR Units: ug/L

Workgroup (AAB#): WG514217 Cal ID: LCMS1 - 17-NOV-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4050113
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514223-06

Instrument ID: LCMS1 Run Time: 22:00 Method: 6850

File ID: 1LM.LM29124 Analyst: JWR Units: ug/L

Workgroup (AAB#): WG514217 Cal ID: LCMS1 - 17-NOV-14

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4050113
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514223-02

Instrument ID: LCMS1 Run Time: 15:03 Method: 6850

File ID: 1LM.LM29102 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG514217 Cal ID: LCMS1 - 17-NOV-14

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.10	ug/L	1.49	10.0	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 4050112

Report generated 03/09/2015 13:15

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514223-03
Instrument ID: LCMS1 Run Time: 18:50 Method: 6850
File ID: 1LM.LM29114 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG514217 Cal ID: LCMS1 - 17-NOV-14
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.03	ug/L	1.39	3.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4050112
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514223-05
Instrument ID: LCMS1 Run Time: 21:22 Method: 6850
File ID: 1LM.LM29122 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG514217 Cal ID: LCMS1 - 17-NOV-14
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.39	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4050112
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

QCMRL SAMPLE

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514217-07

Instrument ID: LCMS1 Run Time: 15:22 Prep Method: 6850

File ID: 1LM.LM29103 Analyst: JWR Method: 6850

Workgroup (AAB#): WG514217 Matrix: Water Units: ug/L

Contract #: Cal ID: LCMS1-17-NOV-14

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.196	98.0	70 - 130	

QCMRL - Modified 03/06/2007

PDF File ID: 4050111

Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

QCMRL SAMPLE

Login Number:	L15021217	**Run Date:**	03/04/2015	**Sample ID:**	WG514217-08
Instrument ID:	LCMS1	**Run Time:**	19:09	**Prep Method:**	6850
File ID:	1LM.LM29115	**Analyst:**	JWR	**Method:**	6850
Workgroup (AAB#):	WG514217	**Matrix:**	Water	**Units:**	ug/L
Contract #:		**Cal ID:**	LCMS1-17-NOV-14		

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.193	96.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4050111
Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

QCMRL SAMPLE

Login Number: L15021217 Run Date: 03/04/2015 Sample ID: WG514217-09

Instrument ID: LCMS1 Run Time: 21:41 Prep Method: 6850

File ID: 1LM.LM29123 Analyst: JWR Method: 6850

Workgroup (AAB#): WG514217 Matrix: Water Units: ug/L

Contract #: Cal ID: LCMS1-17-NOV-14

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.185	92.5	70 - 130	

QCMRL - Modified 03/06/2007

PDF File ID: 4050111

Report generated 03/09/2015 13:15

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L15021217
Instrument ID: LCMS1
Workgroup (AAB#): WG514217

ICAL CCV Number: WG501146-05
CAL ID: LCMS1-17-NOV-14
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG501146	NA	NA	321000
Upper Limit	NA	NA	481500
Lower Limit	NA	NA	160500
L15021217-01	1.00	01	296000
L15021217-02	1.00	01	310000
L15021217-03	1.00	01	318000
L15021217-04	1.00	01	318000
L15021217-05	1.00	01	319000
WG514217-02	1.00	01	312000
WG514217-03	1.00	01	308000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 4050114
Report generated 03/09/2015 13:17

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	L15021217-01
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29107
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 16:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	10900	3660	2.98	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	L15021217-02
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29110
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 17:34	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	3330	1420	2.35	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	L15021217-03
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29111
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 17:53	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	2560	818	3.13	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	L15021217-04
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29112
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 18:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	27700	8940	3.10	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	L15021217-05
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29113
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 18:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	30600	10600	2.89	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG501146-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM27604
Analyst:	ADC	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	11/17/2014 13:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	11100	3370	3.29	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG501146-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM27605
Analyst:	ADC	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	11/17/2014 13:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17300	5740	3.01	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG501146-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM27606
Analyst:	ADC	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	11/17/2014 13:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	44100	14600	3.02	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG501146-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM27607
Analyst:	ADC	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	11/17/2014 13:56	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	84400	29400	2.87	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG501146-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM27608
Analyst:	ADC	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	11/17/2014 14:15	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	173000	54700	3.16	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG501146-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM27609
Analyst:	ADC	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	11/17/2014 14:34	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	420000	140000	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG501146-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM27610
Analyst:	ADC	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	11/17/2014 14:53	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	841000	276000	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG501146-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM27611
Analyst:	ADC	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	11/17/2014 15:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	88800	29400	3.02	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	WG514217-01
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29104
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 15:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	16400	5790	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	WG514217-02
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29105
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 16:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	225	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	WG514217-03
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29106
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 16:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17300	5690	3.04	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	WG514217-05
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29108
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 16:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	28300	9340	3.03	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	WG514217-06
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29109
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 17:16	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	26700	9540	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	WG514217-07
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29103
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 15:22	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17600	5520	3.19	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	WG514217-08
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29115
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 19:09	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17600	5570	3.16	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**	6850	**Samplenum:**	WG514217-09
Instrument:	LCMS1	**Prep Date:**	03/04/2015 14:00	**File ID:**	1LM.LM29123
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 21:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17800	6420	2.77	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG514223-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM29101
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 14:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	360	453	0.795	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG514223-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM29102
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 15:03	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	88900	28400	3.13	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG514223-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM29114
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 18:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	90400	29600	3.05	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG514223-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM29116
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 19:28	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	721	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG514223-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM29122
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 21:22	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	91300	28900	3.16	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L15021217	**Prep Method:**		**Samplenum:**	WG514223-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM29124
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG514217	**Analysis Date:**	03/04/2015 22:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	200	0.000	2.3	3.8	*

2.1.1.3 Sample Data

Data File	LM29107.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 4:38:10 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

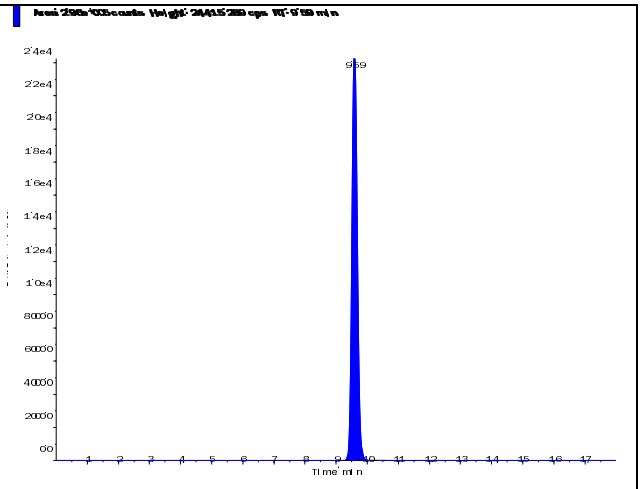
Sample Name	L15021217-01 REF	**Injection Vial**	7.00
Data File	LM29107.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 4:38:10 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-04	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

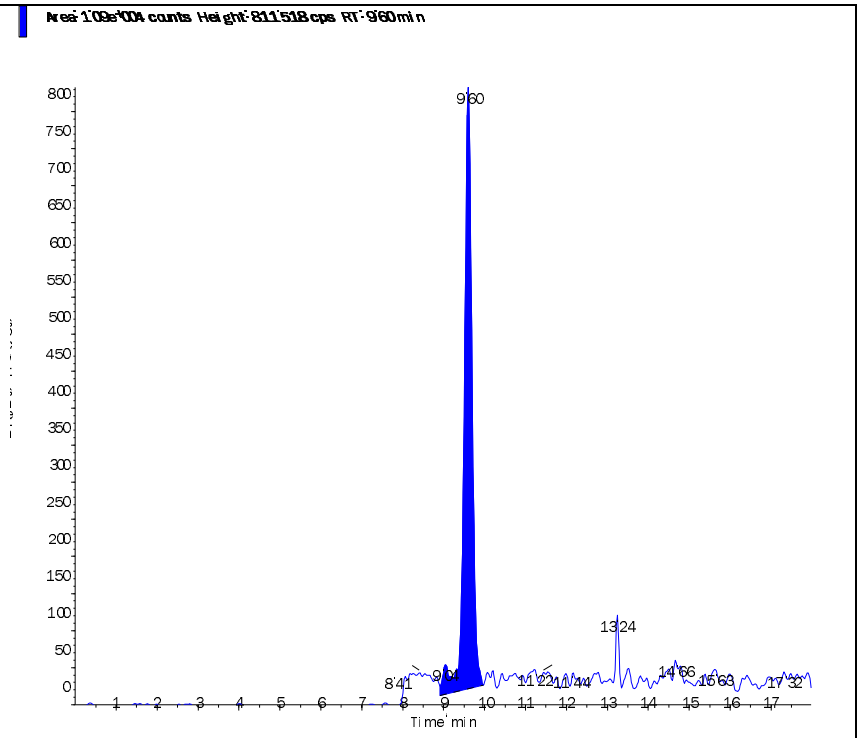
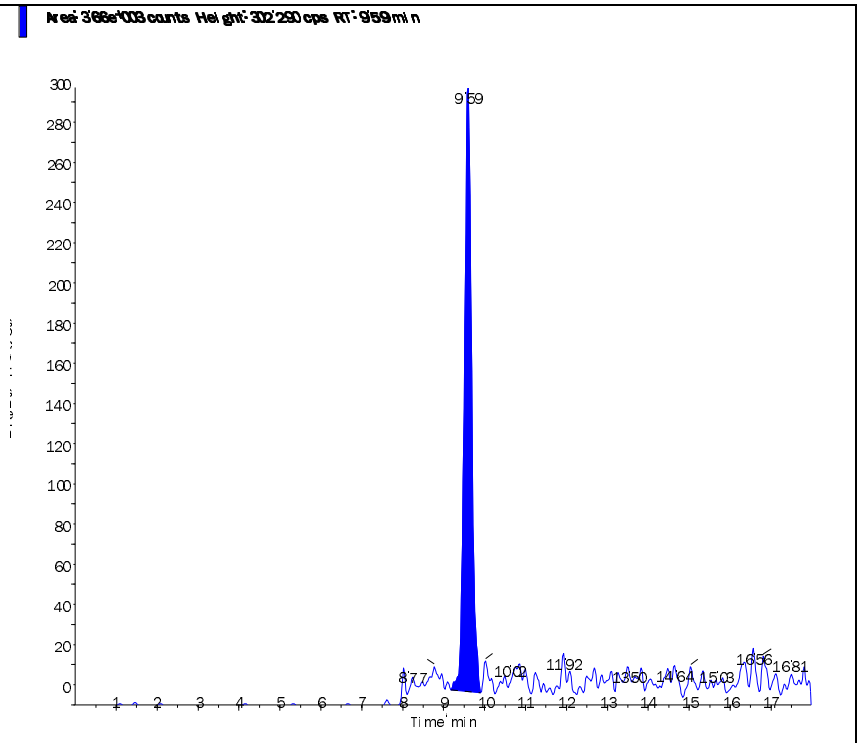
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.960e+05	9.59	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.090e+04	9.60	N/A	0.124
Perchlorate conf	3.660e+03	9.59	N/A	0.13

O18LP (Internal Standard)

RT (Exp. RT): 9.59(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.60 (10.30) min Calculated conc: 0.124 ng/ml Area Ratio: 0.037 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.59 (10.30) min Calculated conc: 0.13 ng/ml Area Ratio: 0.012 Sample Type: (Unknown)	

Data File	LM29110.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 5:34:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

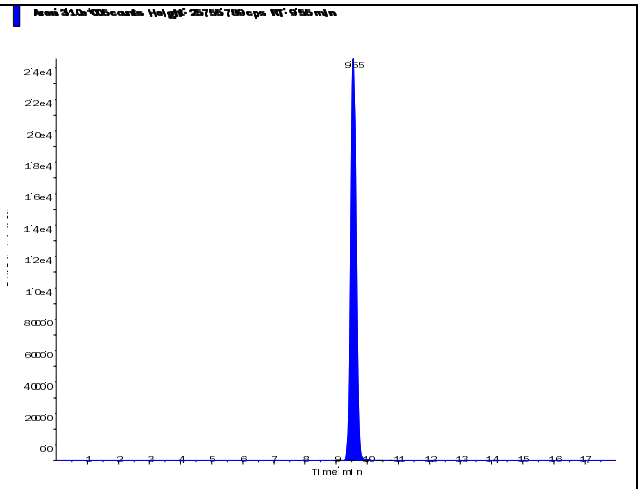
Sample Name	L15021217-02	**Injection Vial**	10.00
Data File	LM29110.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 5:34:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	L15021217-02	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.100e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.330e+03	9.59	N/A	0.0258
Perchlorate conf	1.420e+03	9.55	N/A	0.0412

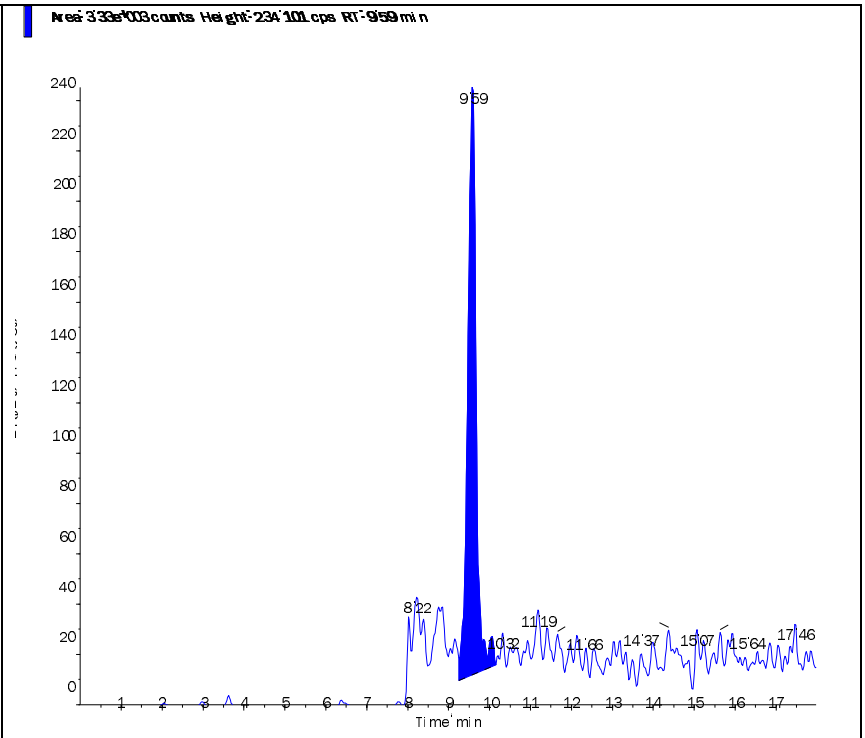
O18LP (Internal Standard)

RT (Exp. RT): 9.55(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



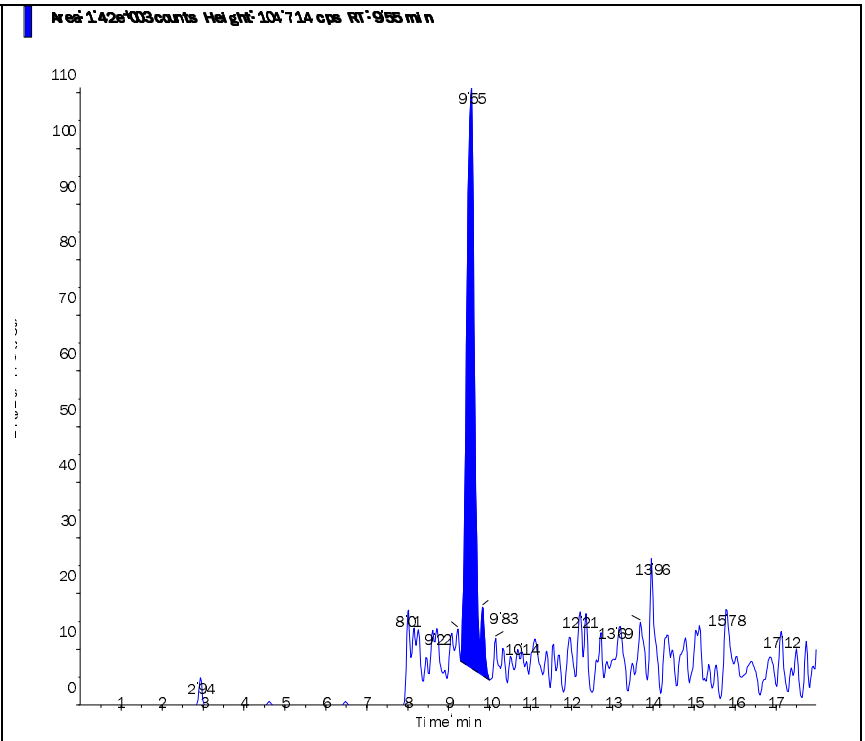
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.59 (10.30) min
Calculated conc:	0.0258 ng/ml
Area Ratio:	0.011
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.55 (10.30) min
Calculated conc:	0.0412 ng/ml
Area Ratio:	0.005
Sample Type:	(Unknown)



Data File	LM29111.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 5:53:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

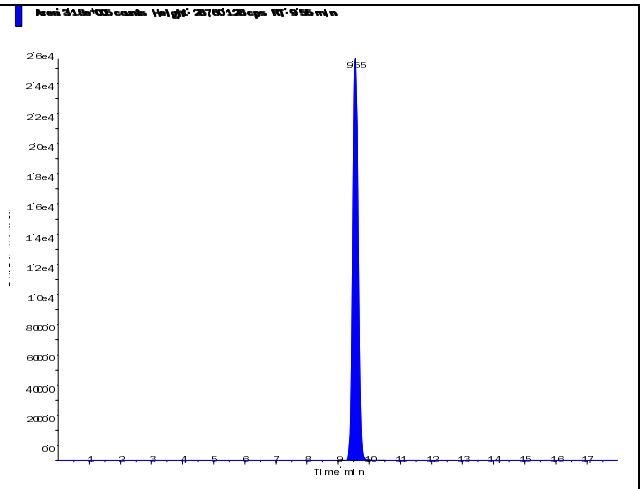
Sample Name	L15021217-03	**Injection Vial**	11.00
Data File	LM29111.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 5:53:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	L15021217-03	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.180e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.560e+03	9.57	N/A	0.0157
Perchlorate conf	8.180e+02	9.54	N/A	0.0183

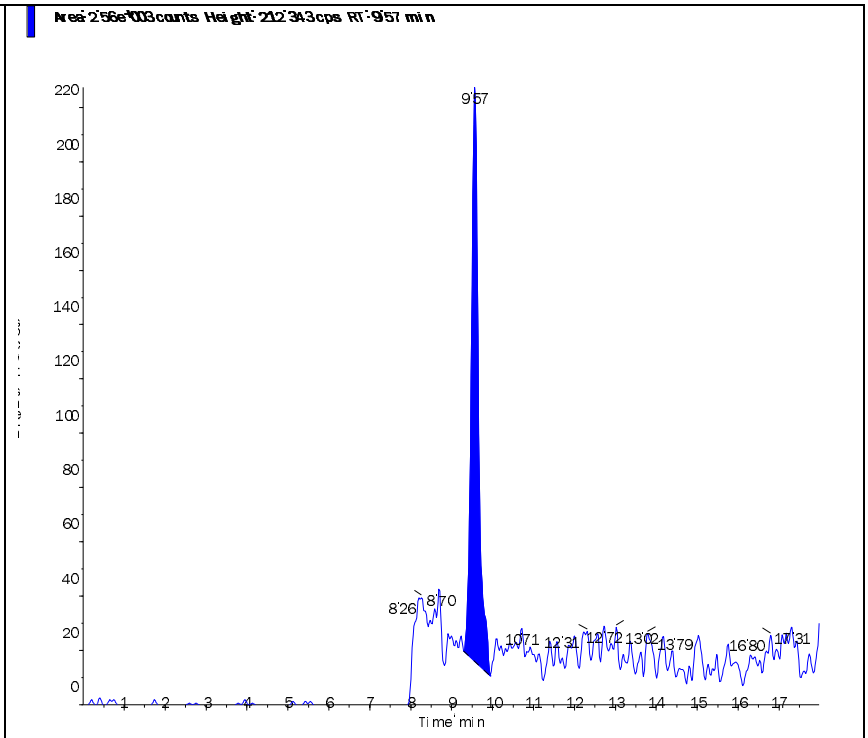
O18LP (Internal Standard)

RT (Exp. RT): 9.55(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



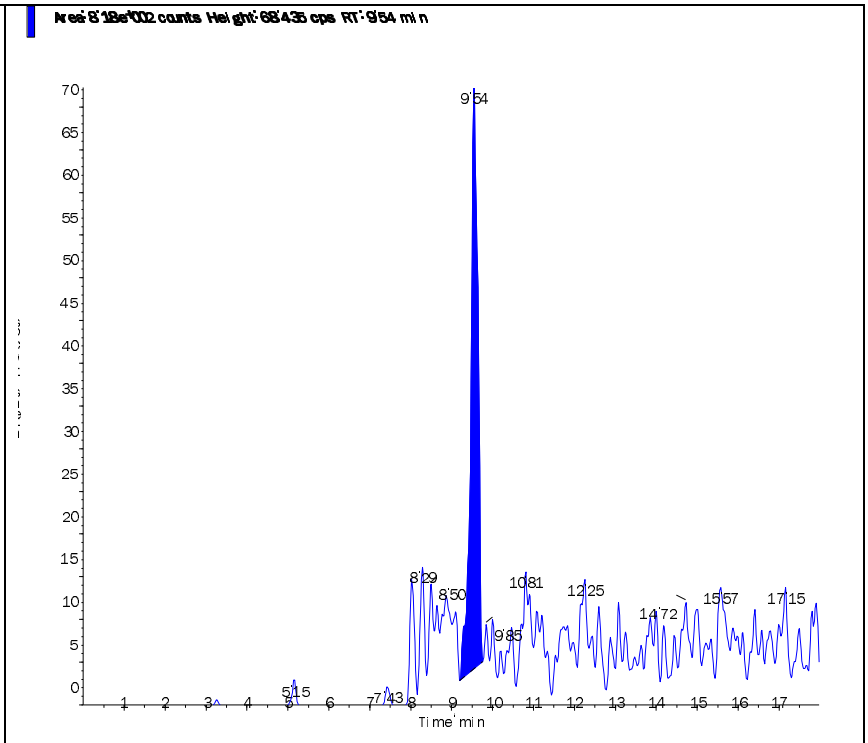
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.57 (10.30) min
Calculated conc:	0.0157 ng/ml
Area Ratio:	0.008
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.54 (10.30) min
Calculated conc:	0.0183 ng/ml
Area Ratio:	0.003
Sample Type:	(Unknown)



Data File	LM29112.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 6:12:55 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

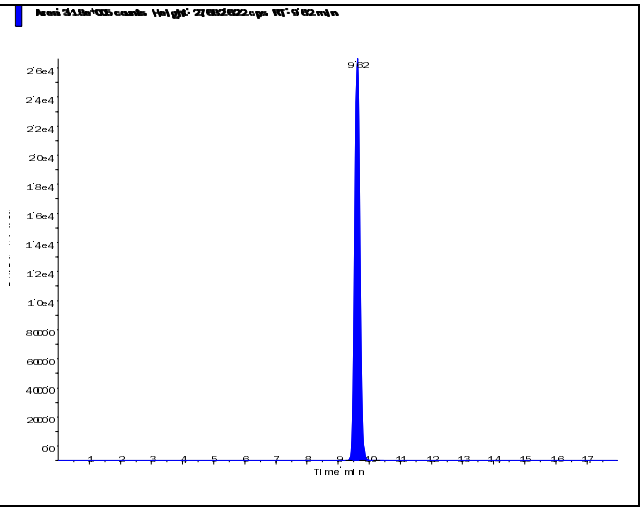
Sample Name	L15021217-04	**Injection Vial**	12.00
Data File	LM29112.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 6:12:55 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	L15021217-04	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

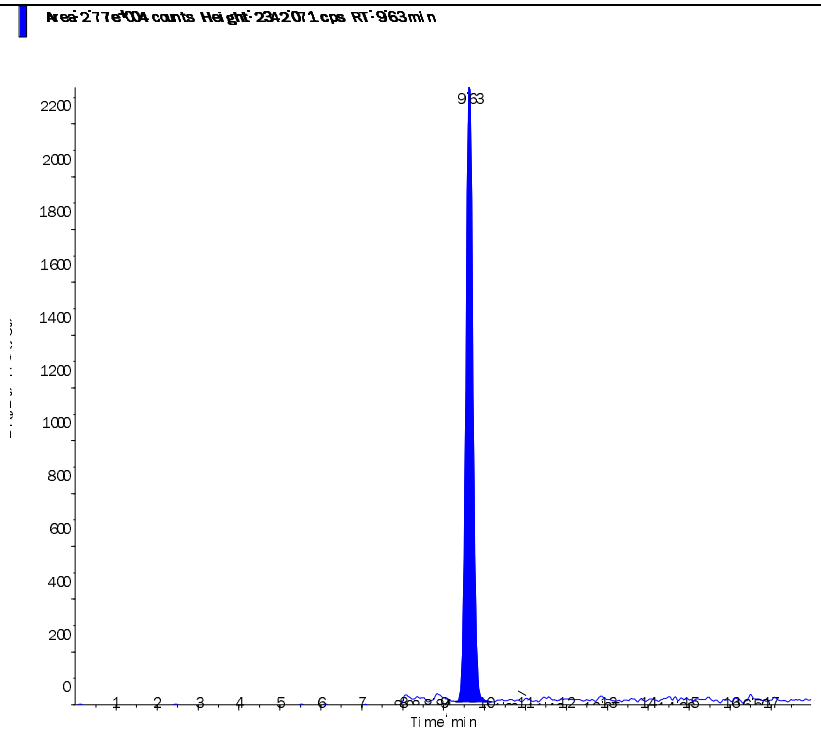
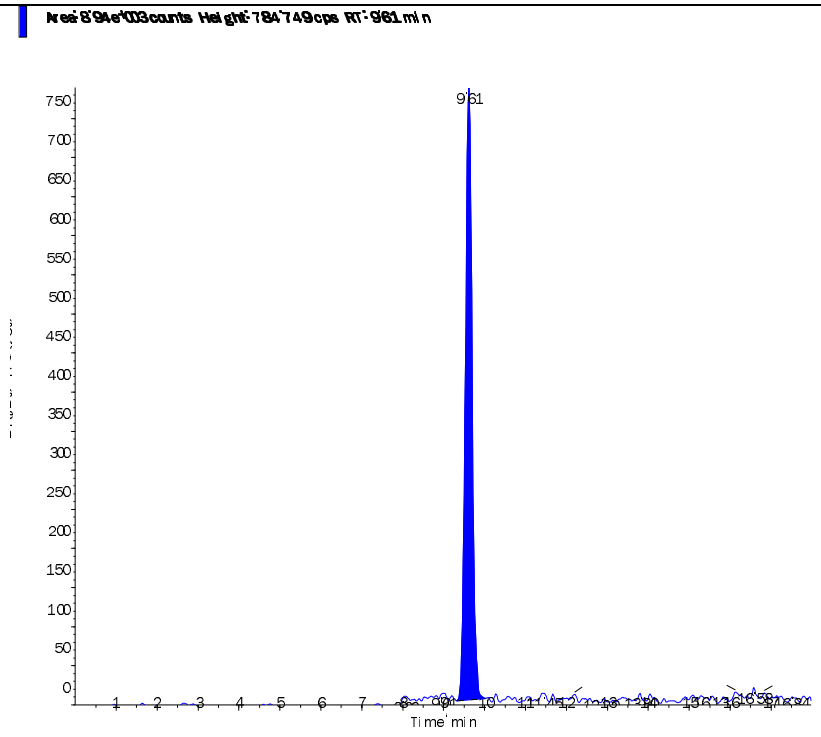
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.180e+05	9.62	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.770e+04	9.63	N/A	0.311
Perchlorate conf	8.940e+03	9.61	N/A	0.308

O18LP (Internal Standard)

RT (Exp. RT): 9.62(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.63 (10.30) min Calculated conc: 0.311 ng/ml Area Ratio: 0.087 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.61 (10.30) min Calculated conc: 0.308 ng/ml Area Ratio: 0.028 Sample Type: (Unknown)	

Data File	LM29113.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 6:31:50 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

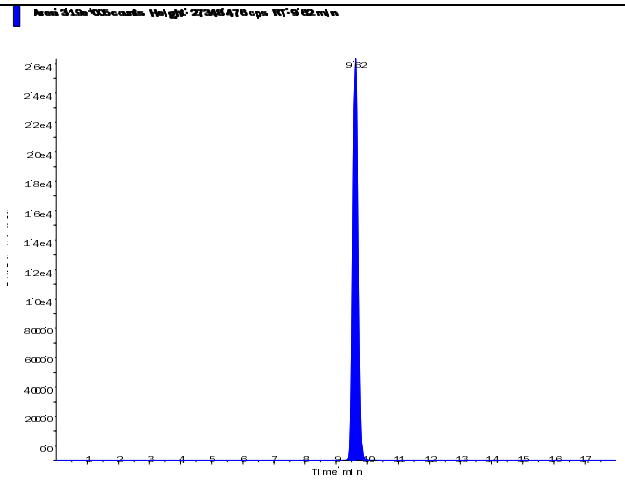
Sample Name	L15021217-05	**Injection Vial**	13.00
Data File	LM29113.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 6:31:50 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	L15021217-05	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

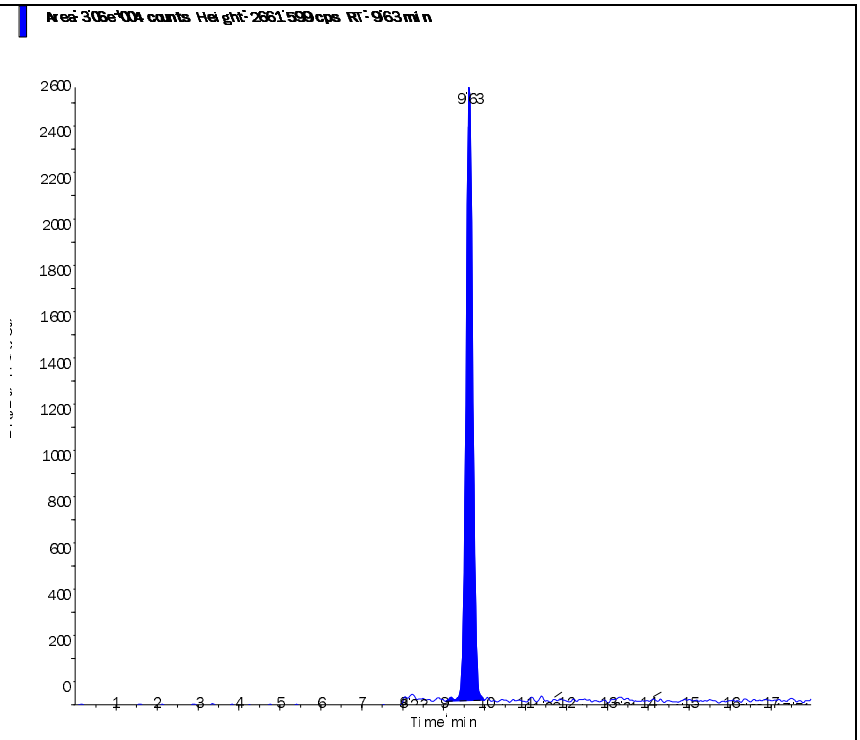
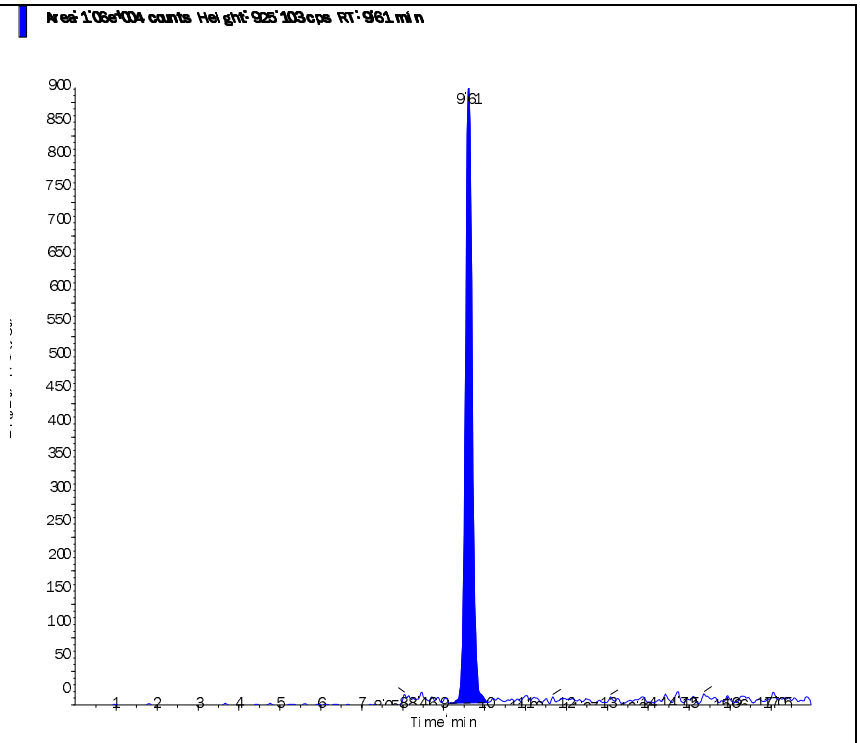
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.190e+05	9.62	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.060e+04	9.63	N/A	0.344
Perchlorate conf	1.060e+04	9.61	N/A	0.366

O18LP (Internal Standard)

RT (Exp. RT): 9.62(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.63 (10.30) min Calculated conc: 0.344 ng/ml Area Ratio: 0.096 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.61 (10.30) min Calculated conc: 0.366 ng/ml Area Ratio: 0.033 Sample Type: (Unknown)	

2.1.1.4 Standards Data

Data File	LM27603.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	11/17/2014 12:41:13 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG501146-01 CCB	**Injection Vial**	1.00
Data File	LM27603.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 12:41:13 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG501146-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.170e+05	10.30	5.00	-

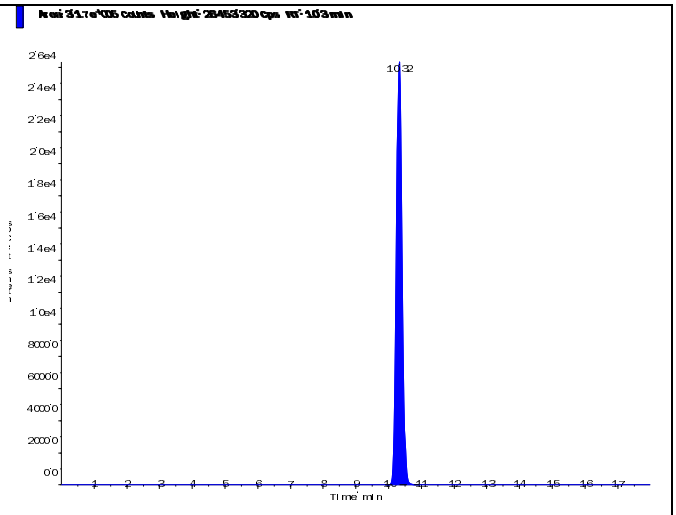
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	4.340e+02	10.30	N/A	< 0
Perchlorate conf	2.010e+02	10.30	N/A	< 0

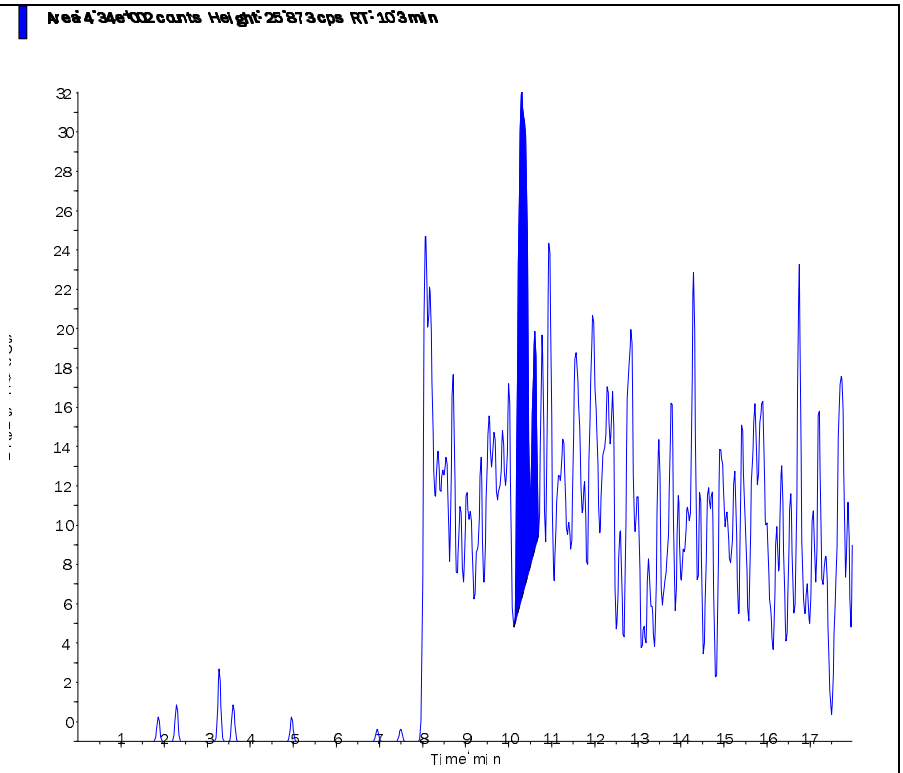
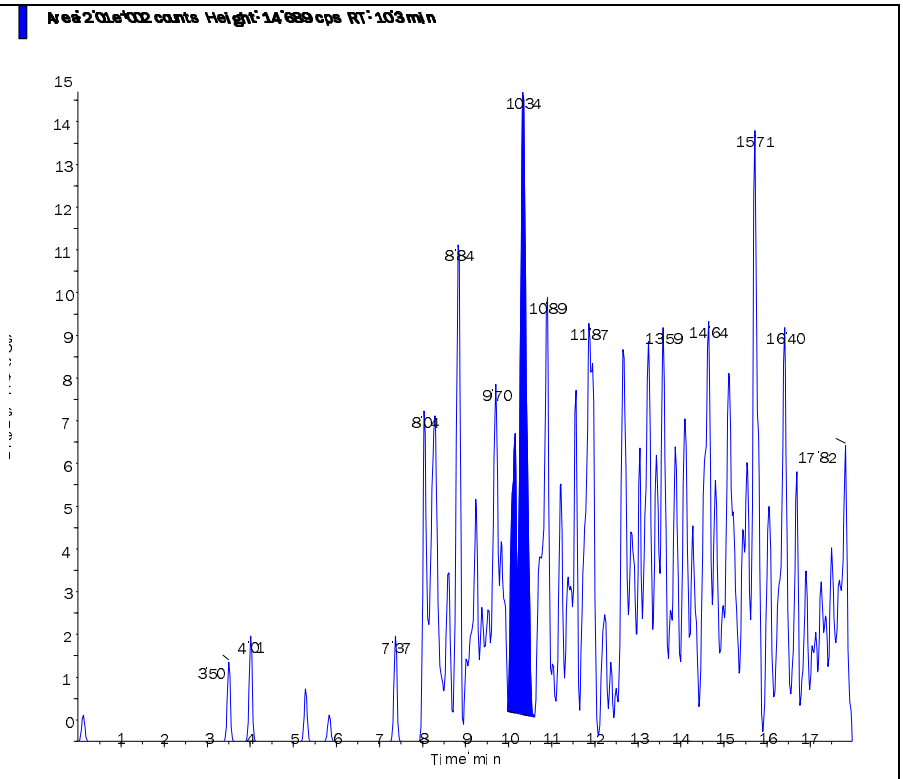
O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Unknown)



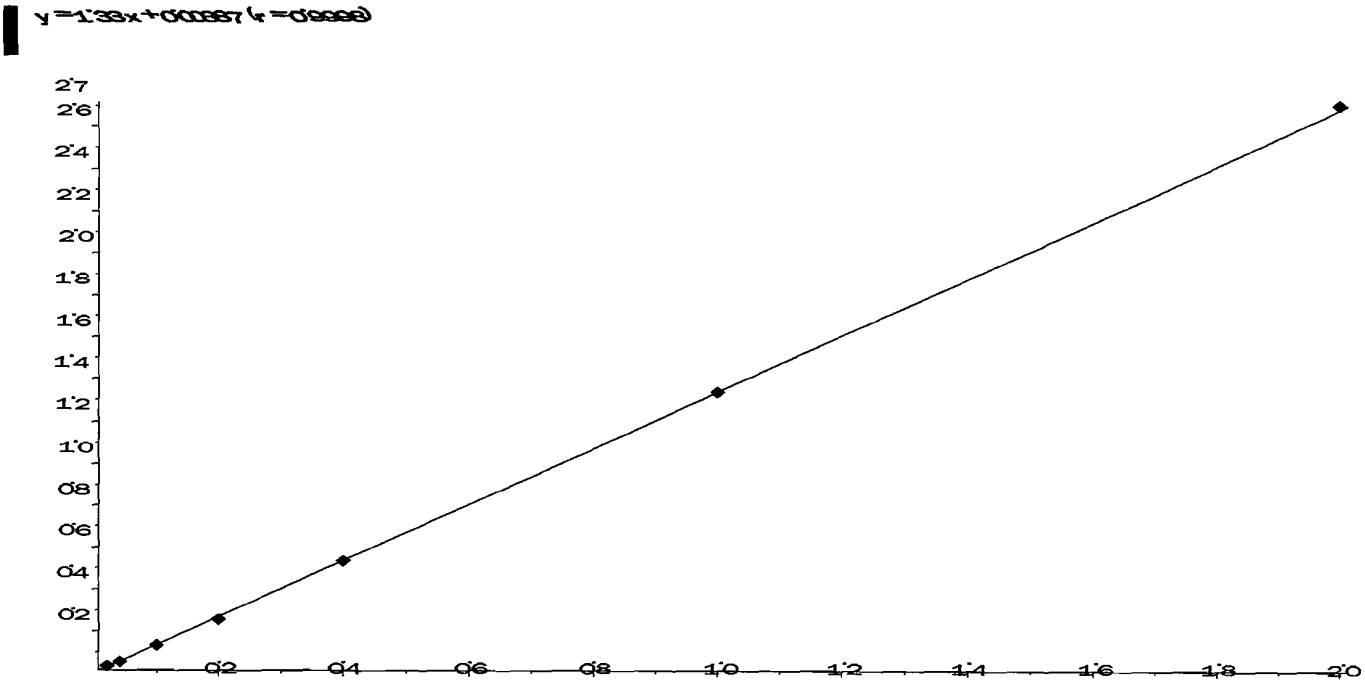
Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	

Analyte Name: **Perchlorate**
Internal Standard: O18LP

Data File	LM27603.wiff	**Result Table**	111714_ADC.rdb
Acquisition Date	11/17/2014 12:41:13 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 1.33 x + 0.00387 (r = 0.9998)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.11	114.3	N/A	N/A
0.20	1	0.19	93.0	N/A	N/A
0.50	1	0.49	97.3	N/A	N/A
1.00	1	0.95	95.2	N/A	N/A
2.00	1	1.99	99.5	N/A	N/A
5.00	1	4.99	99.9	N/A	N/A
10.00	1	10.08	100.8	N/A	N/A

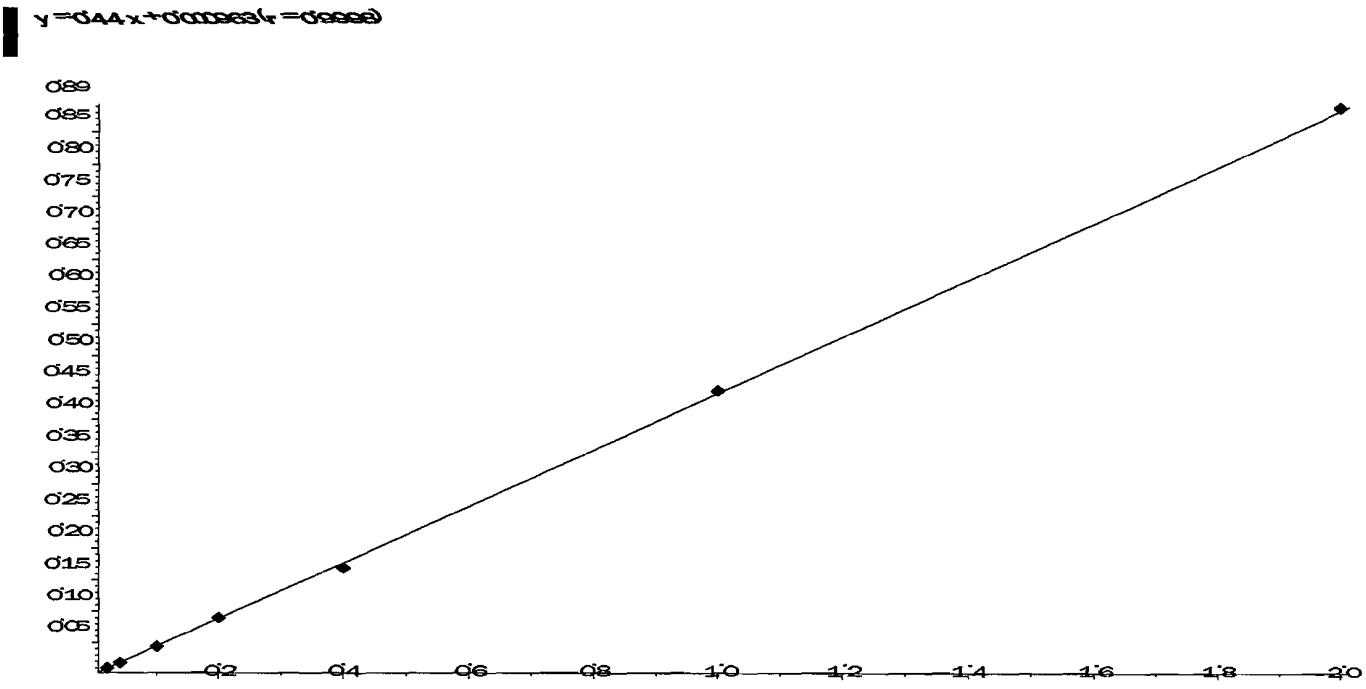


Analyte Name: **Perchlorate conf**
Internal Standard: O18LP

Data File	LM27603.wiff	**Result Table**	111714_ADC.rdb
Acquisition Date	11/17/2014 12:41:13 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 0.44 x + 0.000963 (r = 0.9998)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.11	108.0	N/A	N/A
0.20	1	0.19	95.6	N/A	N/A
0.50	1	0.49	98.3	N/A	N/A
1.00	1	1.01	101.2	N/A	N/A
2.00	1	1.91	95.6	N/A	N/A
5.00	1	5.04	100.8	N/A	N/A
10.00	1	10.05	100.5	N/A	N/A



Data File	LM27604.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	11/17/2014 1:00:09 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

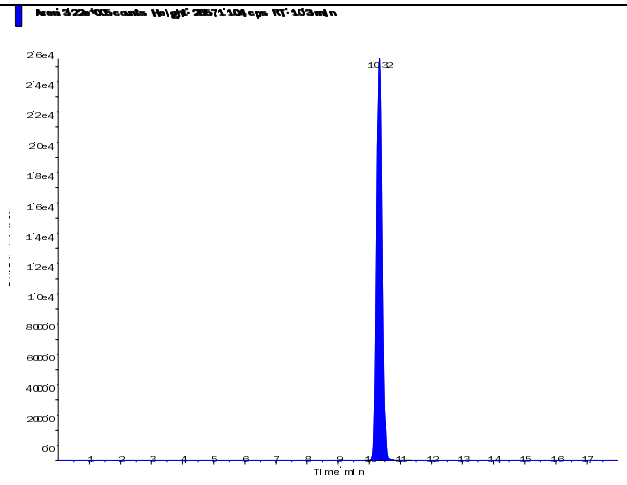
Sample Name	WG501146-02 STD (0.1 ug/L)	**Injection Vial**	2.00
Data File	LM27604.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 1:00:09 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG501146-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

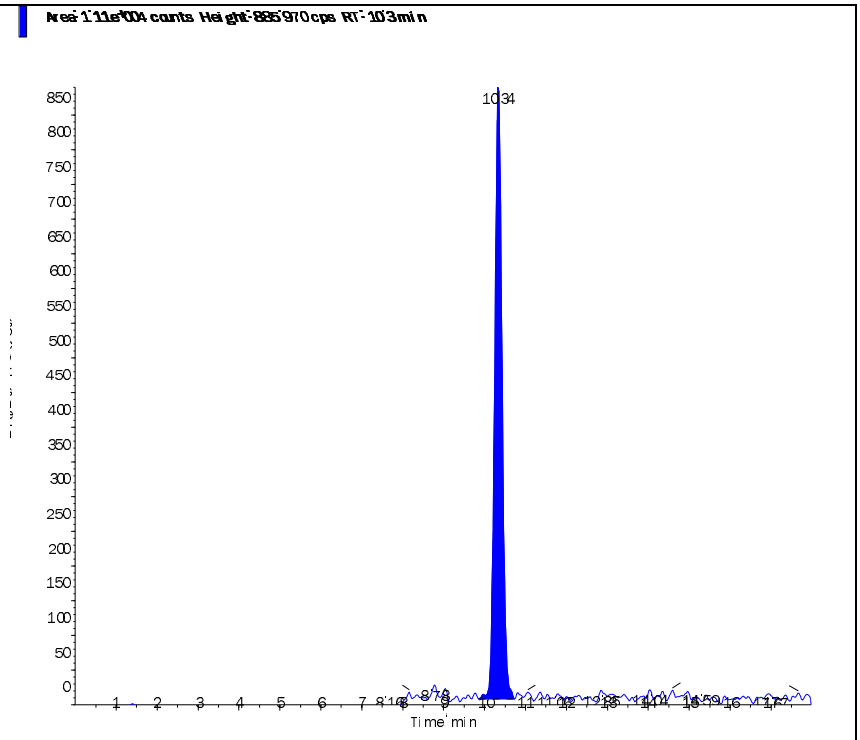
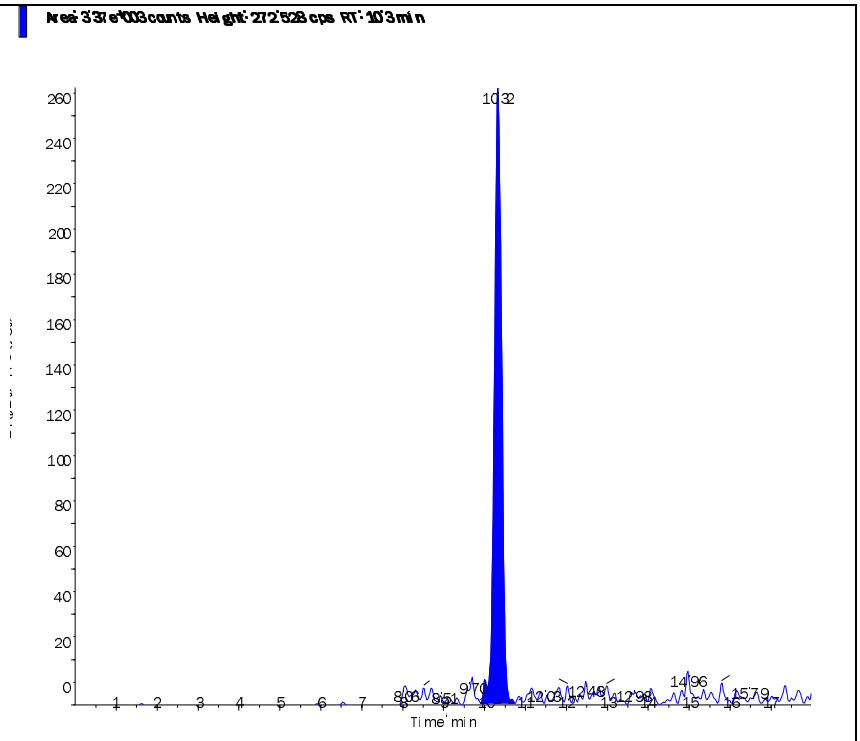
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.220e+05	10.30	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.110e+04	10.30	0.10	0.114
Perchlorate conf	3.370e+03	10.30	0.10	0.108

O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 0.114 ng/ml Area Ratio: 0.034 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 0.108 ng/ml Area Ratio: 0.01 Sample Type: (Standard)	

Data File	LM27605.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	11/17/2014 1:19:06 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG501146-03 STD (0.2 ug/L)	**Injection Vial**	3.00
Data File	LM27605.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 1:19:06 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG501146-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.220e+05	10.30	5.00	-

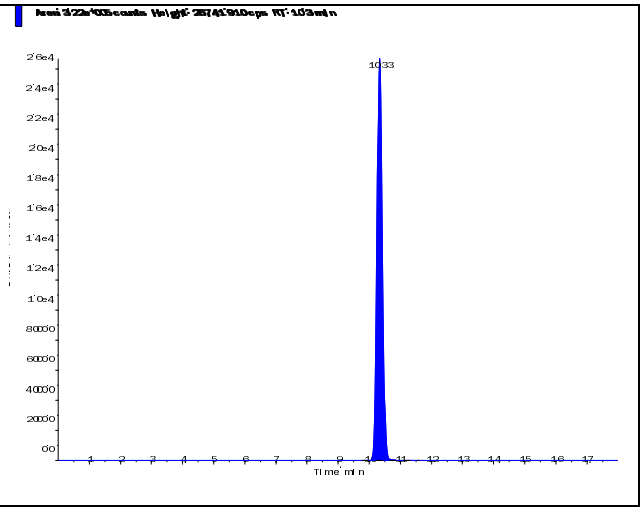
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.730e+04	10.30	0.20	0.186
Perchlorate conf	5.740e+03	10.30	0.20	0.191

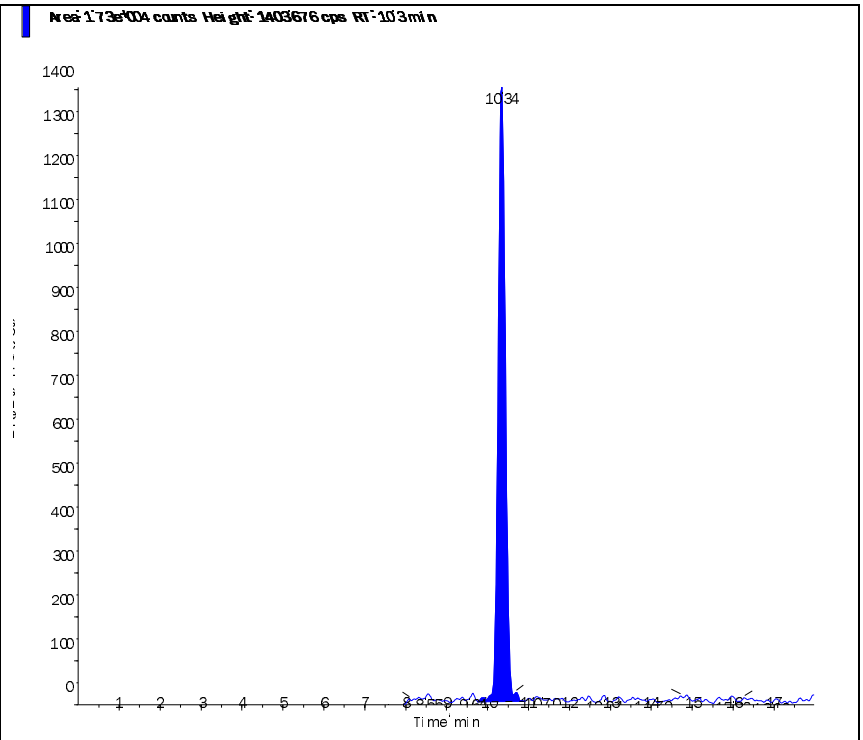
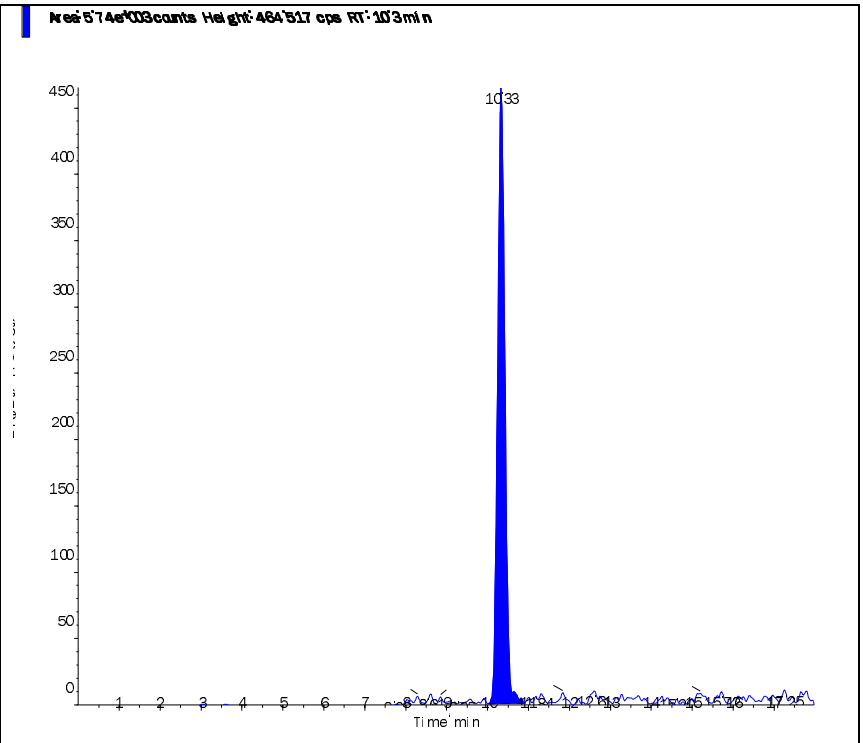
O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 0.186 ng/ml Area Ratio: 0.054 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 0.191 ng/ml Area Ratio: 0.018 Sample Type: (Standard)	

Data File	LM27606.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	11/17/2014 1:38:01 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG501146-04 STD (0.5 ug/L)	**Injection Vial**	4.00
Data File	LM27606.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 1:38:01 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG501146-04	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.290e+05	10.30	5.00	-

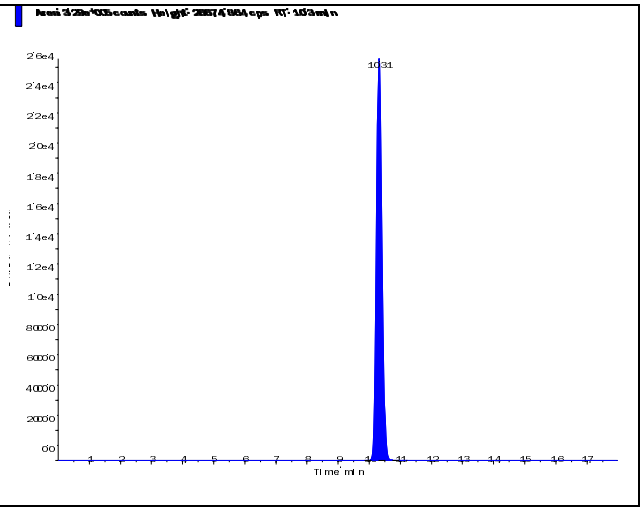
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	4.410e+04	10.30	0.50	0.487
Perchlorate conf	1.460e+04	10.30	0.50	0.492

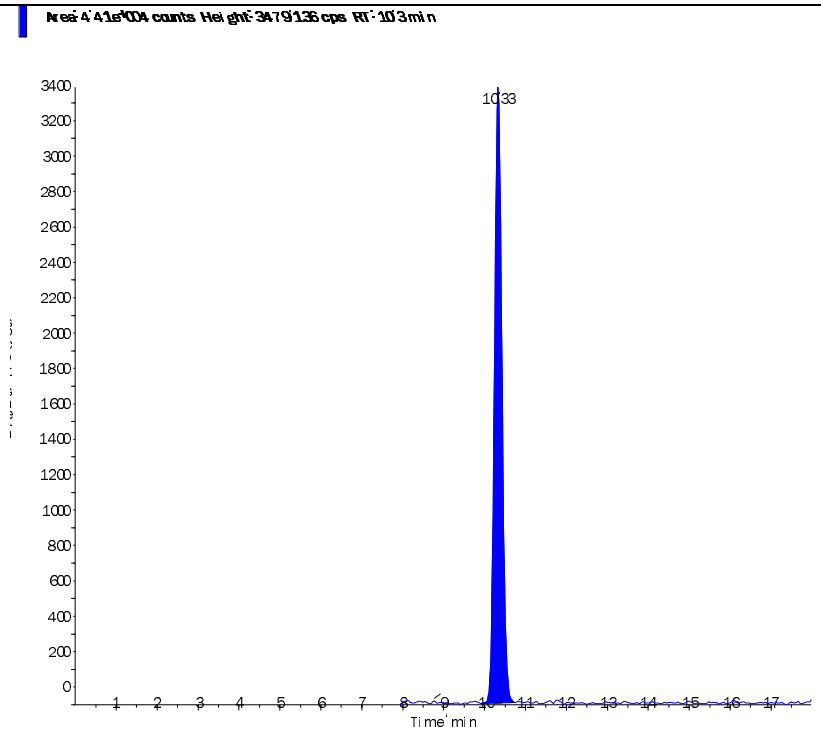
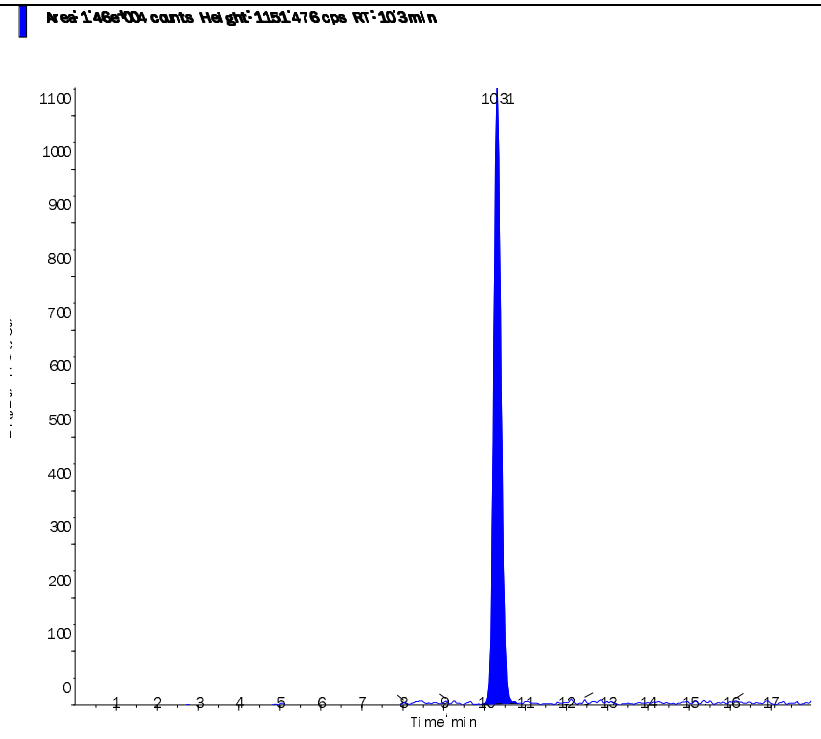
O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 0.487 ng/ml Area Ratio: 0.134 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 0.492 ng/ml Area Ratio: 0.044 Sample Type: (Standard)	

Data File	LM27607.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	11/17/2014 1:56:57 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

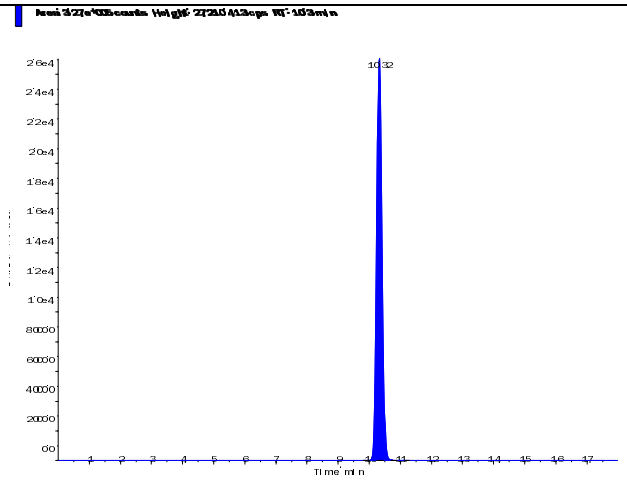
Sample Name	WG501146-05 STD (1.0 ug/L)	**Injection Vial**	5.00
Data File	LM27607.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 1:56:57 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG501146-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

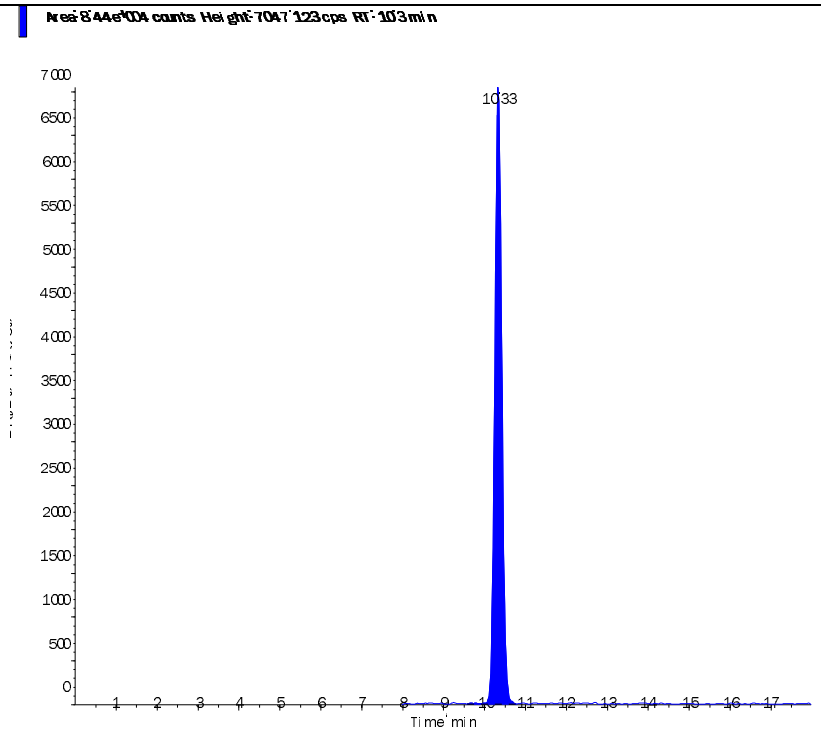
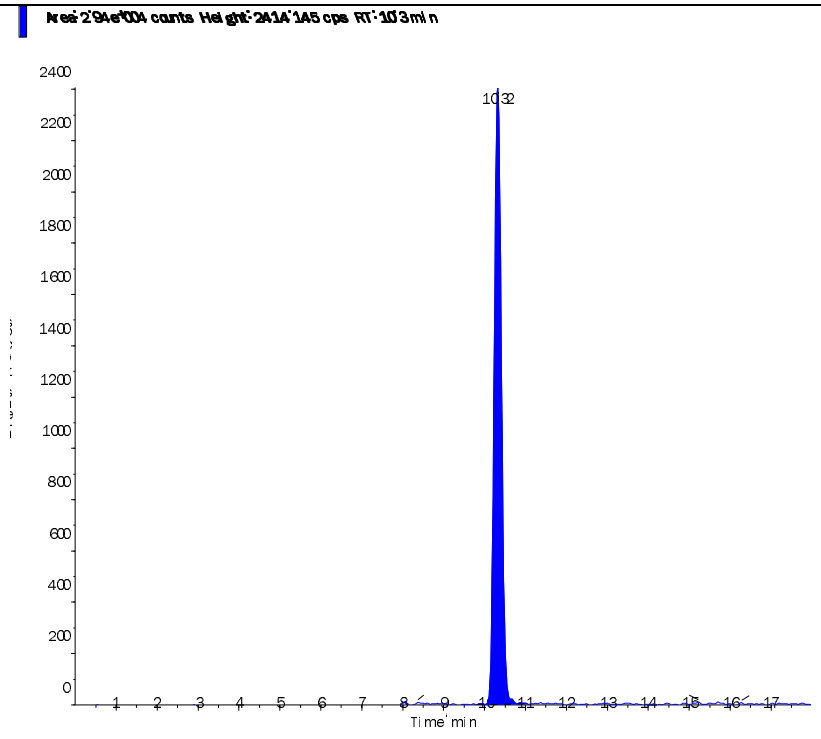
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.270e+05	10.30	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.440e+04	10.30	1.00	0.952
Perchlorate conf	2.940e+04	10.30	1.00	1.01

O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 0.952 ng/ml Area Ratio: 0.258 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 1.01 ng/ml Area Ratio: 0.09 Sample Type: (Standard)	

Data File	LM27608.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	11/17/2014 2:15:52 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

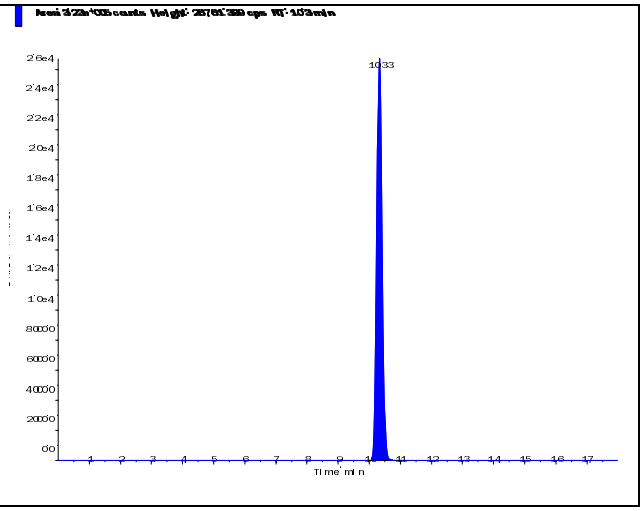
Sample Name	WG501146-06 STD (2.0 ug/L)	**Injection Vial**	6.00
Data File	LM27608.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 2:15:52 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG501146-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

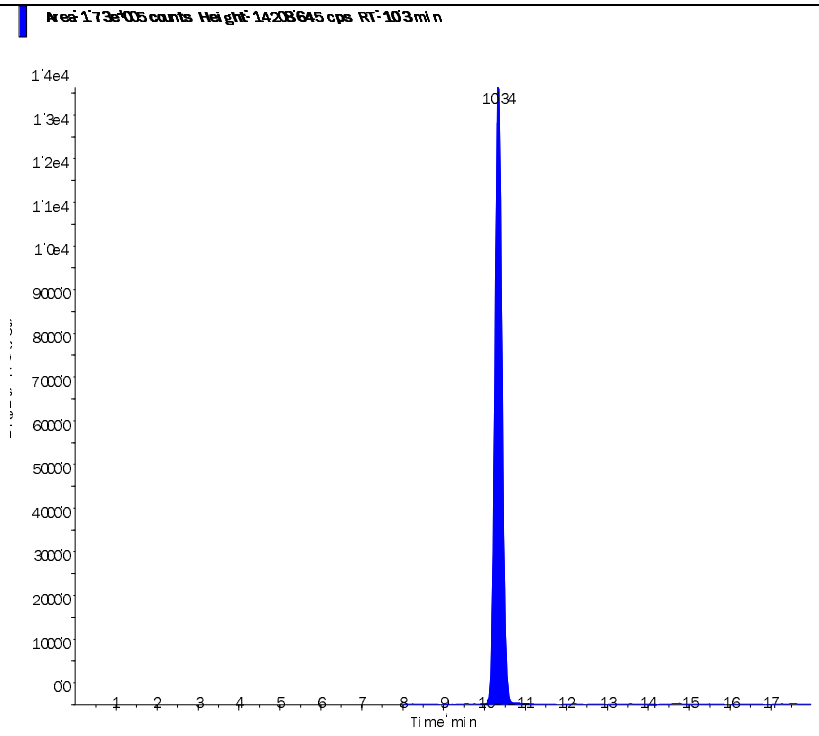
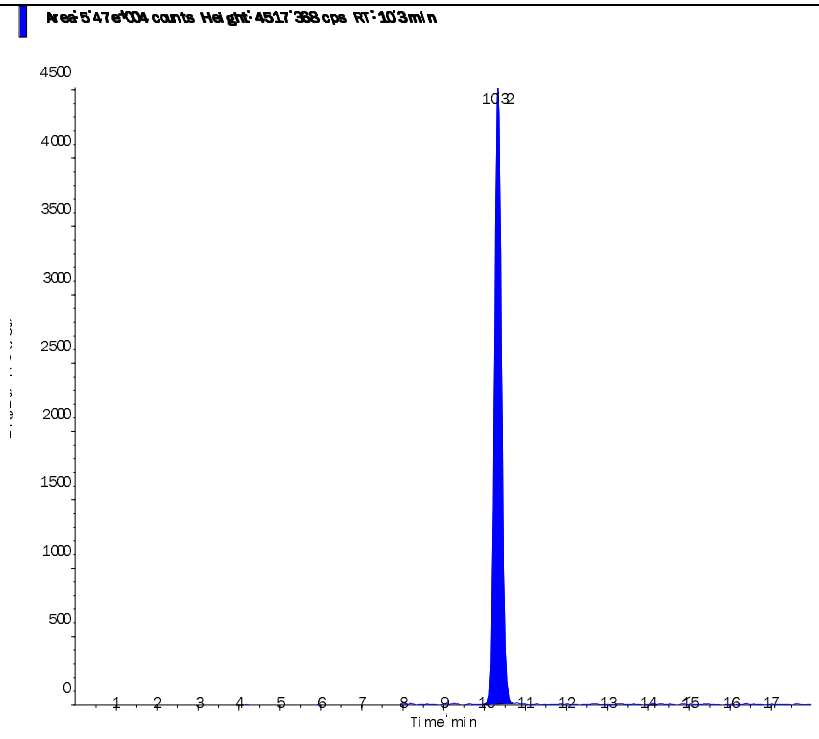
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.230e+05	10.30	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.730e+05	10.30	2.00	1.99
Perchlorate conf	5.470e+04	10.30	2.00	1.91

O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 1.99 ng/ml Area Ratio: 0.535 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 1.91 ng/ml Area Ratio: 0.169 Sample Type: (Standard)	

Data File	LM27609.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	11/17/2014 2:34:50 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

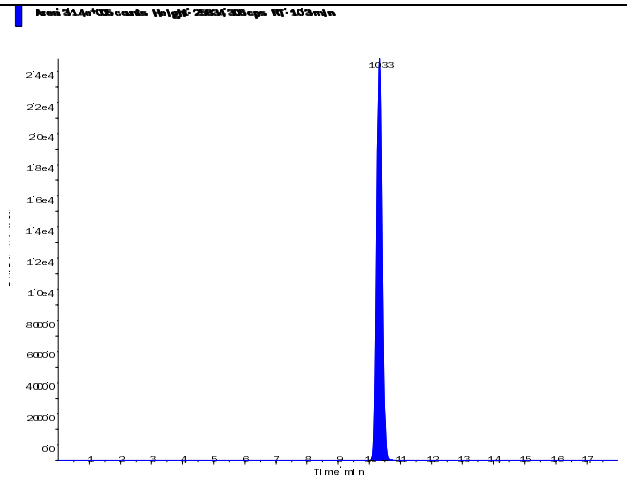
Sample Name	WG501146-07 STD (5.0 ug/L)	**Injection Vial**	7.00
Data File	LM27609.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 2:34:50 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG501146-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

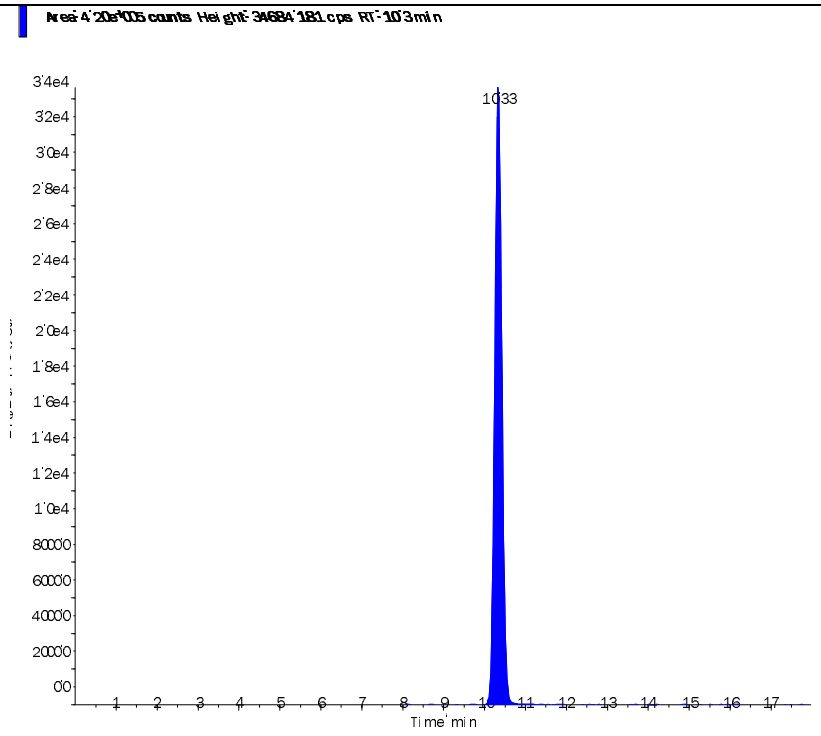
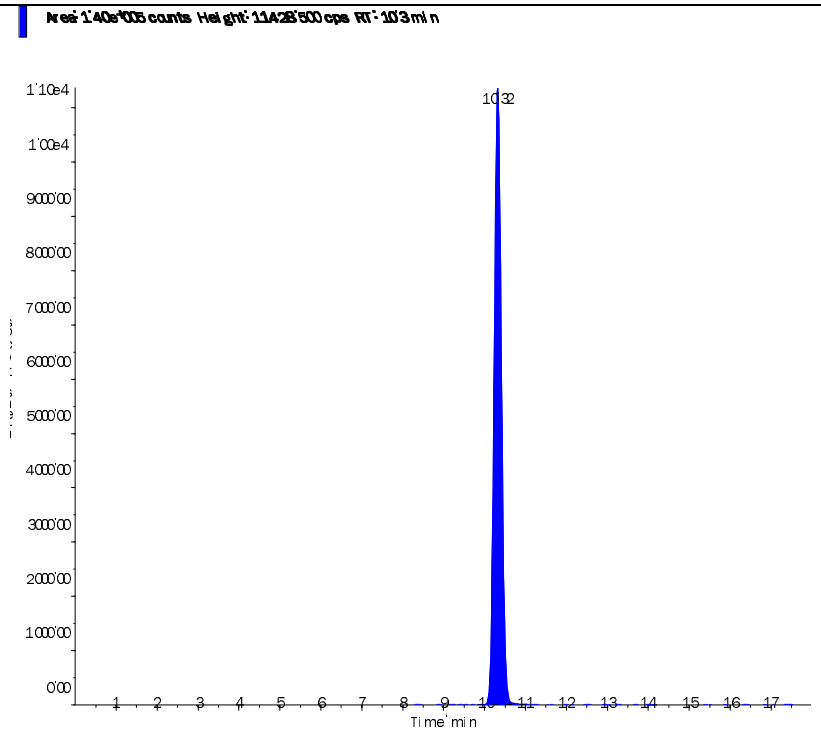
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.140e+05	10.30	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	4.200e+05	10.30	5.00	4.99
Perchlorate conf	1.400e+05	10.30	5.00	5.04

O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 4.99 ng/ml Area Ratio: 1.337 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 5.04 ng/ml Area Ratio: 0.445 Sample Type: (Standard)	

Data File	LM27610.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	11/17/2014 2:53:43 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG501146-08 STD (10 ug/L)	**Injection Vial**	8.00
Data File	LM27610.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 2:53:43 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG501146-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.120e+05	10.30	5.00	-

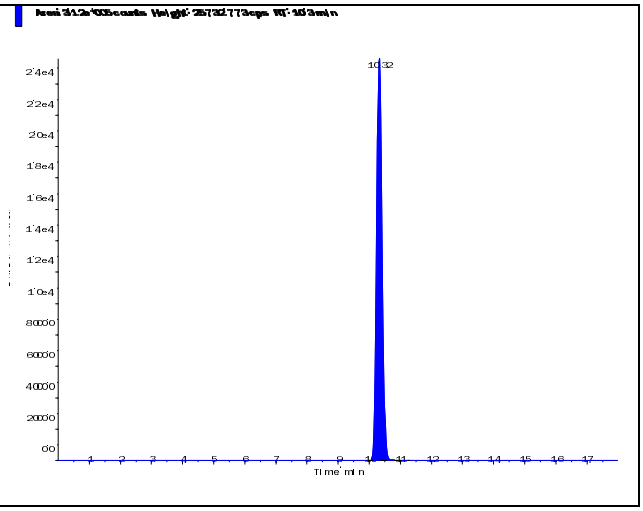
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.410e+05	10.30	10.00	10.10
Perchlorate conf	2.760e+05	10.30	10.00	10.00

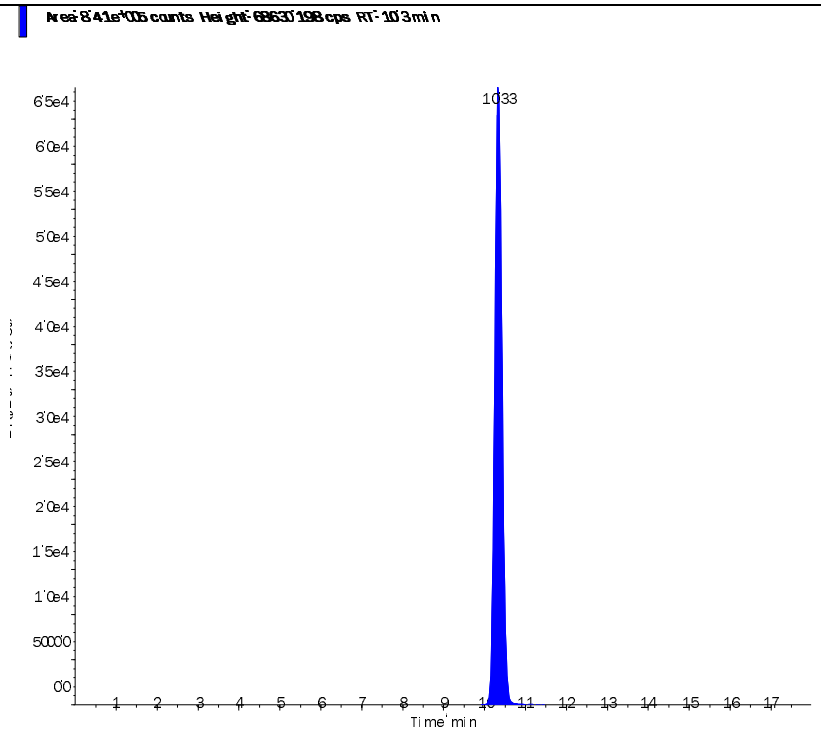
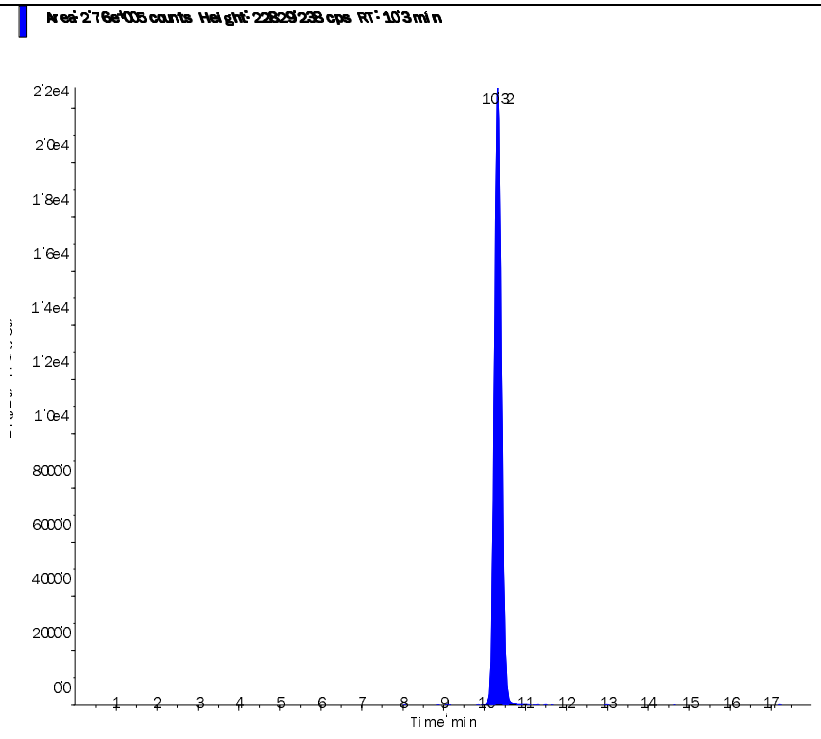
O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 10.10 ng/ml Area Ratio: 2.694 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 10.00 ng/ml Area Ratio: 0.886 Sample Type: (Standard)	

Data File	LM27611.wiff	**Result Table**	111714_ADC.rdb
Acquisition Date	11/17/2014 3:12:39 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

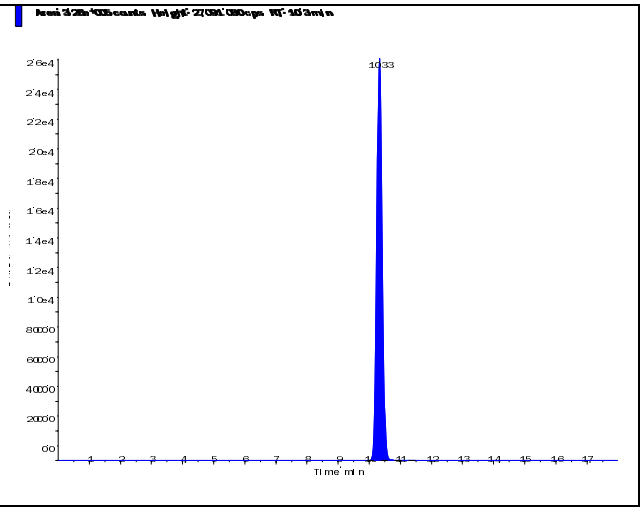
Sample Name	WG501146-09 SSCV (1.0 ug/L)	**Injection Vial**	9.00
Data File	LM27611.wiff	**Injection Volume**	10.00
Acquisition Date	11/17/2014 3:12:39 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	111714_ADC.rdb
Sample ID	WG501146-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD67082	**Weight to Volume**	0.00

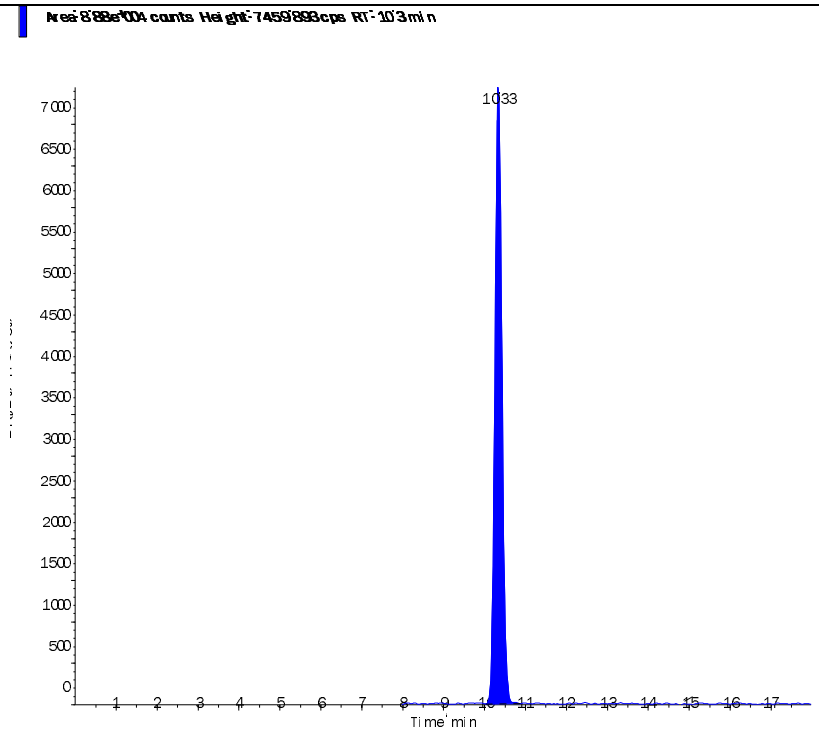
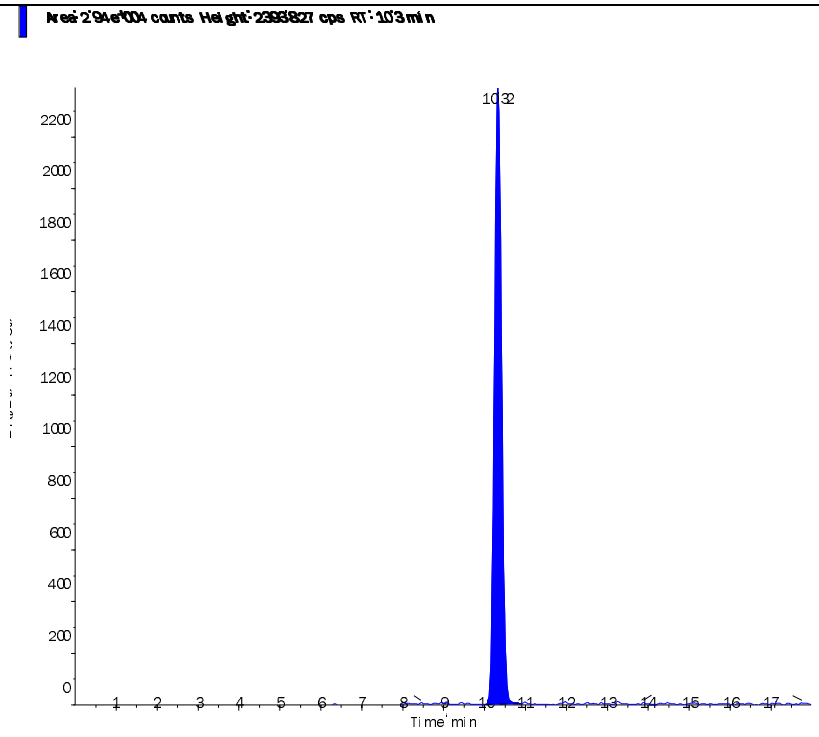
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.260e+05	10.30	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.880e+04	10.30	1.00	1.01
Perchlorate conf	2.940e+04	10.30	1.00	1.01

O18LP (Internal Standard)

RT (Exp. RT): 10.30(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 1.01 ng/ml Area Ratio: 0.272 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 10.30 (10.30) min Calculated conc: 1.01 ng/ml Area Ratio: 0.09 Sample Type: (Quality Control)	

Data File	LM29102.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 3:03:26 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

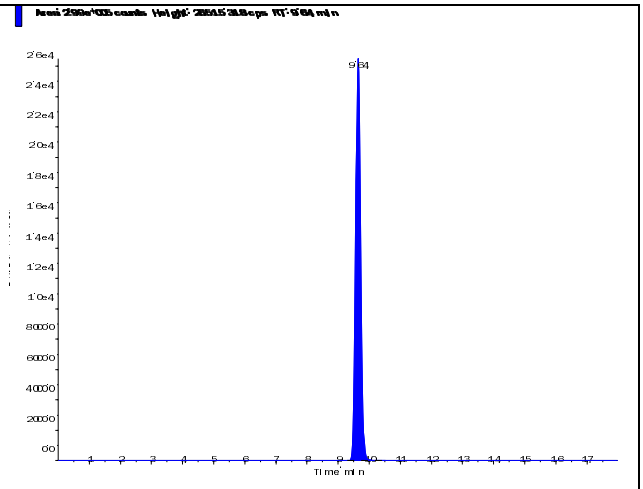
Sample Name	WG514223-02 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM29102.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 3:03:26 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514223-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

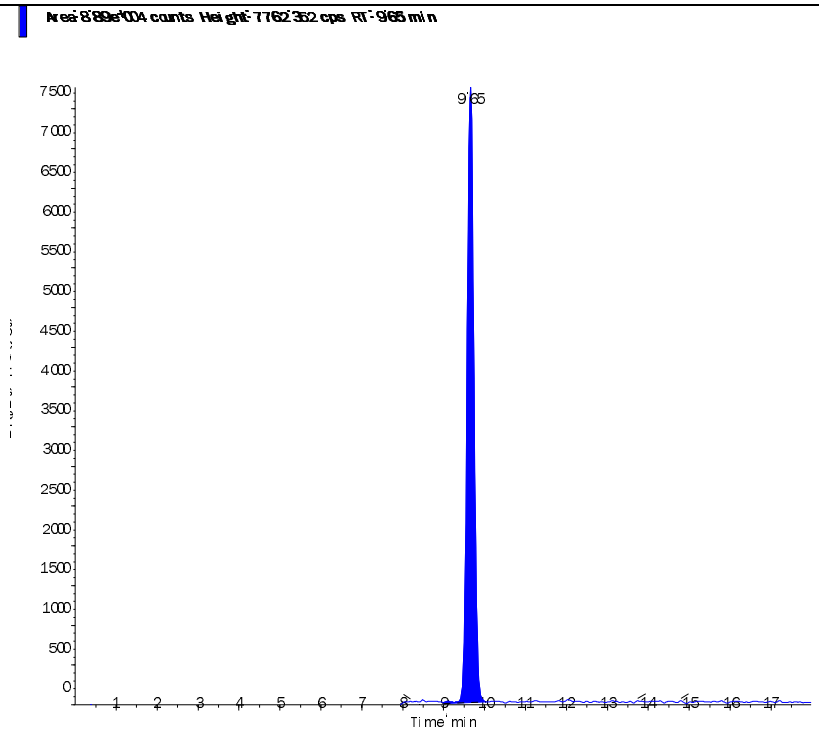
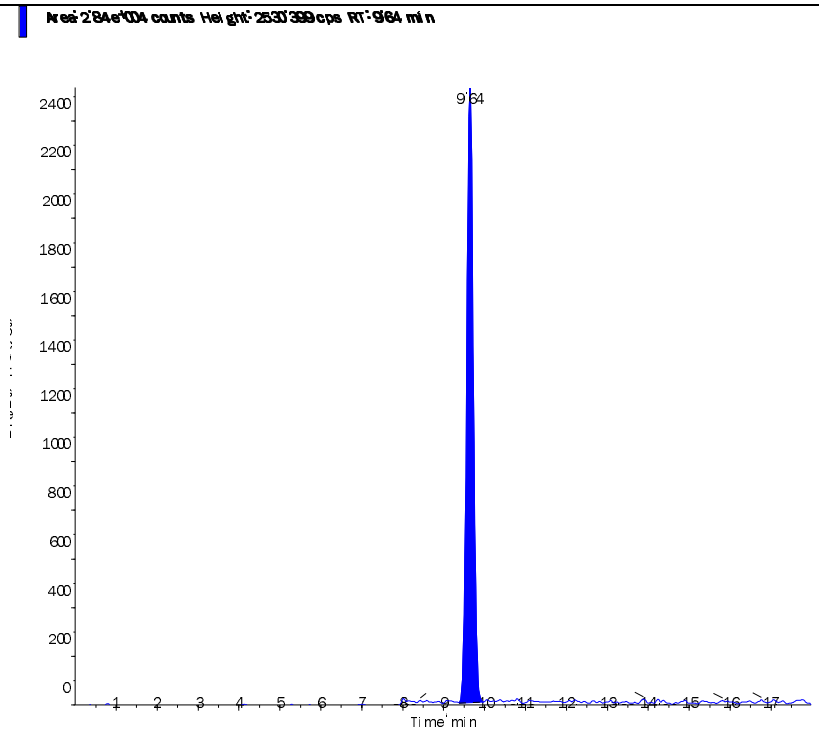
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.990e+05	9.64	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.890e+04	9.65	1.00	1.10
Perchlorate conf	2.840e+04	9.64	1.00	1.07

O18LP (Internal Standard)

RT (Exp. RT): 9.64(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.65 (10.30) min Calculated conc: 1.10 ng/ml Area Ratio: 0.297 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.64 (10.30) min Calculated conc: 1.07 ng/ml Area Ratio: 0.095 Sample Type: (Quality Control)	

Data File	LM29114.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 6:50:46 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG514223-03 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM29114.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 6:50:46 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514223-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.240e+05	9.64	5.00	-

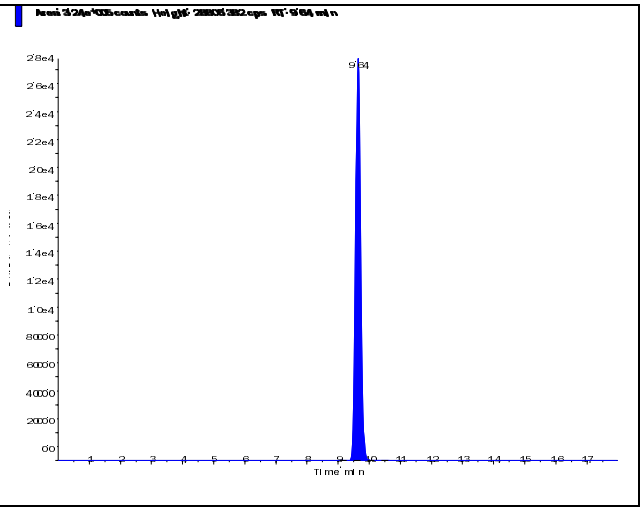
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	9.040e+04	9.65	1.00	1.03
Perchlorate conf	2.960e+04	9.63	1.00	1.03

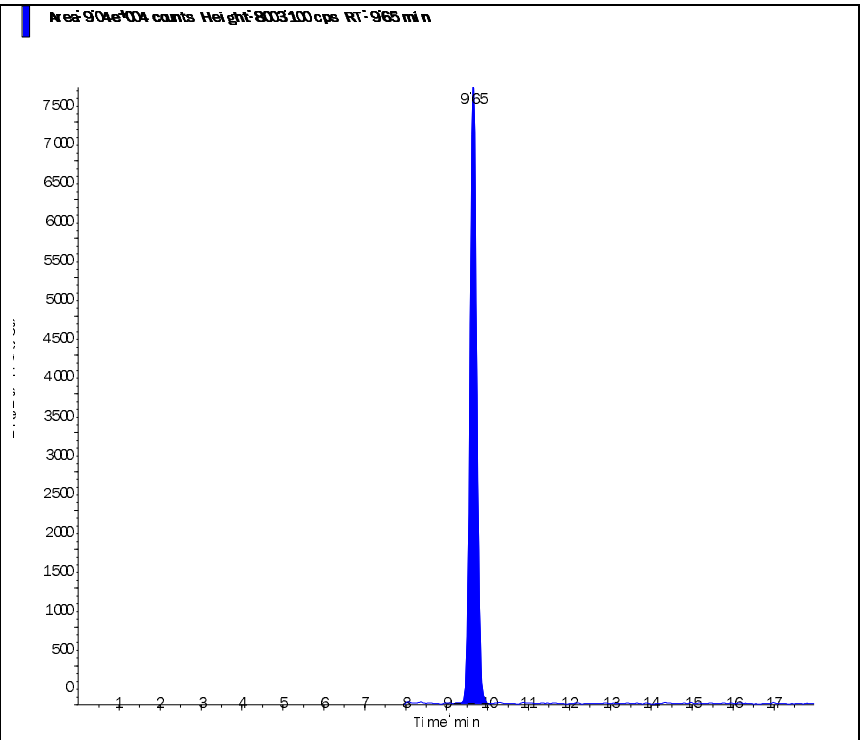
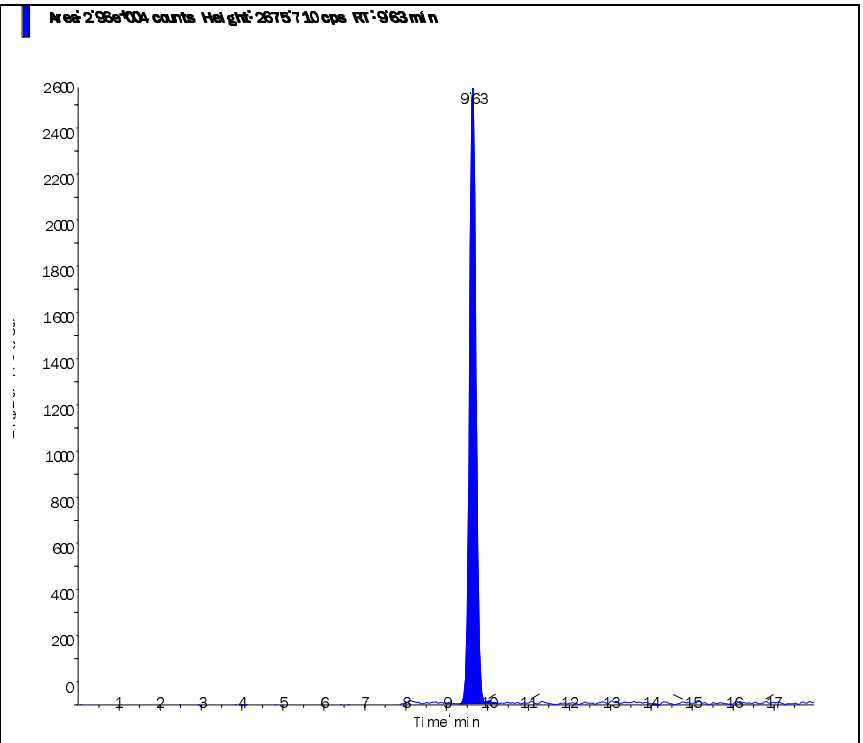
O18LP (Internal Standard)

RT (Exp. RT): 9.64(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.65 (10.30) min Calculated conc: 1.03 ng/ml Area Ratio: 0.279 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.63 (10.30) min Calculated conc: 1.03 ng/ml Area Ratio: 0.091 Sample Type: (Quality Control)	

Data File	LM29122.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 9:22:17 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

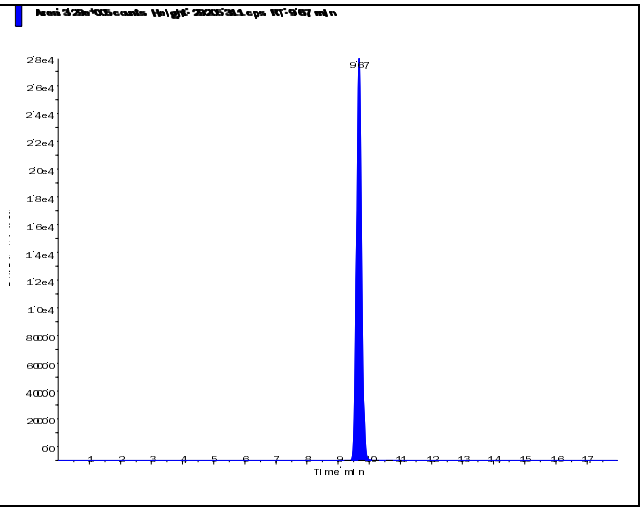
Sample Name	WG514223-05 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM29122.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 9:22:17 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514223-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

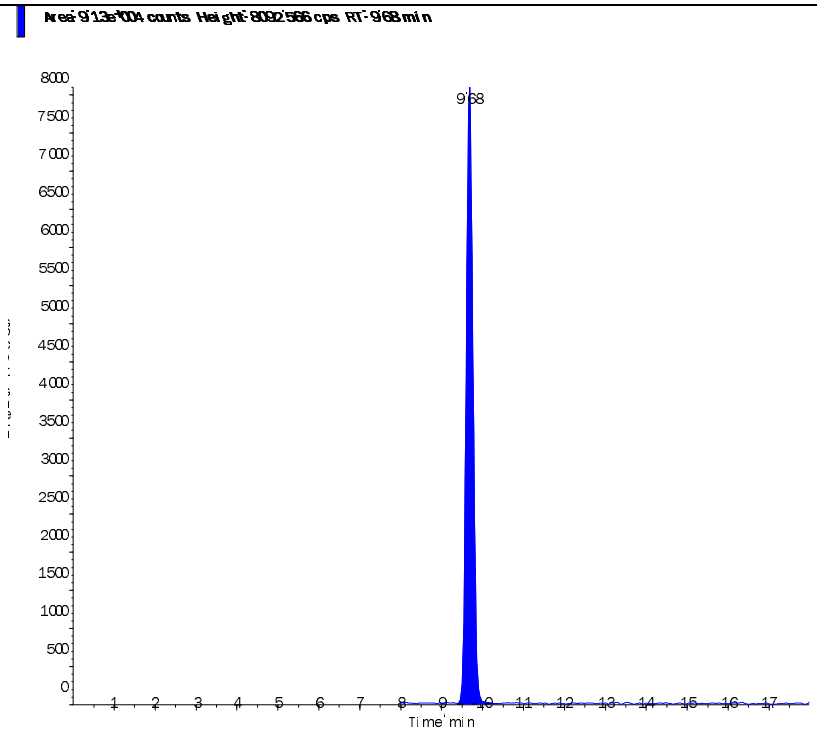
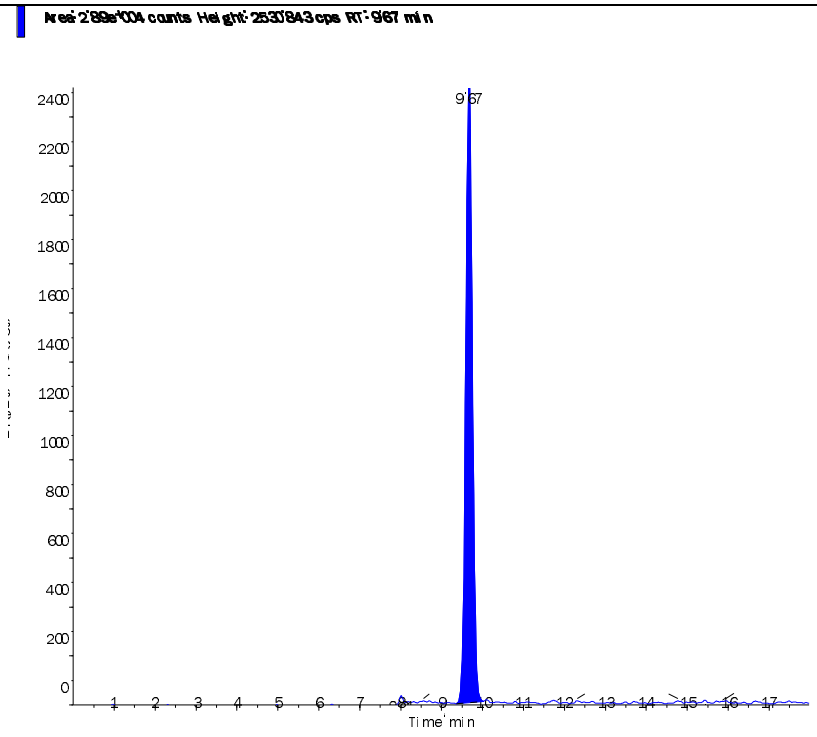
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.290e+05	9.67	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	9.130e+04	9.68	1.00	1.02
Perchlorate conf	2.890e+04	9.67	1.00	0.986

O18LP (Internal Standard)

RT (Exp. RT): 9.67(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.68 (10.30) min Calculated conc: 1.02 ng/ml Area Ratio: 0.277 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.67 (10.30) min Calculated conc: 0.986 ng/ml Area Ratio: 0.088 Sample Type: (Quality Control)	

Data File	LM29103.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 3:22:22 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

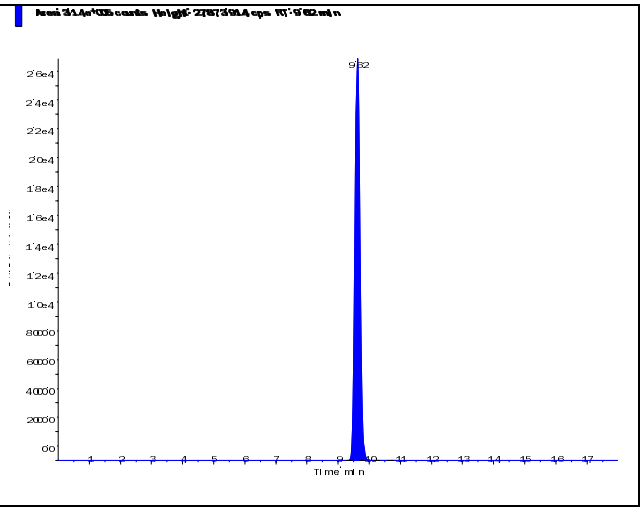
Sample Name	WG514217-07 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM29103.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 3:22:22 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

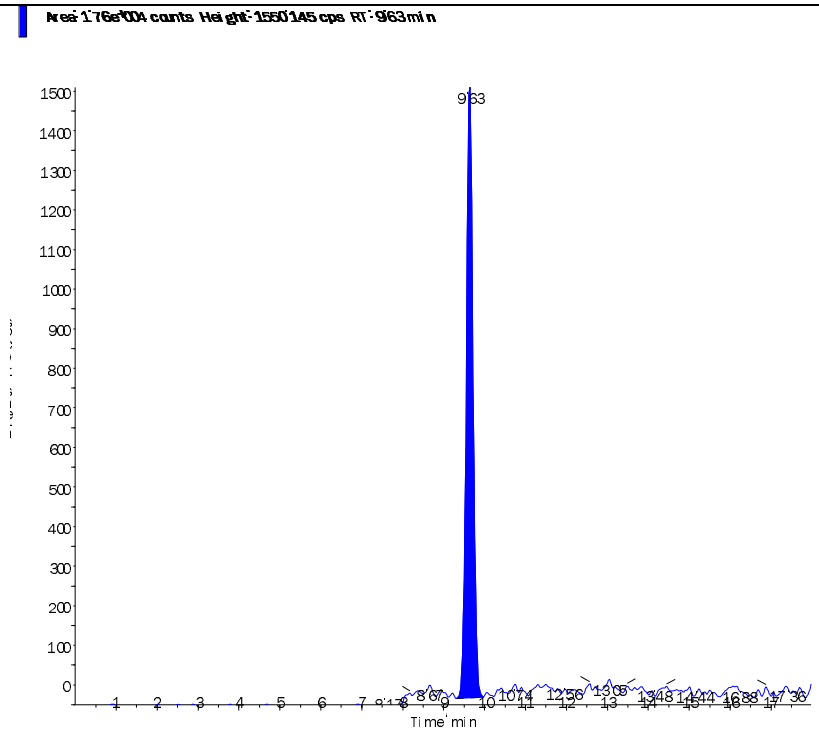
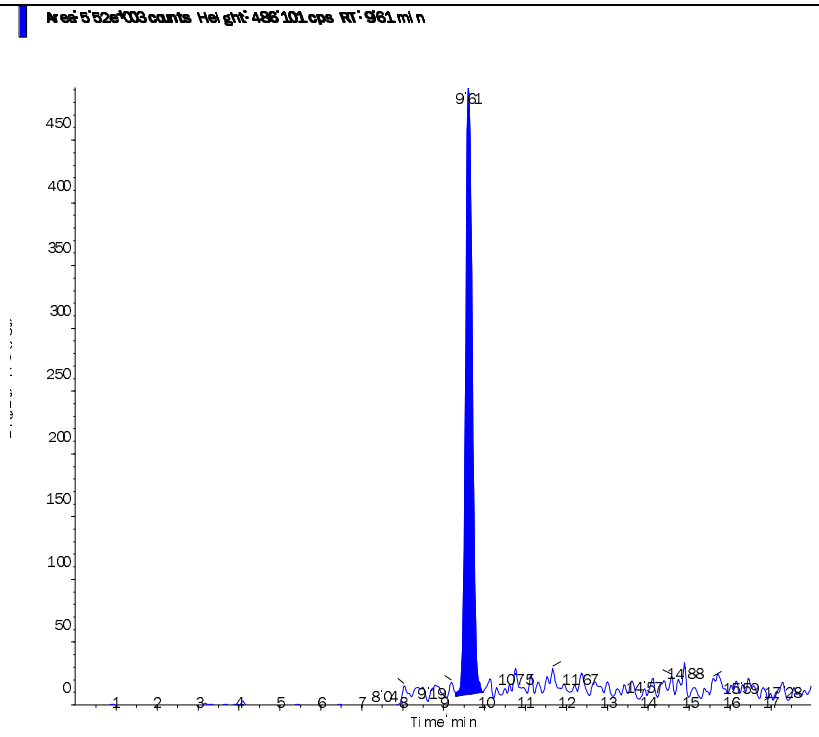
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.140e+05	9.62	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.760e+04	9.63	N/A	0.196
Perchlorate conf	5.520e+03	9.61	N/A	0.189

O18LP (Internal Standard)

RT (Exp. RT): 9.62(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.63 (10.30) min Calculated conc: 0.196 ng/ml Area Ratio: 0.056 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.61 (10.30) min Calculated conc: 0.189 ng/ml Area Ratio: 0.018 Sample Type: (Unknown)	

Data File	LM29115.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 7:09:41 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG514217-08 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM29115.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 7:09:41 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.180e+05	9.62	5.00	-

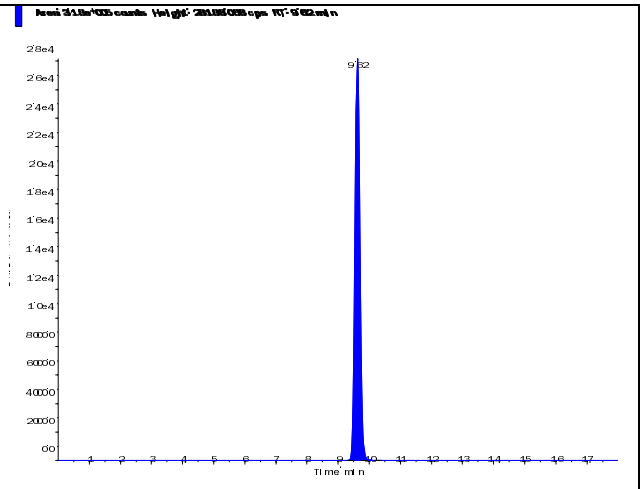
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.760e+04	9.63	N/A	0.193
Perchlorate conf	5.570e+03	9.63	N/A	0.188

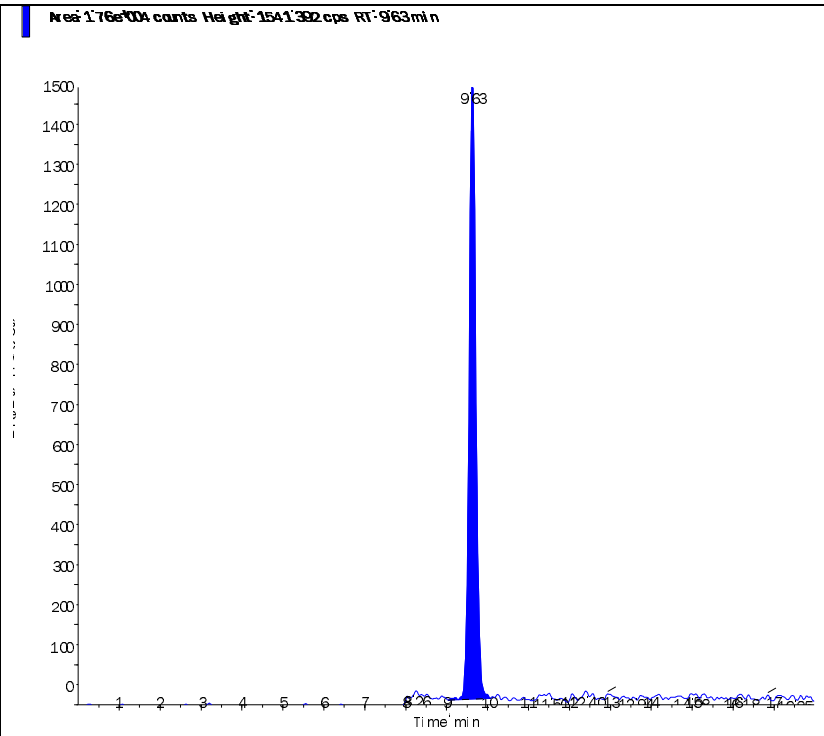
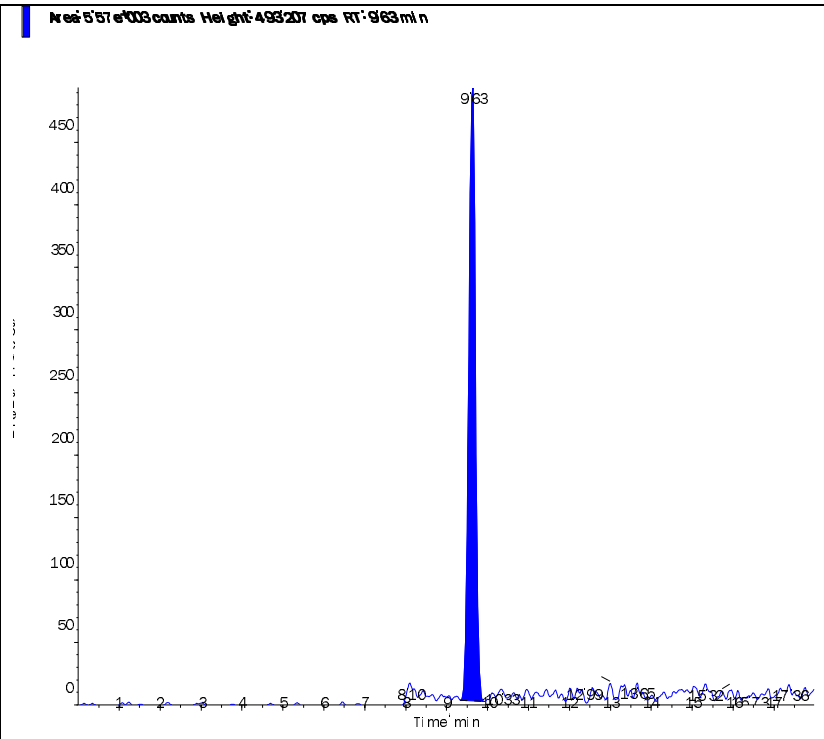
O18LP (Internal Standard)

RT (Exp. RT): 9.62(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.63 (10.30) min Calculated conc: 0.193 ng/ml Area Ratio: 0.056 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.63 (10.30) min Calculated conc: 0.188 ng/ml Area Ratio: 0.018 Sample Type: (Unknown)	

Data File	LM29123.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 9:41:12 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

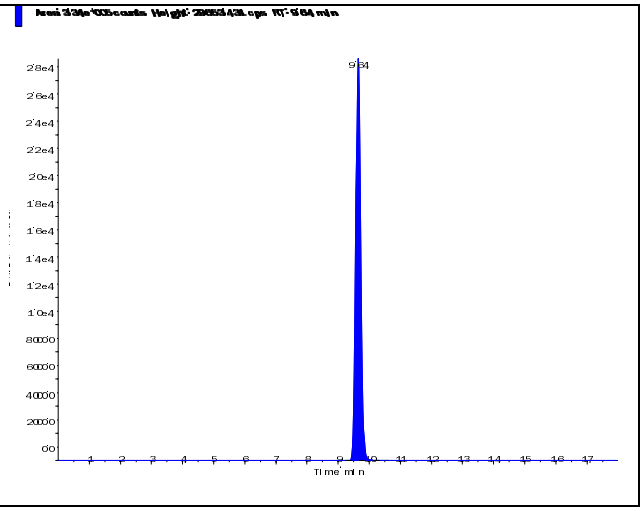
Sample Name	WG514217-09 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM29123.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 9:41:12 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

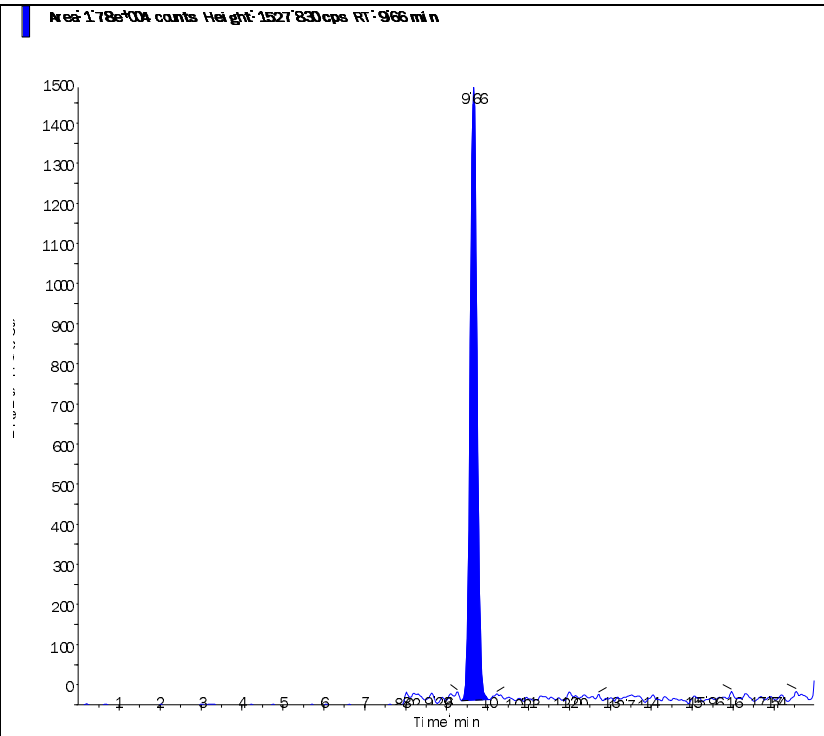
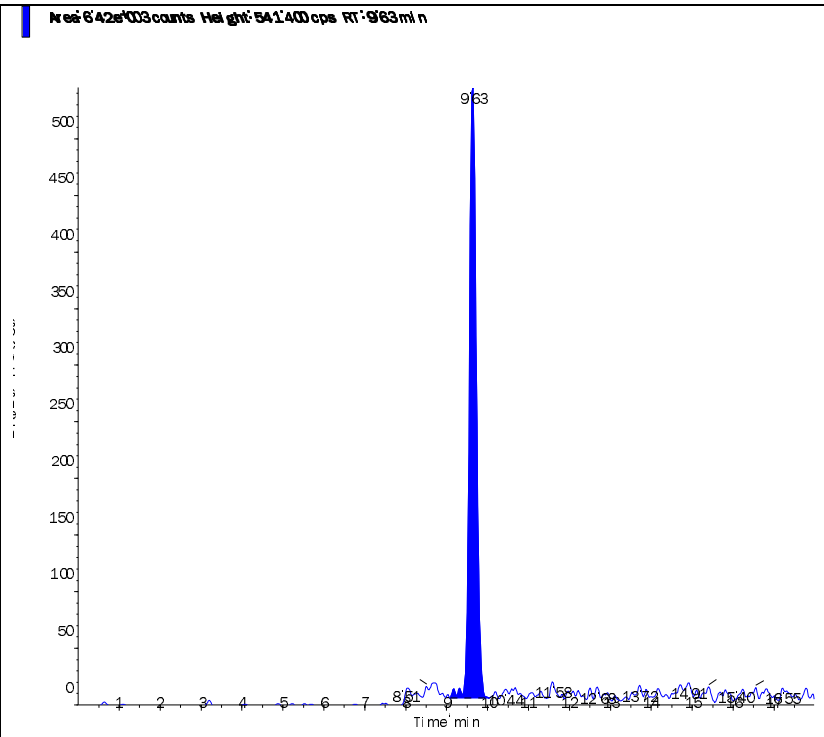
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.340e+05	9.64	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.780e+04	9.66	N/A	0.185
Perchlorate conf	6.420e+03	9.63	N/A	0.207

O18LP (Internal Standard)

RT (Exp. RT): 9.64(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.66 (10.30) min Calculated conc: 0.185 ng/ml Area Ratio: 0.053 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.63 (10.30) min Calculated conc: 0.207 ng/ml Area Ratio: 0.019 Sample Type: (Unknown)	

Data File	LM29101.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 2:44:27 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG514223-01 CCB	**Injection Vial**	1.00
Data File	LM29101.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 2:44:27 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514223-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.040e+05	9.66	5.00	-

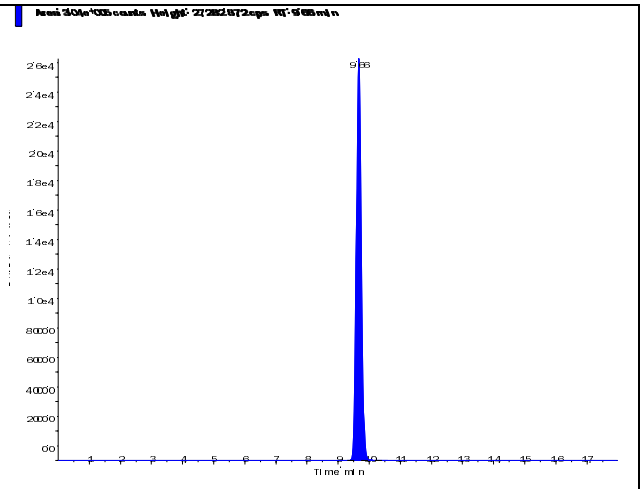
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.600e+02	9.43	N/A	< 0
Perchlorate conf	4.530e+02	9.76	N/A	0.006

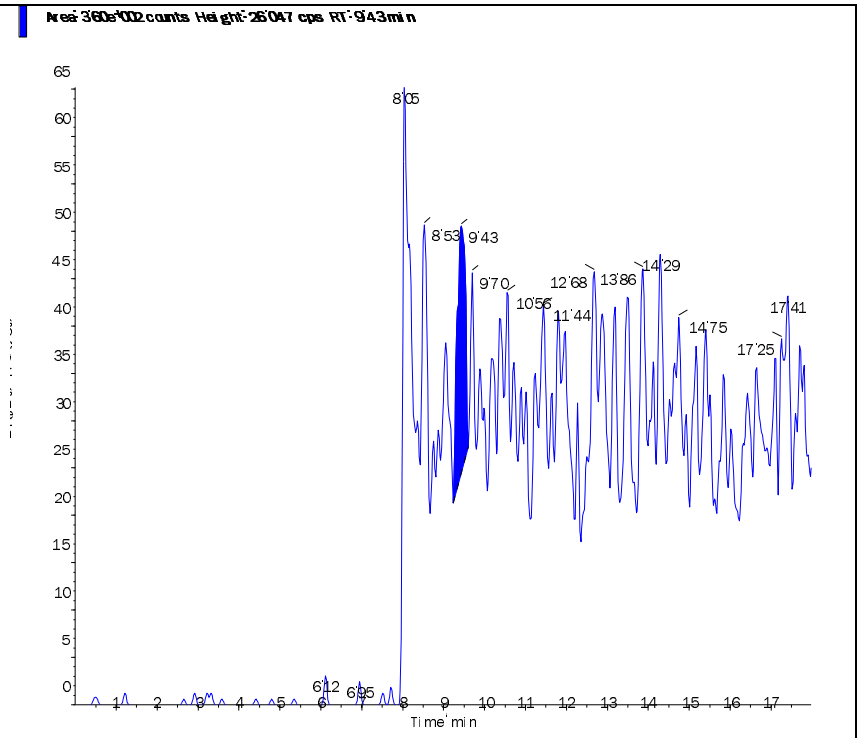
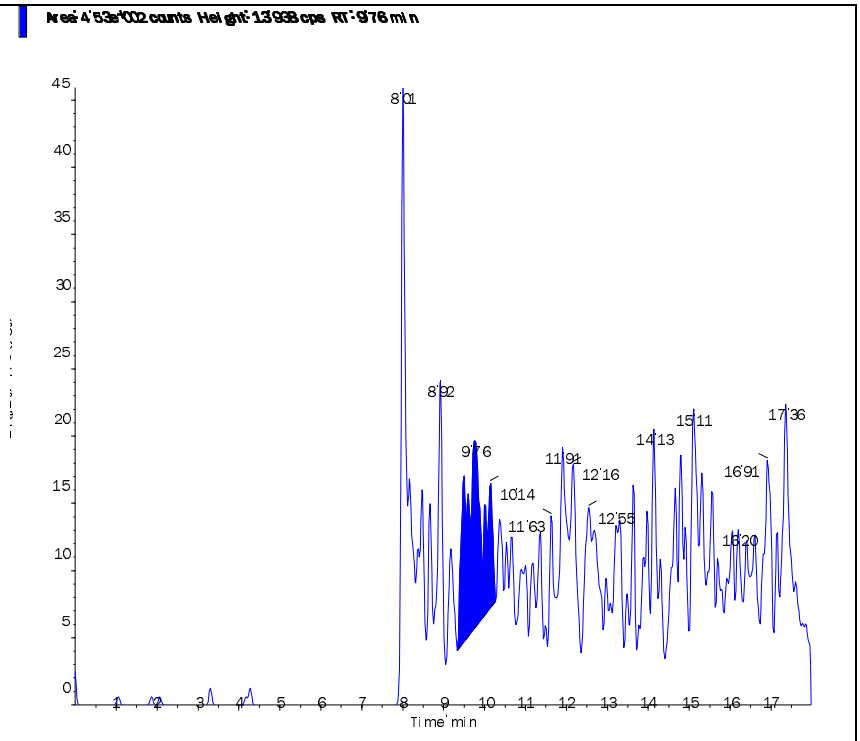
O18LP (Internal Standard)

RT (Exp. RT): 9.66(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.43 (10.30) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.76 (10.30) min Calculated conc: 0.006 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	

Data File	LM29116.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 7:28:39 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG514223-04 CCB	**Injection Vial**	1.00
Data File	LM29116.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 7:28:39 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514223-04	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.260e+05	9.67	5.00	-

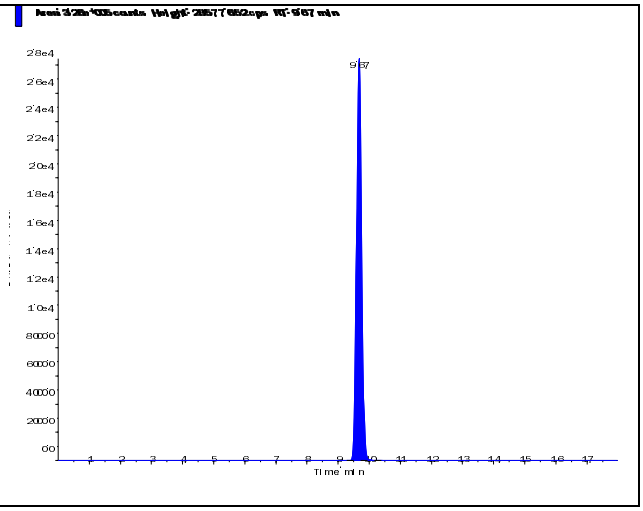
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	7.210e+02	9.79	N/A	< 0
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.67(10.30) min

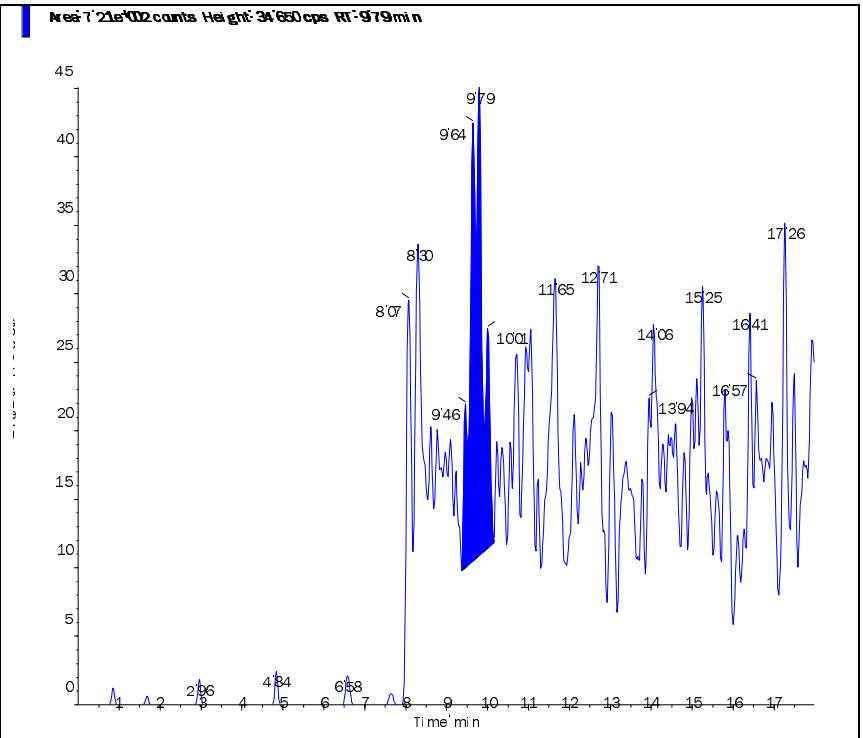
Concentration: 5.00 ug/L

Sample Type: (Unknown)



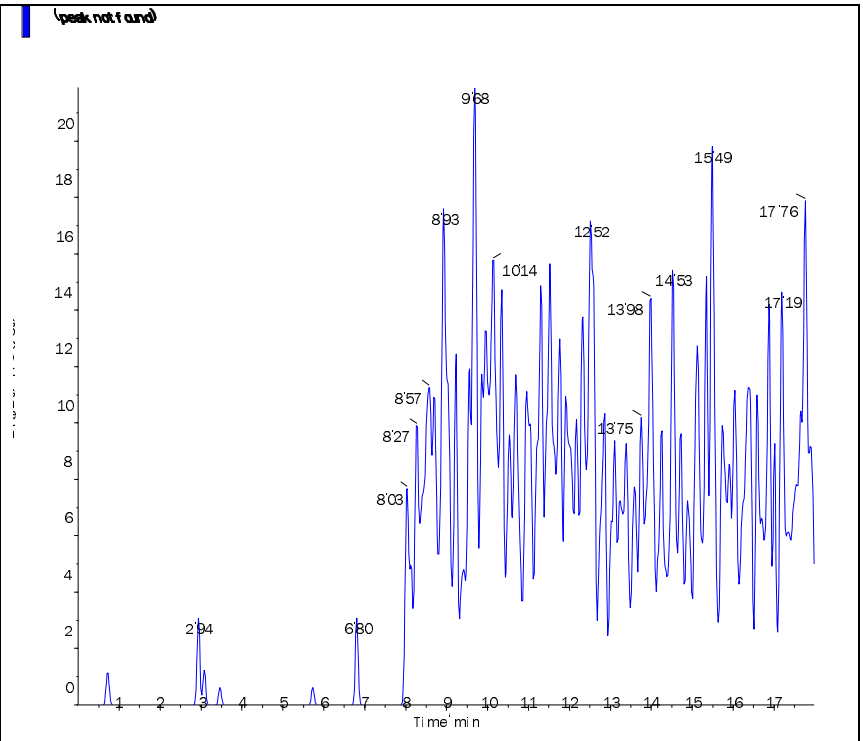
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.79 (10.30) min
Calculated conc:	< 0 ng/ml
Area Ratio:	0.002
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	0.00 (10.30) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



Data File	LM29124.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 10:00:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

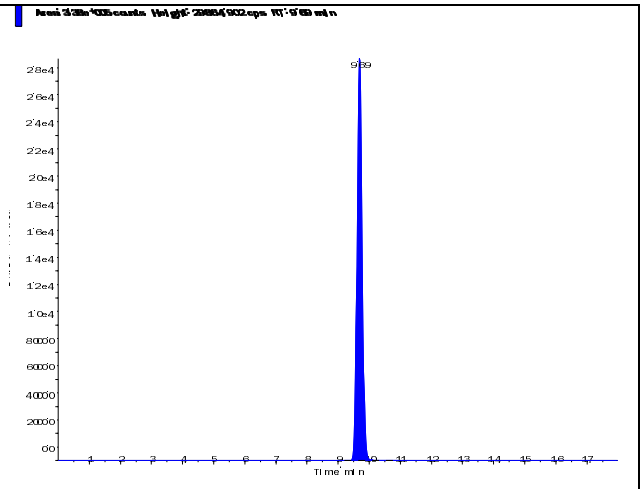
Sample Name	WG514223-06 CCB	**Injection Vial**	1.00
Data File	LM29124.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 10:00:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514223-06	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

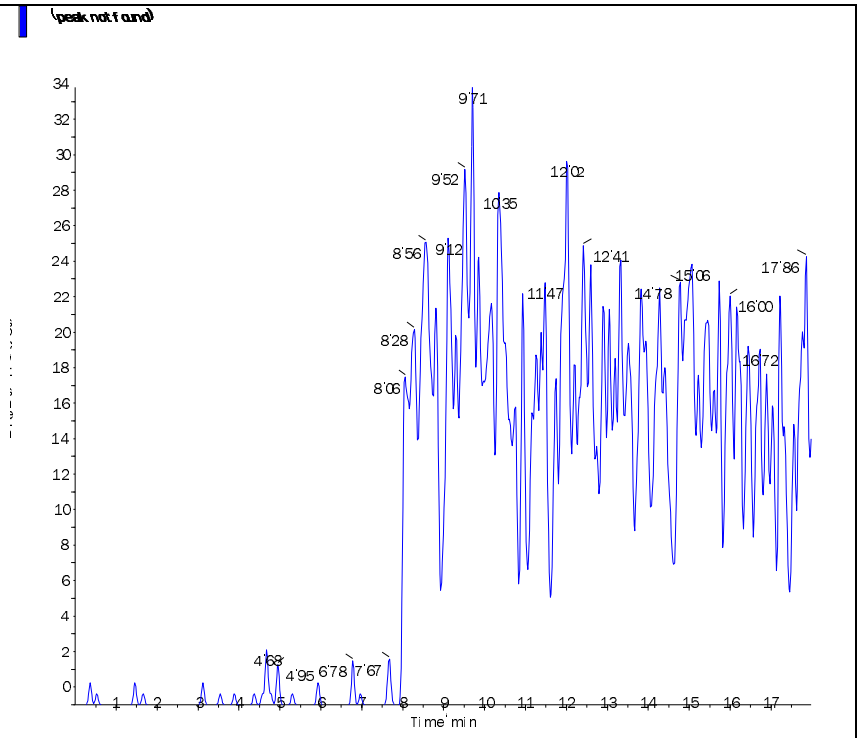
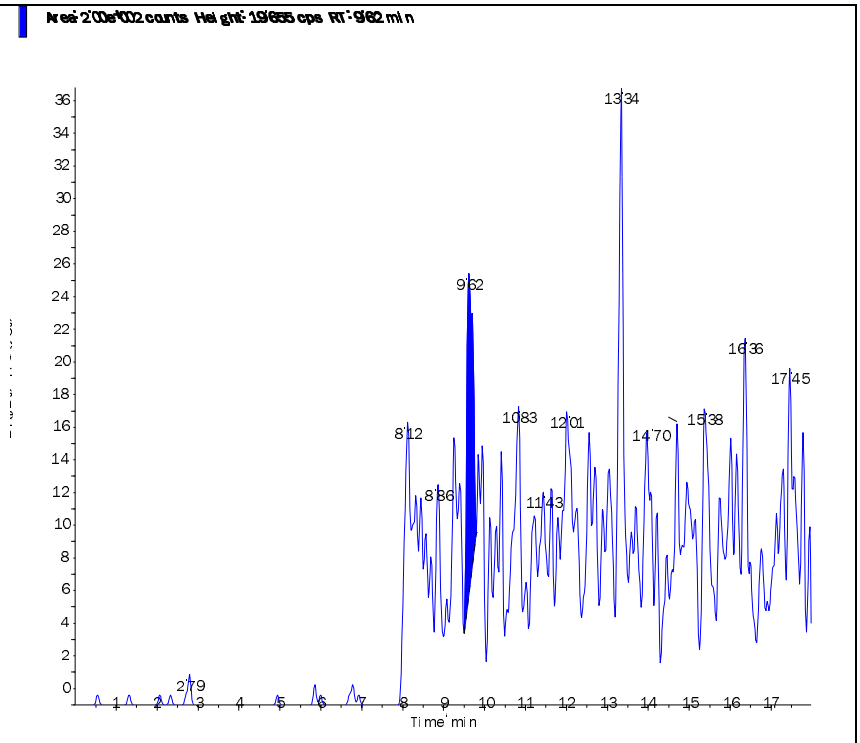
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.380e+05	9.69	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	2.000e+02	9.62	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.69(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (10.30) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.62 (10.30) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	

Data File	LM29104.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 3:41:18 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

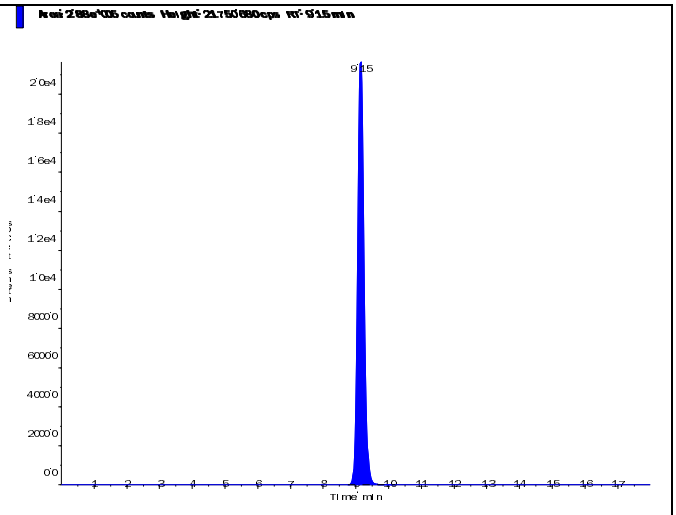
Sample Name	WG514217-01 MCT (0.2ug/L)	**Injection Vial**	4.00
Data File	LM29104.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 3:41:18 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-01	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

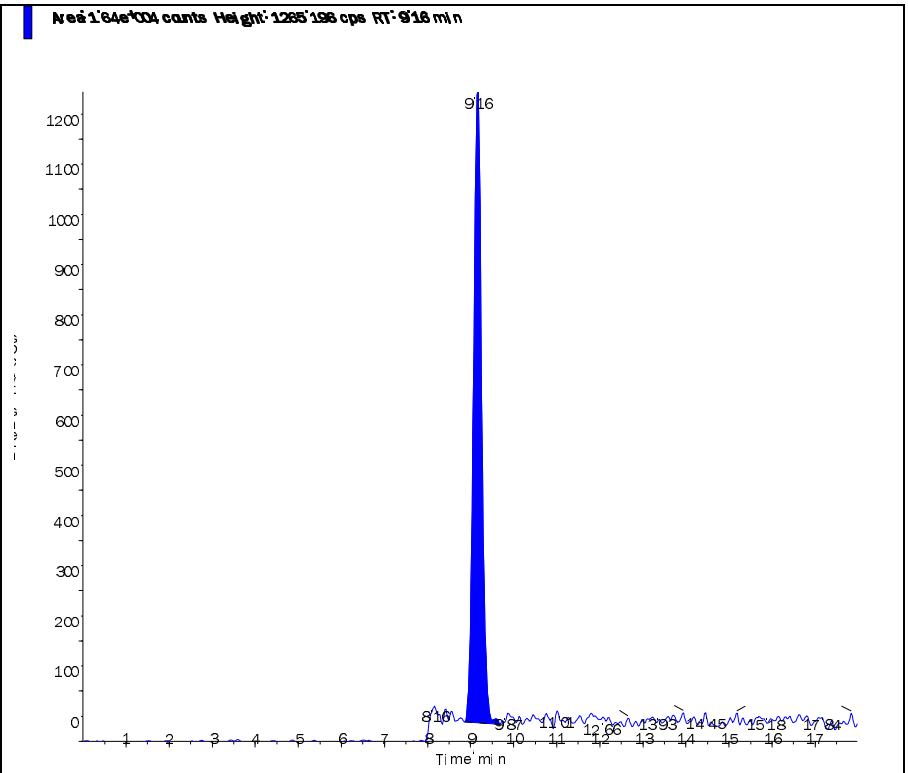
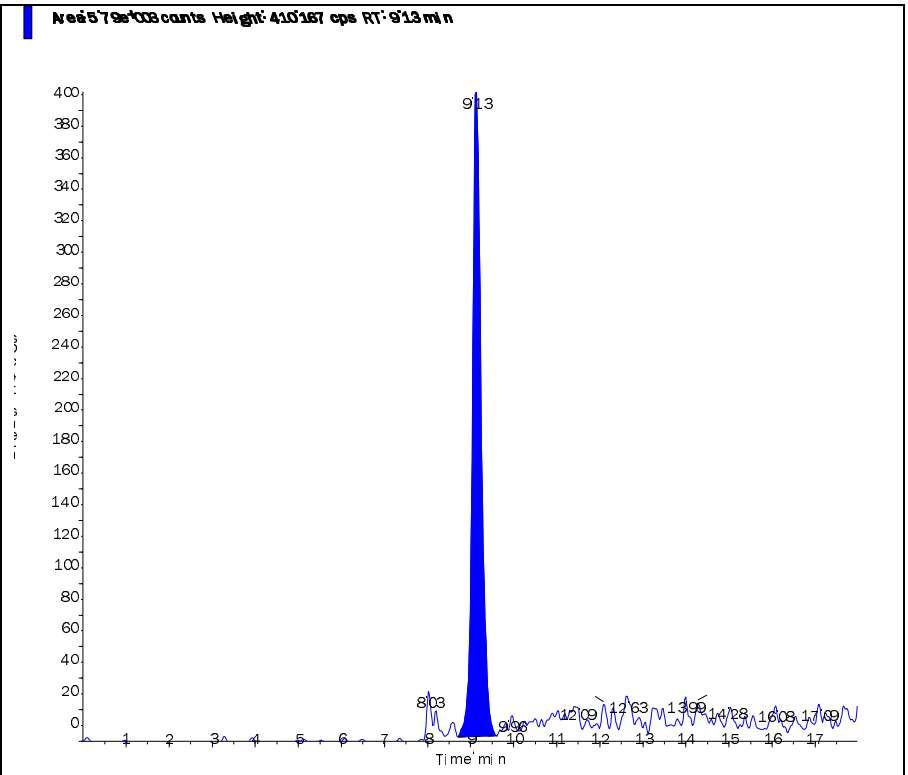
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.880e+05	9.15	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.640e+04	9.16	N/A	0.199
Perchlorate conf	5.790e+03	9.13	N/A	0.218

O18LP (Internal Standard)

RT (Exp. RT): 9.15(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.16 (10.30) min Calculated conc: 0.199 ng/ml Area Ratio: 0.057 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.13 (10.30) min Calculated conc: 0.218 ng/ml Area Ratio: 0.02 Sample Type: (Unknown)	

2.1.1.5 Raw QC Data

Data File	LM29105.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 4:00:13 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG514217-02 BLANK	**Injection Vial**	5.00
Data File	LM29105.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 4:00:13 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-02	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.120e+05	9.68	5.00	-

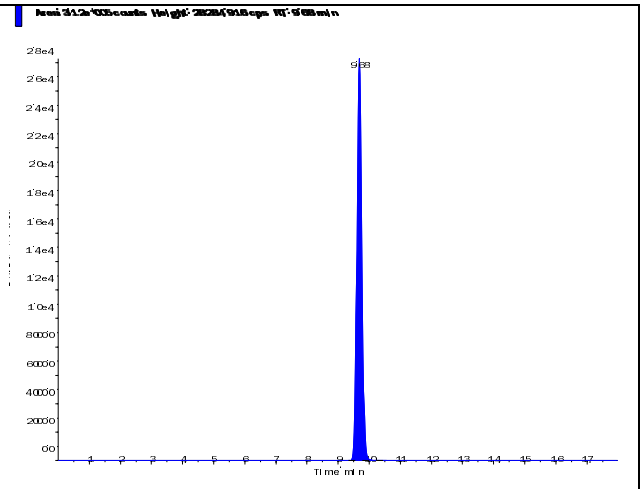
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	2.250e+02	9.79	N/A	< 0

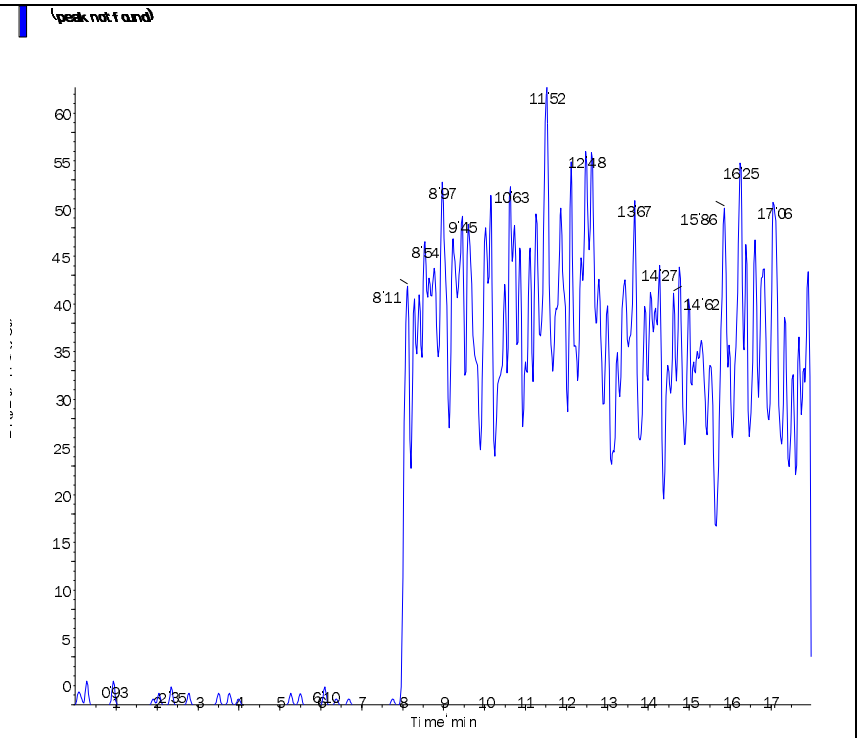
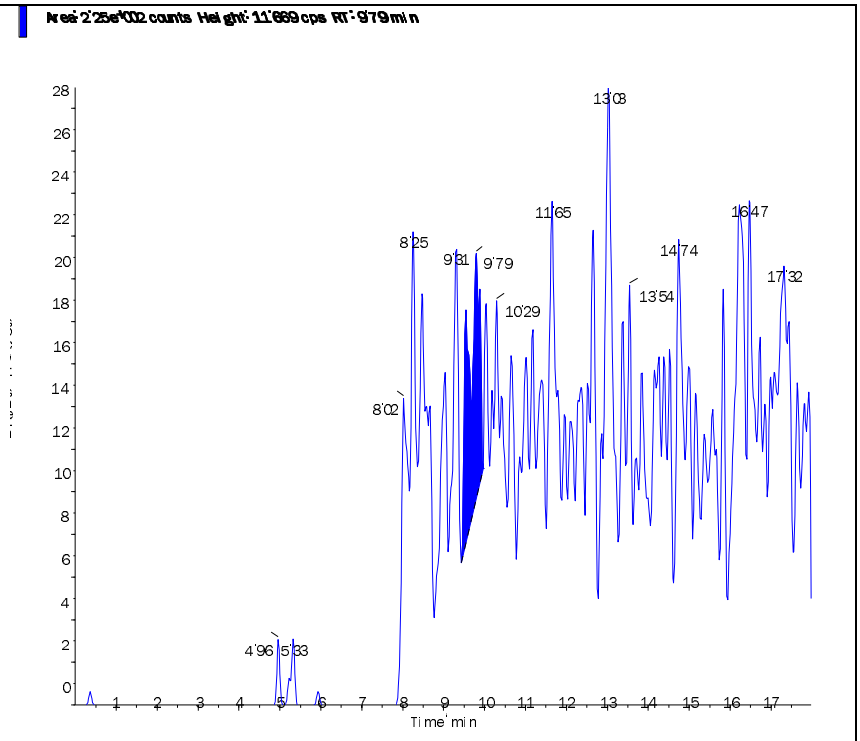
O18LP (Internal Standard)

RT (Exp. RT): 9.68(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (10.30) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.79 (10.30) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	

Data File	LM29106.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 4:19:09 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG514217-03 LCS (0.2ug/L)	**Injection Vial**	6.00
Data File	LM29106.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 4:19:09 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.080e+05	9.68	5.00	-

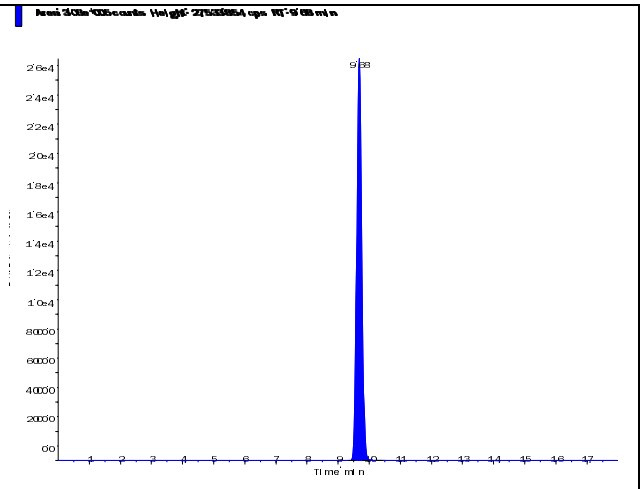
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.730e+04	9.69	N/A	0.196
Perchlorate conf	5.690e+03	9.67	N/A	0.199

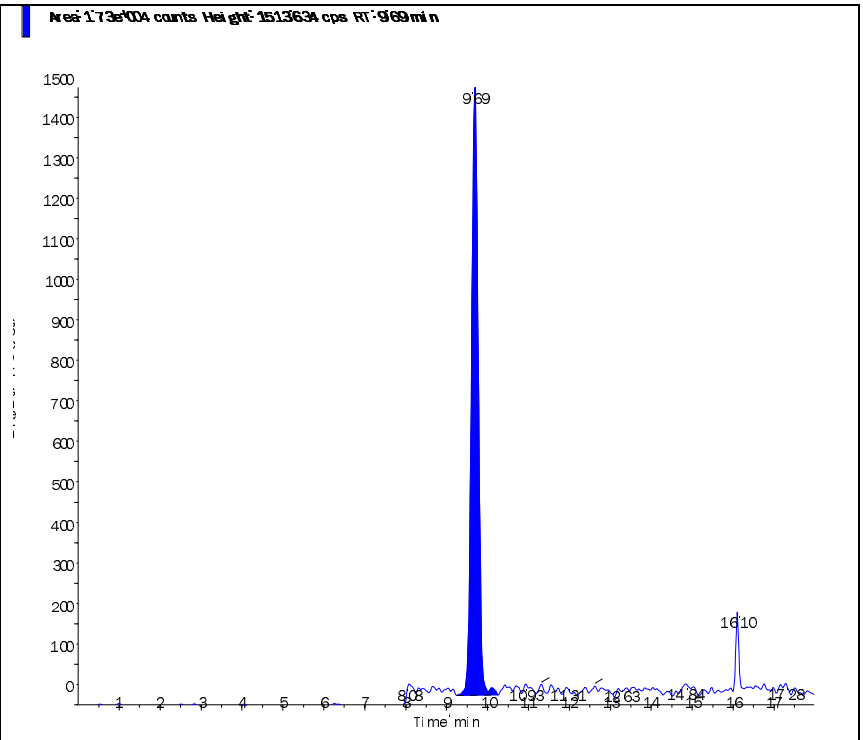
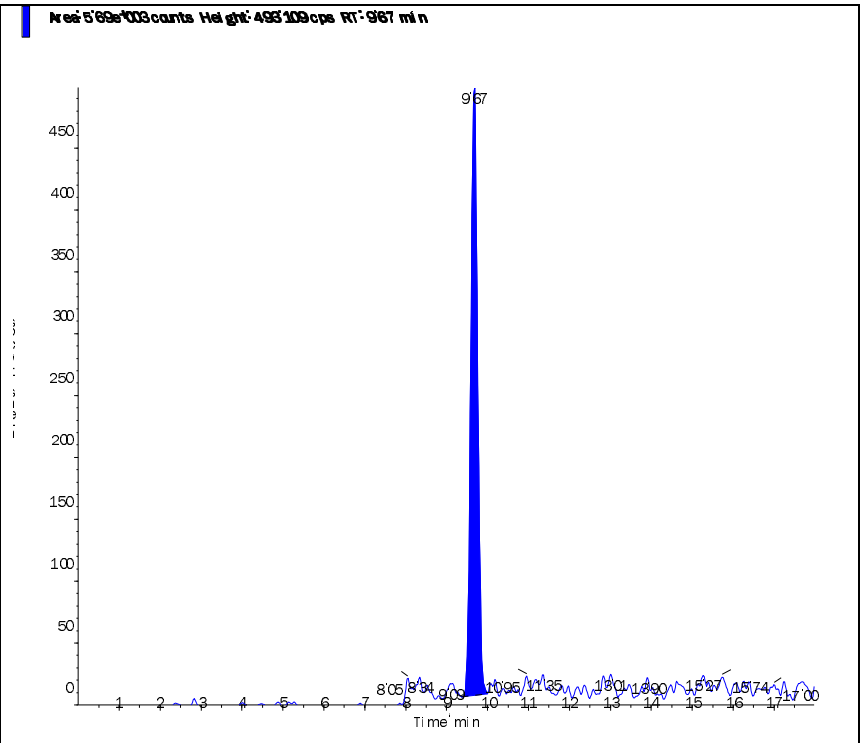
O18LP (Internal Standard)

RT (Exp. RT): 9.68(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.69 (10.30) min Calculated conc: 0.196 ng/ml Area Ratio: 0.056 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.67 (10.30) min Calculated conc: 0.199 ng/ml Area Ratio: 0.018 Sample Type: (Unknown)	

Data File	LM29108.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 4:57:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

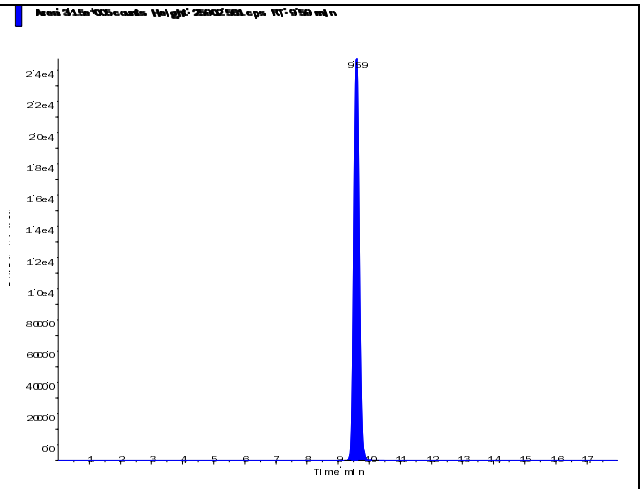
Sample Name	L15021217-01 MS	**Injection Vial**	8.00
Data File	LM29108.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 4:57:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

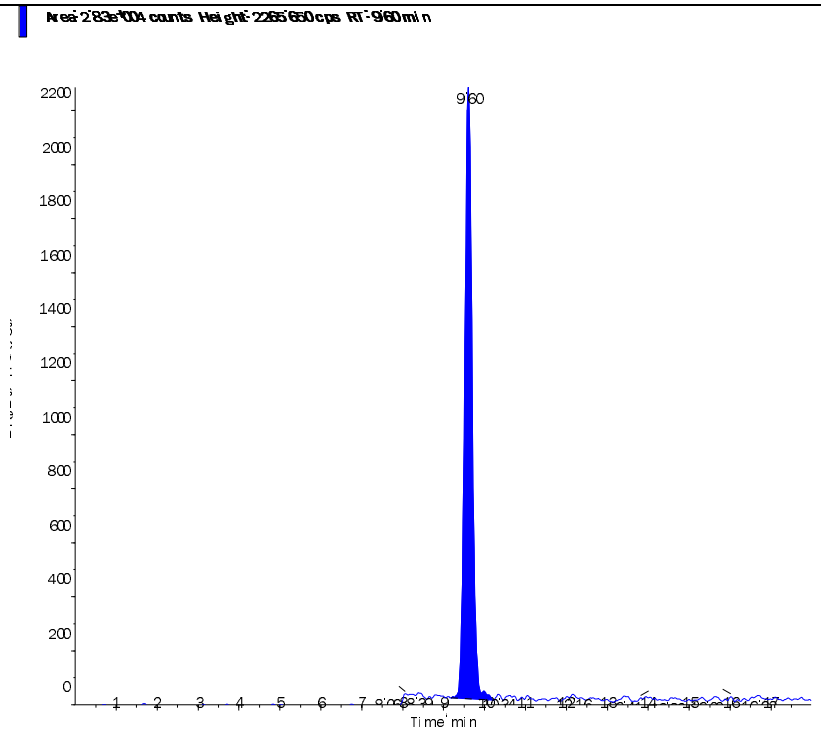
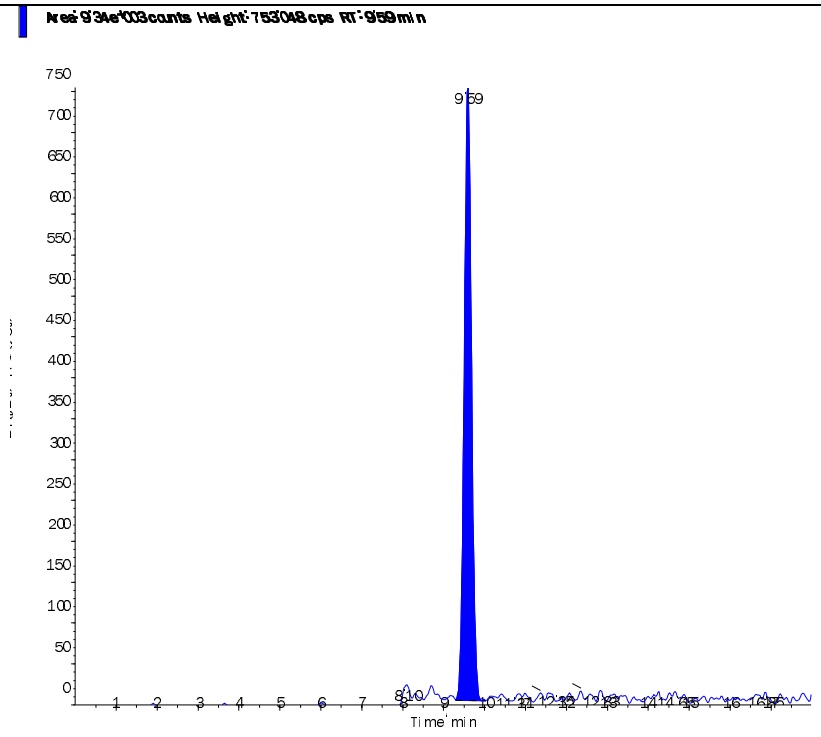
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.150e+05	9.59	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.830e+04	9.60	N/A	0.323
Perchlorate conf	9.340e+03	9.59	N/A	0.326

O18LP (Internal Standard)

RT (Exp. RT): 9.59(10.30) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.60 (10.30) min Calculated conc: 0.323 ng/ml Area Ratio: 0.09 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.59 (10.30) min Calculated conc: 0.326 ng/ml Area Ratio: 0.03 Sample Type: (Unknown)	

Data File	LM29109.wiff	**Result Table**	030415_JWR.rdb
Acquisition Date	3/4/2015 5:16:03 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	L15021217-01 MSD	**Injection Vial**	9.00
Data File	LM29109.wiff	**Injection Volume**	10.00
Acquisition Date	3/4/2015 5:16:03 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030415_JWR.rdb
Sample ID	WG514217-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD67080	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.960e+05	9.55	5.00	-

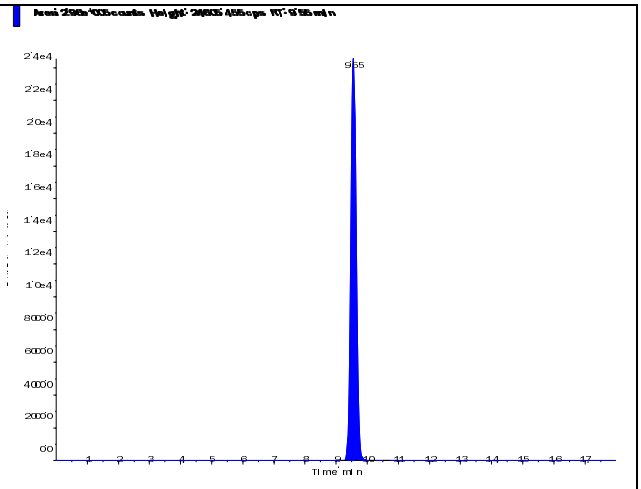
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.670e+04	9.57	N/A	0.323
Perchlorate conf	9.540e+03	9.55	N/A	0.355

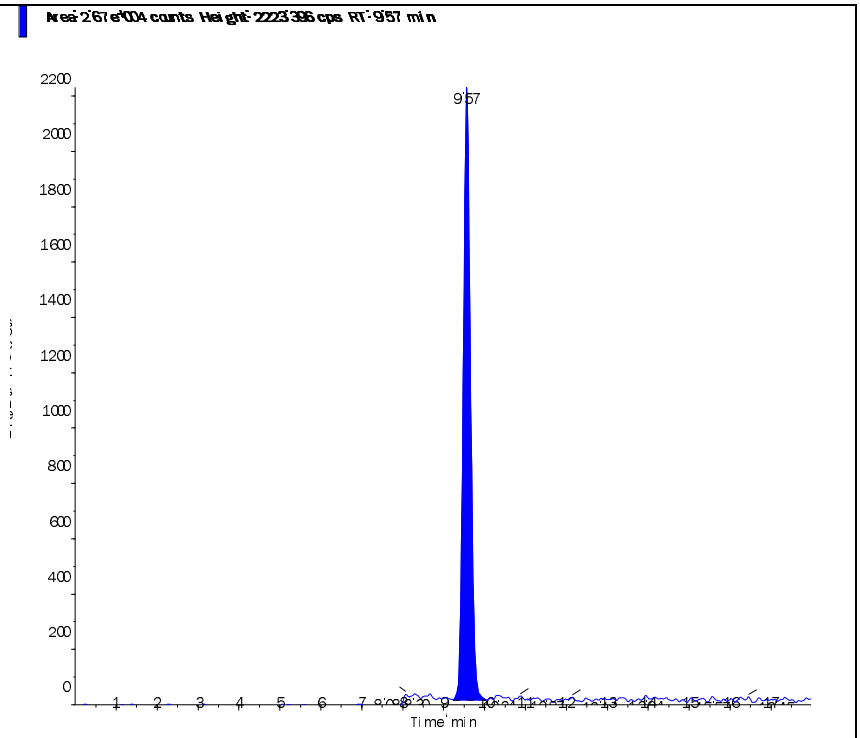
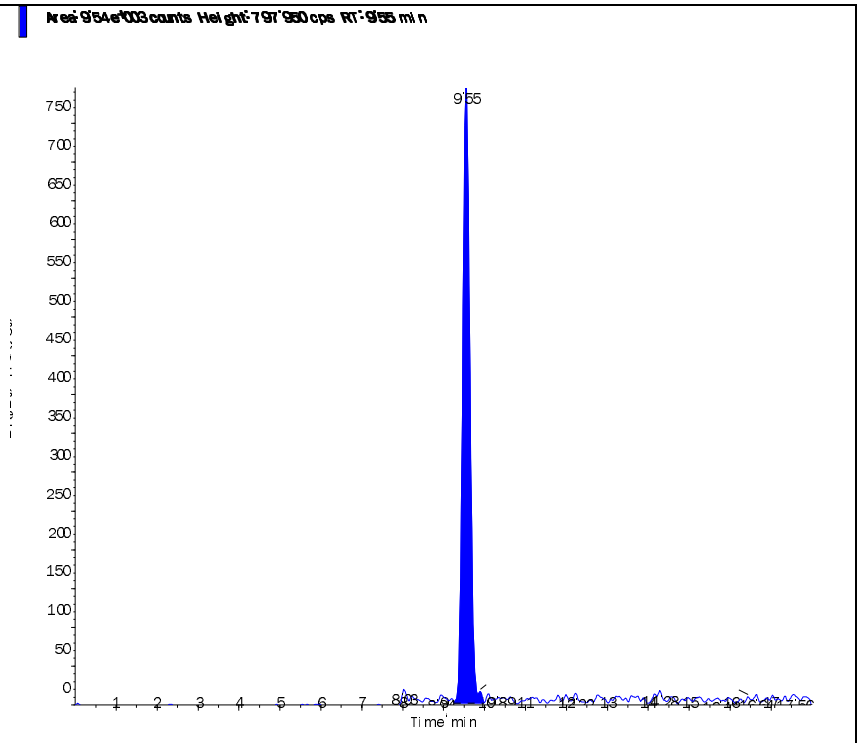
O18LP (Internal Standard)

RT (Exp. RT): 9.55(10.30) min

Concentration: 5.00 ug/L

Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (10.30) min Calculated conc: 0.323 ng/ml Area Ratio: 0.09 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (10.30) min Calculated conc: 0.355 ng/ml Area Ratio: 0.032 Sample Type: (Unknown)	

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
March 9, 2015

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001 – BIO-CHEM TESTING WVDEP 220	002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental	004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES	006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES	008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND	ADC – ANTHONY D. CANTER
ADG – APRIL D. GREENE	AED – ALLEN E. DAVIS
ALS – ADRIANE L. STEED	AWE – ANDREW W. ESSIG
AZH – AFTER HOURS	BJO – BRIAN J. OGDEN
BKT – BRENDAN TORRENCE	BLG – BRENDA L. GREENWALT
BRG – BRENDA R. GREGORY	CAA – CASSIE A. AUGENSTEIN
CAF – CHERYL A. FLOWERS	CEB – CHAD E. BARNES
CJR – COURTNEY J. REXROAD	CLC – CHRYS L. CRAWFORD
CLS – CARA L. STRICKLER	CLW – CHARISSA L. WINTERS
CPD – CHAD P. DAVIS	CSH – CHRIS S. HILL
DAK – DEAN A. KETELSEN	DCM – DAVID C. MERCKLE
DEV – DAVID E. VANDENBERG	DIH – DEANNA I. HESSON
DLB – DAVID L. BUMGARNER	DLP – DOROTHY L. PAYNE
DLW – DIANA L. WRIGHT	DSM – DAVID S. MOSSOR
ECL – ERIC C. LAWSON	ENY – EMILY N. YOAK
EPT – ETHAN P. TIDD	ERP – ERIN R. PORTER
FJB – FRANCES J. BOLDEN	JBK – JEREMY B. KINNEY
JDH – JUSTIN D. HESSON	JDS – JARED D. SMITH
JJS – JOHN J. STE MARIE	JKP – JACQUELINE K. PARSONS
JLL – JOHN L. LENT	JMW – JEANA M. WHITE
JTP – JOSHUA T. PEMBERTON	JWR – JOHN W. RICHARDS
JWS – JACK W. SHEAVES	JYH – JI Y. HU
KAJ – KELLIE A. JOHNSON	KAT – KATHY A. TUCKER
KDW – KATHRYN D. WELCH	KEB – KATIE E. BARNES
KHR – KIM H. RHODES	KKB – KERRI K. BUCK
KRA – KATHY R. ALBERTSON	KRB – KAELY R. BECKER
KRP – KATHY R. PARSONS	LEC – LAURA E. CARPENTER
LKN – LINDA K. NEDEFF	LLS – LARRY L. STEPHENS
LSB – LESLIE S. BUCINA	MBK – MORGAN B. KNOWLTON
MDA – MIKE D. ALBERTSON	MDC – MIKE D. COCHRAN
MES – MARY E. SCHILLING	MLB – MEGAN L. BACHE
MMB – MAREN M. BEERY	MRT – MICHELLE R. TAYLOR
MSW – MATT S. WILSON	PDM – PIERCE D. MORRIS
PIT – MICROBAC WARRENDALE	PRL – PAIGE R. LAMB
PSW – PEGGY S. WEBB	QX – QIN XU
RAH – ROY A. HALSTEAD	REK – BOB E. KYER
RLB – BOB BUCHANAN	RM – RAYMOND MALEKE
RNP – RICK N. PETTY	RST – ROBIN S. TURNER
SAV – SARAH A. VANDENBERG	SDC – SHALYN D. CONLEY
SLM – STEPHANIE L. MOSSBURG	SLP – SHERI L. PFALZGRAF
TB – TODD BOYLE	TMB – TIFFANY M. BAILEY
TMM – TAMMY M. MORRIS	VC – VICKI COLLIER
WJB – WILL J. BEASLEY	WRR – WESLEY R. RICHARDS
WTD – WADE T. DELONG	XXX – UNAVAILABLE OR SUBCONTRACT

Microbac Laboratories Inc.
List of Valid Qualifiers
March 09, 2015

Qualkey: DOD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Greater than
A	See the report narrative
B	The reported result is associated with a contaminated method blank.
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value; the analyte concentration was less than the RL/LOQ.
J,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
NA	Not applicable
ND	Not detected at or above the reporting limit (RL/MDL).
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.

Qualkey: DOD

TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported LOD.
U,H1	Not detected; Sample analysis performed past holding time.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

AECOM

Chain of Custody Record

COC Number:

Laboratory: Microbac POC: Kathy Albertson	Project Manager: Mark Heaston	Mail to: Linda Raabe	
Address: 158 Starlite Drive	Phone/Fax Number: 210-296-2000		112 East Pecan STE. 400
Marietta, OH 45750	Sampler (print): Scott Beesinger		San Antonio, TX 78205
Phone: 1-800-373-4071			210-296-2000
Client: AECOM	Signature: Scott Beesinger	Fed Ex Airbill No:	
Address: 112 East Pecan Ste. 400			
San Antonio, TX 78205	pH:	Program:	
Turn Around Time: STANDARD			
Project Name/Location: Longhorn			
Project Number: 60256135.0009AA			

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp*	Grab	Matrix	Number of Containers	Perchlorate	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
Harrison Bayou & Goose Prarie Creek	HBW 7 - 022315			2/23/15	0900		X	W	1	X					
	HBW 10 - 022315			2/23/15	0915		X	W	1	X					
	HBW 1 - 022315			2/23/15	0935		X	W	1	X					
	GPW 1 - 022315			2/23/15	0950		X	W	1	X					
	GPW 3 - 022315			2/23/15	1005		X	W	1	X					

ERPIMS REQUIRED FIELDS

Comments: **STANDARD TAT**

Relinquished by: (Signature) Scott Beesinger	Date 2/23/15	Time 1200	Receive	Time	Relinquished by: (Signature)
Relinquished by: (Signature)	Date	Time	Receive (Signatu	me	Remarks:

Microbac OVD
Received: 02/25/2015 09:46
By: BRENDA GREGORY 221000066024
Brenda Gregory

*Homogenize all composite samples prior to analysis

...er, Pink QA/QC Manager

Internal Chain of Custody Report

Login: L15021217
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 06-MAR-2015

Samplenum	Container ID	Products
L15021217-01	527500	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-FEB-2015 10:42	CLS		
2	ANALYZ	W1	SEM	04-MAR-2015 12:14	JWR	CLS	
3	STORE	SEM	A1	06-MAR-2015 13:03	BRG	JWR	

Samplenum	Container ID	Products
L15021217-02	527501	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-FEB-2015 10:42	CLS		
2	ANALYZ	W1	SEM	04-MAR-2015 12:14	JWR	CLS	
3	STORE	SEM	A1	06-MAR-2015 13:03	BRG	JWR	

Samplenum	Container ID	Products
L15021217-03	527502	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-FEB-2015 10:42	CLS		
2	ANALYZ	W1	SEM	04-MAR-2015 12:14	JWR	CLS	
3	STORE	SEM	A1	06-MAR-2015 13:03	BRG	JWR	

Samplenum	Container ID	Products
L15021217-04	527503	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-FEB-2015 10:42	CLS		
2	ANALYZ	W1	SEM	04-MAR-2015 12:14	JWR	CLS	
3	STORE	SEM	A1	06-MAR-2015 13:03	BRG	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L15021217
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 06-MAR-2015

Samplenum	Container ID	Products
L15021217-05	527504	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	25-FEB-2015 10:42	CLS		
2	ANALYZ	W1	SEM	04-MAR-2015 12:14	JWR	CLS	
3	STORE	SEM	A1	06-MAR-2015 13:03	BRG	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVL NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO3)
Thiodiglycol (TDG-LCMS)
Acetate (HPLC-UV)
Formate (HPLC-UV)
Acetaldehyde (HPLC-UV)
Propionaldehyde (HPLC-UV)
Fluoroborate (ISE)

SOLID AND HAZARDOUS CHEMICALS
Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVL HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVL MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam

Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVL MSV0I/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVL RSKOI/GC-FID

Isobutane
n-Butane
Propane
Propylene
Propyne

OVL HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

SOLID AND HAZARDOUS CHEMICALS

OVL MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

OVL MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
lsoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Subject:	**Final Minutes, Monthly Managers' Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**Teleconference – 866-203-6896, passcode 8603914725**
Date of Meeting:	**August 11, 2015 – 11:00 AM**

Attendees:

Army BRAC:	Rose Zeiler (RMZ)
EPA:	Rich Mayer (RM), Kent Becher (KB)
TCEQ:	April Palmie (AP)
USACE:	Aaron Williams (AW)
AECOM:	Mark Heaston (MH), Marwan Salameh (MS), JoLynn Snow (JS)
AEC:	Nicholas Smith (NS)
USFWS:	Paul Bruckwicki (PB)

Welcome **AECOM**

Action Items
AECOM

- Develop revised 1,4-dioxane sampling memo and sampling plan for next event. This action item will be replaced with development of a sampling plan focusing on evaluating the extent of 1,4-dioxane at LHAAP-18/24 in support of revising the FS. **In Progress**
    - RM asks what the targeted sampling date would be. MH responds that late September, early October 2015 would be the targeted sampling time. RM may try to schedule split sampling at the same time.
    - AP asks when the memo will be submitted. MH responds that submission is planned to Army by the end of this week.
- AECOM to send out an email to notify group when GWTP effluent discharge to Harrison Bayou begins.
    - MS states that levels have been below 20 ug/L for three rounds of sampling.
- Propose land application revisions to address concerns for ponding and potential runoff at 18/24 due to sprinkling activities.
    - RM asks if sprinklers are turned on from building or if it is manual. MS responds that he thinks it is manual. RMZ and KB concur.
    - RMZ says she has a previously approved proposal for land application process that covers three methods. Will send to group.
    - AP states that she does not disagree with current land application process, just has concerns for ponding and runoff. RM agrees.
    - MH asks AP if rolling the proposed checklist/photo logs for land application into the GWTP report is acceptable. AP agrees.

Army

- No outstanding action items

EPA

- Update regarding sampling and geophysics work performed at LHAAP-18/24
    - KB will produce field report estimated by September 2015.

    - RM states results from EPA sampling of four wells inside containment at LHAAP-18/24 pretty much show the same as AECOM results. 1,4-dioxane results show low levels.
    - No perchlorate in ditch in northwest corner of LHAAP-18/24.
    - May be able to present results from sampling at next MMM/RAB meeting if wanted.
    - KB hopes that this micropurge sampling may add value to sampling protocol.
    - RM also states that they took a sample from Fire Station tap. Awaiting results.
- Send RMZ electronic original paleochannel report and maps. **Complete**.
- Status update regarding Certificates of Completion for LHAAP-58
    - RM states John Mayer should be sending this week.

TCEQ

- No outstanding action items

AEC

- Provide completion information for Bioplug study system abandonment and decommissioning activities
    - NS states that Bioplug study should be submitted next week.

USFWS

- No outstanding action items

Defense Environmental Restoration Program (DERP) PBR Update AECOM

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

  Item 1 (GWTP Quarterly Report) –Q1 2015 submitted for Army review on 6/11/15. Army comments received 6/16/15. Responses to Army comments submitted 7/13/15. Army concurrence on Draft received 7/13/15. Q1 2015 submitted to Agencies on 7/14/15. Received TCEQ comments on Q1 2015 on 7/23/15. Q2 2015 Report estimated to Army by 8/30/15.

  Item 2a (LHAAP-18/24 Revised PSI) – Revised Draft PSI provided to Army for review on 7/31/15. Responses to comments on Draft PSI estimated by 8/21/15.

  Item 2b (LHAAP-18/24 1,4-Dioxane Sampling Memo) – Draft 1,4-Dioxane Sampling Plan/Memo estimated by 8/14/15. AW clarified that a previous technical direction for 1-4 dioxane sampling captures approval for follow-on sampling required- the plan and sampling activities could proceed.

  Item 2c (LHAAP-18/24 Revised FS) – Prepare after finalizing PSI and determining data gaps. Estimated January 2016.

  Item 3 (LHAAP-37 RACR) – Draft Final submitted to agencies on 4/3/15. Received RTRTCs from EPA on 4/7/15.
  - Army considering EPA comments from 5/8/18 conference call.
  - AW says contract modification for AECOM is being considered by the contracting officer.

  Item 4 (LHAAP-37 LUC) – LUC recordation is complete.

Item 5 (LHAAP-46 RACR) – Complete. Certificate of Completion received 7/20/15.

Item 6 (LHAAP-46 LUC) – LUC recordation is complete.

Item 7 (LHAAP-50 RACR) – Draft RTC sent to Army for review 4/22. RTCs sent to Agencies 4/27/15. LUC Recordation received. Draft Final submitted to Agencies on 7/29/15. Received comments from TCEQ on 8/6/15.

Item 8 (LHAAP-50 LUC) – LUC recordation is complete.

Item 9 (LHAAP-58 RACR) – Amended RTCs indicating concurrence on issues and that Draft Final will be considered Final submitted on 5/28/15. Certificate of completion to be received from EPA by 6/29/15 (30 days from Draft Final going Final).

Item 10 (LHAAP-58 LUC) – LUC recordation is complete.

Item 11 (LHAAP-67 RACR) – Amended RTC table indicating EPA remaining comments should be/will be addressed in Year #1 RAO Report submitted 3/17/15. Conference calls w/agencies were held on 4/2 (TCEQ and EPA) and 4/10 (EPA) to discuss finalizing RACR. EPA requiring a commitment to install an additional well in the western portion of the plume and periodic intermediate zone monitoring. Army contracting officer is considering contract modification from AECOM. Further discussion needed between Army and AECOM.

Item 12 (LHAAP-67 LUC) – LUC recordation is complete.

Item 13 (LHAAP-12 LTM Report) – Incorporating Agency comments. Projected submittal for Army review 8/11/15. Projected submittal of RTCs and Draft Final Report to Agencies on 8/12/15.

Item 14 (LHAAP-46 RAO Report) – Draft Report submitted to Agencies on 7/29/15.

Item 15 (LHAAP-67 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

Item 16 (LHAAP-50 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

- RMZ asks if a Provisional Certificate of Completion could be issued from EPA on LHAAP-50. RM says he will look into it.

Item 17 (LHAAP-58 RAO Report) – To be submitted to agencies once Certificate of Completion is received from EPA.

Item 18 (Monthly Managers' Meeting) – Next MMM scheduled for 1PM, Tuesday, September 15th.

Item 19 (LHAAP-29 Amended RI/FS) – Received direction from Army to pursue individual submittals of Amended RI and Amended FS.

Item 20 (LHAAP-17 PDI WP, LHAAP-16 RD WP, LHAAP-03 RD/RAWP, LHAAP-04 RD, LHAAP-47 RD) – Placeholder for sites on hold due to dispute. RM says EPA might be meeting with OMB in the next few weeks.

Item 21 (RAB/Website) – Next RAB meeting scheduled for October 29, 2015.

- RAB Schedule and finalized RAB Meeting Minutes have been uploaded to the website.

Item 22 (GWTP O&M) – RTCs to TCEQ and EPA comments on SAP Appendix B for Army review estimated by 8/21/15. Continued O&M. MS discusses replacement of several ICTs. Irrigation ongoing until verification that perchlorate and 1,4-dioxane are meeting discharge standards.

Item 23 (Administrative Record Update) – 1st Quarter 2015 Update in progress. Projected submission to Army by 8/14/15.

Item 24 (CRP/CIP) – FFA parties to submit updated questions for survey by 5/29/15. Compiled list of questions sent to TCEQ/EPA 6/2/15.

- Ongoing discussion about how best to provide information to the public. Possible mailing, but need to get a mailing list.
  - RMZ and NS discuss possibly having Post Office distribute to all mailing addresses. Looking into it.

- Upcoming field work
  - 8th Quarterly Sampling at LHAAP-46, 7th Quarterly Sampling at LHAAP-50 and water levels at LHAAP-12 in August 2015
  - RM asks if any increase has been seen in water levels. MH concurs.
- Monthly data package
- Groundwater Treatment Plant
  - MS discusses results of perchlorate during period of feed pump being out of service.

MMRP Update **Army**

- Update – no update.

Other Environmental Restoration **Army**

- Quarterly Reporting and Requirements
  - GWTP Evaluation with air monitoring data
  - Surface Water/Perimeter Well Quarterly Update
  - Administrative Record Update
  - Website Update
    - RMZ requests that sampling schedule be posted on website.
- Annual Reporting
  - LUC Management Plan Update (due September 2015)
  - CRP/CIP Revision (Biennial) and questionnaire October 2015
    - Status of questionnaire development

Programmatic Issues **RMZ/RM/AP**

- Status of Dispute – discussed earlier in meeting.

USFWS Update **RMZ/PB**

- Update – no update.

Schedule Next Managers' Meeting – 1PM, Tuesday, September 15th by teleconference.

Adjourn

ACRONYM LIST

ug/L	micrograms per liter
AEC	United States Army Environmental Command
AECOM	AECOM Technical Services, Inc.
AP	April Palmie
AW	Aaron Williams
BRAC	Base Realignment and Closure
CRP/CIP	Community Relations Plan/Community Involvement Plan
DERP	Defense Environmental Restoration Program
EPA	United States Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
GWTP	Ground Water Treatment Plant
ICT	Interceptor Collection Trench
JS	JoLynn Snow
KB	Kent Becher
LHAAP	Longhorn Army Ammunition Plant
LTM	Long-Term Monitoring
LUC	Land Use Control
MH	Mark Heaston
MMM	Monthly Managers' Meeting
MMRP	Military Munitions Response Program
MS	Marwan Salameh
NS	Nicholas Smith
O&M	Operation and Maintenance
OMB	Office of Management and Budget
PB	Paul Bruckwicki
PBR	Performance-Based Remediation
PDI	Pre-Design Investigation
PSI	Post-Screening Investigation
RAB	Restoration Advisory Board
RACR	Remedial Action Completion Report
RAO	Remedial Action Operation
RAWP	Remedial Action Work Plan
RD	Remedial Design
RDWP	Remedial Design Work Plan
RI/FS	Remedial Investigation / Feasibility Study
RM	Rich Mayer
RMZ	Rose M. Zeiler
RTC	Response to Comments
RTRTC	Response to Response to Comments

SAP	Sampling and Analysis Plan
TCEQ	Texas Commission on Environmental Quality
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WP	Work Plan

LHAAP Data Validated
July 2015

GWTP Effluent and Influent

Weekly, Biweekly, Monthly and Quarterly - May/June 2015

1,4-Dioxane (8270D-SIM)	Metals (6010C)
Ammonia (350.1)	Metals (6020A)
VOC (8260B)	Perchlorate (6850)
Ortho-Phosphate (365.2)	Hexavalent Chromium (7196A)
Inorganic Anions (9056)	Oil & Grease (1664A)
Total Organic Carbon (415.1)	Chemical Oxygen Demand (410.4)

Site 18/24

Semi-Annual Sampling - May/June 2015

Metals (6010C)
Metals (6020A)
Perchlorate (6850)
Mercury (7470A)
VOC (8260B)

Perimeter

Annual Sampling - June 2015

Perchlorate (6850)

GWTP Effluent Weekly Sampling - May/June 2015

Sample ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6272-GRAB 5/4/2015	LH18/24-SP650-6274-GRAB 5/13/2015	LH18/24-SP650-6277-GRAB 5/18/2015	LH18/24-SP650-6278-GRAB 5/28/2015	LH18/24-SP650-6280-GRAB 6/4/2015	LH18/24-SP650-6282-GRAB 6/8/2015	LH18/24-SP650-6284-GRAB 6/15/2015	LH18/24-SP650-6286-GRAB 6/22/2015
Location Description:			GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Weekly.
1,4-DIOXANE (8270D-SIM)										
1,4-DIOXANE*	ug/L	134.2	NA	NA	NA	NA	NA	NA	15.7	6.66
Ammonia-N (350.1)										
AMMONIA AS N	mg/L		3.38	3.75	4.66	0.784	6.45	4.97	3.91	3.92
Ortho-Phosphate (365.2)										
ORTHO-PHOSPHATE	mg/L		0.737	0.138	0.971	<0.05 U	0.987	0.996	0.814	0.935
Total Organic Carbon (415.1)										
TOTAL ORGANIC CARBON (TOC)	mg/L		19.5	17.6	11.6	13	27	7.4	7.84	5.96
Perchlorate (6850)										
PERCHLORATE	ug/L	13	<0.2 U	0.153 J	237	25.9	1.02	17.5	4.18	14.7

* Calculated Effluent Limit

Blue Highlighting Indicates concentrations above Daily Maximum Concentration

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

GWTP Effluent Biweekly Sampling - May/June 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6271-COMP 5/4/2015	LH18/24-SP650-6271-GRAB 5/4/2015	LH18/24-SP650-6276-COMP 5/18/2015	LH18/24-SP650-6276-GRAB 5/18/2015	LH18/24-SP650-6279-COMP 6/4/2015	LH18/24-SP650-6279-GRAB 6/4/2015	LH18/24-SP650-6283-COMP 6/15/2015	LH18/24-SP650-6283-GRAB 6/15/2015
Location Description:			GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Biweekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly.	GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Biweekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly.	GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Biweekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly.	GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Biweekly.	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly.
Metals (6010C)										
SELENIUM	mg/L	0.012	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Metals (6020A)										
LEAD	mg/L	0.0046	<0.001 U	<0.001 U	<0.001 U	<0.001 U	0.00127 J	<0.001 U	<0.001 U	<0.001 U
SILVER	mg/L	0.003	<0.001 U	0.00604	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U
Perchlorate (6850)										
PERCHLORATE	ug/L	13	<0.2 U	<0.2 U	264	100	1.91	0.854	0.619 J	4.35
Hexavalent Chromium (7196A)										
HEXAVALENT CHROMIUM	mg/L	0.124	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Volatile Organic Compounds (8260B)										
1,1,1,2-TETRACHLOROETHANE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	7230	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	216.9	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,1-DICHLOROETHANE	ug/L	14032	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
1,1-DICHLOROETHENE	ug/L	253	NA	<1 U	NA	<1 U	NA	<1 U	NA	<1 U
1,1-DICHLOROPROPENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		NA	<0.3 U	NA	<0.3 UJ	NA	<0.3 U	NA	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		NA	<1 U	NA	<1 U	NA	<1 U	NA	<1 U
1,2,4-TRICHLOROBENZENE	ug/L		NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L		NA	<2 U	NA	<2 UJ	NA	<2 U	NA	<2 U
1,2-DIBROMOETHANE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,2-DICHLOROBENZENE	ug/L		NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
1,2-DICHLOROETHANE	ug/L	181	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,3-DICHLOROBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
1,3-DICHLOROPROPANE	ug/L		NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U
1,4-DICHLOROBENZENE	ug/L		NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
2,2-DICHLOROPROPANE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
2-BUTANONE	ug/L		NA	<5 U	NA	<5 U	NA	<5 U	NA	<5 U

GWTP Effluent Biweekly Sampling - May/June 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6271-COMP 5/4/2015	LH18/24-SP650-6271-GRAB 5/4/2015	LH18/24-SP650-6276-COMP 5/18/2015	LH18/24-SP650-6276-GRAB 5/18/2015	LH18/24-SP650-6279-COMP 6/4/2015	LH18/24-SP650-6279-GRAB 6/4/2015	LH18/24-SP650-6283-COMP 6/15/2015	LH18/24-SP650-6283-GRAB 6/15/2015
2-CHLOROTOLUENE	ug/L		NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
2-HEXANONE	ug/L		NA	<5 U	NA	<5 U	NA	<5 U	NA	<5 U
4-CHLOROTOLUENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
4-METHYL-2-PENTANONE	ug/L		NA	<5 U	NA	<5 U	NA	<5 U	NA	<5 U
ACETONE	ug/L	2395	NA	<5 U	NA	<5 U	NA	<5 U	NA	<5 U
BENZENE	ug/L	181	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
BROMOBENZENE	ug/L		NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
BROMOCHLOROMETHANE	ug/L		NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U
BROMODICHLOROMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
BROMOFORM	ug/L		NA	<1 U	NA	<1 U	NA	<1 U	NA	<1 U
BROMOMETHANE	ug/L		NA	<1 UJ	NA	<1 U	NA	<1 U	NA	<1 U
CARBON DISULFIDE	ug/L		NA	<1 U	NA	1.48 J	NA	<1 U	NA	<1 U
CARBON TETRACHLORIDE	ug/L	181	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
CHLOROBENZENE	ug/L	47180	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
CHLOROETHANE	ug/L		NA	<1 U	NA	<1 U	NA	<1 U	NA	<1 U
CHLOROFORM	ug/L	3615	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
CHLOROMETHANE	ug/L		NA	<1 U	NA	<1 U	NA	<1 U	NA	<1 U
CIS-1,2-DICHLOROETHENE	ug/L		NA	1.24	NA	1.23	NA	1.05	NA	1.23
CIS-1,3-DICHLOROPROPENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
DIBROMOCHLOROMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
DIBROMOMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
ETHYLBENZENE	ug/L	57025	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
HEXACHLOROBUTADIENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
ISOPROPYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
M,P-XYLENE	ug/L	83.6	NA	<1 U	NA	<1 U	NA	<1 U	NA	<1 U
METHYLENE CHLORIDE	ug/L	1699	NA	<0.5 U	NA	0.462 J	NA	0.36 J	NA	0.252 J
NAPHTHALENE	ug/L		NA	<0.4 U	NA	<0.4 U	NA	<0.4 U	NA	<0.4 U
N-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
N-PROPYLBENZENE	ug/L		NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
O-XYLENE	ug/L	83.6	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
SEC-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
STYRENE	ug/L	5987	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U	NA	<0.25 U
TERT-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
TETRACHLOROETHENE	ug/L	180.7	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
TOLUENE	ug/L	4189	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		NA	<1 U	NA	<1 U	NA	<1 U	NA	<1 U
TRICHLOROETHENE	ug/L	181	NA	1.24	NA	1.4	NA	1.19	NA	1.51
TRICHLOROFLUOROMETHANE	ug/L		NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U
VINYL CHLORIDE	ug/L	72	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U	NA	<0.5 U

GWTP Effluent Biweekly Sampling - May/June 2015

Location ID: / Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6271-COMP 5/4/2015	LH18/24-SP650-6271-GRAB 5/4/2015	LH18/24-SP650-6276-COMP 5/18/2015	LH18/24-SP650-6276-GRAB 5/18/2015	LH18/24-SP650-6279-COMP 6/4/2015	LH18/24-SP650-6279-GRAB 6/4/2015	LH18/24-SP650-6283-COMP 6/15/2015	LH18/24-SP650-6283-GRAB 6/15/2015
Anions (9056)										
CHLORIDE	mg/L		509	530	446	448	410	431	475	484
SULFATE	mg/L		52.5	44	32.9	31.7	34.3	33.1	33.2	32.3

Blue Highlighting Indicates concentrations above MCL/MSC

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

NA - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

GWTP Effluent Monthly Sampling - May 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6273-GRAB 5/13/2015
Location Description:			GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Monthly.
Metals (6010C)			
ALUMINUM	mg/L	1.644	<0.1 U
IRON	mg/L	2.395	0.674
SELENIUM	mg/L	0.012	0.00505 J
Metals (6020A)			
ANTIMONY	mg/L		0.000544 J
ARSENIC	mg/L	0.722	0.00319
BARIUM	mg/L	2	0.196
CADMIUM	mg/L	0.0034	0.000327 J
CHROMIUM	mg/L	0.752	0.00865
COBALT	mg/L	11.495	0.0078
LEAD	mg/L	0.0046	<0.001 U
MANGANESE	mg/L	15.494	0.123 B
NICKEL	mg/L	0.184	0.0195
SILVER	mg/L	0.003	<0.001 U
THALLIUM	mg/L		<0.0002 U
VANADIUM	mg/L	3.592	0.00118 J
ZINC	mg/L	0.31	0.109

B - Blank contamination: The analyte was found in an associated blank as well as in the sample.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

U - Undetected: The analyte was analyzed for, but not detected.

GWTP Influent Monthly Sampling - May 2015

Location ID: Sample Date:	Units	LH18/24-SP140-7273-GRAB 5/13/2015
Location Description:		GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Quarterly.
Perchlorate (6850)		
PERCHLORATE	ug/L	6140
Volatile Organic Compounds (8260B)		
1,1,1,2-TETRACHLOROETHANE	ug/L	<12.5 U
1,1,1-TRICHLOROETHANE	ug/L	<12.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	<10 U
1,1,2-TRICHLOROETHANE	ug/L	<12.5 U
1,1-DICHLOROETHANE	ug/L	3.87 J
1,1-DICHLOROETHENE	ug/L	34.9 J
1,1-DICHLOROPROPENE	ug/L	<12.5 U
1,2,3-TRICHLOROBENZENE	ug/L	<7.5 U
1,2,3-TRICHLOROPROPANE	ug/L	<25 U
1,2,4-TRICHLOROBENZENE	ug/L	<10 U
1,2,4-TRIMETHYLBENZENE	ug/L	<12.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	<50 U
1,2-DIBROMOETHANE	ug/L	<12.5 U
1,2-DICHLOROBENZENE	ug/L	<6.26 U
1,2-DICHLOROETHANE	ug/L	34.9
1,2-DICHLOROPROPANE	ug/L	<10 U
1,3,5-TRIMETHYLBENZENE	ug/L	<12.5 U
1,3-DICHLOROBENZENE	ug/L	<12.5 U
1,3-DICHLOROPROPANE	ug/L	<10 U
1,4-DICHLOROBENZENE	ug/L	<6.26 U
2,2-DICHLOROPROPANE	ug/L	<12.5 U
2-BUTANONE	ug/L	<125 U
2-CHLOROTOLUENE	ug/L	<6.26 U
2-HEXANONE	ug/L	<125 U
4-CHLOROTOLUENE	ug/L	<12.5 U
4-METHYL-2-PENTANONE	ug/L	<125 U
ACETONE	ug/L	<125 U
BENZENE	ug/L	<6.26 U
BROMOBENZENE	ug/L	<6.26 U
BROMOCHLOROMETHANE	ug/L	<10 U
BROMODICHLOROMETHANE	ug/L	<12.5 U
BROMOFORM	ug/L	<25 U
BROMOMETHANE	ug/L	<25 U
CARBON DISULFIDE	ug/L	<25 U
CARBON TETRACHLORIDE	ug/L	<12.5 U
CHLOROBENZENE	ug/L	<6.26 U
CHLOROETHANE	ug/L	<25 U
CHLOROFORM	ug/L	8.58 J
CHLOROMETHANE	ug/L	<25 U
CIS-1,2-DICHLOROETHENE	ug/L	1450

GWTP Influent Monthly Sampling - May 2015

Location ID: Sample Date:	Units	LH18/24-SP140-7273-GRAB 5/13/2015
CIS-1,3-DICHLOROPROPENE	ug/L	<12.5 U
DIBROMOCHLOROMETHANE	ug/L	<12.5 U
DIBROMOMETHANE	ug/L	<12.5 U
DICHLORODIFLUOROMETHANE	ug/L	<12.5 U
ETHYLBENZENE	ug/L	<12.5 U
HEXACHLOROBUTADIENE	ug/L	<12.5 U
ISOPROPYLBENZENE	ug/L	<12.5 U
M,P-XYLENE	ug/L	<25 U
METHYLENE CHLORIDE	ug/L	13.9 J
NAPHTHALENE	ug/L	<10 U
N-BUTYLBENZENE	ug/L	<12.5 U
N-PROPYLBENZENE	ug/L	<6.26 U
O-XYLENE	ug/L	<12.5 U
P-ISOPROPYLTOLUENE	ug/L	<12.5 U
SEC-BUTYLBENZENE	ug/L	<12.5 U
STYRENE	ug/L	<6.26 U
TERT-BUTYLBENZENE	ug/L	<12.5 U
TETRACHLOROETHENE	ug/L	16.3 J
TOLUENE	ug/L	<12.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	6.64 J
TRANS-1,3-DICHLOROPROPENE	ug/L	<25 U
TRICHLOROETHENE	ug/L	5440
TRICHLOROFLUOROMETHANE	ug/L	<12.5 U
VINYL CHLORIDE	ug/L	17.4 J

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

NA - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

GWTP Effluent Quarterly Sampling - June 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6285-COMP 6/22/2015	LH18/24-SP650-6285-GRAB 6/22/2015
Location Description:			GWTP – Collected from holding jar accumulating aliquots of discharge from a TK-650 effluent spigot every few hours. Sampled Quarterly.	GWTP – Collected from a spigot on the discharge of effluent TK-650. Sampled Quarterly.
Oil and Grease (1664A)				
OIL & GREASE	mg/L	15	2.4 J	2.8 J
Chemical Oxygen Demand (410.4)				
CHEMICAL OXYGEN DEMAND	mg/L	200	20.4 J	36.6 J
Metals (6010C)				
ALUMINUM	mg/L	1.644	<0.1 U	<0.1 U
IRON	mg/L	2.395	0.227	0.293
SELENIUM	mg/L	0.012	<0.01 U	<0.01 U
Metals (6020A)				
ANTIMONY	mg/L		<0.001 U	<0.001 U
ARSENIC	mg/L	0.722	0.00213	0.00228
BARIUM	mg/L	2	0.355	0.367
CADMIUM	mg/L	0.0034	<0.0006 U	<0.0006 U
CHROMIUM	mg/L	0.752	0.00199 J	0.00256 J
COBALT	mg/L	11.495	0.00122 J	0.0014 J
LEAD	mg/L	0.0046	<0.001 U	<0.001 U
MANGANESE	mg/L	15.494	0.096	0.103
NICKEL	mg/L	0.184	0.00347 J	0.0037 J
SILVER	mg/L	0.003	<0.001 U	<0.001 U
THALLIUM	mg/L		<0.0002 U	<0.0002 U
VANADIUM	mg/L	3.592	<0.001 U	<0.001 U
ZINC	mg/L	0.31	0.0171 J	0.0223 J
Perchlorate (6850)				
PERCHLORATE	ug/L	13	6.07	13.9
Hexavalent Chromium (7196A)				
HEXAVALENT CHROMIUM	mg/L	0.124	<0.01 UJ	<0.01 U
Volatile Organic Compounds (8260B)				
1,1,1,2-TETRACHLOROETHANE	ug/L		NA	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	7230	NA	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		NA	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	216.9	NA	<0.5 U
1,1-DICHLOROETHANE	ug/L	14032	NA	<0.25 U
1,1-DICHLOROETHENE	ug/L	253	NA	<1 U
1,1-DICHLOROPROPENE	ug/L		NA	<0.5 U

GWTP Effluent Quarterly Sampling - June 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6285-COMP 6/22/2015	LH18/24-SP650-6285-GRAB 6/22/2015
1,2,3-TRICHLOROBENZENE	ug/L		NA	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		NA	<1 U
1,2,4-TRICHLOROBENZENE	ug/L		NA	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		NA	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L		NA	<2 U
1,2-DIBROMOETHANE	ug/L		NA	<0.5 U
1,2-DICHLOROBENZENE	ug/L		NA	<0.25 U
1,2-DICHLOROETHANE	ug/L	181	NA	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	NA	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		NA	<0.5 U
1,3-DICHLOROBENZENE	ug/L		NA	<0.5 U
1,3-DICHLOROPROPANE	ug/L		NA	<0.4 U
1,4-DICHLOROBENZENE	ug/L		NA	<0.25 U
2,2-DICHLOROPROPANE	ug/L		NA	<0.5 U
2-BUTANONE	ug/L		NA	<5 U
2-CHLOROTOLUENE	ug/L		NA	<0.25 U
2-HEXANONE	ug/L		NA	<5 U
4-CHLOROTOLUENE	ug/L		NA	<0.5 U
4-METHYL-2-PENTANONE	ug/L		NA	<5 U
ACETONE	ug/L	2395	NA	<5 U
BENZENE	ug/L	181	NA	<0.25 U
BROMOBENZENE	ug/L		NA	<0.25 U
BROMOCHLOROMETHANE	ug/L		NA	<0.4 U
BROMODICHLOROMETHANE	ug/L		NA	<0.5 U
BROMOFORM	ug/L		NA	<1 U
BROMOMETHANE	ug/L		NA	<1 U
CARBON DISULFIDE	ug/L		NA	<1 U
CARBON TETRACHLORIDE	ug/L	181	NA	<0.5 U
CHLOROBENZENE	ug/L	47180	NA	<0.25 U
CHLOROETHANE	ug/L		NA	<1 U
CHLOROFORM	ug/L	3615	NA	<0.25 U
CHLOROMETHANE	ug/L		NA	<1 U
CIS-1,2-DICHLOROETHENE	ug/L		NA	1.14
CIS-1,3-DICHLOROPROPENE	ug/L		NA	<0.5 U
DIBROMOCHLOROMETHANE	ug/L		NA	<0.5 U
DIBROMOMETHANE	ug/L		NA	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		NA	<0.5 U
ETHYLBENZENE	ug/L	57025	NA	<0.5 U
HEXACHLOROBUTADIENE	ug/L		NA	<0.5 U
ISOPROPYLBENZENE	ug/L		NA	<0.5 U
M,P-XYLENE	ug/L	83.6	NA	<1 U
METHYLENE CHLORIDE	ug/L	1699	NA	<0.5 U
NAPHTHALENE	ug/L		NA	<0.4 U
N-BUTYLBENZENE	ug/L		NA	<0.5 U
N-PROPYLBENZENE	ug/L		NA	<0.25 U
O-XYLENE	ug/L	83.6	NA	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		NA	<0.5 U
SEC-BUTYLBENZENE	ug/L		NA	<0.5 U
STYRENE	ug/L	5987	NA	<0.25 U
TERT-BUTYLBENZENE	ug/L		NA	<0.5 U
TETRACHLOROETHENE	ug/L	180.7	NA	<0.5 U

GWTP Effluent Quarterly Sampling - June 2015

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6285-COMP 6/22/2015	LH18/24-SP650-6285-GRAB 6/22/2015
TOLUENE	ug/L	4189	NA	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L		NA	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		NA	<1 U
TRICHLOROETHENE	ug/L	181	NA	1.51
TRICHLOROFLUOROMETHANE	ug/L		NA	<0.5 U
VINYL CHLORIDE	ug/L	72	NA	<0.5 U
Anions (9056)				
CHLORIDE	mg/L		428	451
SULFATE	mg/L		26.5	27.3

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: Sample Date:	Units	MCL/ MSC	109-060915 6/9/2015	120-061115 6/11/2015	126-061015 6/10/2015	126F-061015 6/10/2015	129-060915 6/9/2015	130-061715 6/17/2015	130FD-061715 6/17/2015	18CPTMW01SW-061215 6/12/2015	18CPTMW03SW-060815 6/8/2015	18CPTMW04-061015 6/10/2015	18CPTMW04SW-061015 6/10/2015	18CPTMW06-061215 6/12/2015	18CPTMW07-061615 6/16/2015	18CPTMW08DW-060915 6/9/2015
Location Description:			Site 18/24 – NE, just inside the fence line. Sampled Semi-Annually	Site 18/24 – W, insdie the fence line, outer region Filtered Sampled Annualy	Site 18/24 – SE, on right side of road as you turn toward Site 18/24 entrance Sampled Once	Site 18/24 – SE, on right side of road as you turn toward Site 18/24 entrance Sampled Once	Site 18/24 – SW, inside the fence line, outer region Sampled Annually	Site 18/24 – SW, outside the fence line, right next to Site 17 boarder Sampled Once	Site 18/24 – SW, outside the fence line, right next to Site 17 boarder Sampled Once	Site 18/24 – NE, inside the fence line, middle region Shallow Wilcox Sampled Semi-Annualy	Site 18/24 - S, inside the fence line, Shallow Wilcox.	Site 18/24 – NW, inside the fence line, middle region Sampled Semi-Annualy	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – SSE, inside the fence line, middle region. Sampled Semi-Annually	Site 18/24 – NNE, inside the fence line, outter region. Sampled Semi-Annually	Site 18/24 – N, inside the fence line, outter region Deep Wilcox Sampled semiannually
Metals (6010C)																
ALUMINUM	mg/L	100	NA	NA	NA	0.0699 J	0.386	NA	NA	<0.1 U	1.12	NA	NA	NA	NA	NA
BERYLLIUM	mg/L	0.004	NA	NA	NA	<0.01 U	<0.01 U	NA	NA	<0.01 U	<0.01 U	NA	NA	NA	NA	NA
CALCIUM	mg/L		NA	NA	NA	293	2.92	NA	NA	32.8	11.5	NA	NA	NA	NA	NA
IRON	mg/L		NA	NA	NA	0.366	0.623	NA	NA	49.1	0.202	NA	NA	NA	NA	NA
MAGNESIUM	mg/L		NA	NA	NA	233	2.28	NA	NA	20.1	<0.5 U	NA	NA	NA	NA	NA
POTASSIUM	mg/L		NA	NA	NA	3.44	<1 U	NA	NA	3.36	375	NA	NA	NA	NA	NA
SELENIUM	mg/L	0.05	NA	NA	NA	<0.01 U	<0.01 UJ	NA	NA	<0.01 U	<0.01 UJ	NA	NA	NA	NA	NA
SODIUM	mg/L		NA	NA	NA	850	60.7	NA	NA	99	282	NA	NA	NA	NA	NA
Metals (6020A)																
ANTIMONY	mg/L	0.006	NA	NA	NA	<0.001 U	<0.001 U	NA	NA	<0.001 U	<0.001 U	NA	NA	NA	NA	NA
ARSENIC	mg/L	0.01	NA	NA	NA	0.0152	0.000884 J	NA	NA	0.0194	0.00941	NA	NA	NA	NA	NA
BARIUM	mg/L	2	NA	NA	NA	8.89	0.0795	NA	NA	0.93	0.0831	NA	NA	NA	NA	NA
CADMIUM	mg/L	0.005	NA	NA	NA	0.000839 J	<0.0006 U	NA	NA	<0.0006 U	<0.0006 U	NA	NA	NA	NA	NA
CHROMIUM	mg/L	0.1	NA	NA	NA	0.00278 J	0.0025 J	NA	NA	<0.002 U	0.0114	NA	NA	NA	NA	NA
COBALT	mg/L	6.1	NA	NA	NA	0.0996	0.00147 J	NA	NA	0.00204	0.00141 J	NA	NA	NA	NA	NA
COPPER	mg/L	1.3	NA	NA	NA	0.00434	0.00136 J	NA	NA	<0.002 U	0.00108 J	NA	NA	NA	NA	NA
LEAD	mg/L	0.015	NA	NA	NA	<0.001 U	0.000602 J	NA	NA	<0.001 U	<0.001 U	NA	NA	NA	NA	NA
MANGANESE	mg/L	14	NA	NA	NA	3.38	0.0388	NA	NA	0.594	0.0064	NA	NA	NA	NA	NA
NICKEL	mg/L	2	NA	NA	NA	0.135	0.00257 J	NA	NA	0.00336 J	0.00716 J	NA	NA	NA	NA	NA
SILVER	mg/L	0.51	NA	NA	NA	<0.001 U	<0.001 U	NA	NA	<0.001 U	<0.001 U	NA	NA	NA	NA	NA
THALLIUM	mg/L	0.002	NA	NA	NA	<0.0002 U	<0.0002 U	NA	NA	<0.0002 U	<0.0002 U	NA	NA	NA	NA	NA
VANADIUM	mg/L	0.72	NA	NA	NA	<0.05 U	0.0012 J	NA	NA	<0.001 U	0.00337	NA	NA	NA	NA	NA
ZINC	mg/L	31	NA	NA	NA	0.111	<0.025 U	NA	NA	0.0136 J	<0.025 U	NA	NA	NA	NA	NA
Perchlorate (6850)																
PERCHLORATE	ug/L	72	3220	82200	1.52 J	NA	1570	37.8	38.1	21.8	1580	280	81.8	1.22 J	12.8	144
Mercury (7470A)																
MERCURY	mg/L	0.002	NA	NA	NA	<0.0002 U	<0.0002 U	NA	NA	<0.0002 U	<0.0002 U	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
1,1,1-TRICHLOROETHANE	ug/L	200	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<2 U	<80 U	<0.4 U	NA	<1 U	<0.4 U	<0.4 U	<20 U	<1 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA
1,1,2-TRICHLOROETHANE	ug/L	5	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
1,1-DICHLOROETHANE	ug/L	10000	1.08 J	33.1 J	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	<12.5 U	0.598 J	0.26 J	<0.25 U	<0.25 U	<0.25 U	NA
1,1-DICHLOROETHENE	ug/L	7	2.77 J	223 J	<1 U	NA	<2.5 U	<1 U	<1 U	<50 U	<2.5 U	8.11	<1 U	<1 U	<1 U	NA
1,1-DICHLOROPROPENE	ug/L	2.9	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
1,2,3-TRICHLOROBENZENE	ug/L	310	<1.5 U	<60 U	<0.3 U	NA	<0.75 U	<0.3 U	<0.3 U	<15 U	<0.75 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	NA
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<5 U	<200 U	<1 U	NA	<2.5 U	<1 U	<1 U	<50 U	<2.5 U	<1 U	<1 U	<1 U	<1 U	NA
1,2,4-TRICHLOROBENZENE	ug/L	70	<2 U	<80 U	<0.4 U	NA	<1 U	<0.4 U	<0.4 U	<20 U	<1 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<10 U	<400 U	<2 U	NA	<5 U	<2 U	<2 U	<100 U	<5 U	<2 U	<2 U	<2 U	<2 U	NA
1,2-DIBROMOETHANE	ug/L	0.005	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
1,2-DICHLOROBENZENE	ug/L	600	<1.25 U	<50 U	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	<12.5 U	<0.626 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA
1,2-DICHLOROETHANE	ug/L	5	<2.5 U	91.9 J	<0.5 U	NA	4.73	<0.5 U	<0.5 U	<25 U	47.5	1.07	<0.5 U	<0.5 U	<0.5 U	NA
1,2-DICHLOROPROPANE	ug/L	5	<2 U	<80 U	<0.4 U	NA	<1 U	<0.4 U	<0.4 U	<20 U	<1 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
1,3-DICHLOROBENZENE	ug/L	3100	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
1,3-DICHLOROPROPANE	ug/L	29	<2 U	<80 U	<0.4 U	NA	<1 U	<0.4 U	<0.4 U	<20 U	<1 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA
1,4-DICHLOROBENZENE	ug/L	75	<1.25 U	<50 U	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	<12.5 U	<0.626 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA
2,2-DICHLOROPROPANE	ug/L	42	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
2-BUTANONE	ug/L	61000	<25 U	<1000 U	<5 U	NA	<12.5 U	<5 U	<5 U	<250 U	<12.5 U	<5 U	<5 U	<5 U	<5 U	NA
2-CHLOROTOLUENE	ug/L	2000	<1.25 U	<50 U	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	<12.5 U	<0.626 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA
2-HEXANONE	ug/L	6100	<25 U	<1000 U	<5 U	NA	<12.5 U	<5 U	<5 U	<250 U	<12.5 U	<5 U	<5 U	<5 U	<5 U	NA

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: / Sample Date:	Units	MCL/ MSC	109-060915 6/9/2015	120-061115 6/11/2015	126-061015 6/10/2015	126F-061015 6/10/2015	129-060915 6/9/2015	130-061715 6/17/2015	130FD-061715 6/17/2015	18CPTMW01SW-061215 6/12/2015	18CPTMW03SW-060815 6/8/2015	18CPTMW04-061015 6/10/2015	18CPTMW04SW-061015 6/10/2015	18CPTMW06-061215 6/12/2015	18CPTMW07-061615 6/16/2015	18CPTMW08DW-060915 6/9/2015
4-CHLOROTOLUENE	ug/L	2000	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
4-METHYL-2-PENTANONE	ug/L	8200	<25 UJ	<1000 U	<5 U	NA	<12.5 U	<5 U	<5 U	<250 U	<12.5 UJ	<5 U	<5 UJ	<5 U	<5 U	NA
ACETONE	ug/L	92000	<25 U	<1000 U	<5 U	NA	<12.5 U	<5 U	<5 U	<250 U	49	<5 U	<5 U	3 J	<5 U	NA
BENZENE	ug/L	5	<1.25 U	<50 U	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	7.44 J	9.5	0.327 J	<0.25 U	0.268 J	<0.25 U	NA
BROMOBENZENE	ug/L	2000	<1.25 U	<50 U	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	<12.5 U	<0.626 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA
BROMOCHLOROMETHANE	ug/L	4100	<2 U	<80 U	<0.4 U	NA	<1 U	<0.4 U	<0.4 U	14.1 J	<1 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA
BROMODICHLOROMETHANE	ug/L	4.6	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
BROMOFORM	ug/L	36	<5 U	<200 U	<1 U	NA	<2.5 U	<1 U	<1 U	<50 U	<2.5 U	<1 U	<1 U	<1 U	<1 U	NA
BROMOMETHANE	ug/L	140	<5 U	<200 U	<1 UJ	NA	<2.5 U	<1 UJ	<1 UJ	<50 U	<2.5 UJ	<1 UJ	<1 UJ	<1 U	<1 UJ	NA
CARBON DISULFIDE	ug/L	10000	<5 U	<200 U	<1 U	NA	<2.5 U	<1 U	<1 U	<50 U	<2.5 U	<1 U	<1 U	<1 U	<1 U	NA
CARBON TETRACHLORIDE	ug/L	5	<2.5 U	<100 U	<0.5 U	NA	1.16 J	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
CHLOROBENZENE	ug/L	100	<1.25 U	<50 U	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	<12.5 U	<0.626 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA
CHLOROETHANE	ug/L	41000	<5 U	<200 U	<1 U	NA	<2.5 U	<1 U	<1 U	<50 U	<2.5 U	<1 U	<1 U	<1 U	<1 U	NA
CHLOROFORM	ug/L	1000	2.09 J	95.8 J	<0.25 U	NA	3.68	<0.25 U	<0.25 U	<12.5 U	<0.626 U	1.71	<0.25 U	<0.25 U	<0.25 U	NA
CHLOROMETHANE	ug/L	220	<5 U	<200 U	<1 U	NA	<2.5 U	<1 U	<1 U	<50 U	<2.5 U	<1 U	<1 U	<1 U	<1 U	NA
CIS-1,2-DICHLOROETHENE	ug/L	70	149	2930	<0.5 U	NA	4.15	<0.5 U	<0.5 U	12.8 J	73.4	38.7	<0.5 U	0.72 J	<0.5 U	NA
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
DIBROMOCHLOROMETHANE	ug/L	34	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
DIBROMOMETHANE	ug/L	380	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
DICHLORODIFLUOROMETHANE	ug/L	20000	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	7.04 J	<0.5 U	2.41	<0.5 U	<0.5 U	NA
ETHYLBENZENE	ug/L	700	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
HEXACHLOROBUTADIENE	ug/L	20	<2.5 U	<100 U	<0.5 U	NA	<1.25 UJ	<0.5 U	<0.5 U	<25 U	<1.25 UJ	<0.5 U	<0.5 UJ	<0.5 U	<0.5 U	NA
ISOPROPYLBENZENE	ug/L	1000	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
M,P-XYLENE	ug/L	10000	<5 U	<200 U	<1 U	NA	<2.5 U	<1 U	<1 U	<50 U	<2.5 U	<1 U	<1 U	<1 U	<1 U	NA
METHYLENE CHLORIDE	ug/L	5	<2.5 U	125 J	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	11000	13.6	<0.5 U	<0.5 U	42.8	<0.5 U	NA
NAPHTHALENE	ug/L	2000	<2 U	<80 U	<0.4 U	NA	<1 U	<0.4 U	<0.4 U	<20 U	<1 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA
N-BUTYLBENZENE	ug/L	4100	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
N-PROPYLBENZENE	ug/L	4100	<1.25 U	<50 U	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	<12.5 U	<0.626 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA
O-XYLENE	ug/L	10000	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
P-ISOPROPYLTOLUENE	ug/L	10000	<2.5 U	<100 U	0.395 J	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
SEC-BUTYLBENZENE	ug/L	4100	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
STYRENE	ug/L	100	<1.25 U	<50 U	<0.25 U	NA	<0.626 U	<0.25 U	<0.25 U	<12.5 U	<0.626 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA
TERT-BUTYLBENZENE	ug/L	4100	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
TETRACHLOROETHENE	ug/L	5	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	0.911 J	<0.5 U	<0.5 U	<0.5 U	NA
TOLUENE	ug/L	1000	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	1.32 J	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA
TRANS-1,2-DICHLOROETHENE	ug/L	100	1.56 J	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	4.54	0.415 J	<0.5 U	<0.5 U	<0.5 U	NA
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<5 U	<200 U	<1 U	NA	<2.5 U	<1 U	<1 U	<50 U	<2.5 U	<1 U	<1 U	<1 U	<1 U	NA
TRICHLOROETHENE	ug/L	5	755	27900	<0.5 U	NA	509	2.18	1.94	473	561	1110	0.889 J	3.34	2.29	NA
TRICHLOROFLUOROMETHANE	ug/L	31000	<2.5 U	<100 U	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	1.75	<0.5 U	<0.5 U	<0.5 U	NA
VINYL CHLORIDE	ug/L	2	<2.5 U	165 J	<0.5 U	NA	<1.25 U	<0.5 U	<0.5 U	<25 U	<1.25 U	1.62	<0.5 U	<0.5 U	<0.5 U	NA

Location IDs containing "F" indicate sample filtered in the field with 10 micron filter.

Location IDs containing "FD" indicate duplicate samples.

Blue Highlighting Indicates Analyte Detected Above Regulatory Limit

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: Sample Date:	Units	MCL/ MSC	18CPTMW08SW-060915 6/9/2015	18CPTMW10SW-061915 6/19/2015	18CPTMW12SW-061815 6/18/2015	18CPTMW14-062215 6/22/2015	18CPTMW15-061915 6/19/2015	18CPTMW16-062315 6/23/2015	18CPTMW18-062215 6/22/2015	18CPTMW18FD-062215 6/22/2015	18CPTMW19-061515 6/15/2015	18CPTMW22SW-060915 6/9/2015	18CPTMW23-061715 6/17/2015	18CPTMW24-061615 6/16/2015	18WW03-061215 6/12/2015	18WW03FD-061215 6/12/2015
Location Description:			Site 18/24 – N, inside the fence line, outter region. Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – WSW, outside the fence line, along the outter loop road. Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the road surrounding the fence line Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – SE, outside the fence line, along the road surrounding the fence line Sampled Semi-annually	Site 18/24 – NW, outside the fence line. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line, near Harrison Bayou. Sampled Semi-Annually	Site 18/24 – NE, outside the fence line, in the woods Sampled semiannually	Site 18/24 – NE, outside the fence line, in the woods Sampled semiannually	Site 18/24 – N, outside the fence line. Sampled Semi-Annually	Site 18/24 - Central, inside the fence line, Shallow Wilcox.	Site 18/24 – WNW, outside the fence line, near the road surrounding the fence line. Sampled Semi-Annually	Site 18/24 – E, outside the fence line, on the road surrounding the fence line Sampled Semi-Annually	Site 18/24 – E, outside the fence line. Sampled Annually	Site 18/24 – E, outside the fence line. Sampled Annually
Metals (6010C)																
ALUMINUM	mg/L	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.431	NA	NA	NA	NA
BERYLLIUM	mg/L	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.01 U	NA	NA	NA	NA
CALCIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	193	NA	NA	NA	NA
IRON	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1 U	NA	NA	NA	NA
MAGNESIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.5 U	NA	NA	NA	NA
POTASSIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	121	NA	NA	NA	NA
SELENIUM	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.01 UJ	NA	NA	NA	NA
SODIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	283	NA	NA	NA	NA
Metals (6020A)																
ANTIMONY	mg/L	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.001 U	NA	NA	NA	NA
ARSENIC	mg/L	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00644	NA	NA	NA	NA
BARIUM	mg/L	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21	NA	NA	NA	NA
CADMIUM	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0006 U	NA	NA	NA	NA
CHROMIUM	mg/L	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0569	NA	NA	NA	NA
COBALT	mg/L	6.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.001 U	NA	NA	NA	NA
COPPER	mg/L	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0021 J	NA	NA	NA	NA
LEAD	mg/L	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.001 U	NA	NA	NA	NA
MANGANESE	mg/L	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0012 J	NA	NA	NA	NA
NICKEL	mg/L	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0077 J	NA	NA	NA	NA
SILVER	mg/L	0.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.001 U	NA	NA	NA	NA
THALLIUM	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0002 U	NA	NA	NA	NA
VANADIUM	mg/L	0.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00574	NA	NA	NA	NA
ZINC	mg/L	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.025 U	NA	NA	NA	NA
Perchlorate (6850)																
PERCHLORATE	ug/L	72	43800	0.594	30.9	99.5	506	0.167 J	<2 U	<2 U	6.87	7940	5500	101	6.05	6.42
Mercury (7470A)																
MERCURY	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0002 U	NA	NA	NA	NA
Volatile Organic Compounds (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	1.23	<0.5 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	4.32	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	1.29	<0.25 U	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	1.14 J	<1 U	<1 U	1.53 J	<1 U	NA	<1 U	<1 U	<1 U	<1 U	13.3	<1 U	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	NA	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	<2 U	NA	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	1.91	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	299	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	0.312 J	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	<5 U	<5 U	<5 U	NA	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	<5 U	<5 U	<5 U	<5 U	NA	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: / Sample Date:	Units	MCL/ MSC	18CPTMW08SW-060915 6/9/2015	18CPTMW10SW-061915 6/19/2015	18CPTMW12SW-061815 6/18/2015	18CPTMW14-062215 6/22/2015	18CPTMW15-061915 6/19/2015	18CPTMW16-062315 6/23/2015	18CPTMW18-062215 6/22/2015	18CPTMW18FD-062215 6/22/2015	18CPTMW19-061515 6/15/2015	18CPTMW22SW-060915 6/9/2015	18CPTMW23-061715 6/17/2015	18CPTMW24-061615 6/16/2015	18WW03-061215 6/12/2015	18WW03FD-061215 6/12/2015
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 UJ	<5 U	<5 U	<5 U	<5 U	NA	<5 U	<5 U	<5 U	<5 UJ	<5 U	<5 U	<5 U	<5 U
ACETONE	ug/L	92000	<5 U	<5 U	<5 U	<5 U	<5 U	NA	<5 U	<5 U	<5 U	12.6	<5 U	<5 U	<5 U	<5 U
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	1.6	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	2.37	<0.25 U	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 UJ	<1 UJ	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	NA	0.512 J	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CHLOROFORM	ug/L	1000	0.617 J	<0.25 U	<0.25 U	5.95	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	7.36	<0.25 U	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	17.8	<0.5 U	<0.5 U	205	0.611 J	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	262	30	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U	2.51	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	3.79	0.359 J	<0.5 U	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	0.297 J	<0.5 U	<0.5 U	1.05	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	1.66	<0.5 U	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	0.287 J	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	5.11	<0.5 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U	<1 U	<1 U	NA	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	73.5	<0.5 U	1.19	365 J	3.24	NA	<0.5 U	<0.5 U	<0.5 U	0.343 J	5340	16	<0.5 U	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U	0.276 J	<0.5 U	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	10.2	<0.5 U	<0.5 U	<0.5 U	0.417 J	NA	<0.5 U	<0.5 U	<0.5 U	<0.5 U	6.27	<0.5 U	<0.5 U	<0.5 U

Location IDs containing "F" indicate sample filtered in the field with 10 micron filter.

Location IDs containing "FD" indicate duplicate samples.

Blue Highlighting Indicates Analyte Detected Above Regulatory Limit

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: / Sample Date:	Units	MCL/ MSC	18WW06-061715 6/17/2015	18WW07-061115 6/11/2015	18WW08-061615 6/16/2015	18WW09-061615 6/16/2015	18WW18-061815 6/18/2015	18WW18FD-061815 6/18/2015	18WW22-061915 6/19/2015	18WW24-061815 6/18/2015	AWD1-061015 6/10/2015	AWD2-061115 6/11/2015	AWD3-060815 6/8/2015	AWD4-061615 6/16/2015	AWD4F-061615 6/16/2015	C01-061015 6/10/2015	C03-061815 6/18/2015
Location Description:			Site 18/24 – W, just outside the fence line. Sampled Annually	Site 18/24 – NNW, outside the fence line Sampled Annually	Site 18/24 – NNW, outside the fence line. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line, near Harrison Bayou. Sampled Annually	Site 18/24 – NE, outside the fence line, by the outer loop road. Sampled Semi-Annually	Site 18/24 – NE, outside the fence line, by the outer loop road. Sampled Semi-Annually	Site 18/24 – NNE, outside the fence line, on the road heading north Sampled Semi-annually	Site 18/24 – W, along Harrison Bayou, near 18CPTMW23. Sampling frequency TBD.	Site 18/24 – W, just inside the fence line. Sampled Semi-Annually	Site 18/24 – WNW, inside the fence line.	Site 18/24 – SW, inside the fence line. Sampled Annually	Site 18/24 – NNW, outside the fence line, along the perimeter road.	Site 18/24 – NNW, outside the fence line, along the perimeter road.	LHAAP-18/24 - S, outside containment along S side of road leading to GWTP.	Site 18/24 – NE, outside the fence line, along the outer loop road Sampled Annually
Metals (6010C)																	
ALUMINUM	mg/L	100	NA	NA	NA	<0.1 U	NA	NA	NA	0.167 J	1.19	2.15	0.513	NA	<0.1 U	NA	NA
BERYLLIUM	mg/L	0.004	NA	NA	NA	<0.01 U	NA	NA	NA	<0.01 U	<0.01 U	<0.01 U	<0.01 U	NA	<0.01 U	NA	NA
CALCIUM	mg/L		NA	NA	NA	16.4	NA	NA	NA	103	6.3	25.4	0.847	NA	23.9	NA	NA
IRON	mg/L		NA	NA	NA	30.3	NA	NA	NA	<0.1 U	9.07	3.72	0.801	NA	3.5	NA	NA
MAGNESIUM	mg/L		NA	NA	NA	9.23	NA	NA	NA	87.9	7.1	32.2	0.547 J	NA	22.7	NA	NA
POTASSIUM	mg/L		NA	NA	NA	2.11	NA	NA	NA	1.45 J	5.1	0.642 J	0.952 J	NA	1.75 J	NA	NA
SELENIUM	mg/L	0.05	NA	NA	NA	<0.01 U	NA	NA	NA	<0.01 U	<0.01 U	<0.01 U	0.00538 J	NA	<0.01 U	NA	NA
SODIUM	mg/L		NA	NA	NA	51	NA	NA	NA	1270	126	61.3	26.8	NA	145	NA	NA
Metals (6020A)																	
ANTIMONY	mg/L	0.006	NA	NA	NA	<0.001 U	NA	NA	NA	<0.001 U	0.00274	<0.001 U	<0.001 U	NA	<0.001 U	NA	NA
ARSENIC	mg/L	0.01	NA	NA	NA	0.00159 J	NA	NA	NA	0.0146	0.0278	0.00178 J	<0.001 U	NA	0.00162 J	NA	NA
BARIUM	mg/L	2	NA	NA	NA	0.222	NA	NA	NA	0.0322	0.63	0.95	0.0472	NA	0.778	NA	NA
CADMIUM	mg/L	0.005	NA	NA	NA	<0.0006 U	NA	NA	NA	<0.0006 U	0.000381 J	0.000472 J	<0.0006 U	NA	0.00064 J	NA	NA
CHROMIUM	mg/L	0.1	NA	NA	NA	0.00342 J	NA	NA	NA	<0.002 U	0.0375	0.103	0.115	NA	0.432	NA	NA
COBALT	mg/L	6.1	NA	NA	NA	0.00071 J	NA	NA	NA	0.031	0.0174	0.00962	<0.001 U	NA	0.0465	NA	NA
COPPER	mg/L	1.3	NA	NA	NA	<0.002 U	NA	NA	NA	0.0102	0.00241 J	0.00504	0.00247 J	NA	0.0366	NA	NA
LEAD	mg/L	0.015	NA	NA	NA	<0.001 U	NA	NA	NA	<0.001 U	0.000981 J	0.00169 J	<0.001 U	NA	<0.001 U	NA	NA
MANGANESE	mg/L	14	NA	NA	NA	0.723	NA	NA	NA	4.63	0.637	0.158	0.00492	NA	0.759	NA	NA
NICKEL	mg/L	2	NA	NA	NA	<0.004 UJ	NA	NA	NA	0.186 J	0.0323	0.0614	0.0048 J	NA	<0.2 UJ	NA	NA
SILVER	mg/L	0.51	NA	NA	NA	<0.001 U	NA	NA	NA	<0.001 U	<0.001 U	<0.001 U	<0.001 U	NA	<0.001 U	NA	NA
THALLIUM	mg/L	0.002	NA	NA	NA	<0.0002 U	NA	NA	NA	<0.0002 U	0.000279 J	0.000126 J	<0.0002 U	NA	<0.0002 U	NA	NA
VANADIUM	mg/L	0.72	NA	NA	NA	<0.001 U	NA	NA	NA	<0.001 U	0.00166 J	0.00781	<0.001 U	NA	<0.05 U	NA	NA
ZINC	mg/L	31	NA	NA	NA	<0.025 U	NA	NA	NA	<0.025 UJ	0.0513	0.0206 J	<0.025 U	NA	0.0258 J	NA	NA
Perchlorate (6850)																	
PERCHLORATE	ug/L	72	0.809	1.2	0.655	12.7	0.576	0.509	2.9	<4 U	5.24	109	8.33	45400	NA	1.38 J	12.3
Mercury (7470A)																	
MERCURY	mg/L	0.002	NA	NA	NA	<0.0002 U	NA	NA	NA	<0.0002 U	<0.0002 U	<0.0002 U	<0.0002 U	NA	<0.0002 U	NA	NA
Volatile Organic Compounds (8260B)																	
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	NA	<0.4 U	<0.4 U	NA	NA	<0.4 U	<0.4 U	<80 UJ	<0.4 U	<0.4 U	<0.4 U	NA	NA	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	582 J	<0.25 U	<0.25 U	2.16	NA	NA	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	NA	<1 U	<1 U	NA	NA	<1 U	<1 U	835 J	<1 U	<1 U	0.593 J	NA	NA	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	NA	<0.3 U	<0.3 U	NA	NA	<0.3 U	<0.3 U	<60 UJ	<0.3 U	<0.3 U	<0.3 U	NA	NA	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	NA	<1 U	<1 U	NA	NA	<1 U	<1 U	<200 UJ	<1 U	<1 U	<1 U	NA	NA	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	NA	<0.4 U	<0.4 U	NA	NA	<0.4 U	<0.4 U	<80 UJ	<0.4 U	<0.4 U	<0.4 U	NA	NA	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	NA	<2 U	<2 U	NA	NA	<2 U	<2 U	<400 UJ	<2 U	<2 U	<2 U	NA	NA	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	<0.25 U	<0.25 U	NA	NA	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	703 J	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	NA	<0.4 U	<0.4 U	NA	NA	<0.4 U	<0.4 U	<80 UJ	<0.4 U	<0.4 U	<0.4 U	NA	NA	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	0.307 J	NA	NA	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	NA	<0.4 U	<0.4 U	NA	NA	<0.4 U	<0.4 U	<80 UJ	<0.4 U	<0.4 U	<0.4 U	NA	NA	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	<0.25 U	<0.25 U	NA	NA	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	NA	<5 U	<5 U	NA	NA	<5 U	<5 U	<1000 UJ	<5 U	<5 U	<5 U	NA	NA	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	<0.25 U	<0.25 U	NA	NA	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	NA	<5 U	<5 U	NA	NA	<5 U	<5 U	<1000 UJ	<5 U	<5 U	<5 U	NA	NA	<5 U

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: / Sample Date:	Units	MCL/ MSC	18WW06-061715 6/17/2015	18WW07-061115 6/11/2015	18WW08-061615 6/16/2015	18WW09-061615 6/16/2015	18WW18-061815 6/18/2015	18WW18FD-061815 6/18/2015	18WW22-061915 6/19/2015	18WW24-061815 6/18/2015	AWD1-061015 6/10/2015	AWD2-061115 6/11/2015	AWD3-060815 6/8/2015	AWD4-061615 6/16/2015	AWD4F-061615 6/16/2015	C01-061015 6/10/2015	C03-061815 6/18/2015
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	NA	<5 U	<5 U	NA	NA	<5 U	<5 U	<1000 UJ	<5 U	<5 UJ	<5 U	NA	NA	<5 U
ACETONE	ug/L	92000	<5 U	NA	<5 U	<5 U	NA	NA	8.38 J	<5 U	<1000 UJ	<5 U	<5 U	<5 U	NA	NA	<5 U
BENZENE	ug/L	5	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	0.53 J	<0.25 U	NA	NA	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	<0.25 U	<0.25 U	NA	NA	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	NA	<0.4 U	<0.4 U	NA	NA	<0.4 U	<0.4 U	<80 UJ	<0.4 U	<0.4 U	<0.4 U	NA	NA	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
BROMOFORM	ug/L	36	<1 U	NA	<1 U	<1 U	NA	NA	<1 U	<1 U	<200 UJ	<1 U	<1 U	<1 U	NA	NA	<1 U
BROMOMETHANE	ug/L	140	<1 UJ	NA	<1 UJ	<1 UJ	NA	NA	<1 U	<1 U	<200 UJ	<1 UJ	<1 U	<1 UJ	NA	NA	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	NA	<1 U	<1 U	NA	NA	<1 U	<1 U	<200 UJ	<1 U	<1 U	<1 U	NA	NA	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	50.2	<0.5 U	NA	NA	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	<0.25 U	<0.25 U	NA	NA	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	NA	<1 U	<1 U	NA	NA	<1 U	<1 U	<200 UJ	<1 U	<1 U	<1 U	NA	NA	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	0.832 J	0.269 J	NA	NA	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	NA	<1 U	<1 U	NA	NA	<1 U	<1 U	<200 UJ	<1 U	<1 U	<1 U	NA	NA	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	64300	1.64	1.27	8.97	NA	NA	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	5.9	<0.5 U	NA	NA	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	NA	<1 U	<1 U	NA	NA	<1 U	<1 U	<200 UJ	<1 U	<1 U	<1 U	NA	NA	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	69.2 J	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	NA	<0.4 U	<0.4 U	NA	NA	<0.4 U	<0.4 U	<80 UJ	<0.4 U	<0.4 U	<0.4 U	NA	NA	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	<0.25 U	<0.25 U	NA	NA	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
STYRENE	ug/L	100	<0.25 U	NA	<0.25 U	<0.25 U	NA	NA	<0.25 U	<0.25 U	<50 UJ	<0.25 U	<0.25 U	<0.25 U	NA	NA	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	3.67	<0.5 U	NA	NA	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	NA	<1 U	<1 U	NA	NA	<1 U	<1 U	<200 UJ	<1 U	<1 U	<1 U	NA	NA	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	13700 J	8	447	37.2	NA	NA	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	<100 UJ	<0.5 U	<0.5 U	<0.5 U	NA	NA	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	NA	<0.5 U	<0.5 U	NA	NA	<0.5 U	<0.5 U	2290 J	<0.5 U	0.563 J	1.61	NA	NA	<0.5 U

Location IDs containing "F" indicate sample filtered in the field with 10 micron filter.

Location IDs containing "FD" indicate duplicate samples.

Blue Highlighting Indicates Analyte Detected Above Regulatory Limit

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: / Sample Date:	Units	MCL/ MSC	C04-062315 6/23/2015	C08-061215 6/12/2015	MW1-061115 6/11/2015	MW1FD-061115 6/11/2015	MW2-061215 6/12/2015	MW3-061115 6/11/2015	MW7-061715 6/17/2015	MW8-061515 6/15/2015	MW10-061115 6/11/2015	MW14-061015 6/10/2015	MW16-061915 6/19/2015	MW18-062215 6/22/2015	MW19-062215 6/22/2015	MW19F-062215 6/22/2015	MW20-060915 6/9/2015
Location Description:			Site 18/24 – N, outside the fence line, along the road heading north. Sampled Annually	Site 18/24 – E, outside the fence line, along the road heading east northeast. Sampled Semi-Annually	Site 18/24 – N, inside the fencline. Sampled Annually	Site 18/24 – N, inside the fencline. Sampled Annually	Site 18/24 – NE, inside the fence line. Sampled Semi-Annually	Site 18/24 – N, inside the fence line. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the road surrounding the fence line Sampled Semi-Annually	Site 18/24 – SW, outside the fence line Sampled Semi-Annually	Site 18/24 – W, outside the fence line, along the outer loop road. Sampled Semi-Annually	LHAAP-18/24 - inside containment. Sampled Annually	Site 18/24 – W, outside the fence line, along the road surrounding the fence line. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – SSW, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – SSW, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – S, outside the fence line, along the outer loop road. Sampled Semi-Annually
Metals (6010C)																	
ALUMINUM	mg/L	100	NA	0.287	0.0562 J	0.0742 J	<0.1 U	<0.1 U	NA	NA	NA	0.0723 J	NA	NA	NA	<0.1 U	NA
BERYLLIUM	mg/L	0.004	NA	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	NA	NA	NA	<0.01 UJ	NA	NA	NA	<0.01 U	NA
CALCIUM	mg/L		NA	148	56	59.8	129	27.4	NA	NA	NA	85.4	NA	NA	NA	122	NA
IRON	mg/L		NA	0.69	2.26	2.45	15.6	0.624	NA	NA	NA	97.8 J	NA	NA	NA	46.3	NA
MAGNESIUM	mg/L		NA	55.6	42.7	46.8	82	17.9	NA	NA	NA	54	NA	NA	NA	67.6	NA
POTASSIUM	mg/L		NA	0.953 J	3.94	4.14	4.02	2 J	NA	NA	NA	17.1 J	NA	NA	NA	2.77	NA
SELENIUM	mg/L	0.05	NA	<0.01 U	<0.01 U	0.00864 J	<0.05 U	<0.01 U	NA	NA	NA	<0.01 U	NA	NA	NA	<0.01 U	NA
SODIUM	mg/L		NA	270	278	298	268	217	NA	NA	NA	463	NA	NA	NA	1270	NA
Metals (6020A)																	
ANTIMONY	mg/L	0.006	NA	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	NA	NA	NA	<0.001 U	NA	NA	NA	<0.001 U	NA
ARSENIC	mg/L	0.01	NA	0.00554	0.0026	0.00239	0.00675	0.00131 J	NA	NA	NA	0.00827	NA	NA	NA	0.0112	NA
BARIUM	mg/L	2	NA	1.77	1.73	1.7	3.68	0.455	NA	NA	NA	0.622	NA	NA	NA	0.115	NA
CADMIUM	mg/L	0.005	NA	<0.0006 U	0.000551 J	0.000533 J	<0.0006 U	<0.0006 U	NA	NA	NA	0.00106 J	NA	NA	NA	<0.0006 U	NA
CHROMIUM	mg/L	0.1	NA	0.00121 J	0.425	0.369	0.024	0.00497	NA	NA	NA	0.0291	NA	NA	NA	<0.002 U	NA
COBALT	mg/L	6.1	NA	0.00265	0.00889	0.00914	0.0755	0.0017 J	NA	NA	NA	0.0166	NA	NA	NA	0.0116	NA
COPPER	mg/L	1.3	NA	0.00109 J	0.00379 J	0.00364 J	0.0024 J	0.00113 J	NA	NA	NA	0.00295 J	NA	NA	NA	0.00553	NA
LEAD	mg/L	0.015	NA	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	NA	NA	NA	<0.001 U	NA	NA	NA	<0.001 U	NA
MANGANESE	mg/L	14	NA	0.644	1.1	1.08	2.72	0.766	NA	NA	NA	4.17	NA	NA	NA	2.36	NA
NICKEL	mg/L	2	NA	0.00599 J	0.509	0.505	0.0982	0.00585 J	NA	NA	NA	0.0809	NA	NA	NA	0.501	NA
SILVER	mg/L	0.51	NA	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	NA	NA	NA	<0.001 U	NA	NA	NA	<0.001 U	NA
THALLIUM	mg/L	0.002	NA	<0.0002 U	<0.0002 U	<0.0002 U	<0.0002 U	<0.0002 U	NA	NA	NA	<0.0002 U	NA	NA	NA	<0.0002 U	NA
VANADIUM	mg/L	0.72	NA	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	NA	NA	NA	<0.001 U	NA	NA	NA	<0.05 U	NA
ZINC	mg/L	31	NA	<0.025 U	<0.025 U	<0.025 U	0.158	<0.025 U	NA	NA	NA	0.181	NA	NA	NA	<0.025 U	NA
Perchlorate (6850)																	
PERCHLORATE	ug/L	72	0.166 J	0.648 J	15500	17500	428	24900	26800	40700	3.69	248000	9370	<2 U	<2 U	NA	4
Mercury (7470A)																	
MERCURY	mg/L	0.002	NA	<0.0002 U	<0.0002 U	<0.0002 U	<0.0002 U	<0.0002 U	NA	NA	NA	<0.0002 U	NA	NA	NA	<0.0002 U	NA
Volatile Organic Compounds (8260B)																	
1,1,1,2-TETRACHLOROETHANE	ug/L	110	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	NA	<0.4 U	<1 U	<0.4 U	<400 U	<1 UJ	<0.4 U	<1 U	<0.4 U	<40 U	<0.8 U	<0.4 U	<0.4 U	NA	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	0.293 J	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	NA	<0.25 U	0.476 J	0.537 J	<250 U	4.23 J	0.228 J	<0.626 U	<0.25 U	35.1 J	2.1	<0.25 U	<0.25 U	NA	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	NA	<1 U	5.99	6.62	887 J	14.9 J	6.78	<2.5 U	<1 U	164 J	12.6	0.645 J	<1 U	NA	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	NA	<0.3 U	<0.75 U	<0.3 U	<300 U	<0.75 UJ	<0.3 U	<0.75 U	<0.3 U	<30 U	<0.6 U	<0.3 U	<0.3 U	NA	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	NA	<1 U	<2.5 U	<1 U	<1000 U	<2.5 UJ	<1 U	<2.5 U	<1 U	<100 U	<2 U	<1 U	<1 U	NA	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	NA	<0.4 U	<1 U	<0.4 U	<400 U	<1 UJ	<0.4 U	<1 U	<0.4 U	<40 U	<0.8 U	<0.4 U	<0.4 U	NA	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	NA	<2 U	<5 U	<2 U	<2000 U	<5 UJ	<2 U	<5 U	<2 U	<200 U	<4 U	<2 U	<2 U	NA	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	NA	<0.25 U	<0.626 U	<0.25 U	<250 U	<0.626 UJ	<0.25 U	<0.626 U	<0.25 U	<25 U	<0.5 U	<0.25 U	<0.25 U	NA	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	NA	<0.5 U	24.8	22.2	<500 U	<1.25 UJ	38.8	3	<0.5 U	118	72.1	<0.5 U	1.44	NA	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	NA	<0.4 U	<1 U	<0.4 U	<400 U	<1 UJ	<0.4 U	<1 U	<0.4 U	<40 U	<0.8 U	<0.4 U	<0.4 U	NA	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	NA	<0.4 U	<1 U	<0.4 U	<400 U	<1 UJ	<0.4 U	<1 U	<0.4 U	<40 U	<0.8 U	<0.4 U	<0.4 U	NA	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	NA	<0.25 U	<0.626 U	<0.25 U	<250 U	<0.626 UJ	<0.25 U	<0.626 U	<0.25 U	<25 U	<0.5 U	<0.25 U	<0.25 U	NA	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
2-BUTANONE	ug/L	61000	NA	<5 U	<12.5 U	<5 U	<5000 U	<12.5 UJ	<5 U	<12.5 UJ	<5 U	<500 U	<10 U	<5 U	<5 U	NA	<5 U
2-CHLOROTOLUENE	ug/L	2000	NA	<0.25 U	<0.626 U	<0.25 U	<250 U	<0.626 UJ	<0.25 U	<0.626 U	<0.25 U	<25 U	<0.5 U	<0.25 U	<0.25 U	NA	<0.25 U
2-HEXANONE	ug/L	6100	NA	<5 U	<12.5 U	<5 U	<5000 U	<12.5 UJ	<5 U	<12.5 U	<5 U	<500 U	<10 U	<5 U	<5 U	NA	<5 U

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: / Sample Date:	Units	MCL/ MSC	C04-062315 6/23/2015	C08-061215 6/12/2015	MW1-061115 6/11/2015	MW1FD-061115 6/11/2015	MW2-061215 6/12/2015	MW3-061115 6/11/2015	MW7-061715 6/17/2015	MW8-061515 6/15/2015	MW10-061115 6/11/2015	MW14-061015 6/10/2015	MW16-061915 6/19/2015	MW18-062215 6/22/2015	MW19-062215 6/22/2015	MW19F-062215 6/22/2015	MW20-060915 6/9/2015
4-CHLOROTOLUENE	ug/L	2000	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	NA	<5 U	<12.5 UJ	<5 U	<5000 U	<12.5 UJ	<5 U	<12.5 U	<5 U	<500 UJ	<10 U	<5 U	<5 U	NA	<5 UJ
ACETONE	ug/L	92000	NA	<5 U	<12.5 U	58.2	<5000 U	<12.5 UJ	<5 U	<12.5 UJ	<5 U	<500 U	<10 U	<5 U	<5 U	NA	<5 U
BENZENE	ug/L	5	NA	<0.25 U	0.73 J	0.845 J	<250 U	0.332 J	1.12	<0.626 U	<0.25 U	<25 U	0.358 J	<0.25 U	<0.25 U	NA	<0.25 U
BROMOBENZENE	ug/L	2000	NA	<0.25 U	<0.626 U	<0.25 U	<250 U	<0.626 UJ	<0.25 U	<0.626 U	<0.25 U	<25 U	<0.5 U	<0.25 U	<0.25 U	NA	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	NA	<0.4 U	<1 U	<0.4 U	<400 U	<1 UJ	<0.4 U	<1 U	<0.4 U	<40 U	<0.8 U	<0.4 U	<0.4 U	NA	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
BROMOFORM	ug/L	36	NA	<1 U	<2.5 U	<1 U	<1000 U	<2.5 UJ	<1 U	<2.5 U	<1 U	<100 U	<2 U	<1 U	<1 U	NA	<1 U
BROMOMETHANE	ug/L	140	NA	<1 U	<2.5 UJ	<1 UJ	<1000 U	<2.5 UJ	<1 UJ	<2.5 U	<1 UJ	<100 UJ	<2 U	<1 U	<1 U	NA	<1 U
CARBON DISULFIDE	ug/L	10000	NA	<1 U	<2.5 U	<1 U	<1000 U	<2.5 UJ	<1 U	<2.5 U	<1 U	<100 U	<2 U	<1 U	<1 U	NA	<1 U
CARBON TETRACHLORIDE	ug/L	5	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	3.23	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
CHLOROBENZENE	ug/L	100	NA	<0.25 U	<0.626 U	<0.25 U	<250 U	<0.626 UJ	<0.25 U	<0.626 U	<0.25 U	<25 U	<0.5 U	<0.25 U	<0.25 U	NA	<0.25 U
CHLOROETHANE	ug/L	41000	NA	<1 U	<2.5 U	<1 U	<1000 U	<2.5 UJ	<1 U	<2.5 U	<1 U	<100 U	<2 U	<1 U	<1 U	NA	<1 U
CHLOROFORM	ug/L	1000	NA	<0.25 U	1.96 J	2.12	<250 U	1.63 J	18.1	1.05 J	<0.25 U	<25 U	0.743 J	<0.25 U	<0.25 U	NA	<0.25 U
CHLOROMETHANE	ug/L	220	NA	<1 U	<2.5 U	<1 U	<1000 U	<2.5 UJ	<1 U	<2.5 U	<1 U	<100 U	<2 U	<1 U	<1 U	NA	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	NA	<0.5 U	112	124	65000	62.2 J	17.5	1.59 J	0.45 J	2090	34	3.75	1.87	NA	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
DIBROMOMETHANE	ug/L	380	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	NA	<0.5 U	2.55	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
ETHYLBENZENE	ug/L	700	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	NA	<0.5 U	<1.25 UJ	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 UJ	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
M,P-XYLENE	ug/L	10000	NA	<1 U	<2.5 U	<1 U	<1000 U	<2.5 UJ	<1 U	<2.5 U	<1 U	<100 U	<2 U	<1 U	<1 U	NA	<1 U
METHYLENE CHLORIDE	ug/L	5	NA	<0.5 U	<1.25 U	<0.5 U	130000	<1.25 UJ	0.352 J	<1.25 U	<0.5 U	312	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
NAPHTHALENE	ug/L	2000	NA	<0.4 U	<1 U	<0.4 U	<400 U	2.74 J	<0.4 U	<1 U	<0.4 U	<40 U	<0.8 U	<0.4 U	<0.4 U	NA	<0.4 U
N-BUTYLBENZENE	ug/L	4100	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
N-PROPYLBENZENE	ug/L	4100	NA	<0.25 U	<0.626 U	<0.25 U	<250 U	<0.626 UJ	<0.25 U	<0.626 U	<0.25 U	<25 U	<0.5 U	<0.25 U	<0.25 U	NA	<0.25 U
O-XYLENE	ug/L	10000	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
STYRENE	ug/L	100	NA	<0.25 U	<0.626 U	<0.25 U	<250 U	<0.626 UJ	<0.25 U	<0.626 U	<0.25 U	<25 U	<0.5 U	<0.25 U	<0.25 U	NA	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
TETRACHLOROETHENE	ug/L	5	NA	<0.5 U	<1.25 U	0.544 J	<500 U	<1.25 UJ	0.441 J	<1.25 U	<0.5 U	<50 U	1.07 J	<0.5 U	<0.5 U	NA	<0.5 U
TOLUENE	ug/L	1000	NA	<0.5 U	<1.25 U	<0.5 U	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	NA	<0.5 U	0.692 J	0.695 J	<500 U	2.06 J	0.278 J	<1.25 U	<0.5 U	<50 U	0.723 J	<0.5 U	<0.5 U	NA	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	NA	<1 U	<2.5 U	<1 U	<1000 U	<2.5 UJ	<1 U	<2.5 U	<1 U	<100 U	<2 U	<1 U	<1 U	NA	<1 U
TRICHLOROETHENE	ug/L	5	NA	3.64	1150	1220	6760	387 J	1860	575	35.3	15100	1020	130	31.1	NA	0.441 J
TRICHLOROFLUOROMETHANE	ug/L	31000	NA	<0.5 U	<1.25 U	0.361 J	<500 U	<1.25 UJ	<0.5 U	<1.25 U	<0.5 U	<50 U	<1 U	<0.5 U	<0.5 U	NA	<0.5 U
VINYL CHLORIDE	ug/L	2	NA	<0.5 U	1.08 J	2.47	<500 U	16.5 J	0.322 J	<1.25 U	<0.5 U	<50 U	0.669 J	<0.5 U	<0.5 U	NA	<0.5 U

Location IDs containing "F" indicate sample filtered in the field with 10 micron filter.

Location IDs containing "FD" indicate duplicate samples.

Blue Highlighting Indicates Analyte Detected Above Regulatory Limit

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: Sample Date:	Units	MCL/ MSC	MW20FD-060915 6/9/2015	MW21-060915 6/9/2015	MW22-061215 6/12/2015	MW23-061815 6/18/2015
Location Description:			Site 18/24 – S, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – ENE, inside the fence line. Sampled Semi-Annually	Site 18/24 – ESE, inside the fence line. Sampled Semi-Annually	Site 18/24 – S, inside the fence line. Sampled Semi-Annually
Metals (6010C)						
ALUMINUM	mg/L	100	NA	<0.1 U	<0.1 U	NA
BERYLLIUM	mg/L	0.004	NA	<0.01 U	<0.01 U	NA
CALCIUM	mg/L		NA	270	33.2	NA
IRON	mg/L		NA	2.47	0.144 J	NA
MAGNESIUM	mg/L		NA	208	12.5	NA
POTASSIUM	mg/L		NA	3.04	1.85 J	NA
SELENIUM	mg/L	0.05	NA	<0.01 UJ	<0.01 U	NA
SODIUM	mg/L		NA	618	409	NA
Metals (6020A)						
ANTIMONY	mg/L	0.006	NA	<0.001 U	0.000658 J	NA
ARSENIC	mg/L	0.01	NA	0.0124	0.00305	NA
BARIUM	mg/L	2	NA	9.87	0.521	NA
CADMIUM	mg/L	0.005	NA	0.0011 J	<0.0006 U	NA
CHROMIUM	mg/L	0.1	NA	0.243	0.0326	NA
COBALT	mg/L	6.1	NA	0.0756	0.00141 J	NA
COPPER	mg/L	1.3	NA	0.0293	0.00282 J	NA
LEAD	mg/L	0.015	NA	<0.001 U	<0.001 U	NA
MANGANESE	mg/L	14	NA	2.41	0.0144	NA
NICKEL	mg/L	2	NA	0.756	0.022	NA
SILVER	mg/L	0.51	NA	<0.001 U	<0.001 U	NA
THALLIUM	mg/L	0.002	NA	0.000105 J	<0.0002 U	NA
VANADIUM	mg/L	0.72	NA	<0.05 U	0.000541 J	NA
ZINC	mg/L	31	NA	0.0313 J	<0.025 U	NA
Perchlorate (6850)						
PERCHLORATE	ug/L	72	2.57	41200	519	75300
Mercury (7470A)						
MERCURY	mg/L	0.002	NA	<0.0002 U	<0.0002 U	NA
Volatile Organic Compounds (8260B)						
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<50 U	<2.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<50 U	<2.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<40 U	<2 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<50 U	<2.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	<25 U	<1.25 U	0.423 J
1,1-DICHLOROETHENE	ug/L	7	<1 U	<100 U	0.801 J	1.35 J
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<50 U	<2.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<30 U	<1.5 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<100 U	<5 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<40 U	<2 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<50 U	<2.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<200 U	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<50 U	<2.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<25 U	<1.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	65.2 J	3.5	45.7
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<40 U	<2 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<50 U	<2.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<50 U	<2.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<40 U	<2 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<25 U	<1.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<50 U	<2.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<500 U	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<25 U	<1.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	<500 U	<5 U	<5 U

LHAAP-18/24 Semi-Annual Sampling - June 2015

Location ID: / Sample Date:	Units	MCL/ MSC	MW20FD-060915 6/9/2015	MW21-060915 6/9/2015	MW22-061215 6/12/2015	MW23-061815 6/18/2015
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<50 U	<2.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 UJ	<500 UJ	<5 U	<5 U
ACETONE	ug/L	92000	<5 U	<500 U	<5 U	<5 U
BENZENE	ug/L	5	<0.25 U	<25 U	2.26 J	1.08
BROMOBENZENE	ug/L	2000	<0.25 U	<25 U	<1.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<40 U	<2 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<50 U	<2.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<100 U	<5 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<100 U	<5 U	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	<100 U	<5 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<50 U	<2.5 U	2.35
CHLOROBENZENE	ug/L	100	<0.25 U	<25 U	<1.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<100 U	<5 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	17.4 J	3.08	5.37
CHLOROMETHANE	ug/L	220	<1 U	<100 U	<5 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	122	4.31 J	9.05
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<50 U	<2.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<50 U	<2.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<50 U	<2.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<50 U	<2.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<50 U	<2.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<50 U	<2.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<50 U	<2.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<100 U	<5 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<50 U	0.601 J	0.492 J
NAPHTHALENE	ug/L	2000	<0.4 U	<40 U	<2 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<50 U	<2.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<25 U	<1.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<50 U	<2.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<50 U	<2.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<50 U	<2.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<25 U	<1.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<50 U	<2.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<50 U	0.512 J	0.3 J
TOLUENE	ug/L	1000	<0.5 U	<50 U	<2.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<50 U	<2.5 U	1.5
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<100 U	<5 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	9910	364 I	1270
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<50 U	<2.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	63.6 J	0.422 J	0.504 J

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mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

ug/L - micrograms per liter

LHAAP Perimeter Wells Annual Sampling - June 2015

Location ID: / Sample Date:	Units	MCL/ MSC	PW108-062415 6/24/2015	PW110-062515 6/25/2015	PW111-062415 6/24/2015	PW112-062415 6/24/2015	PW112FD-062415 6/24/2015	PW133-062415 6/24/2015	PW134-062415 6/24/2015
Location Description:			LHAAP Perimeter - ENE, near creek. Sampled annually.	LHAAP Perimeter – SSE. Sampled annually.	LHAAP Perimeter – WSW. Sampled annually.	LHAAP Perimeter – WNW. Sampled annually.	LHAAP Perimeter – WNW. Sampled annually.	LHAAP Perimeter - NW. Sampled annually.	LHAAP Perimeter - NW. Sampled annually.
Perchlorate (6850)									
PERCHLORATE	ug/L	72	0.566	<2 U	<0.2 U	<2 U	<2 U	0.692	1.11

U - Undetected: The analyte was analyzed for, but not detected.

ug/L- Micrograms per liter

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TX 75202-2733

AUG 11 2015

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Thomas E. Lederle, Chief
Army BRAC Office
ATTN: Tom Lederle (DAIM-ODB)
600 Army Pentagon
Washington, DC 20310-0600

RE: Longhorn Army Ammunition Plant
Remedial Action Completion
LHAAP-35A (58), Shops Area

Dear Mr. Lederle:

This letter is to document that the U.S. Environmental Protection Agency (EPA) finds that the Remedial Action at LHAAP-35A (58), Shops Area is complete. The EPA defines completion of an operable unit remedial action as: conclusion of construction activities, determination that the remedy is operational and functional, performance of a final inspection, and preparation of an operable unit Remedial Action Report.

In regards to the Remedial Action at LHAAP, the remedial action objective is restoration to EPA Maximum Contaminant Levels (MCLs). The estimated timeframe for contaminants to achieve MCLs is 200 years, via a Monitored Natural Attenuation Program (MNAP). The MCLs to be achieved are:

- Trichloroethylene: 0.005 mg/L MCL
- cis-1,2-Dichloroethylene: 0.070 mg/L MCL
- vinyl chloride: 0.002 mg/L MCL
- 1,1-Dichloroethylene: 0.007 mg/L MCL
- Tetrachloroethane: 0.005 mg/L MCL
- trans-1,2-Dichloroethylene: 0.100 mg/L MCL

The Remedial Action completed at LHAAP-35A (58) included: installation of monitoring wells to implement the MNAP (included an Enhanced In-Situ Bioremediation), implementing a surface water monitoring program to prevent contaminated groundwater from migrating into nearby surface water, and the implementation of land use controls to prevent human exposure to contaminated groundwater.

The Army completed construction activities on September 30, 2013, and the wells survey and deed notification were recorded in the county on March 16, 2015. A draft final Operable Unit Remedial Action Report was submitted by the Army on April 2, 2015, and EPA accepted the final Remedial Action Completion Report on April 14, 2015.

If you have any further questions, please feel free to contact Mr. Stephen Tzhone at (214) 665-8409, and via email: tzhone.stephen@epa.gov, or Mr. Richard Mayer at (214) 665-7442, and via email: mayer.richard@epa.gov.

Sincerely,

Carlos A. Sanchez

for John C. Meyer
Associate Director
Superfund Remedial Branch

cc: Ms. Rose Zeiler, Army
Ms. April Palmie, TCEQ

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

August 12, 2015

DAIM-ODB-LO

Mr. Rich Mayer
US Environmental Protection Agency
Federal Facilities Section R6
1445 Ross Avenue
Dallas, TX 75202-2733

Re: Draft Final 2014 Remedial Action Operation Report for LHAAP-12, Landfill 12
Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Mayer,

The above-referenced document is being transmitted to you for your records and includes revisions based upon your comments on the Draft. In accordance with the FFA, the Draft Final will be considered Final after 30 days without further comment.

The document was prepared by AECOM on behalf of the Army as part of AECOM's Performance Based Remediation contract for the facility. I ask that Mark Heaston, AECOM's Project Manager, be copied on any communications related to the project.

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.

Sincerely,

Rose M. Zeiler

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

Copies furnished:
A. Palmie, TCEQ, Austin, TX
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
R. Smith, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
R. Paul, USAEC, San Antonio, TX
M. Heaston, AECOM – San Antonio, TX (for project files)

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

August 12, 2015

DAIM-ODB-LO

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

Re: Draft Final 2014 Remedial Action Operation Report for LHAAP-12, Landfill 12
Longhorn Army Ammunition Plant, Karnack, Texas

Dear Ms. Palmie,

The above-referenced document is being transmitted to you for your records and includes revisions based upon your comments on the Draft. In accordance with the FFA, the Draft Final will be considered Final after 30 days without further comment.

The document was prepared by AECOM on behalf of the Army as part of AECOM's Performance Based Remediation contract for the facility. I ask that Mark Heaston, AECOM's Project Manager, be copied on any communications related to the project.

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.

Sincerely,

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

Copies furnished:
R. Mayer, USEPA Region 6, Dallas, TX
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
R. Smith, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
R. Paul, USAEC, San Antonio, TX
M. Heaston, AECOM, San Antonio, TX (for project files)

Responses to Comments on
Draft 2014 Remedial Action Operation Report for Site LHAAP-12, Landfill 12
Longhorn Army Ammunition Plant, Karnack, Texas

June 2015

Reviewer: Richard Mayer, EPA

Respondent: Mark Heaston, AECOM

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Page	Section/ Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
1		General	The report should include a contingency plan/pathway for determining whether monitoring well 12WW24 needs to be replaced (due to the bailing of the well). While the EPA recognizes that the well has been sampled the past two years, the DO and ORP data was not valid. These are some key data to support the MNA evaluation at the Site. Hopefully, the recent rains this year may make this decision pathway mute.	D	The first two years of sampling for site 12 were conducted quarterly and included natural attenuation parameters to evaluate both primary and secondary lines of evidence. The results of the first two years of quarterly sampling documented that degradation is occurring at the site. The remedy for the site has achieved OPS. In accordance with the RD, geochemical parameters are no longer sampled and the subsequent annual reports focus on trend analysis for the primary COCs. The bailing technique does not affect VOC (primary COC) results, therefore a contingency plan to replace 12WW24 is not required. With the rain quantities received since April 2015, it is expected that adequate water will be present in the well for low-flow sampling to be used in the future and for representative ORP and DO parameters to be collected, rendering the comment moot.	

Responses to Comments on
Draft 2014 Remedial Action Operation Report for Site LHAAP-12, Landfill 12
Longhorn Army Ammunition Plant, Karnack, Texas

June 2015

Reviewer: Richard Mayer, EPA

Respondent: Mark Heaston, AECOM

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Page	Section/ Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
2	2-3	Section 2	As recommended in the EPA comments on the 2012 and 2013 RAO Report, the Army should be performing more robust statistical analyses of these data to support MNA evaluation. A concentration-time plot by itself, such as presented in Figure 2-3, is only one piece of multiple lines of evidence needed to demonstrate MNA. The Report does not include other lines of evidence. The sample taken in January 2015 from well 12WW24 was the second highest concentration of TCE measured since December of 2006 and the second consecutive increase. EPA recommends using the following Guidance: An Approach for Evaluating the Progress of Natural Attenuation in Groundwater, EPA 600-R11/204, December 2011/www.epa.gov/ada.	E	Agree with EPA that a plot of concentration of time is not sufficient on its own. The concentrations were subjected to Mann-Kendall trend analysis with and without the last two data points. The Mann-Kendall was conducted using EPA Pro UCL ver 5.0.0. The analysis indicated a significant decrease in TCE concentration in 12WW24 has occurred through June 2011. However, due to the drought condition and the change in seasonal sampling which has seen an increase in TCE concentration in this well in the last two sampling events, the Mann-Kendall statistics did not show a significant decreasing trend although a general decreasing trend was observed. The Mann-Kendall information is introduced as Appendix G. As stated in response to comment #1 above, in accordance with the RD, geochemical parameters are no longer sampled and the subsequent annual reports focus on trend analysis for the primary COCs.	
3	Table 2-4	Section 2	Please include the sampling results for January 2015 in this Table.	C	January 2015 results were added to Table 2-4.	
4	Page 2-2	1st Paragraph	What is the current projected time for the cleanup of TCE (in the groundwater) to the MCL?	C	Based on all the data and using a first order decay rate, the projected time for TCE to reach the MCL is estimated at 250 years. Without the last two data points (i.e., between 2006 and 2011), the projected time to reach the MCL is estimated at 15 years. The drought conditions along with changes in seasonal sampling have constrained the trend observed between 2006 and 2011. Additional data will be evaluated under normal weather conditions to confirm projected estimates regarding time frame to cleanup.	

Responses to Comments on
Draft 2014 Remedial Action Operation Report for Site LHAAP-12, Landfill 12
Longhorn Army Ammunition Plant, Karnack, Texas

June 2015

Reviewer: Richard Mayer, EPA

Respondent: Mark Heaston, AECOM

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Page	Section/ Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
5	Figure 2-4	Section 2	Please include boring 12WW25 on the Figure and take off the "NS" symbol from the Notes.	C	Changes made to Figure 2-4 as indicated.	
6	Page 3-1	3rd Paragraph	The EPA notes that the groundwater sampling results from temporary boring 12WW25 indicate that the COCs detected are below MCLs; however, the question is: are these results indicative of a plume that is decreasing/degrading or a plume that is migrating laterally to the east from contaminated well 12WW24?	E	This is indicative of an extremely small plume with no evidence of migration. All parties agreed that due the limited size of the plume an additional well installed less than 50 feet from 12WW24 was not practical.	
7	Page 3-1	Last Paragraph	So if monitoring well 12WW22 is only monitored once every five years, what well will be used as a background well for the annual monitoring?	E	The intended objective for 12WW22, per the RD Groundwater Sampling Plan, is to meet the RAO for preventing TCE contaminated groundwater from migrating into nearby surface water. No background well was required in the sampling plan.	

Responses to Comments on
Draft 2014 Remedial Action Operation Report for Site LHAAP-12, Landfill 12
Longhorn Army Ammunition Plant, Karnack, Texas

June 2015

Reviewer: Richard Mayer, EPA

Respondent: Mark Heaston, AECOM

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Page	Section/ Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
8		General	As has been repeatedly expressed in EPA comments on other documents, the DO and ORP measurements presented in the Monitoring Well Sample Collection Forms (Appendix C) are notable, and the EPA questions some of the data. Please consider:			
			• Is it realistic to have DO concentrations of 0 in shallow groundwater at any location, especially those located outside of the plume (where anaerobic reductive dechlorination is not supposed to be occurring)? This is the case at monitoring wells 12WW23 and 12WW21.	C	Zero DO readings in clean well in shallow zone aquifers may not be representative of aquifer conditions as levels above zero would be expected. Non-impacted wells should generally reflect natural aerobic aquifer conditions.	
			• While the EPA recognizes that low water levels necessitated sampling of 12WW24 by bailing, the DO and ORP values are clearly not representative of a plume where anaerobic reductive dechlorination is purported to be occurring. This undoubtedly is a function of the sampling method. These are key data to support the MNA evaluation. If a well is bailed, do not take DO or ORP values, as they are not representative of the aquifer.	C	ORP and DO data from bailed wells will not be used.	
			• Monitoring well 12WW22 had very low DO readings and negative ORP readings (except for the first reading). This well is located hydraulically upgradient and is located over a 1000 feet from contaminated well 12WW24. Are these readings correct?	C	Previous sampling events have provided similar results for 12WW22 and while the results could be considered contradictory, literature indicates it is possible to have a positive DO value and a negative ORP value. Based on this information, we believe the readings are correct.	

Responses to Comments on
Draft 2014 Remedial Action Operation Report for Site LHAAP-12, Landfill 12
Longhorn Army Ammunition Plant, Karnack, Texas

June 2015

Reviewer: April Palmie, TCEQ

Respondent: Mark Heaston, AECOM

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Page	Section/ Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
1	2-1	Section 2.1	First bullet of O&M activities says desiccation cracks, erosion, or gullying will be repaired upon observance. Why wasn't the 18" subsidence area repaired? Please repair this and any subsidence areas upon observation.	C	Concur with comment. A portion of the subsidence area has been repaired by backfilling eroded area with top soil and adding matting to enhance grass growth. A load of top soil is under order and will be used to patch the other two small subsidence areas.	
2	2-3	Section 2.2	States: Water samples were collected using the low-flow method Standard Operating Procedure (AECOM, 2013). According to the field notes, 12WW24 was bailed dry and sampled after recovery. This should be in the narrative. Please revise to reflect well was bailed and explain why. [I copied/pasted this comment from last report comments - this is consistently misstated]	C	Revised text to indicate that monitoring well 12WW24 was bailed because of insufficient water in the well to support low-flow sampling.	
3	2-3	Section 2.2	Last paragraph – I concur with EPA's comment (comment 2) regarding lack of evidence to support MNA. It will continue to be difficult to conduct trend analysis based on one plume data point.	C	See response to EPA's Comment #2. Because 12WW24 is the only well with CoCs above the MCL, it is the only well of interest. The attempt to install a second well within the plume on September 8, 2014 included the installation of a boring and collection of a grab groundwater sample. The results of the grab groundwater sample were barely detectable levels of COCs TCE (0.317 ug/L) and cis-1,2-DCE (0.402 ug/L) which indicated that the plume is extremely small. All parties agreed that due the limited size of the plume an additional well installed less than 50 feet from 12WW24 was not practical.	
4	Table 2-4	Section 2	Add January 2015 TCE results. You could change title to "Cumulative" rather than "Historic"	C	Added January 2015 TCE concentration and changed title to "Cumulative".	

Responses to Comments on
Draft 2014 Remedial Action Operation Report for Site LHAAP-12, Landfill 12
Longhorn Army Ammunition Plant, Karnack, Texas

June 2015

Reviewer: April Palmie, TCEQ

Respondent: Mark Heaston, AECOM

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Page	Section/ Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
5	3-1	Section 3	Third paragraph – Extra period in the paragraph before "Limited".	C	Removed extra period.	
			Last paragraph – If 12WW22 sampling is reduced to once per five years, what well serves as background well?	E	The intended objective for 12WW22, per the RD Groundwater Sampling Plan, is to meet the RAO for preventing TCE contaminated groundwater from migrating into nearby surface water. No background well was required in the sampling plan.	

From: Mayer, Richard [mailto:mayer.richard@epa.gov]
Sent: Thursday, September 03, 2015 4:38 PM
To: Zeiler, Rose M CIV USARMY HQDA ACSIM (US)
Cc: 'Williams, Aaron K SWT'; Forsythe, Barry; 'Dale Vodak'; Tzhone, Stephen; Burton, Terry; 'april.palmie@tceq.texas.gov'; 'paul_bruckwicki@fws.gov'; 'Smith, Richard P SWT'; 'Becher, Kent'; Torcoletti, Paul; Turner, Philip; Heaston, Mark; 'nicholas.b.smith56.civ@mail.mil'; Salameh, Marwan
Subject: FW: EPAs Approval of the Draft Final 2014 Remedial Action Operation Report for Longhorn Site 12 (Plus the RTCs)

Rose, EPA approves the Draft Final 2014 Remedial Action Operation Report for Longhorn Site 12. Below are EPA's Responses to the Army RTCs on the Draft 2014 Remedial Action Operation Report.

1. Concur; however, the Army takes a risk by relying only on the concentration levels for the COCs in determining whether MNA is occurring. For TCE, the 2006 concentration was 404 ug/l at 12WW24. In January of 2015, the concentration level for TCE was 353 ug/l, a 17% decrease. Also, only time will indicate whether 12WW24 will need to be replaced.

2. Concur, the Mann-Kendall information was added.

3. Concur, January 2015 results were added.

4. Concur.

5. Concur, changes were made to Figure 2-4.

6. Concur.

7. Concur.

8. Concur.

From: April Palmie <april.palmie@tceq.texas.gov>
Sent: Thursday, August 20, 2015 9:45 AM
To: Heaston, Mark; 'richard.p.smith@usace.army.mil'
Cc: 'aaron.k.williams@usace.army.mil'; 'rose.m.zeiler.civ@mail.mil'; 'richard.p.smith@usace.army.mil'; 'nicholas.b.smith56.civ@mail.mil'; 'robin.e.paul4.civ@mail.mil'; Salameh, Marwan; Snow, JoLynn
Subject: RE: FOR AGENCY REVIEW- LHAAP-12 Draft Final RAO Report

Good morning. I've reviewed the RTC for LHAAP-12 Draft Final RAO Report and accept the responses.

April Palmie
Project Manager
Superfund Section
Remediation Division
Texas Commission on Environmental Quality
Phone: (512) 239-4152
Email: April.Palmie@tceq.texas.gov

From: Heaston, Mark [mailto:Mark.Heaston@aecom.com]
Sent: Wednesday, August 12, 2015 8:07 PM
To: April Palmie; 'richard.p.smith@usace.army.mil'
Cc: 'aaron.k.williams@usace.army.mil'; 'rose.m.zeiler.civ@mail.mil'; 'richard.p.smith@usace.army.mil'; 'nicholas.b.smith56.civ@mail.mil'; 'robin.e.paul4.civ@mail.mil'; Salameh, Marwan; Snow, JoLynn
Subject: FOR AGENCY REVIEW- LHAAP-12 Draft Final RAO Report

Good Evening April and Rich,

Please find attached transmittal letters for the Draft Final LHAAP-12 2014 RAO Report. Due to large file size, the subject document, transmitted under cover of the attached letters, will be transmitted to you via SendFiles. You should receive the SendFiles notification shortly. I have also included the Draft RTC tables and a Redline of the Draft text to make tracking of the changes easier.

Mark Heaston
Senior Scientist
AECOM Environment
D (402) 643-9823 C (570) 394-0487
mark.heaston@aecom.com

DRAFT FINAL
2014 REMEDIAL ACTION OPERATION REPORT
LANDFILL 12 (LHAAP-12)
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services, Inc.

August 2015

DRAFT FINAL
2014 REMEDIAL ACTION OPERATION REPORT
LANDFILL 12 (LHAAP-12)
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corp of Engineers

Tulsa District

Prepared By:

AECOM Technical Services, Inc.

Contract No. W912DY-09-D-0059

Task Order No. DS01

August 2015

Table of Contents

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Acronyms and Abbreviations

µg/L	micrograms per liter
AECOM	AECOM Technical Services, Inc.
bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminant of concern
IRA	Interim Remedial Action
LHAAP	Longhorn Army Ammunition Plant
LHAAP-12	Landfill 12
LUC	Land Use Control
MCL	maximum contaminant level
MNA	Monitored Natural Attenuation
No.	Number
RA(O)	Remedial Action Operation
RD	Remedial Design
ROD	Record of Decision
TCE	trichloroethene
U.S.	United States
VC	vinyl chloride
VOC	volatile organic compound

1 INTRODUCTION

The United States (U.S.) Army Corps of Engineers, Tulsa District, contracted AECOM Technical Services, Inc. (AECOM), to perform remedial activities at multiple sites at the former Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas, under the Huntsville District's Worldwide Environmental Restoration Services Contract Number (No.) W912DY-09-D-0059, Task Order No. DS01. As part of this contract, AECOM is performing operations and maintenance and monitoring activities at the closed Landfill 12 (LHAAP-12). A Final Record of Decision (ROD) was executed for LHAAP-12 in August, 2006 (Shaw, 2006). Groundwater monitoring and site inspection activities at LHAAP-12 are ongoing as described in the Final Remedial Design (RD) Addendum (Shaw, 2007). This report summarizes the results of January 2015 groundwater sampling and the November 2014 landfill integrity inspections and repairs.

1.1 Remedial Action Operation Scope and Objective

Work completed as part of the Remedial Action Operation (RA[O]) at LHAAP-12 consisted of the following components: physical inspections and repairs; monthly water level measurements of current wells; MNA evaluation; and groundwater monitoring. Physical inspections are conducted at a minimum annually to confirm compliance with Land Use Control (LUC) objectives, which consist of ensuring the integrity of the existing landfill cover, and ensuring no consumption of trichloroethene (TCE)-contaminated groundwater. Monthly groundwater levels have been measured at site 12 since October 2014 to assess optimum sampling dates to avoid dry wells. This activity was recommended for a year. The objectives of groundwater monitoring at LHAAP-12 are to ensure that contaminated groundwater does not migrate into nearby surface water and to perform Monitored Natural Attenuation (MNA) so that maximum contaminant levels (MCLs) are achieved for groundwater contaminants of concern (COCs): TCE, cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC). The remedy at Site 12 is functioning as intended and all human risks are currently under control. This report summarizes the results of groundwater sampling and the landfill integrity inspections and repairs.

1.2 Site Description

LHAAP-12 was established in 1963, covers approximately seven acres, and is 500 feet southeast of Central Creek, which eventually drains into Caddo Lake. LHAAP-12 was used for the disposal of industrial solid wastes, possibly containing small quantities of hazardous constituents generated at LHAAP. From 1978 until its closure in April 1994, the landfill was used continuously for the disposal of non-hazardous industrial solid waste, including cafeteria waste, chemical waste, petroleum-contaminated soil, and asbestos. The construction of a landfill cap over the site was completed in 1998 as part of an Interim Remedial Action (IRA). The IRA is consistent with U.S. Environmental Protection Agency presumptive remedy guidance. The final remedy for LHAAP-12 is protective of human health and the environment and consists of LUCs in conjunction with MNA. LUCs include those set in place by the ROD (Shaw, 2006) for landfill cap maintenance and restriction of groundwater use.

2 OPERATIONS AND MAINTENANCE ACTIVITIES AT LHAAP-12

Physical inspection activities at LHAAP-12 consist of:

- Maintenance of the integrity of the landfill cap and repairs to desiccation cracks, erosion, or gullying upon observance.
- Maintenance of the vegetative cover on the landfill cap, including periodic mowing.
- Maintenance of the signage around landfill cap.
- Prohibition of any activities that would affect the integrity of the cap.
- Prohibition of any activities that would cause exposure to contaminated groundwater.

The RD Addendum stipulated physical inspections to be conducted annually, although actual inspections are conducted more frequently with daily drive-by oversight to ensure compliance with the above requirements and annual groundwater sampling to monitor the effectiveness of MNA in reducing contaminant concentrations over time. The effectiveness of MNA was evaluated in the Years 1 and 2 report (Shaw, 2011). Groundwater was included as a component of the remedy for LHAAP-12 identified in the ROD (Shaw, 2006).

2.1 Physical Inspection Summary

Inspections conducted on 21 November 2014 indicated that minimal repairs were needed. The vegetative cover was observed to be in good condition and well-maintained through routine mowing. No evidence of subsidence that was repaired by AECOM conducted during 2013 was observed. A single small area of subsidence, separate from the 2013 repaired area, approximately 18" in depth was observed along the western edge of the landfill. Inspections conducted during 2014 indicated that no repairs to the cap were needed, and the area of subsidence will be observed to ensure the landfill cap cover continues to cover landfill contents. Six separate locations of surface erosion that were observed during the November 2013 inspection, and were addressed through re-seeding, were found to be in good condition during the 2014 inspection. No excessive cracking or desiccation was observed.

A tree was observed down along the fence line at the south west corner of the landfill, and was removed during the inspection. Signage remains in good condition and the fencing is intact (See Photo Log, **Appendix A**). Well-head locks continue to be in good condition. No damage to bollards, pads, or protective casings was observed, and no encroachment of weeds or brush on the well pads was observed. (See Photo Log, **Appendix A**). No change in land or groundwater use was observed at the site and the use of the site is consistent with that mandated by the ROD (SHAW, 2006). No significant issues were identified regarding the cap condition or maintenance, signs, or site use.

The official 2014 physical inspection of the LHAAP-12 cap was completed November 21, 2014. The LUC Inspection and Maintenance Log is included in **Appendix B**.

2.2 Groundwater Monitoring and Analytical Results

As described by the Groundwater Sampling Plan included in the RD Addendum (Shaw, 2007), groundwater sampling of monitoring wells (12WW20, 12WW21, and 12WW24) and compliance monitoring wells (12WW22 and 12WW23), has been conducted annually beginning in the third

year of the RA(O). The Purpose of the sampling was to develop data to support the effectiveness of MNA in reducing contaminant concentrations over time, to evaluate plume migration, and to ensure that TCE-contaminated groundwater does not impact nearby surface water. The locations of these groundwater monitoring wells are shown in **Figure 2-1**. During the 2015 sampling event, all five wells were in good condition and no evidence of turbidity or silt accumulation was identified.

A DPT boring was installed on September 8th, 2014 at the proposed LHAAP-12 new well 12WW25 location (50 feet down-gradient/east of plume well 12WW24) to guide well installation. The field log for 12WW25 and the memorandum for installation of an additional well are presented in **Appendix C**. The boring was drilled to a depth of 35 feet, with visibly wet soils encountered starting at 25 feet below ground surface (bgs) and an assemblage of sands from 15 – 30 feet bgs. A grab groundwater sample was collected from this boring to confirm its location within the plume. Analytical results identified low levels of COCs TCE (0.317 micrograms per liter [ug/L]) and cis-1,2-DCE (0.402 ug/L) below the MCL, along with similar levels of methylene chloride, benzene, chlorobenzene and 1,4-dichlorobenzene.

The proposed 12WW25 location is not within the plume above the clean-up criteria observed at 12WW24, so a permanent monitoring well will not be installed. This approach was discussed between the Army, EPA, and TCEQ with EPA and TCEQ providing concurrence via email September 17, 2014 and September 18, 2014, respectively. As discussed, a plume this limited in size does not justify the installation of additional wells; however, monthly groundwater level monitoring will be completed for a year in order to assess optimum sampling dates to avoid dry wells. Twelve (12) consecutive monthly groundwater levels for the eight (8) site wells began in October 2014 and the first seven (7) gauging events are presented in Table 2-1. The collected data show consistent trends in water levels with increase in groundwater level observed since measurements began in October 2014. The average increase in water level over the period between October 2014 and March 2015 is 0.66 feet to 3.57 feet with the highest elevation increase occurring in 12WW22, the most upgradient well, and the lowest occurring in 12WW23, the most downgradient well. None of the wells were dry. Because there is no change in the groundwater flow direction between 2013 and 2014 as depicted in **Figure 2-2**, the MNA network of well continues to represent site conditions and no change is recommended. This is corroborated with monthly potentiometric plots of the groundwater levels in the eight (8) wells that were collected between October 2014 and March 2015. The potentiometric plots are presented in **Appendix D** and indicate that the groundwater flow is primarily to the east with occasional slight shift to the northeast and/or southeast. The addition of gauging data from wells 12WW01, 12WW02, and 12WW05 did not change the understanding of groundwater flow at the site even though groundwater levels have increased between 0.66 and 3.57 feet over this time period. Based on the groundwater flow direction which is primarily to the east, the network of wells monitored while appear to be adequate, could be optimized. For example monitoring well 12WW22 is an upgradient well at a great distance from the landfill. This well has historically been sampled to ensure the plume is not migrating to the creek, however based on groundwater flow direction and considering there has been no detections in this well to date, sampling this well can be reduced from annually to once every five years. Additionally, monitoring well 12WW23 located downgradient and farther downgradient from the landfill relative to 12WW21 which remains unimpacted, does not provide additional information to understanding site

conditions. It is recommended to remove well 12WW23 from the network of monitored wells. Wells 12WW22 and 12WW23 will continue to be included in well gauging events.

Groundwater flow direction interpretation shows as south easterly flow, slightly changing from an easterly flow the previous year. The 2013 and 2014 groundwater elevation measurements are within historic range. Year 6 and 7 (i.e., 2013 and 2014) elevation data are plotted on **Figure 2-2**. Groundwater elevation data can be found on **Table 2-2**.

Annual samples were collected January 9, 2015 from wells 12WW20, 12WW21, 12WW22, 12WW23, and 12WW24 and were analyzed for volatile organic compounds (VOCs). Sampling was not conducted in December 2014 due to scheduling conflicts in the field. Analytical results for the samples are shown in **Table 2-3**. Historic COC concentrations for LHAAP-12 wells are shown in **Table 2-4**.

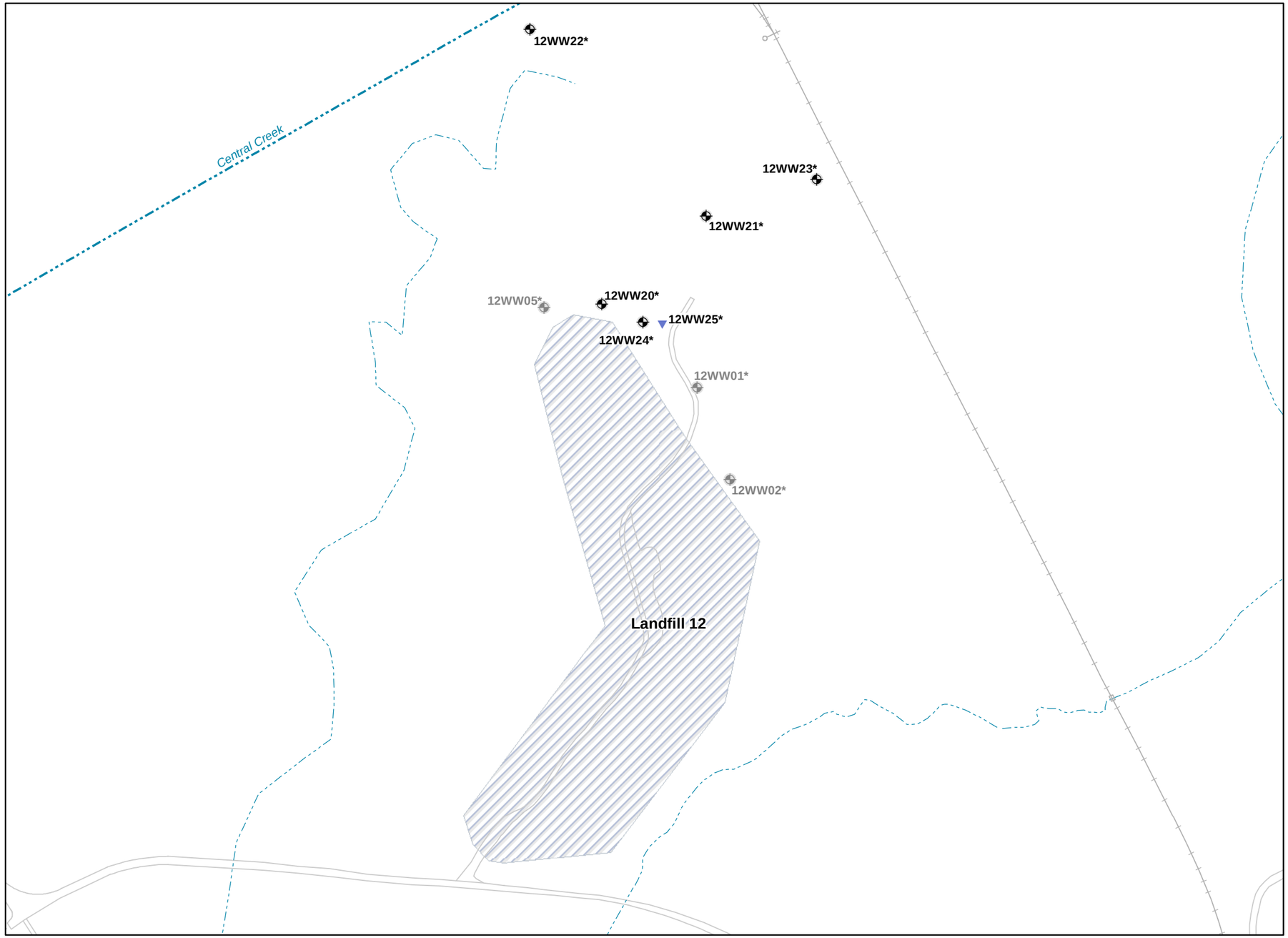
Water samples were collected using the low-flow method Standard Operating Procedure (AECOM, 2013) for wells 12WW20, 12WW21, 12WW22, and 12WW23. Monitoring well 12WW24 was bailed dry and sampled after recovery because of insufficient water in the well to support low-flow sampling. The objective of using this method was to collect representative samples of the groundwater in the formation adjacent to the well screen, eliminating the mixing of stagnant water above and below the well screen. After water quality parameters stabilized and were within acceptable ranges, samples were collected at the same low flow rate. Groundwater monitoring well sampling forms were completed for each monitoring well sampled and are included in **Appendix E**. Laboratory analytical results are included in **Appendix F**.

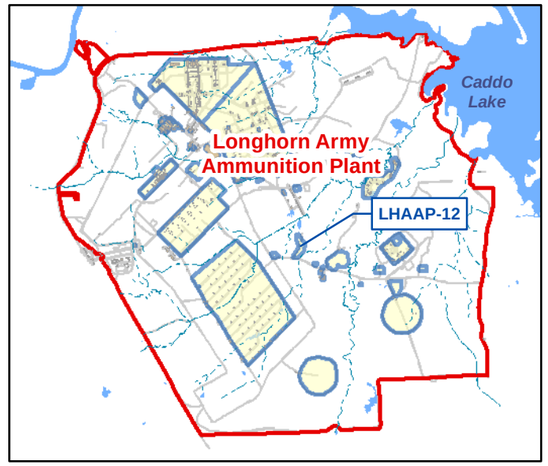
The MNA evaluation completed as part of the Five-Year Review (AECOM, 2014), concluded that TCE degradation was occurring via anaerobic reductive dechlorination. Although an increasing trend in TCE has been observed over the past two years (see **Figure 2-3** for 12WW24), the trend appears due to seasonal effect because both samples were collected in the winter season (December 2013 and January 2015). The groundwater elevation presented on **Figure 2-3** indicated an inverse correlation with constituent concentrations (-44% for TCE, -53% for cis-1,2-DCE, and -34% for VC), noting that these correlations do not account for natural attenuation mechanisms. Groundwater COC concentrations can be found on **Table 2-2** and seen on **Figure 2-4**.

Statistical analysis of the concentration profile for TCE in 12WW24 using Mann-Kendall for trend was completed. The analysis was completed using EPA Pro UCL ver 5.0.0. The results shown in **Appendix G** indicate that a significant decrease in TCE concentration in 12WW24 has occurred through June 2011. However, due to the drought condition as evidenced by the dry well in December 2012 and the increase in TCE concentration in this well in the last two sampling events, the Mann-Kendall statistics did not show a significant decreasing trend although a general decreasing trend was observed. These results provide evidence that natural attenuation is occurring at this site, resulting in a decrease in TCE concentration in groundwater.

The concentration profile for TCE in 12WW24 shown in **Figure 2-3** was used to calculate a first order decay rate. The determination was made for the dataset through June 2011 and for the dataset that included the December 2013 and January 2015 results. This was conducted because drought conditions evidenced by the dry well in December 2012 were later manifested by an increase in TCE concentration in this well in the last two sampling events. The first order rate constant for the period through June 2011 was 6.2E-04 per day while the first order rate constant

for the entire dataset was 4.6E-05 per day, an implied decrease of just over one order of magnitude. Based on these rate constants, the estimated durations to achieve the MCL for TCE in 12WW24 are 15 years using the dataset through June 2011 and 255 years using the entire dataset. The drought conditions along with changes in seasonal sampling have constrained the trend observed between 2006 and 2011. Additional data will be evaluated under normal weather conditions to confirm projected estimates regarding time frame to cleanup





Legend

- DPT Location
- Monitored Natural Attenuation Shallow Well
- Monitoring Well
- Former Railroad
- Streams (Continuous)
- Streams (Intermittent)
- Roads
- Landfill Cap Area

Note:
1 - Each well has 5' x 5' concrete surface monument surrounded bollards. Each piezometer has a PVC riser. Appropriate equipment and care used around these features.
2- *Gauged Monthly for Water Level for 12 months beginning October 2014

AECOM

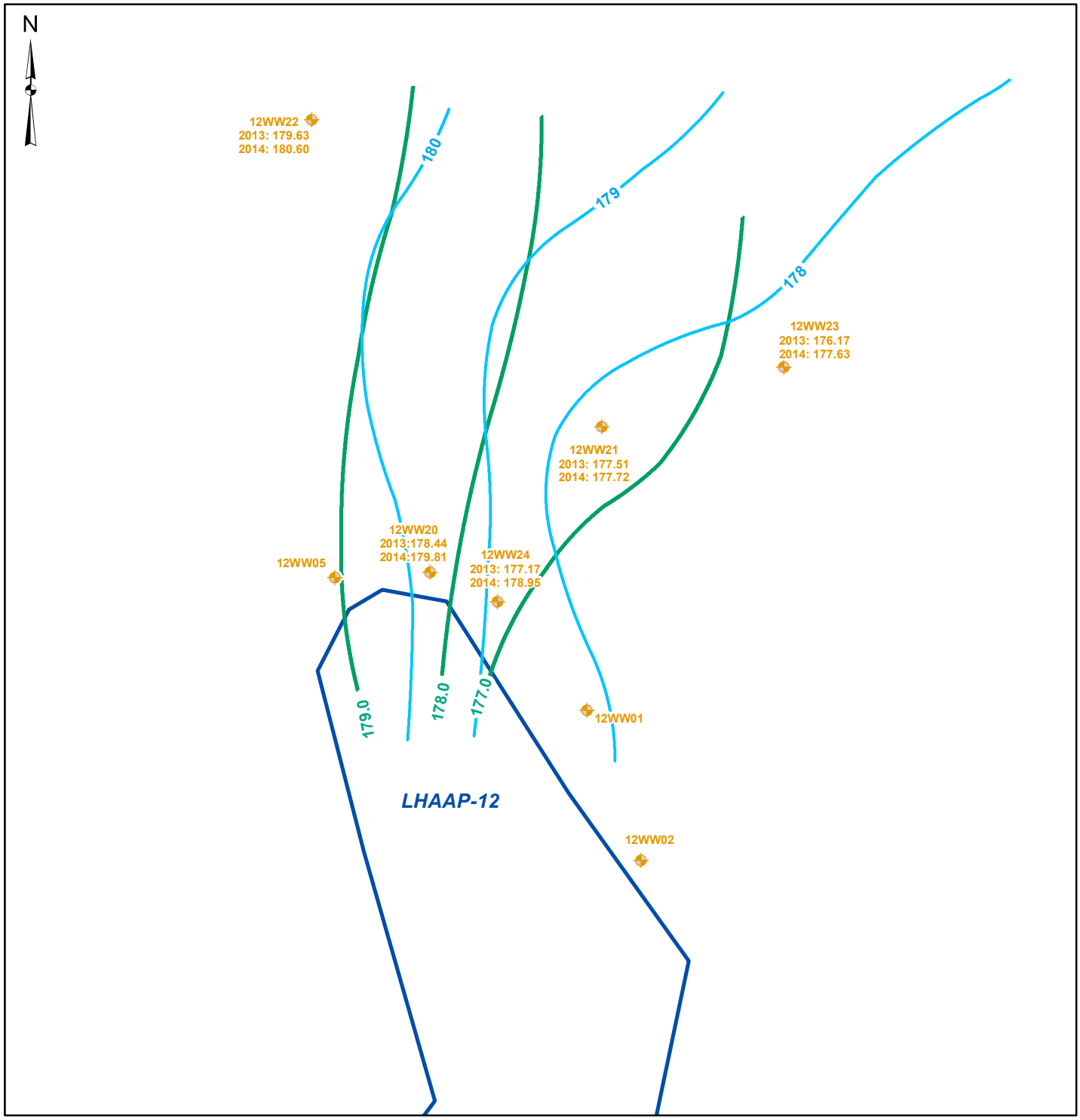
Figure 2-1
Groundwater Monitoring Well Locations
LHAAP-12

Longhorn Army Ammunition Plant
Karnack, Texas

60256135

March 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\2015_Mar_04\Figure 2-1 LHAAP-12 Groundwater MW Locations Rev-RJS.mxd



Legend

- Shallow Monitoring Well
- 2013 Groundwater Gradient Contour
- 2014 Groundwater Gradient Contour
- Streams
- Roads
- Site (Boundary of Landfill Cap)

0 100 200 400 Feet

AECOM

Figure 2-2
Groundwater Gradient Map
2013 and 2014
LHAAP-12
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

March 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\2015_Mar_04\Figure 2-3 LHAAP-12 GW Gradient Map 2012_2013.mxd

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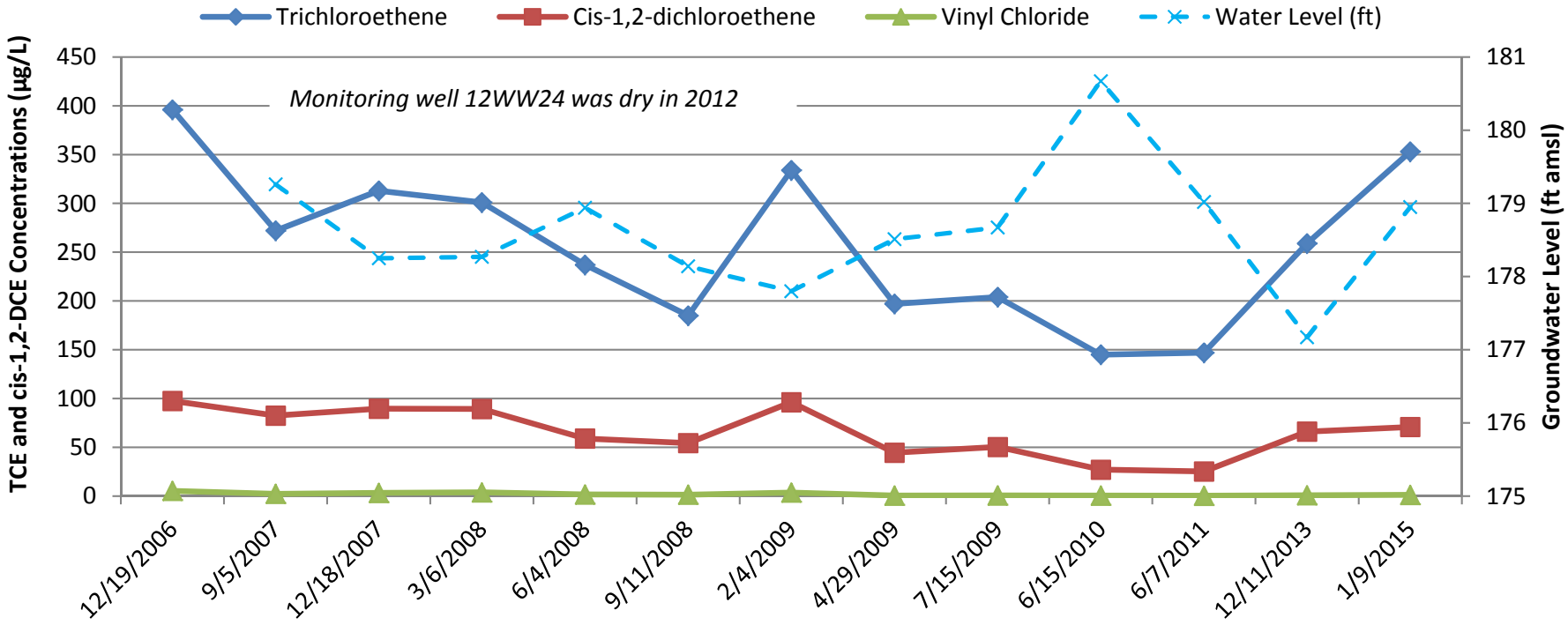
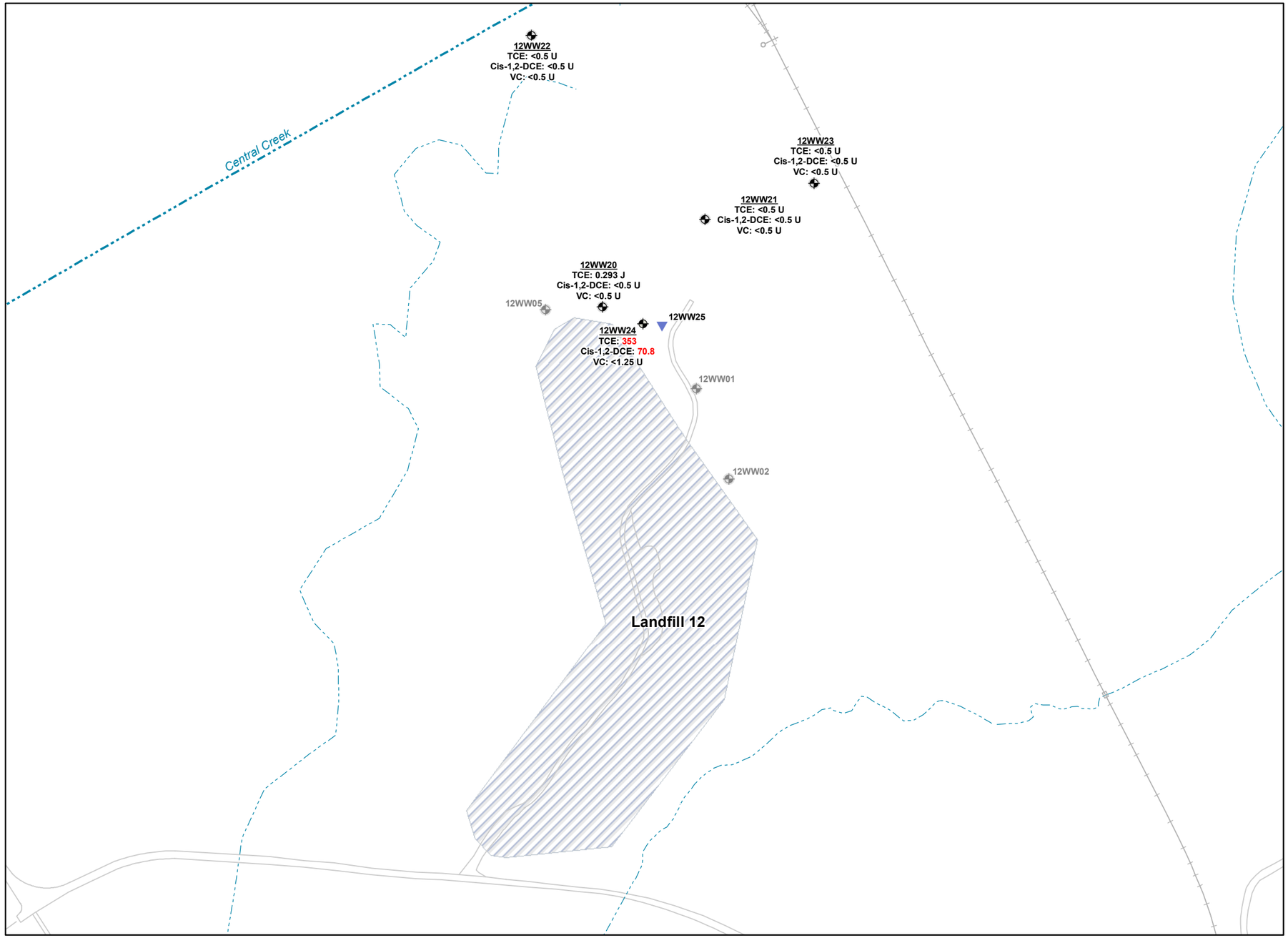
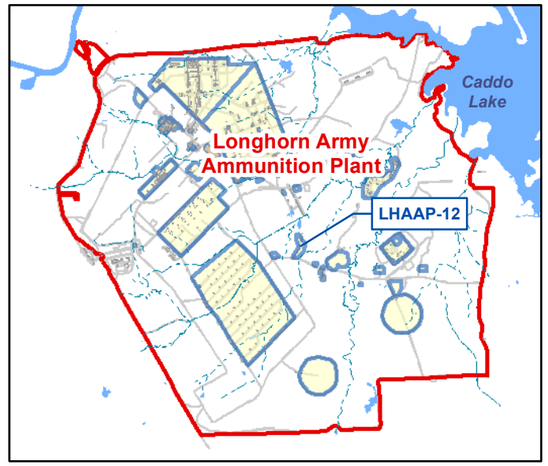
Figure 2-3
TCE, cis-1,2-DCE, and VC Concentrations in 12WW24
LHAAP-12







Legend

- DPT Location
- Monitored Natural Attenuation Shallow Well
- Monitoring Well
- Former Railroad
- Streams (Continuous)
- Streams (Intermittent)
- Roads
- Landfill Cap Area

Note:
1 - Each well has 5' x 5' concrete surface monument surrounded bollards. Each piezometer has a PVC riser. Appropriate equipment and care used around these features.
2 - 12WW25 boring location is approximate.

Results are in micrograms per liter (µg/L)
J - Estimated Value
TCE - Trichloroethene
cis-1,2-DCE - Cis-1,2-dichloroethene
VC - Vinyl Chloride

AECOM

Figure 2-4
Groundwater COC Concentrations Map 2014
LHAAP-12
Longhorn Army Ammunition Plant
Karnack, Texas

60256135 August 2015

Path: L:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\RAO\2015_08_03\Figure 2-4 LHAAP-12 Groundwater COC Concentrations.mxd

Table 2-1: Monthly Groundwater Levels - LHAAP-12

Well ID	Measurement Date	Top of Casing Elevation (ft)	Depth to Water (ft btoc)	Groundwater Elevation (ft AMSL)
12WW01	10/10/2014	204.19	25.40	178.79
	11/8/2014	204.19	25.21	178.98
	12/8/2014	204.19	25.10	179.09
	1/9/2015	204.19	24.98	179.21
	2/4/2015	204.19	24.80	179.39
	3/10/2015	204.19	24.60	179.59
	3/31/2015	204.19	24.47	179.72
12WW02	10/10/2014	202.45	23.77	178.68
	11/8/2014	202.45	23.60	178.85
	12/8/2014	202.45	23.42	179.03
	1/9/2015	202.45	23.25	179.20
	2/4/2015	202.45	22.90	179.55
	3/10/2015	202.45	22.79	179.66
	3/31/2015	202.45	22.55	179.90
12WW05	10/10/2014	190.52	11.27	179.25
	11/8/2014	190.52	11.09	179.43
	12/8/2014	190.52	11.00	179.52
	1/9/2015	190.52	10.42	180.10
	2/4/2015	190.52	9.93	180.59
	3/10/2015	190.52	7.90	182.62
	3/31/2015	190.52	7.95	182.57
12WW20	10/10/2014	199.15	20.15	179.00
	11/8/2014	199.15	20.00	179.15
	12/8/2014	199.15	19.86	179.29
	1/9/2015	199.15	19.34	179.81
	2/4/2015	199.15	18.87	180.28
	3/10/2015	199.15	17.94	181.21
	3/31/2015	199.15	18.00	181.15
12WW21	10/10/2014	202.07	23.78	178.29
	11/8/2014	202.07	23.59	178.48
	12/8/2014	202.07	23.38	178.69
	1/9/2015	202.07	24.35	177.72
	2/4/2015	202.07	23.91	178.16
	3/10/2015	202.07	22.27	179.80
	3/31/2015	202.07	22.29	179.78
12WW22	10/10/2014	190.20	10.98	179.22
	11/8/2014	190.20	10.75	179.45
	12/8/2014	190.20	10.60	179.60
	1/9/2015	190.20	9.60	180.60
	2/4/2015	190.20	9.05	181.15
	3/10/2015	190.20	6.92	183.28
	3/31/2015	190.20	7.41	182.79
12WW23	10/10/2014	196.97	19.37	177.60
	11/8/2014	196.97	19.19	177.78
	12/8/2014	196.97	19.04	177.93
	1/9/2015	196.97	19.34	177.63
	2/4/2015	196.97	19.10	177.87
	3/10/2015	196.97	18.83	178.14
	3/31/2015	196.97	18.71	178.26

Table 2-1: Monthly Groundwater Levels - LHAAP-12

Well ID	Measurement Date	Top of Casing Elevation (ft)	Depth to Water (ft btoc)	Groundwater Elevation (ft AMSL)
12WW24	10/10/2014	203.17	24.35	178.82
	11/8/2014	203.17	24.15	179.02
	12/8/2014	203.17	23.97	179.20
	1/9/2015	203.17	24.22	178.95
	2/4/2015	203.17	24.00	179.17
	3/10/2015	203.17	23.15	180.02
	3/31/2015	203.17	23.10	180.07

Table 2-2: Groundwater Elevation Data – LHAAP-12

Well ID	Sampling Date	Top of Casing Elevation (ft)	Depth to Water from TOC (ft)	Groundwater Elevation (ft AMSL)	Total Depth BGS (ft)	Screen Interval BGS (ft)
12WW20	6/15/2010	199.15	17.98	181.17	38.85	28.85-38.85
	6/7/2011	199.15	19.78	179.37		
	12/8/2012	199.15	22.03	177.12		
	1/8/2014	199.15	20.71	178.44		
	1/9/2015	199.15	19.34	179.81		
12WW21	6/15/2010	202.07	21.85	180.22	41.7	31.70-41.70
	6/7/2011	202.07	23.35	178.72		
	12/3/2012	202.07	24.21	177.86		
	1/8/2014	202.07	24.56	177.51		
	1/9/2015	202.07	24.35	177.72		
12WW22	6/15/2010	190.2	7.93	182.27	38.36	28.36-38.36
	6/7/2011	190.2	9.72	180.48		
	12/3/2012	190.2	13.46	176.74		
	1/8/2014	190.2	10.57	179.63		
	1/9/2015	190.2	9.6	180.60		
12WW23	6/16/2010	196.97	18.28	178.69	25.14	15.14-25.14
	6/7/2011	196.97	19.40	177.57		
	12/3/2012	196.97	20.38	176.59		
	1/8/2014	196.97	20.80	176.17		
	1/9/2015	196.97	19.34	177.63		
12WW24	6/16/2010	203.17	22.50	180.67	26	15.50-25.50
	6/7/2011	203.17	24.15	179.02		
	12/3/2012	203.17	Dry	Dry		
	12/9/2013	203.17	26.00	177.17		
	1/9/2015	203.17	24.22	178.95		

Table 2-3: Groundwater Analytical Results, Year 7 - LHAAP-12

Location ID: Sample Date:	Units	MCL/ MSC	12WW20-010915 1/9/2015	12WW21-010915 1/9/2015	12WW21FD-010915 1/9/2015	12WW22-010915 1/9/2015	12WW23-010915 1/9/2015	12WW24-010915 1/9/2015	12WW25(30)080914 9/8/2014
Volatile Organic Compounds (8260B)									
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<1 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.768 J	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.75 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<1 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	<2 U	<5 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.626 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<1 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<1 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	3.25	0.293 J
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	<5 U	<5 U	<5 U	<12.5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.626 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	<5 U	<5 U	<5 U	<5 U	<12.5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U	<5 U	<5 U	<5 U	<12.5 U	<5 U
ACETONE	ug/L	92000	<5 U	<5 U	<5 U	<5 U	<5 U	<12.5 U	5.15 J
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.649 J	0.38 J
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.626 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<1 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 UJ
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	7.64	0.873 J
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.626 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	70.8	0.402 J
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U

Table 2-3: Groundwater Analytical Results, Year 7 - LHAAP-12

Location ID: / Sample Date:	Units	MCL/ MSC	12WW20-010915 1/9/2015	12WW21-010915 1/9/2015	12WW21FD-010915 1/9/2015	12WW22-010915 1/9/2015	12WW23-010915 1/9/2015	12WW24-010915 1/9/2015	12WW25(30) 080914 9/8/2014
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 UJ
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	0.388 B
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<1 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.626 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.538 J	<1.25 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.626 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	1.87 J	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U	<1 U	<1 U	<2.5 U	<1 U
TRICHLOROETHENE	ug/L	5	0.293 J	<0.5 U	<0.5 U	<0.5 U	<0.5 U	353	0.317 J
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<1.25 U	<0.5 U

Blue Highlighting Indicates Analyte Detected Above MCL/MSC.

B - Blank contamination: The analyte was found in an associated blank as well as in the sample.

J - Estimated value; analyte concentration was less than the limit of quantification

MCL - maximum contaminant level

MSC - medium specific concentrations

NA - not analyzed

U - Analyte was not detected.

UJ - The analysis was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. 'UJ' not detects are not definite; the analyte may be present.

µg/L - microgram per liter

Table 2-4: Cumulative TCE Concentrations (ug/L) at LHAAP-12 Monitoring Wells

Sampling Date	Monitoring Wells					
	12WW20	12WW21	12WW22	12WW23	12WW24	*12WW25(30)
Dec 2006	0.713	ND(1)	ND(1)	ND(1)	404	--
Sept 2007	1.34	ND(1)	ND(1)	ND(1)	272	--
Dec 2007	1.19	ND(1)	ND(1)	ND(1)	313	--
Mar 2008	0.999J	ND(0.25)	ND(0.25)	ND(0.25)	301	--
Jun 2008	1.04	ND(0.25)	ND(0.25)	ND(0.25)	237	--
Sept 2008	0.985	ND(0.25)	ND(0.25)	ND(0.25)	185	--
Feb 2009	1.18	ND(0.25)	ND(0.25)	ND(0.25)	334	--
Apr 2009	0.997	ND(0.25)	ND(0.25)	ND(0.25)	197	--
Jul 2009	0.931	ND(0.25)	ND(0.25)	ND(0.25)	204	--
Jun 2010	0.353J	ND(0.25)	ND(0.25)	ND(0.25)	145	--
Jun 2011	0.263J	ND(0.25)	ND(0.25)	ND(0.25)	147	--
Dec 2012	0.5J	0.582J	ND(0.5)	ND(0.5)	Dry Well	--
Jan 2014	5	0.721J	ND(0.5)	ND(0.5)	**259	--
Aug 2014	--	--	--	--	--	0.317J
Jan 2015	0.293J	ND(0.25)	ND(0.25)	ND(0.25)	353	--

Notes:

*	This was a DPT boring grab groundwater sample, no well was subsequently installed.
**	Analyte was diluted 5X
J	estimated result
ND	not detected; values within parentheses denote detection limits

3 CONCLUSIONS

Physical inspections and groundwater monitoring continue to be completed at LHAAP-12 in compliance with the ROD for LHAAP-12 (Shaw, 2006). No damage to bollards, pads, or protective casings was observed, and no encroachment of weeds or brush on the well pads was observed. No change in land or groundwater use has occurred at the site. Inspections conducted indicated that no repairs to the cap were needed, and the area of subsidence will be observed to ensure the landfill cap cover continues to cover landfill contents. No significant issues were identified regarding the cap condition or maintenance, signs, or site use. LUCs were verified, and the use of the site is still consistent with that mandated by the ROD.

In accordance with the Groundwater Sampling Plan, found in Appendix A of the RD Addendum for LHAAP-12 (Shaw, 2007), annual sampling of wells will continue until the next Five-Year Review. Results for Year 7 are documented in this report.

Monitoring well 12WW24 was sampled on January 9, 2015 for VOCs. TCE was detected above its MCL at 353 µg/L. The MCL for TCE is 5 µg/L. Cis-1,2-DCE was detected above its MCL at 70.8. The MCL for cis-1,2-DCE is 70. VOC concentrations in 12WW24 have shown a decreasing trend over the past several years excluding the most recent two years, where TCE and cis-1,2-DCE increased. The past seven (7) months of groundwater level measurements (the March 31, 2015 gauging event represented the month of April) have not shown any significant changes with regards to seasonal variations, although these measurements have only been through the fall and winter cycle. The measurements began October 2014. A proposed location for an additional monitoring well (12WW25) was not installed within the plume at site 12 due to the limited plume size. This DPT point was reviewed with the results showing low levels of COCs (below the MCLs). Limited sampling groundwater elevation data (**Figure 2-3**) indicated a slight inverse correlation between groundwater elevation and concentrations in 12WW24 (average correlation coefficient of -49%). Some seasonal variation was determined to be present in the levels of the COCs over time as the data were collected in variable seasons. The increase in TCE in the last two years is associated with low water level and the samples being collected in the winter season.

Monitoring wells 12WW20, 12WW21, 12WW22, and 12WW23 were sampled on January 9, 2015 for VOCs. No contaminants were detected above their MCLs. Monitoring well 12WW20 had detections for TCE (0.293 J µg/L), but they were not above the MCL/ medium specific concentration.

Based on gauging results of seven (7) consecutive months and analytical data, it is recommended to sample monitoring well 12WW22 once every five years and to eliminate monitoring well 12WW23 from the network of monitored wells. Wells 12WW22 and 12WW23 will continue to be included in well gauging events.

4 REFERENCES

AECOM, 2013, *Standard Operating Procedures, Groundwater Sampling Procedures*, Longhorn Army Ammunition Plant, Karnack, Texas, June.

AECOM, 2014, *Final 2013 Five-Year Review Report,* Longhorn Army Ammunition Plant, Karnack, Texas, May.

Shaw, 2006, *Final Record of Decision, Landfill 12 (LHAAP-12)*, Longhorn Army Ammunition Plant, Karnack, Texas, August.

Shaw, 2007, *Final Remedial Design Addendum Landfill 12 (LHAAP-12),* Longhorn Army Ammunition Plant, Karnack, Texas, June.

Shaw, 2011, *Draft Annual Remedial Action Operation Report, Years 1 and 2, Landfill 12 (LHAAP-12),* Longhorn Army Ammunition Plant, Karnack, Texas, June.

APPENDIX A: PHOTO LOG

Photo 1 - LHAAP-12 Fence after tree removal – November 2014

Photo 2 - LHAAP-12 Typical view of western edge of Landfill to north – November 2014

Photo 3 - LHAAP-12 small area of subsidence ~18” deep along western edge of Landfill – November 2014

Photo 4 - LHAAP-12 Viewing north along east edge of Landfill – November 2014

Photo 5 – View of monitoring well 12WW20

Photo 6 – View of monitoring well 12WW21

Photo 7 – View of monitoring well 12WW23

Photo 8 – View of monitoring well 12WW24

APPENDIX B: LUC INSPECTION AND MAINTENANCE LOG

LUC Inspection and Maintenance Log - LHAAP 12

Date	Inspected by:	Inspection / MaintenanceActivitiesYearly, at a minimum					Corrective action or repairs required?	Repairs / Action Taken
		Protect Landfill Integrity				Prevent Human Exposure to Groundwater		
		Vegetative Cover maintained: i.e. grass mowed at least annually	Fence and signage maintained	Observance of landfill cover degredation -e.g. desiccation cracks, erosion, or gullying	Continued compliance verified for no digging or disturbance of landfill cover or contents	Verified no withdrawl of use of groundwater (other than environmental testing)		
11/21/2014	Wacker, D.	Completed and maintained. Vegetative cover is in good condition. See photos 2 and 4 of the photo log.	Tree down along fence line at SW edge of LF.	No cover degredation observed.	No evidence of animal burrows along north east edge of cap, as seen during the 2013 inspection.	Completed and verified.	Remove tree from fence line at SW edge of LF.	Tree removed from fence line at SW edge of LF during inspection. See photo 1 of the photo log.
11/21/2014	Wacker, D.		Remainder of fencing and signage in good repair.		Small area of subsidence, ~18" deep, along western edge of LF.		No corrective action required.	Continue to observe subsidance, and ensure LF cap continues to cover contents.

APPENDIX C: 12WW25 DPT LOG & INSTALLATION MEMO

AECOM

Client: USACE
Project Number: 60274185
Site Location: LHAAP-12
Coordinates: Elevation
Drilling Method: HSA
Sample Type(s): 5' Core Barrel
Boring Diameter: 10¼"
Weather: Sunny. 90° F
Logged By: B. H.
Drilling Contractor: Fugro
Ground Elevation:
Date/Time Started: 9/8/14
Date/Time Finished: 9/8/14

BORING ID: 12WW25
Sheet 1 of 2
Monitoring Well Installed:
Screened Interval:
Depth of Boring: 35 feet
Water Level: 24.40' bgs

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
1–3				60" / 60"	0.1	SM	Silty Sand, brown to strong brown, dry to damp, loose to medium dense, no odor.		
3.5'									
4–5					0.0	ML	Silt, pinkish gray with yellowish red mottling, dry, medium stiff, no odor.		
5.5'									
6					0.0	SM	5.5', Silty Sand, light gray to light brown,		
6.0'							damp, loose to medium dense.		
7				45" / 60"		SP	Fine sand with silt, light gray, dry,		
7.4'							dense, no odor.		
8					0.0	ML	Sandy silt, light gray with brown		
8.7'							mottling, moist, stiff, no odor.		
9–10					0.0	NR	10.0' No Recovery		
11–12				60" / 60"	0.0	CL	Sandy clay, light gray, moist, very stiff.		
13.6'									
14					0.0	SM	13.6', Silty Sand light gray, damp,		
14.1'							medium dense, no odor.		
15						ML	15.0' Sandy silt, light gray, damp, medium		
							stiff to stiff, no odor.		
16				56" / 60"	0.0	SM	Silty Sand, light gray, damp to moist,		
17.0'							loose to medium dense, no odor.		
18					0.0	SW	Fine Sand, light gray, damp to moist, loose to medium dense,		
19							No odor.		
19.7'									
20					0.0	NR	No Recovery		

NOTES:

Date	Time	Depth to groundwater while drilling
9/8/14	11:32	27.25 ft, bgs
9/8/14	12:25	24.40 ft, bgs

Checked by: Brian Ho Date: 9/10/14

00216345

AECOM

Client: USACE
Project Number: 60274185
Site Location: LHAAP-12
Coordinates: Elevation
Drilling Method: HSA
Sample Type(s): 5' Core Barrel Boring Diameter: 10¼"
Weather: Sunny 90°F Logged By: B.H. Date/Time Started: 9-8-14
Drilling Contractor: Fugro Ground Elevation: Date/Time Finished: 9-8-14

BORING ID: 12WW25
Sheet 2 of 2
Monitoring Well Installed: No
Screened Interval:
Depth of Boring: 35 feet
Water Level: 24.40' bgs

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21						SW	Fine Sand, light gray, moist, loose, no odor.		
22				60" / 60"	0.0				
23									
24					0.0		Wet at 23.9', otherwise same As Above		
25							25.0'		
26					0.0	SC	Clayey Sand, gray, wet, medium stiff, no odor.		
27				60" / 60"					
28					0.0		28.2'		
29						SW	29.1' Fine Sand, gray, wet, loose to medium dense, no odor.		
30					0.0	CL / SW	29.6' clay, gray, moist, very stiff, no odor. 30.0' Fine Sand, brown, moist, loose, no odor.		
31						CL	Clay, gray with brown mottling, moist, stiff, no odor.		
32				48" / 60"			32.3'		
33						SW / CL / SW	32.4' Fine Sand, wet, brown, loose, no odor. 32.7' Clay, gray, moist, stiff, no odor. 32.9' Fine Sand, gray, wet loose, no odor.		
34						CL / SC	33.7' clay, gray, moist, stiff, no odor. 34.0' clayey Sand, gray, moist to wet, loose to soft, no odor.		
35						NR	35.0' No Recovery		
36									
37							Drilling Terminated, TD = 35 feet		
38									
39									
40									

NOTES:
Groundwater grab sample 12WW25(30)080914 was collected at 12:40 for VOC analysis (8260B).

Date	Time	Depth to groundwater while drilling

Checked by: Brian Ho Date: 9/10/14

00216346

AECOM

MEMORANDUM

DATE: August 18, 2014

PROJECT NAME: Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Karnack, TX

TO:	Rose Zeiler	Site Manager
	Richard Smith	Project Manager
	Aaron Williams	Project Engineer
FROM:	Dave Wacker	AECOM PM, 210-253-7514

SUBJECT: **Installation of New Plume Monitoring Well at LHAAP-12**
Longhorn Army Ammunition Plant, Karnack, TX
(Contract: W912DY-09-D-0059, Task Order DS01)

1 INTRODUCTION

Well 12WW24 is currently the sole well monitoring the shallow groundwater zone plume at LHAAP-12. This well is installed at a relatively shallow depth, resulting in dry well conditions during the 2012 annual Long Term Monitoring (LTM) sampling event.

Per recommendation of the 2012 Five Year Review for the site, installation of an additional plume monitoring well has been evaluated.

2 EVALUATION AND RECOMMENDATIONS

In determining a location with the highest probability of intersecting the plume, historical LHAAP-12 groundwater data was reviewed. Two well locations downgradient from plume well 12WW24 were found to have historical TCE detections. 12WW10 was located approximately 185 feet east of 12WW24. TCE was found in 12WW10 at its highest concentration of 14.5 µg/L in February 2003, but sampling ceased after TCE concentrations declined (1.84 µg/L in February 2004, 6.96 µg/L in December 2004), and the well was abandoned in 2007. 12WW01 located approximately 185 feet southeast of 12WW24 is an existing well that was last sampled in August 2006, but is not sampled under the current LTM plan. The only detection of TCE in this well occurred in 1993 at a concentration of 27 µg/L.

Using these two wells with historical impacts as a downgradient guide, the location proposed for new plume well 12WW25 is located 50 feet east of 12WW24, just south of the line between 12WW24 and 12WW10 (see attached **Figure 1**).

If the plume is not encountered at proposed 12WW25, located only 50 feet downgradient of impacted well 12WW24, this indicates that plume is very limited in extent and does not require a

second well to adequately assess plume conditions. Under this scenario, AECOM instead recommends augmentation of plume well 12WW24 through installation of a deeper shallow zone well at that location. This action will better ensure uninterrupted monitoring of the shallow zone plume even under seasonal or multi-year dry conditions where the water table is lowered, as failure to obtain plume data from 12WW24 due to its shallow installation depth well creates a data gap, complicating on-going trend analysis.

Review of the Final Remedial Design Addendum (Shaw, 2007) indicates well 12WW24 is installed with a total depth of only 26 feet, screened shallowly across the 15.5' – 25.5' below ground surface (bgs) interval. 12WW20, only 100' west-northwest (upgradient), is installed as a shallow zone monitoring well with a greater total depth of 38 feet, and screened deeper across the interval 28' – 38' bgs. 12WW20 maintained nearly 20 feet of water column during even the lowest water table levels observed in 2012.

Given similar lithology at 12WW24 and 12WW20, the additional well will be installed as close as possible to the current 12WW24 location, but with a greater total depth and deeper screened interval, similar to that of 12WW20. Depending upon field conditions, a longer screen length (20-30') may be utilized to prevent a piezometer configuration in the replacement well during non-drought conditions.

Because 12WW24 is currently a functioning monitoring well, containing sufficient water for sampling during the 2013 annual monitoring event, abandonment is not recommended at this time.

3 WELL INSTALLATION PROCEDURES AND REPORTING

Prior to installation of a well at the proposed 12WW25 location, intersection with the plume will be confirmed by installation of a boring, and laboratory analysis of a grab sample from a temporary groundwater sampling point. If intersection with the plume is not confirmed, a well will not be installed at this location.

This monitoring well will be installed in compliance with the Installation-Wide Work Plan in place at the time the work is conducted, and monitored in accordance with the LHAAP-12 Final Remedial Design Addendum (Shaw, 2007).

Installation of this well and analytical data from the initial sampling event will be reported in the 2014 Remedial Action Operation Report.

4 ANTICIPATED SCHEDULE FOR THE PROPOSED WORK

This well is currently planned for installation in August 2014.

5 REFERENCES

Shaw, 2007. *Final LHAAP-12 Well Abandonment and Installation Report, Longhorn Army Ammunition Plant, Karnack, Texas,* April.

Shaw, 2007. *Final Remedial Design Addendum, Landfill 12 (LHAAP-12), Longhorn Ammunition Plant, Karnack, Texas*, June.

6 ATTACHMENT

Figure 1. New Well 12WW25 Proposed Location

.

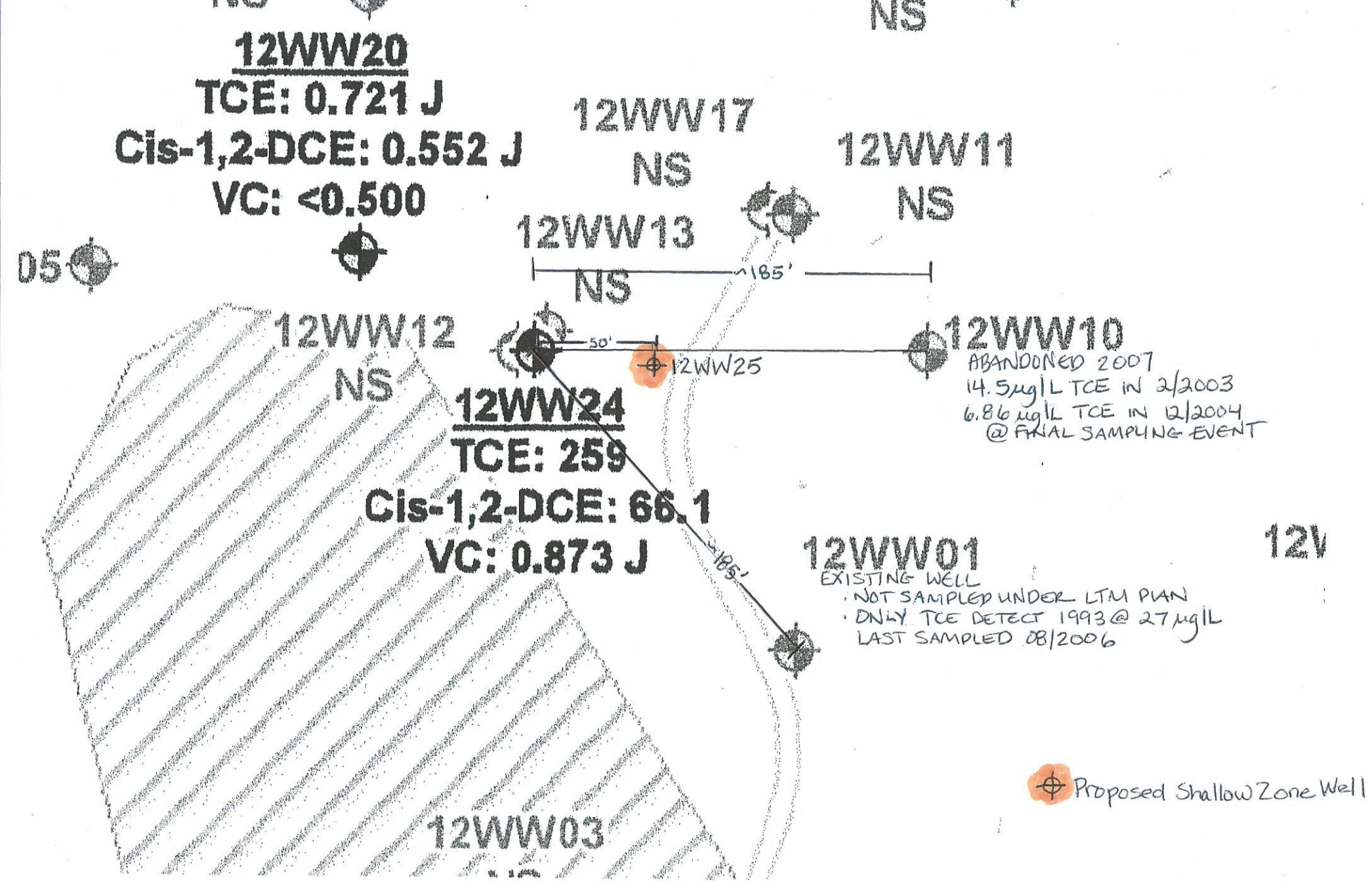
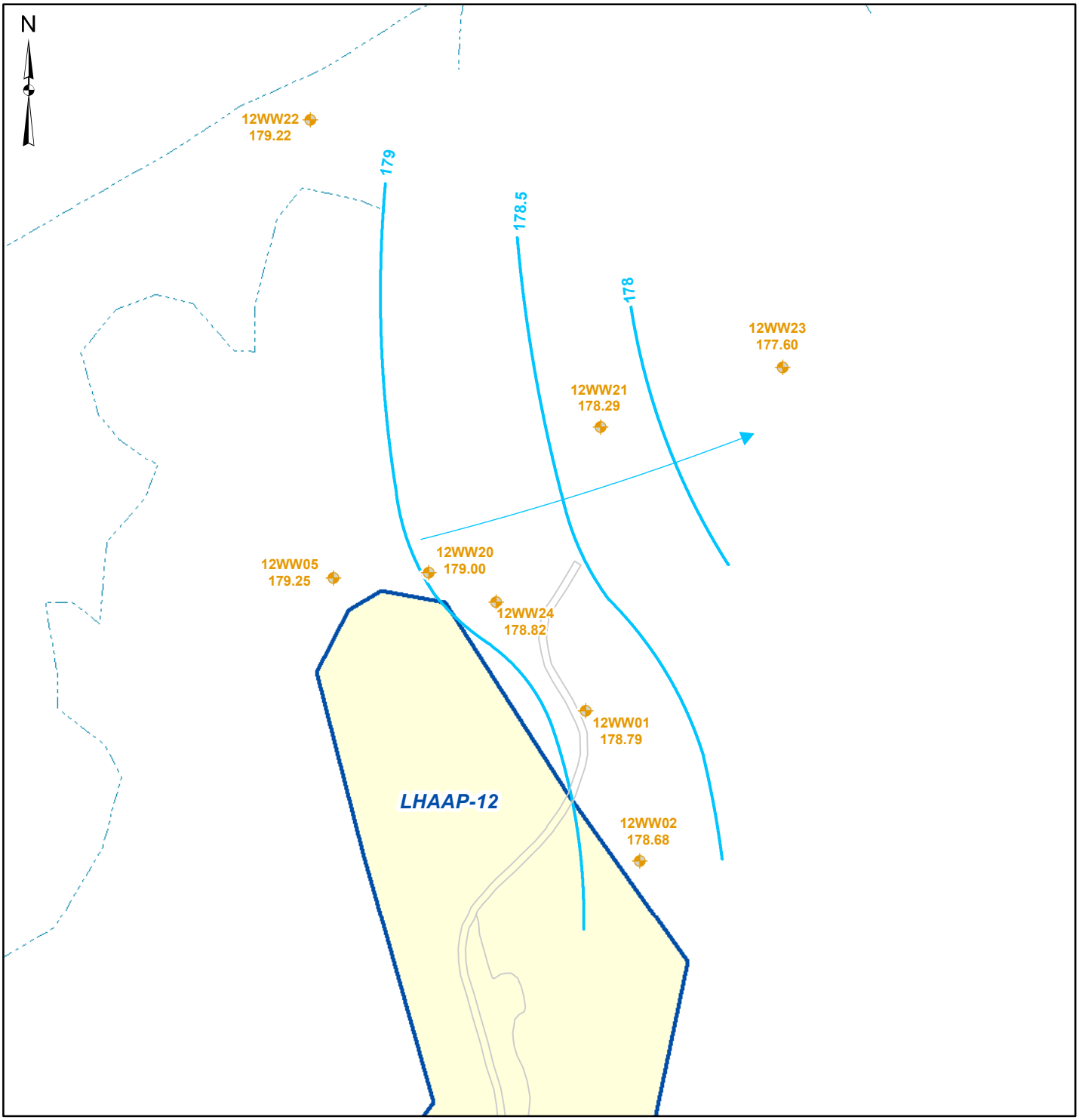


FIGURE 1
NEW WELL 12WW25 PROPOSED LOCATION
LHAAP-12

00216349

APPENDIX D: GROUNDWATER GRADIENT MAPS



Legend

- Shallow Monitoring Well
- Groundwater Flow Direction
- Groundwater Gradient Contour
- Roads
- Streams
- Site (Boundary of Landfill Cap)

0 100 200 400 Feet

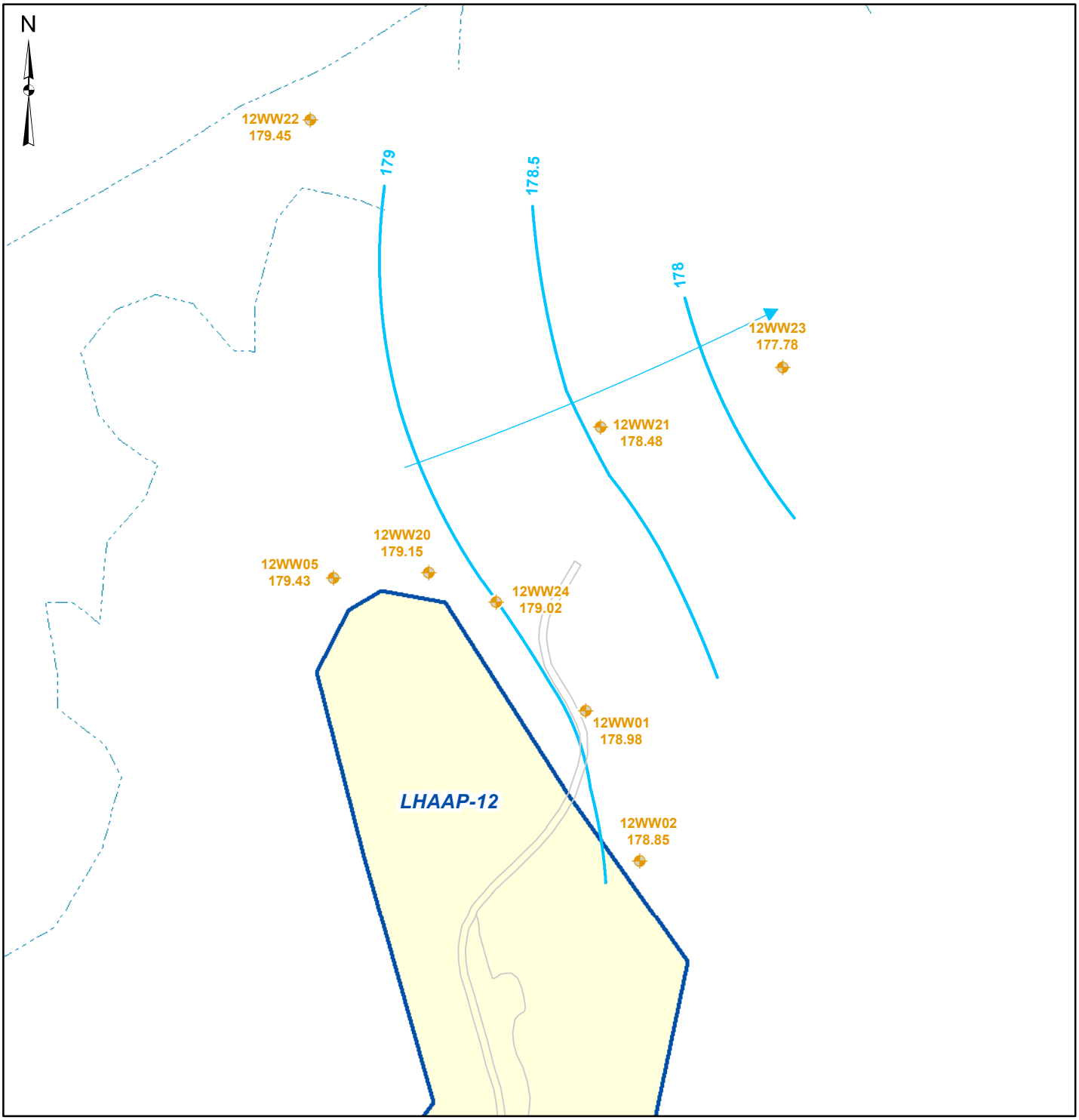
AECOM

Figure A
Groundwater Gradient Map
October 10, 2014
LHAAP-12
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

May 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\Monthly_GW_Levels\2015_05_11\Figure A_LHAAP12_GW Gradient Map_Oct2014.mxd



Legend

- Shallow Monitoring Well
- Groundwater Flow Direction
- Groundwater Gradient Contour
- Roads
- Streams
- Site (Boundary of Landfill Cap)

0 100 200 400 Feet

AECOM

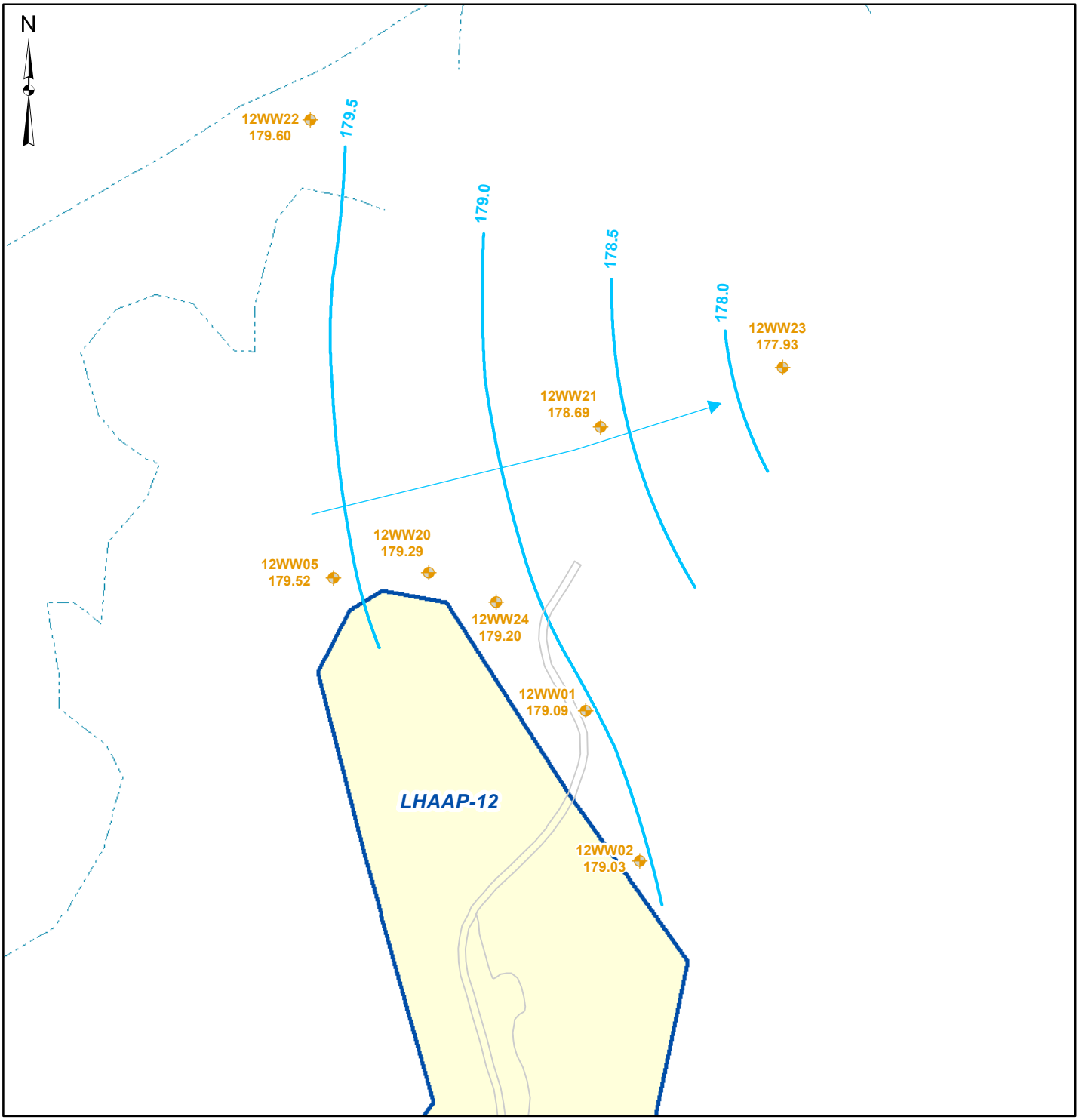
Figure B
Groundwater Gradient Map
November 8, 2014
LHAAP-12
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

May 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\Monthly_GW_Levels\2015_05_11\Figure B_LHAAP12_GW Gradient Map_Nov2014.mxd

00216352



Legend

- Shallow Monitoring Well
- Groundwater Flow Direction
- Groundwater Gradient Contour
- Roads
- Streams
- Site (Boundary of Landfill Cap)

0 100 200 400 Feet

AECOM

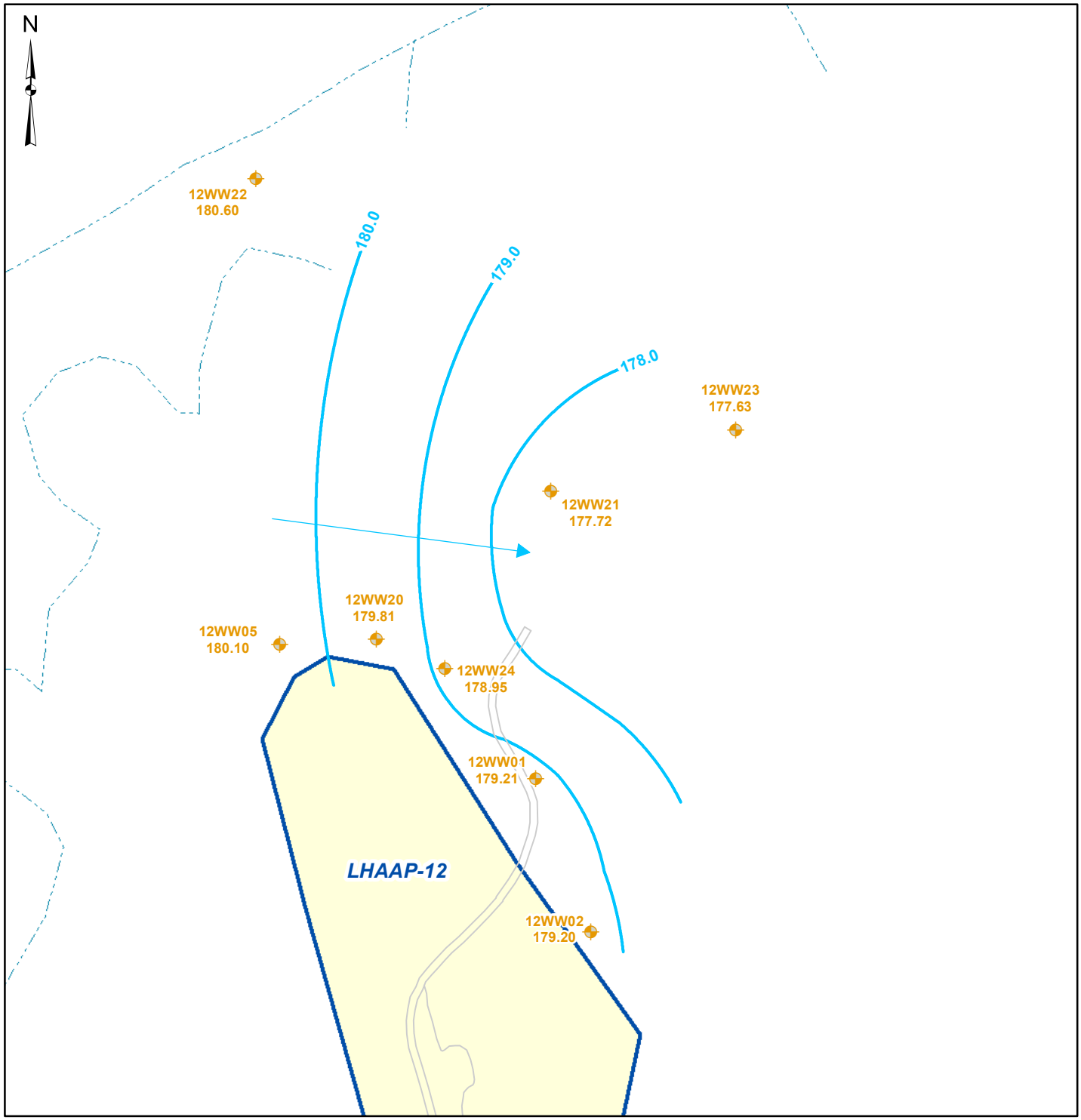
Figure C
Groundwater Gradient Map
December 8, 2014
LHAAP-12
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

May 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\Monthly_GW_Levels\2015_05_11\Figure C_LHAAP12_GW Gradient Map_Dec2014.mxd

00216353



Legend

- Shallow Monitoring Well
- Groundwater Flow Direction
- Groundwater Gradient Contour
- Roads
- Streams
- Site (Boundary of Landfill Cap)

0 100 200 400 Feet

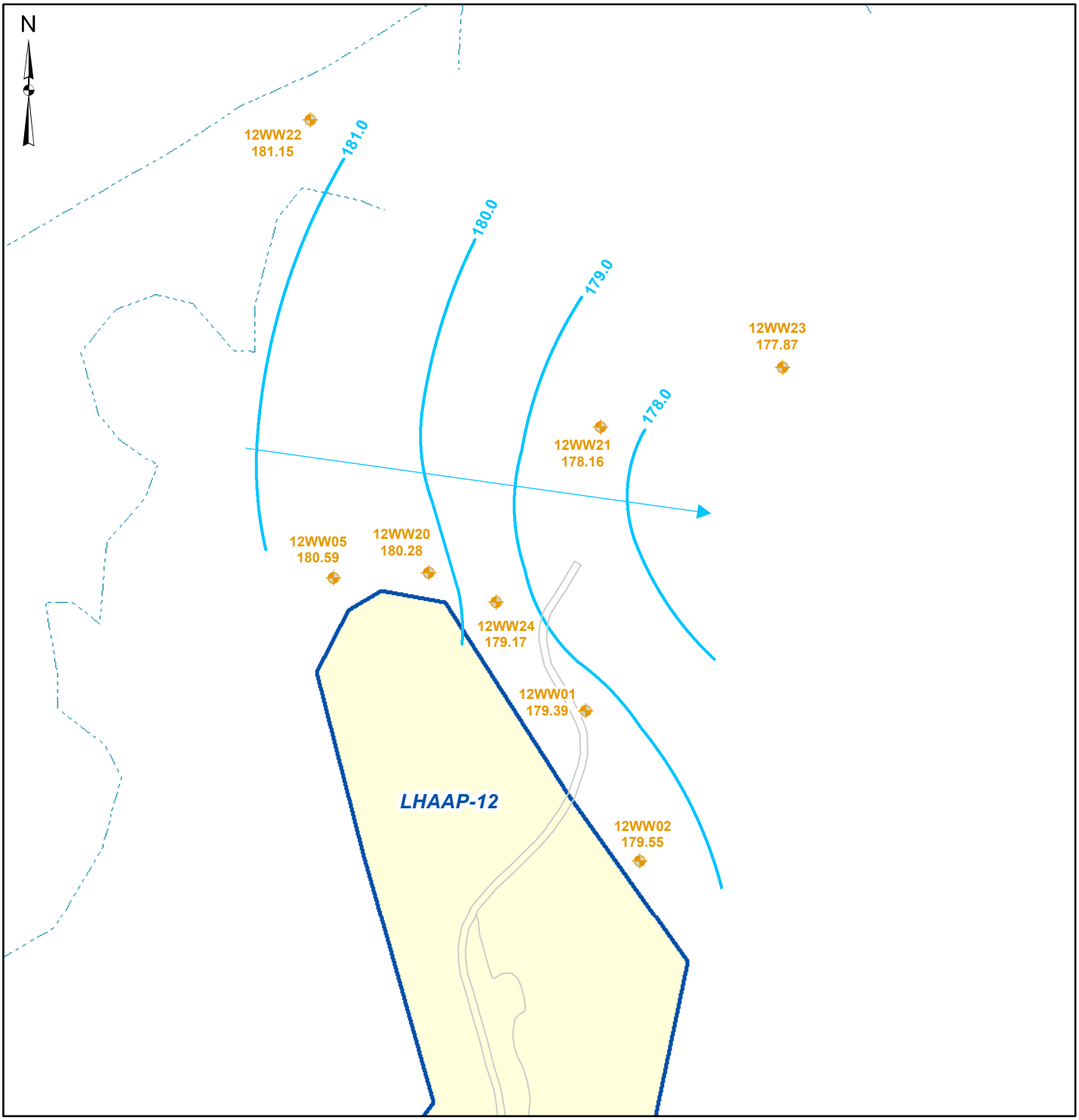
AECOM

Figure D
Groundwater Gradient Map
January 9, 2015
LHAAP-12
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

May 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\Monthly_GW_Levels\2015_05_11\Figure D_LHAAP12_GW Gradient Map_Jan2015.mxd



Legend

- Shallow Monitoring Well
- Groundwater Flow Direction
- Groundwater Gradient Contour
- Roads
- Streams
- Site (Boundary of Landfill Cap)

0 100 200 400 Feet

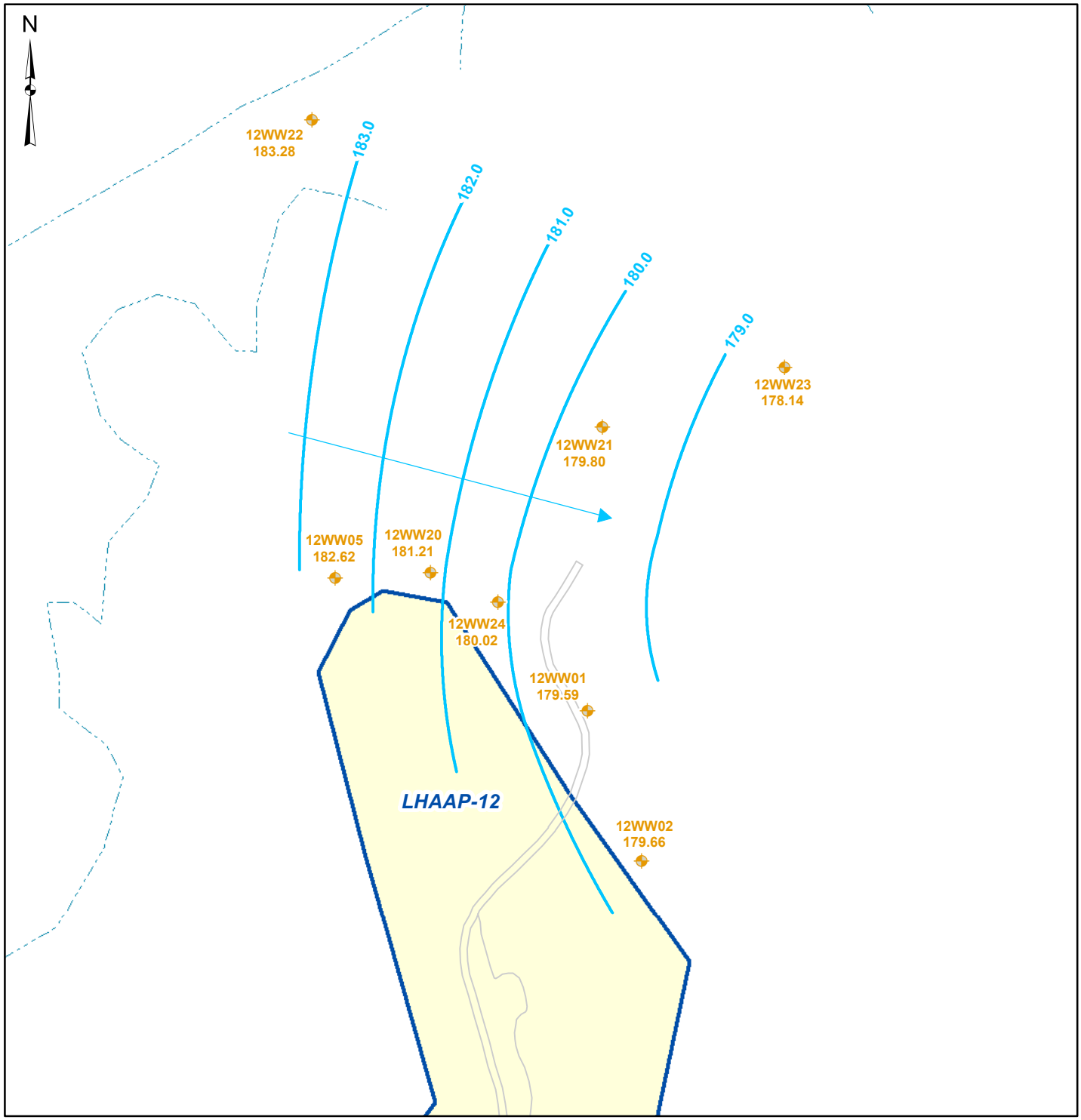
AECOM

Figure E
Groundwater Gradient Map
February 4, 2015
LHAAP-12
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

May 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\Monthly_GW_Levels\2015_05_11\Figure E_LHAAP12_GW Gradient Map_Feb2015.mxd



Legend

- Shallow Monitoring Well
- Groundwater Flow Direction
- Groundwater Gradient Contour
- Roads
- Streams
- Site (Boundary of Landfill Cap)

0 100 200 400 Feet

AECOM

Figure F
Groundwater Gradient Map
March 10, 2015
LHAAP-12

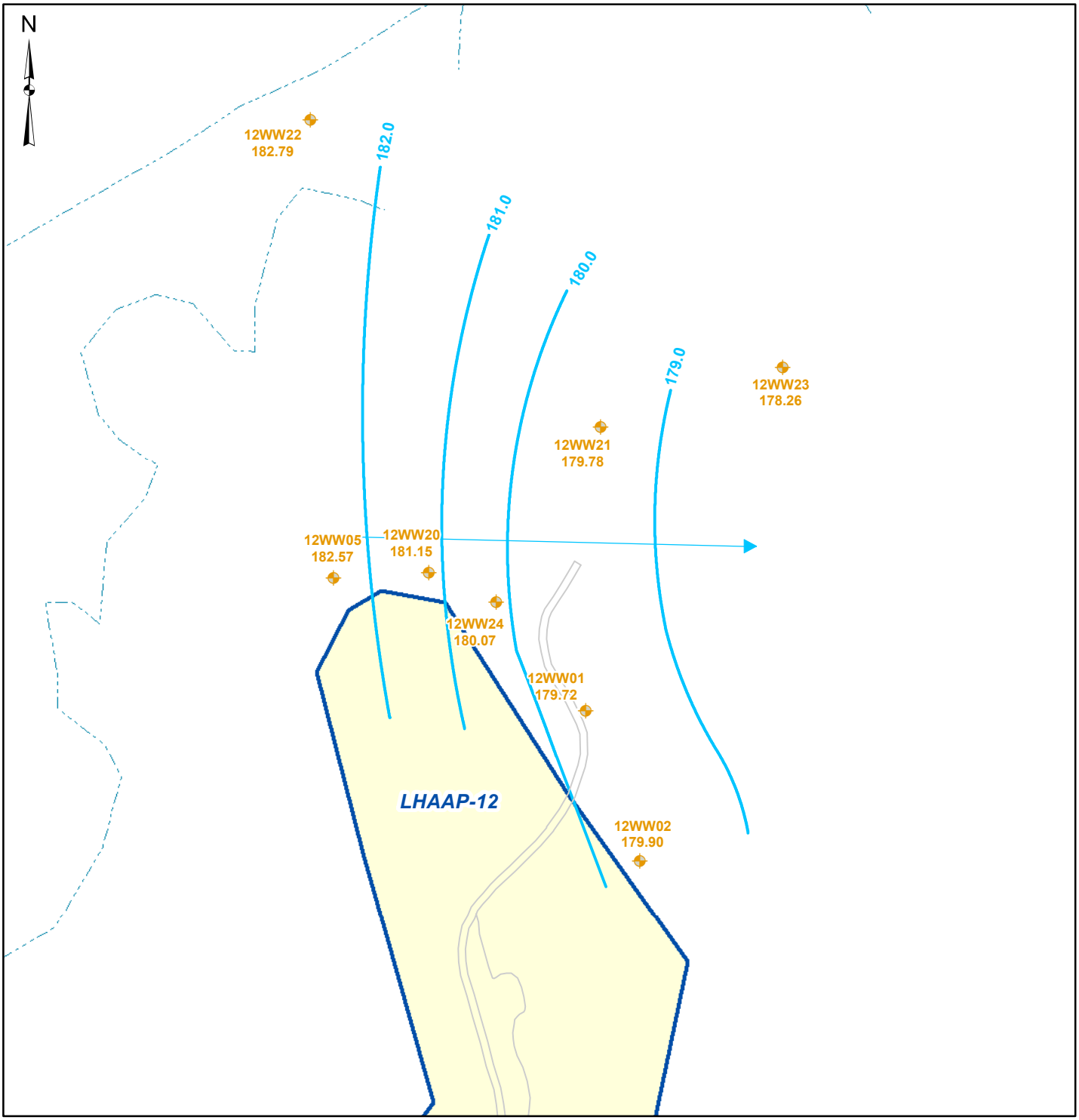
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

May 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\Monthly_GW_Levels\2015_05_11\Figure F_LHAAP12_GW Gradient Map_10March2015.mxd

00216356



Legend

- Shallow Monitoring Well
- Groundwater Flow Direction
- Groundwater Gradient Contour
- Roads
- Streams
- Site (Boundary of Landfill Cap)

0 100 200 400 Feet

AECOM

Figure G
Groundwater Gradient Map
March 31, 2015
LHAAP-12

Longhorn Army Ammunition Plant
Karnack, Texas

60256135

May 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-12\Monthly_GW_Levels\2015_05_11\Figure G_LHAAP12_GW Gradient Map_31March2015.mxd

00216357

APPENDIX E: MONITORING WELL SAMPLING FORMS

AECOM

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: 12	LocID: 12WW20		Date: 1/9/15	
	Project: Longhorn Army Ammunition Plant	Project No. 60256135.0005AA		Recorded By: Scott Beesinger	Checked By:
EQUIPMENT	Water Quality Meter Type/ID #: Horiba U-52	Water Interface Probe:	Water Level Indicator: ID#: 611ces/cevr	Min Recharge Level = (TD-DTW(0.80)) - TD	
	Unit #	Sampling Equipment:	Peristaltic/Bladder/Bailer ID#:		
WELL INFO	Casing I.D. (in) [a]: 4	Static Water Level Reading (ft) [c]: 19.34		Weather Conditions: CLEAR / COLD	
	Total Well Depth (ft) [d]: 39.28	Screened Interval/Pump placement: 28-38 / 33.00		Condition of Well/Remarks: GOOD	

CASING INFO												
Casing I.D. (in) [a]:	0.75	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (gal/in ft) [b]:	0.023	0.09	0.16	0.20	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Date	Time (24 hr)	Water Level (FTOC)	Pumping Rate (mL/min)	Temp. (°C)	pH	Cond (µS/cm)	DO (mg/L)	Turb. (NTU)	ORP (mv)	Remarks (odor, clarity, etc.)
1/9/15	0805	19.30	100	12.44	5.30	1.13	1.67	11.0	172	
1/9/15	0810	19.35	100	14.32	5.23	1.11	1.01	7.3	256	
1/9/15	0815	19.38	100	15.03	5.15	1.10	1.06	3.9	321	
1/9/15	0820	19.40	100	15.50	5.15	1.09	1.17	2.5	357	
1/9/15	0825	19.42	100	15.64	5.17	1.09	1.13	2.3	396	
1/9/15	0830	19.44	100	15.80	5.13	1.09	1.14	2.8	398	
1/9/15	0835	19.46	100	15.82	5.13	1.09	1.12	2.7	400	
1/9/15	0840	19.48	100	15.87	5.12	1.09	1.11	2.5	401	

Pump Rate: <=0.5 L/min Drawdown: <0.33 ft Measurements: 3-5 min Stabilization: +/-10% C, +/-0.1 pH, +/-3% Cond, +/-10% DO, +/-10%Turb(<=10 NTU Ideal), for 4 consecutive readings

SAMPLE ID: 12WW20-010915 TIME: 0840

DUPLICATE (D): YES/NO NO

MATRIX SPIKE (MS): YES/NO NO

MATRIX DUPLICATE (MD): YES/NO NO

CO= LEL= OXY= H2S=

No. Containers/Volume/Type	Preserv.	Filter (Y/N)	Pump OR Bailer	Parameter(s)
3 - 40 ml glass	HCL	N	Pump	VOC

00216359

AECOM

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: 12	LocID: 12WW21	Date: 1/9/15
	Project: Longhorn Army Ammunition Plant	Project No. 60256135.0005AA	Recorded By: Scott Beesinger Checked By:
EQUIPMENT	Water Quality Meter Type/ID #: Horiba U-52	Water Interface Probe: Water Level Indicator: ID#: 611ces/cevr	Min Recharge Level = (TD-DTW(0.80)) - TD
	Unit #	Sampling Equipment: Peristaltic/Bladder/Bailer ID#:	
WELL INFO	Casing I.D. (in) [a]: 4 11	Static Water Level Reading (ft) [c]: 24.35	Weather Conditions: CLEAR / COLD
	Total Well Depth (ft) [d]: 41.83	Screened Interval/Pump placement: 31-41 / 36.00	Condition of Well/Remarks: GOOD

CASING INFO												
Casing I.D. (in) [a]:	0.75	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (gal/in ft) [b]:	0.023	0.09	0.16	0.20	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Date	Time (24 hr)	Water Level (FTOC)	Pumping Rate (mL/min)	Temp. (°C)	pH	Cond (µS/cm)	DO (mg/L)	Turb. (NTU)	ORP (mv)	Remarks (odor, clarity, etc.)
1/9/15	0920	24.31	100	15.08	5.91	4.80	0.75	5.9	81	
1/9/15	0925	24.35	100	15.79	5.91	4.84	0.00	8.2	50	
1/9/15	0930	24.38	100	16.09	5.93	4.98	0.00	7.2	38	
1/9/15	0935	24.40	100	16.21	5.94	5.00	0.00	6.0	35	
1/9/15	0940	24.42	100	16.41	5.95	5.01	0.00	3.9	32	
1/9/15	0945	24.43	100	16.42	5.96	5.01	0.00	4.1	32	
1/9/15	0950	24.43	100	16.45	5.97	5.01	0.00	4.1	32	

Pump Rate: <=0.5 L/min Drawdown: <0.33 ft Measurements: 3-5 min Stabilization: +/-10% C, +/-0.1 pH, +/-3% Cond, +/-10% DO, +/-10%Turb(<=10 NTU ideal), for 4 consecutive readings

SAMPLE ID: 12WW21-010915 TIME: 0950

DUPLICATE (D): YES/NO YES

MATRIX SPIKE (MS): YES/NO NO

MATRIX DUPLICATE (MD): YES/NO NO

CO= LEL= OXY= H2S=

No. Containers/Volume/Type	Preserv.	Filter (Y/N)	Pump OR Bailer	Parameter(s)
6 - 40 ml glass	HCL	N	Pump	VOC

00216360

AECOM

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: 12	LocID: 12 WW 22		Date: 1/9/15	
	Project: Longhorn Army Ammunition Plant	Project No. 60256135.0005AA		Recorded By: Scott Beesinger	Checked By:
EQUIPMENT	Water Quality Meter Type/ID #: Horiba U-52	Water Interface Probe:	Water Level Indicator: ID#: 611ces/cevr	Min Recharge Level = (TD-DTW(0.80)) - TD	
	Unit #	Sampling Equipment:	Peristaltic/Bladder/Bailer ID#:		
WELL INFO	Casing I.D. (in) [a]: 4 11	Static Water Level Reading (ft) [c]: 9.60		Weather Conditions: CLOUDY / COLD	
	Total Well Depth (ft) [d]: 38.63	Screened Interval/Pump placement: 28-38 / 33.00		Condition of Well/Remarks: GOOD	

CASING INFO												
Casing I.D. (in) [a]:	0.75	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (gal/in ft) [b]:	0.023	0.09	0.16	0.20	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Date	Time (24 hr)	Water Level (FTOC)	Pumping Rate (mL/min)	Temp. (°C)	pH	Cond (µS/cm)	DO (mg/L)	Turb. (NTU)	ORP (mv)	Remarks (odor, clarity, etc.)
1/9/15	1300	9.55	100	12.87	6.67	0.692	3.03	16.4	-106	
1/9/15	1305	9.60	100	14.63	6.86	0.952	0.64	15.2	-135	
1/9/15	1310	9.63	100	15.49	6.88	1.04	0.31	16.7	-130	
1/9/15	1315	9.65	100	15.80	6.91	1.08	0.32	17.5	-120	
1/9/15	1320	9.66	100	15.66	6.91	1.09	0.33	16.0	-118	
1/9/15	1325	9.67	100	15.71	6.89	1.10	0.34	10.1	-104	
1/9/15	1330	9.67	100	15.77	6.86	1.10	0.35	9.8	-102	
1/9/15	1335	9.67	100	15.79	6.86	1.11	0.36	9.5	-101	
1/9/15	1340	9.67	100	15.82	6.85	1.11	0.36	9.6	-100	

Pump Rate: <=0.5 L/min Drawdown: <0.33 ft Measurements: 3-5 min Stabilization: +/-10% C, +/-0.1 pH, +/-3% Cond, +/-10% DO, +/-10%Turb(<=10 NTU ideal), for 4 consecutive readings

SAMPLE ID: 12WW22-010915 TIME: 1340

DUPLICATE (D): YES/NO NO

MATRIX SPIKE (MS): YES/NO NO

MATRIX DUPLICATE (MD): YES/NO NO

CO= LEL= OXY= H2S=

No. Containers/Volume/Type	Preserv.	Filter (Y/N)	Pump OR Bailer	Parameter(s)
3-40 ml glass	HCL	N	Pump	VOC

00216361

AECOM

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: 12		LocID: 12WW23		Date: 1/9/15
	Project: Longhorn Army Ammunition Plant		Project No. 60256135.0005AA		Recorded By: Scott Beesinger Checked By:
EQUIPMENT	Water Quality Meter Type/ID #: Horiba U-52		Water Interface Probe: Water Level Indicator: ID#: 611ces/cevr		Min Recharge Level = (TD-DTW(0.80)) - TD
	Unit #		Sampling Equipment: Peristaltic/Bladder/Bailer ID#:		
WELL INFO	Casing I.D. (in) [a]: 4"		Static Water Level Reading (ft) [c]: 19.34		Weather Conditions: CLEAR / COLD
	Total Well Depth (ft) [d]: 25.50		Screened Interval/Pump placement: 15-25 / 22.00		Condition of Well/Remarks: GOOD

CASING INFO												
Casing I.D. (in) [a]:	0.75	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (gal/in ft) [b]:	0.023	0.09	0.16	0.20	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Date	Time (24 hr)	Water Level (FTOC)	Pumping Rate (mL/min)	Temp. (°C)	pH	Cond (µS/cm)	DO (mg/L)	Turb. (NTU)	ORP (mv)	Remarks (odor, clarity, etc.)
1/9/15	1015	19.30	100	12.18	6.55	0.679	0.75	66.3	-27	
1/9/15	1020	19.35	100	12.53	6.15	0.452	0.00	39.9	-14	
1/9/15	1025	19.38	100	12.74	6.13	0.415	0.00	35.9	-14	
1/9/15	1030	19.41	100	12.89	6.12	0.400	0.00	33.1	-16	
1/9/15	1035	19.44	100	13.02	6.12	0.400	0.00	22.3	-19	
1/9/15	1040	19.47	100	13.13	6.11	0.400	0.00	22.5	-20	
1/9/15	1045	19.50	100	13.15	6.12	0.401	0.00	22.0	-21	
1/9/15	1050	19.52	100	13.18	6.12	0.401	0.00	22.4	-22	

Pump Rate: <=0.5 L/min Drawdown: <0.33 ft Measurements: 3-5 min Stabilization: +/-10% C, +/-0.1 pH, +/-3% Cond, +/-10% DO, +/-10%Turb(<=10 NTU ideal), for 4 consecutive readings

SAMPLE ID: 12WW23-010915 TIME: 1050

DUPLICATE (D): YES/NO NO
MATRIX SPIKE (MS): YES/NO NO
MATRIX DUPLICATE (MD): YES/NO NO

CO= LEL= OXY= H2S=

No. Containers/Volume/Type	Preserv.	Filter (Y/N)	Pump OR Bailer	Parameter(s)
3- 40ml glass	HCL	N	Pump	VOC

00216362

AECOM

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site: 12	LocID: 12WW24	Date: 1/8/15
	Project: Longhorn Army Ammunition Plant	Project No. 60256135.000.5AA	Recorded By: Beesinger Checked By:
EQUIPMENT	Water Quality Meter Type/ID #: Horiba U-52	Water Interface Probe: Water Level Indicator ID# Solinist 101	Min Recharge Level = (TD-DTW(0.80)) - TD
	Unit #	Sampling Equipment: Peristaltic/Bladder/Bailer ID#:	
WELL INFO	Casing I.D. (in) [a]: 4"	Static Water Level Reading (ft) [c]: 24.22	Weather Conditions: CLEAR / COLD
	Total Well Depth (ft) [d]: 27.84	Screened Interval/Pump placement: 15.5-25.5	Condition of Well/Remarks: GOOD

CASING INFO												
Casing I.D. (in) [a]:	0.75	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (gal/lin ft) [b]:	0.023	0.09	0.16	0.20	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Date	Time (24 hr)	Water Level (FTOC)	Pumping Rate (mL/min)	Temp. (°C)	pH	Cond (µS/cm)	DO (mg/L)	Turb. (NTU)	ORP (mv)	Total Fe (mg/L)	Ferrous Fe (mg/L)	Ferric Fe (mg/L)	Remarks (odor, clarity, etc.)
1/8/15	1240	24.22	NA										BAILING WELL
1/8/15	1249	27.80	NA										BAILED 3.5 GALLONS RAN DRY
1/9/15	0745	24.22	NA	15.37	4.83	1.07	7.13	15.7	181				

Pump Rate: <=0.5 L/min Drawdown: <0.33 ft Measurements: 3-5 min Stabilization: +/-10% C, +/-0.1 pH, +/-3% Cond, +/-10% DO, +/-10%Turb(<=10 NTU ideal), for 4 consecutive readings

SAMPLE ID: 12WW24-010915 TIME: 0745

DUPLICATE (D): YES/NO NO

MATRIX SPIKE (MS): YES/NO NO

MATRIX DUPLICATE (MD): YES/NO NO

CO= LEL= OXY= H2S=

No. Containers/Volume/Type	Preserv.	Filter (Y/N)	Pump OR Bailer	Parameter(s)
3-40 ml glass	HCL	N	BAILER	VOC

00216363

APPENDIX F: LABORATORY ANALYTICAL RESULTS

QUALITY CONTROL SUMMARY REPORT
FOR
LANDFILL 12 (LHAAP-12)
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

April 2015

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List of Tables

1 INTRODUCTION

AECOM reviewed two data packages from Microbac Laboratory Services, Marietta, OH. A DPT sample was collect on September 8, 2014 for confirmation of location in the plume. Groundwater samples were collected January 9, 2015 at Site 12 at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. Data were reviewed for conformance to the requirements of the following guidance documents: Automated Data Review by Laboratory Data Consultants (ADR.net), United States Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, (EPA, July 2002), and EPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, (EPA, June 2001).

1.1 Intended Use of Data

The objective of this sampling event for LHAAP-12 is to monitor remedy performance by natural attenuation with land use controls.

Analyses requested included SW8260 – Volatiles by GC/MS.

Table 1 lists completeness by method. Table 2 lists the sample identifications and their associated laboratory identifications. Table 3 lists qualified results with the associated quality control parameter that was exceeded.

1.2 Preservation and Holding Times

Sample identification data were evaluated for agreement with the chain-of-custody (COC). All samples were received in appropriate containers, within the proper temperature range, in good condition, and with the required signatures.

1.3 Calibrations

Initial calibration criteria modification includes RSD< or = to 30%, two compounds allowed up to 40%. If the continuing calibration verification (CCV) compound exceeds 30% drift, the compound is checked in the LCS, if both are outside recovery limits, the compound is rejected, R. If only the CCV exceeds recovery criteria and is less than ± 40% drift, then the compound is qualified J or UJ.

1.3.1 Continuing Calibration Verifications (CCV)

1.3.1.1 SW8260

CCV WG491745-02 has bromomethane at 67.4%, dichlorodifluoromethane at 71%, and trichloroethene at 76.8% in SDG L14090460. The associated DPT sample is non-detect for bromomethane and dichlorodifluoromethane and are UJ qualified. Trichloroethene is J qualified for a trace result.

1.3.2 Blanks

Where contamination by a target analyte of one of the various blanks was found, if the sample result for an associated sample was non-detect or less than 5X (10X for common laboratory contaminants) the analyte concentration in the blank, the corresponding sample result for the

analyte was qualified B. Where the sample result for the affected analyte was greater than 5X the amount in the blank, no qualifier was applied.

1.3.2.1 SW8260

Method blank WG491746-01 has methylene chloride at 0.280 µg/L in SDG L14090460.
Associated DPT sample is B qualified for methylene chloride.

1.3.3 Surrogates

All surrogates are within criteria.

1.3.4 Laboratory Control Sample (LCS)

All LCS are within criteria.

2 DATA USABILITY SUMMARY

The data are usable for the intended purposes of the project. The data quality objectives have been met for the project.

Table 1: Completeness by Method

Method	Total Analytes	No. of Rejected Results	% Completeness
SW8260	448	0	100

Table 2: Field Sample Identification and Laboratory Identification

ClientSampleID	LabSampleID	Collected	SW8260
12WW25(30)080914	L14090460-01	9/8/2014	X
12TB080914	L14090460-02	9/8/2014	X
12WW20-010915	L15010566-02	1/9/2015	X
12WW21-010915	L15010566-03	1/9/2015	X
12WW21FD-010915	L15010566-04	1/9/2015	X
12WW22-010915	L15010566-06	1/9/2015	X
12WW23-010915	L15010566-05	1/9/2015	X
12WW24-010915	L15010566-01	1/9/2015	X
Trip blank	L15010566-07	1/9/2015	X

Table 3: Qualified Analytical Data

ClientSampleID	LabSampleID	AnalyteName	DVQualOverall	Reason
12WW25(30)080914	L14090460-01	Bromomethane	UJ	CCV below control limits
		Dichlorodifluoromethane	UJ	CCV below control limits
		Trichloroethene	J	CCV below control limits
		Methylene chloride	B	Method blank contamination

Laboratory data packages will be included in a separate file.

APPENDIX G: MANN-KENDALL STATISTICS FOR TREND IN 12WW24 FOR TCE

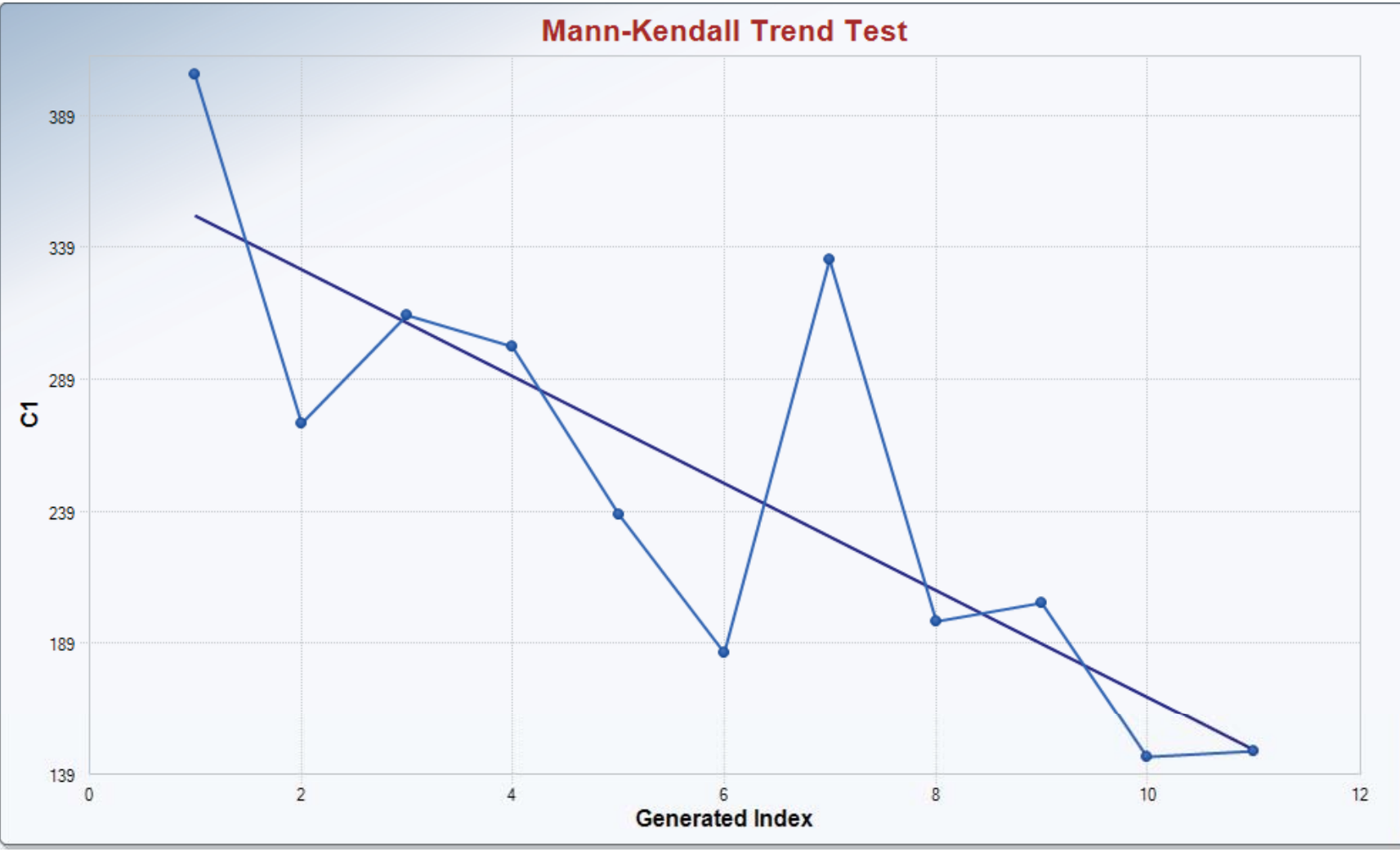
	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	8/1/2015 7:58:57 PM	
From File	WorkSheet.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

C1

General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	11
Number Values Reported (n)	12
Number Values Missing	1
Number Values Used	11
Minimum	145
Maximum	404
Mean	249
Geometric Mean	236.6
Median	237
Standard Deviation	82.93

Mann-Kendall Test	
Test Value (S)	-33
Tabulated p-value	0.005
Standard Deviation of S	12.85
Standardized Value of S	-2.491
Approximate p-value	0.00637

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	-2.4912
Test Value (S)	-33
Tabulated p-value	0.0050
Approximate p-value	0.0064

OLS Regression Line (Blue)

OLS Regression Slope	-20.2818
OLS Regression Intercept	370.6909

Statistically significant evidence of a decreasing trend at the specified level of significance.

00216373

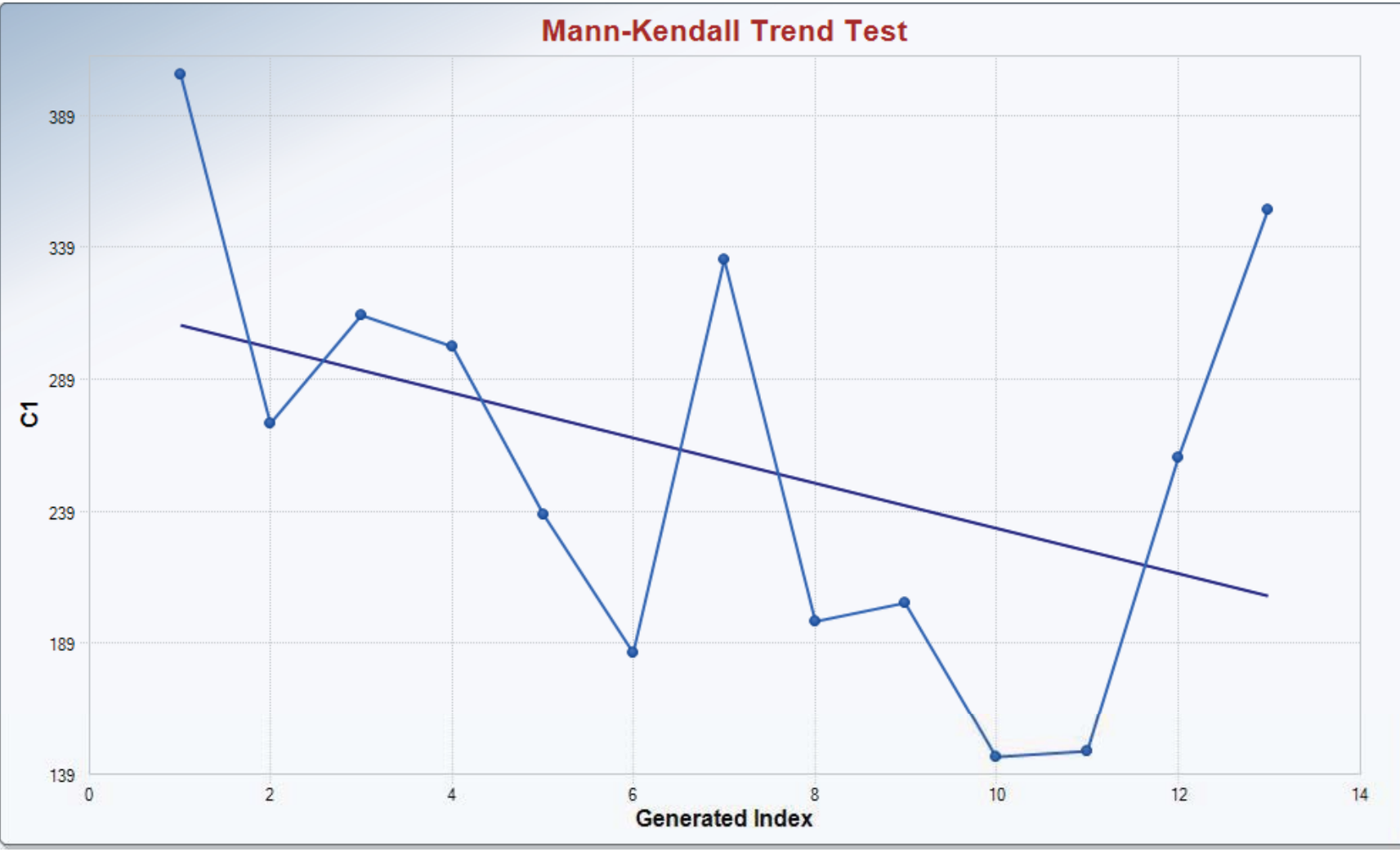
	Mann-Kendall Trend Test Analysis	
User Selected Options		
Date/Time of Computation	8/1/2015 7:56:33 PM	
From File	WorkSheet.xls	
Full Precision	OFF	
Confidence Coefficient	0.95	
Level of Significance	0.05	

C1

General Statistics	
Number or Reported Events Not Used	0
Number of Generated Events	13
Number Values Reported (n)	14
Number Values Missing	1
Number Values Used	13
Minimum	145
Maximum	404
Mean	257.8
Geometric Mean	245.7
Median	259
Standard Deviation	80.98

Mann-Kendall Test	
Test Value (S)	-22
Tabulated p-value	0.102
Standard Deviation of S	16.39
Standardized Value of S	-1.281
Approximate p-value	0.1

Insufficient evidence to identify a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3911
Standardized Value of S	-1.2812
Test Value (S)	-22
Tabulated p-value	0.1020
Approximate p-value	0.1001

OLS Regression Line (Blue)

OLS Regression Slope	-8.5549
OLS Regression Intercept	317.6538

Insufficient statistical evidence of a significant trend at the specified level of significance.

00216375

FINAL

DECISION DOCUMENT FOR LHAAP-05, LHAAP-09 LHAAP-15, LHAAP-34, LHAAP-52, LHAAP-57, LHAAP-61 LHAAP-63, LHAAP-70 AND LHAAP-71 SITES LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

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

September 2015

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Acronyms and Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CES	Complete Environmental Service
DNT	Dinitrotoluene
DRMS	Defense Reutilization and Marketing Service
FFA	Federal Facility Agreement
Jacobs	Jacobs Engineering Group, Inc.
LHAAP	Longhorn Army Ammunition Plant
MSC	medium-specific concentration
NPL	National Priorities List
PA	Preliminary Assessment
PCB	polychlorinated biphenyls
POL	Petroleum/Oil/Lubricants
RCRA	Resource Conservation and Recovery Act
SPLP	Synthetic Precipitation Leaching Procedure
SvE	Sverdrup
SVOC	semi-volatile organic compound
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TNRCC	Texas Natural Resource Conservation Commission
TNT	Trinitrotoluene
TPH	total petroleum hydrocarbons
TWC	Texas Water Commission
USEPA	U. S. Environmental Protection Agency
USFWS	U. S. Fish and Wildlife Service
UST	underground storage tanks
VOC	volatile organic compound

DECISION DOCUMENT FOR LHAAP-05, LHAAP-09, LHAAP-15, LHAAP-34, LHAAP-52, LHAAP-57, LHAAP-61, LHAAP-63, LHAAP-70 AND LHAAP-71 SITES

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

1.0 Declaration

1.1 Statement of Basis and Purpose

This document presents the basis for the decision that no further action is necessary for LHAAP-05, LHAAP-09, LHAAP-15, LHAAP-34, LHAAP-52, LHAAP-57, LHAAP-61, LHAAP-63, LHAAP-70 and LHAAP-71 sites at the Longhorn Army Ammunition Plant (LHAAP) in Karnack, Texas. The decision was made by LHAAP and the United States Environmental Protection Agency (USEPA) in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act, the National Contingency Plan, Resource Conservation and Recovery Act, and AR 200-1, as applicable. Although there are several Superfund National Priorities List (NPL) environmental sites at LHAAP, the above-listed sites are not among them. These sites are being addressed under CERCLA as non-NPL environmental sites.

1.2 Description of Selected Remedy

No action is necessary for LHAAP-05, LHAAP-09, LHAAP-15, LHAAP-34, LHAAP-57, and LHAAP-61. No further action is necessary for LHAAP-52, LHAAP-63, LHAAP-70 and LHAAP-71. Taken together, the No Action and No Further Action sites are referenced as the "NFA Sites." Site investigations were conducted through which it was determined by LHAAP and USEPA that these sites either had no history of contamination or had been properly remediated. It was also agreed that these sites were suitable for refuge purposes. All of these sites were transferred to USFWS and are part of the Caddo Lake National Wildlife Refuge.

1.3 Statutory Determinations

None of the CERCLA §121 statutory determinations are applicable in this action since no remedies are being selected. No remedial actions are necessary to ensure protection of human health and the environment.

1.4 Approval and Signature

No further investigations or actions are necessary for the NFA sites. There is no cost associated with this decision beyond the cost for limited monitoring in the form of certification of proper land use every five years for LHAAP-52, LHAAP-63, LHAAP-70 and LHAA-71. The undersigned is the appropriate approval authority for this decision.

APPROVED BY:

Thomas E. Lederle
Chief
BRAC Division, ACSIM
United States Army

2.0 Decision Summary

2.1 Site Name, Location, and Description

The NFA sites are located within LHAAP, a former Army installation that occupied 8,416 acres between State Highway 43 in Karnack, Texas, and the southwestern shore of Caddo Lake. The nearest city is Marshall, Texas, approximately 14 miles to the southwest (**Figure 1**). Locations of the 11 sites evaluated are shown on **Figure 2**.

LHAAP operated until 1997 when it was placed on inactive status and classified by the U.S. Army Armament, Munitions, and Chemical Command 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 responsible party 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. The Army is the lead agency for all environmental restoration activities at LHAAP.

None of the sites addressed in this document, LHAAP-05, LHAAP-09, LHAAP-15, LHAAP-34, LHAAP-52, LHAAP-57, LHAAP-61, LHAAP-63, LHAAP-70 and LHAAP-71 are NPL-listed. These sites were transferred to USFWS with USEPA concurrence as the lead regulatory agency in the years when LHAAP was considered a fenceline-to-fenceline NPL site.

The supporting documentation can be found in **Appendix A** and **Appendix B**. The Support Documentation Table (**Appendix A**) provides a description of the support document, its location in the Administrative Record by Bate Stamp number, and the summary of recommendations/conclusions presented in the support document. The USEPA transfer concurrence documentation is included in **Appendix B**.

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, Plant 2 began production of pyrotechnic ammunition, such as photoflash bombs, simulators, hand signals, and tracers for 40 mm ammunition 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 decommissioning of Pershing I and II solid propellant 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 functions of the NFA Sites are described below.

LHAAP-5 (Powerhouse Boiler Pond) is located in the Buffer area west of Plant 3. LHAAP-5 was used as an evaporation pond for wastewater from the Powerhouse.

LHAAP-9 (Container Storage Area Building 31-W) was used for liquid waste storage prior to offsite disposal, is located in the Warehouse Area.

LHAAP-15 (Container Storage Area, Metals Recovery Unit Building 49-W), a site used for solid and hazardous waste storage and held for shipment to Defense Reutilization and Marketing Service (DRMS).

LHAAP-57 (Rubble Burial Site), a site used for burial of inert materials that were cleared from property after acquisition, are both located in the Flashing Area.

LHAAP-34 (Container Storage Area Building 701) is located in the Administrative Area and was used for storage of PCB transformers and PCB-contaminated material.

LHAAP-52 (Magazine Washout Area), a site used to wash out trucks used for the transport of TNT and LHAAP-70 (Loading Dock Magazine Area), a site where a large quantity of TNT was spilled, are both located in the Magazine Area, LHAAP-45.

LHAAP-61 is located in the Shops Area of LHAAP. It was a Water Treatment Plant Effluent Settling Pond used to settle out solids from the backwashing water treatment sand filters.

LHAAP-63 (Former Burial Pits) is located in the Burning Ground Area and was used for the detonation of Plant 3 reject materials of unknown composition.

LHAAP-71 (Building 813), though unrelated to the TNT Waste Disposal, is located in the TNT Waste Disposal Plant. LHAAP-71 is the site of an oil tank spill.

Environmental restoration activities at the NFA Sites have progressed through the site investigation, at which point it was agreed by the Army and USEPA that these sites had no history of contamination or had been properly remediated (**Appendix B**).

2.3 Public Participation

The Army, USEPA and the Restoration Advisory Board (RAB) have provided public outreach to the surrounding community. The outreach program has included fact sheets, 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 decisions for no further investigation or action at the NFA Sites was discussed at the public information forums held for each of the respective ECOPs at the LHAAP. Reports supporting the no further investigation or action determination for these sites 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, TX 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

2.4.1 LHAAP-05

LHAAP-05 (Power House Boiler Pond 401-B) was a 4-foot-deep earthen lagoon lined with a polyvinyl chloride (PVC) liner. The pond was a 5.7-acre surface impoundment that was trapezoid shaped, 870 feet long, 338 feet wide at one end and 252 feet wide at opposite end. The lagoon received approximately 3,000 gallons per day of backwash water from zeolite treatment units at the Building 401 Powerhouse. Site was in operation from 1978

to 1999. Water was either evaporated from the lagoon or discharged to the sewage treatment plant (TWC, 1988). No suspected/reported contaminants at LHAAP-05 (Plexus, 2005).

2.4.2 LHAAP-09
LHAAP-09 (Building 31-W) was a Drum Storage Building used to store containers of liquid hazardous waste. The building was a 100 by 50 foot structure with Transite siding. Beginning in 1987, Building 31-W had a separate 80 feet by 50 feet structure with galvanized metal siding. Within the older area were three concrete troughs measuring 6 feet by 31 feet with 6-inch curbs that were used for polychlorinated biphenyls (PCB) storage. Various chemicals were held in the lab pack for disposal. The newer area consisted of eight concrete pads measuring 20 feet 1 inch by 25 feet 10 inches in size that were enclosed by 6-inch concrete curbs (TWC, 1988). Drums on pallets were stored on the pads. The site was used for liquid waste storage during the early 1950's and was used for hazardous waste storage since 1984 to 1995. No suspected/reported contaminants at LHAAP-09 (Plexus, 2005).

2.4.3 LHAAP-15
LHAAP-15 (Building 49-W) was a Drum Storage Shed used to store solid and hazardous waste. The shed was a 50 feet by 100 feet by 10/16 feet (sloped) metal building, with a concrete floor. Wastes stored here included brine sludge, oil-contaminated material, batteries, adhesives and dirt, contaminated dirt, mercury and dirt, and ash. Drums were stacked three high on pallets and held for shipment to the DRMS. This site was in operation from 1984 to 1999. No suspected/reported contaminants at LHAAP-15 (Plexus, 2005).

2.4.4 LHAAP-34
LHAAP-34 (Building 701) consisted of a building formerly used for storage of PCB-contaminated material from the cleanup of transformer spills in 30- and 55-gallon drums. The site consisted of a wooden framed building with shingles and a concrete floor, approximately 25 by 110 feet in dimension. The north half of the building was used for storage (TWC, 1988). This site was in operation from 1980 to 1984. The contaminants of concern were PCBs.

2.4.5 LHAAP-52
LHAAP-52 (Magazine Washout Area) is located near the northwestern corner of LHAAP-45 (Plant 1 Magazine Area) and encompasses ¼ of an acre. The Plant 1 Magazine Area contains 58 Richmond-type magazines and two aboveground magazines, all of which had been used for the storage of TNT. The site consists of a grassy area surrounding a water hydrant with an attached standpipe. The stand pipe near the intersection of Avenue E and 19th Street was used to wash out trucks used for the transport of TNT. Waste waters from this operation may have flowed onto the ground. The contaminants of concern were explosive compounds.

2.4.6 LHAAP-57
LHAAP-57 (Rubble Burial Site) was used for burial of inert materials (i.e. barbed wire, fence posts and other inert materials) that were cleared from property after acquisition.

2.4.7 LHAAP-61
LHAAP-61 (Water Treatment Plant Effluent Settling Pond) consisted of two adjacent ponds, each 0.1 hectares (108 by 127 feet) by 1.5 meters deep and protected by a 6-foot earthen dike. The ponds were located just north of the shops area. The ponds were lined with a synthetic waterproof sheeting with a 12 inch soil cover. The purpose of the facility was to settle out solids from the backwashing water treatment sand filters. Sludge was removed from the ponds as needed and taken to the sewage plant and allowed to dry. After drying it was taken to the landfill (Plexus, 2005). The contaminant of concern was industrial sludge.

2.4.8 LHAAP-63

LHAAP-63 (Former Burial Pits) is located along Bobby Jones Road, approximately 30 meters north of Long Point Road and east of the explosive burning ground. These pits were used in the late 1950s for the detonation of Plant 3 reject materials of unknown composition. The contaminants of concern were explosives.

2.4.9 LHAAP-70

LHAAP-70 (Loading Dock Magazine Area) is located near the southern corner of LHAAP-45 and was the former bunker/magazine number 811-50. On December 18, 1952, improperly stacked 23-kg fiberboard boxes of TNT fell in magazine area 811-50, resulting in the spill of a large quantity of TNT. The contaminant of concern was TNT.

2.4.10 LHAAP-71

LHAAP-71 (Building 813) is located near the southwest corner of LHAAP-29. An oil tank spill occurred at Building 813 in December 1978. The spill was contained before it reached Central Creek. The contaminant of concern was Petroleum oil and lubricants (POL).

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 U.S. Fish and Wildlife Service (USFWS) and are operated as the Caddo Lake National Wildlife Refuge. The NFA Sites are located on land already transferred to USFWS.

2.6 Site Investigations

2.6.1 LHAAP-05

A Resource Conservation and Recovery Act (RCRA) Facility Assessment was conducted at the site in 1988. This site was identified as a Solid Waste Management Unit in the RFA, and the TWC, which became TNRCC (now TCEQ), determined that there were no additional investigations required at the Power House Boiler Pond (LHAAP-05) (TWC, 1988). After performing a preliminary assessment of the site in 1998, the Army has also determined that no releases have occurred and no further action is needed at this site. Prior to emptying the Boiler Pond, the water was sampled and analyzed for contaminants, and biomonitoring performed on the water. Soil samples were collected prior to closure of the impoundment. Samples verified that any contamination from sodium chloride was within acceptable limits for closure (CES, 1999). The site was closed to the attainment of Risk Reduction Standard Number 2: Closure to Groundwater Protection Standard for Residential Use (CES, 1999). A notification was filed in the Harrison County records in 1999, as required by 30 TAC §335.560(b), stating that the land is considered suitable for residential use (CES, 1999), attached as Appendix C. The TCEQ approved closure in 2002 stating that no post closure care was required (TCEQ, 2002).

In preparation for transfer, LHAAP-05 was classified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas). LHAAP-05 was included in ECOP III (Shaw, 2005) as part of the Northwest Block of the Production Area tract and transferred to the USFWS. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated October 31, 2005 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.2 LHAAP-09

A Resource Conservation and Recovery Act (RCRA) Facility Assessment was conducted at the site in 1988. The 1988 assessment identified LHAAP-9, Bldg 31-W, Drum Storage as LHAAP-10. This site was identified as a Solid Waste Management Unit in the RFA, and the TWC, which became TNRCC (now TCEQ), determined that there were no additional investigations required at that time for Building 31-W, Drum Storage (LHAAP-09) (TWC, 1988).

After performing a preliminary assessment of the site in 1998, the Army determined that no releases had occurred and no further action was needed at the site. Subsequently, as a part of closure activities, decontamination samples were collected from the structure and soil samples were collected from the perimeter of 31-W. None of the samples collected contained detectable concentrations of volatiles. The semi-volatile bis(2-ethylhexylphthalate) was a constituent in the structure left in place and barium and cadmium were constituents in soil left in place and were included in the deed of record (CES, 1999a). The bis(2-ethylhexylphthalate) was compared to TNRCC 30 TAC 335.568 Appendix II Groundwater Protection Standards for Residential Use (GWP-Res) and to the Soil/Air and Ingestion Standards for Residential Use (SAI-Res) and levels are well below the risk-based concentration in the RBC Table dated October 1998. Levels of barium in the soil at container storage area are well below the risk-based concentration in the RBC Table dated October 1998. Levels of total cadmium in the soil, although above acceptable concentrations for health based closure, do not leach detectable concentrations of cadmium at a concentration of 0.005 mg/l, the EPA maximum contaminant limit (MCL) for groundwater. Therefore, cadmium is considered to be acceptable for closure for GWP-Res and SAI-Res. In June 1999, approximately 9 cubic yards of soil were excavated at one location where lead concentrations far exceeded the analytical results from the other eleven soil samples. The container storage area 31-W has been decontaminated and meets criteria for health-based closure/remediation based on Title 30 Chapter 335 Subchapter S Part 568 Appendix II (CES, 1999a). The site was RCRA permitted closed on November 18, 1999 (TCEQ, 2007). A notification was filed in the Harrison County records, as required by 30 TAC §335.560(b), stating that the property is considered appropriate for residential use in accordance with risk reduction standards applicable at the time of filing (CES, 1999a), attached as Appendix C.

LHAAP-09 was reclassified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas). LHAAP-09 was included in ECOP I (Shaw, 2004) and transferred to the USFWS. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated April 28, 2004 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.3 LHAAP-15

A Resource Conservation and Recovery Act (RCRA) Facility Assessment was conducted at the site in 1988. This site was identified as a Solid Waste Management Unit in the RFA, and the TWC, which became TNRCC (now TCEQ), determined that there were no additional investigations required at that time for Building 49-W, Drummed Waste Storage Shed (LHAAP-15) (TWC, 1988).

After performing a preliminary assessment of the site in 1998, the Army determined that no releases had occurred and no further action was needed at this site. Subsequently, as part of closure activities,

decontamination samples were collected from the structure and soil samples were collected from the perimeter of 49-W. The decontamination samples and soil samples did not contain detectable concentrations of VOC and SVOCs. The site soil at two locations was contaminated with chromium above LHAAP background levels. After excavation of soil at these two locations down to fifteen inches the soils were tested 15 inches below the surrounding ground elevation. The results showed that chromium concentrations were well below plant background concentrations. The container storage area, 49-W, has been decontaminated and closed to background levels (CES, 1999b). In 1999, the site was closed in accordance with RCRA guidelines (CES, 1999b). The site was RCRA permitted closed on October 14, 1999 (TCEQ, 2007).

LHAAP-15 was reclassified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas). LHAAP-15 was included in ECOP I (Shaw, 2004) and transferred to the USFWS. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated April 28, 2004 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.4 LHAAP-34

A Resource Conservation and Recovery Act (RCRA) Facility Assessment was conducted at the site in 1988. The 1988 assessment identified LHAAP-34, Bldg 701 as LHAAP-33. This site was identified as a Solid Waste Management Unit in the RFA, and the TWC, which became TNRCC (now TCEQ), determined that there were no additional investigations required at that time for Building 701 PCB Storage (LHAAP-34) (TWC, 1988).

After performing a preliminary assessment of the site in 1997 for PCBs and in 2000 for TPH, the Army determined that no releases had occurred and no further action was needed at this site. Subsequently, as a part of closure activities, decontamination samples were collected from the structure and soil samples were collected from the perimeter of Bldg 701. Structure and soil samples found no contamination. The site was closed in accordance with the requirements stated in 30 TAC Chapter 335 and the requirements of Longhorn Army Ammunition Plant Part B Hazardous Waste Permit 50195 (CES, 2000a).

LHAAP-34 was reclassified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas). LHAAP-34 was included in ECOP I (Shaw, 2004) and transferred to the USFWS. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated April 28, 2004 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.5 LHAAP-52

In 1995 and 1996, SvE conducted a site investigation at the Magazine Area Washout (LHAAP-52) to determine if a release of potential contaminants from previous operations had affected the surface and subsurface soils at the site (SvE, 1997).

Site investigation sampling at LHAAP-52 included the collection and analysis of ten surface soil and nine subsurface soil samples. Surface soil samples were collected from the uppermost foot of soil at five locations in

October 1995. The locations were re-sampled for explosives in February 1996. Subsurface soil samples were collected from three soil borings at depth intervals of 2 to 4 feet, 7 to 9 feet, and 12 to 14 feet below ground surface in October 1995. Samples were analyzed for volatile organic compounds (VOCs), SVOCs, explosive compounds, and target analyte list metals.

VOCs, SVOCs, and metals were detected in surface and subsurface soil samples at LHAAP-52. No explosives were detected in the soil samples.

Metals detected in the soil and sediment samples at LHAAP-52 were compared to the maximum detected concentration for LHAAP soil background levels. The majority of the detected metals were below soil background levels. Six metal concentrations were above LHAAP soil background levels; however, no further action was required at the site (USACE, 1995; SvE, 1997).

Based on the data presented in Section 4 of the Final Site Characterization Investigation Report, no further action is required at this site since no significant release of contaminants has been identified (SvE, 1997). The EPA and TNRCC (now TCEQ) concurred with the conclusion for no further action at LHAAP-52 (EPA, 1998; TNRCC, 1998).

LHAAP-52 was classified as a CERFA Category 3 site which describes areas where release, disposal, and or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response. LHAAP-52 was included in ECOP I (Shaw, 2004) and transferred to the USFWS as a part of the Magazine Area, LHAAP-45. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated August 18, 2004 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.6 LHAAP-57

Findings from the Army's preliminary assessment concluded that no further action was necessary at this site (USACE, 1996).

LHAAP-57 was reclassified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas). LHAAP-57 was included in ECOP I (Shaw, 2004) and transferred to the USFWS. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated April 28, 2004 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.7 LHAAP-61

Findings from the Army's preliminary assessment concluded that no further action was necessary at this site (USACE, 1996).

LHAAP-61 was classified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas). LHAAP-61 was included in ECOP IV (Shaw, 2007) and transferred to the USFWS. The

USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated April 13, 2007 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.8 LHAAP-63

Sverdrup Environmental, Inc. (SvE) conducted a site investigation at the Former Burial Pits (LHAAP-63) to determine if a release of potential contaminants from previous operations had affected the surface and subsurface soils at the site (SvE, 1997).

Site investigation sampling included the collection and analysis of 10 surface soil samples and 15 subsurface soil samples. Surface soil samples were collected in October 1995 from the uppermost foot of soil at five locations. These locations were re-sampled for explosives in February 1996. Subsurface soil samples were collected from five soil borings at depth intervals of 5 to 7 feet, 10 to 12 feet, and 15 to 17 feet below ground surface. Samples were analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), explosive compounds, and target analyte list metals.

VOCs, SVOCs, and metals were detected in surface and subsurface soil samples. No explosives were detected in the surface and subsurface samples.

Metals detected in the soil samples were compared to the maximum detected concentration for LHAAP soil background levels. The majority of the detected metals were below soil background levels. Eleven metals concentrations were above LHAAP soil background levels; however, SvE concluded that no further action was required at the site (USACE, 1995; SvE, 1997).

Based on the data presented in Section 6 of the Final Site Characterization Investigation Report, no further action is required at this site since no significant release of contaminants has been identified (SvE, 1997). The EPA and TNRCC (now TCEQ) concurred with the conclusion for no further action at LHAAP-63 (EPA, 1998; TNRCC, 1998).

LHAAP-63 was classified as a CERFA Category 3 site which describes areas where release, disposal, and or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response. LHAAP-63 was included in ECOP I (Shaw, 2004) and transferred to the USFWS. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated April 28, 2004 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.9 LHAAP-70

On January 10, 1995, a site inspection was conducted by USACE-Tulsa representatives of the 811-50 magazine and the surrounding area. The results of the inspection revealed no visual evidence of contamination from TNT or related compounds resulting from the spill in December 1952. It has been concluded that the area was likely swept clean of excess TNT particles (SvE, 1995) and that the site required no further environmental investigation.

LHAAP-70 is located within LHAAP-45, the Magazine Area. Analysis of 22 LHAAP-45 surface soil samples from the USFWS (2003) study and 14 samples from the USACHPPM (2000) study shows that chemicals were detected at low concentrations, often consistent with LHAAP background levels. Individual measured concentrations were compared with risk-based soil screening concentrations developed by the TCEQ and the USEPA to be protective of human health and the environment (Shaw, 2004a). Based on EPA's review of the Draft Final Evaluation of LHAAP-45 Surface Soil Analytical Data, the USFWS LHAAP-45 soil data, and the USACHPPM LHAAP-45 soil data, the EPA concurred with the recommendation that no further environmental investigation was necessary in this area (EPA, 2004).

LHAAP-70 was classified as a CERFA Category 3 site which describes areas where release, disposal, and or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response. LHAAP-70 was included in ECOP I (Shaw, 2004) and transferred to the USFWS as a part of the Magazine Area, LHAAP-45. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated August 18, 2004 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

2.6.10 LHAAP-71

After a site inspection conducted by USACE representatives in January 1995, it was determined that LHAAP-71 required no further environmental investigations (SvE, 1995). On January 10, 1995, a site inspection was conducted by USACE-Tulsa representatives at Building 813, the site of an oil spill from an aboveground storage tank which occurred on December 1978. The results of the inspection revealed no remaining visual evidence of contamination from the oil spill. Since, the oil spill was not released into Central Bayou and no evidence of the spill has been noted, no further environmental study will be conducted at this area.

The sump associated with site LHAAP-71 (Sump 118) was investigated under LHAAP-35 (Shaw, 2008). LHAAP-71 (Building 813) is located southwest of LHAAP-29.

In 1993 two surface soil samples and two subsurface soil samples were collected in association with Sump 118 and in 2006 one surface soil sample and one subsurface soil samples were collected in association with Sump 118. The 1993 samples were analyzed for metals, DNT, SVOCs and VOCs and the 2006 samples were analyzed for explosives and VOCs. All chemicals have concentrations below the Risk Based Screening Value, therefore no further action is required for soil associated with sump 118 at LHAAP-71 (Shaw, 2008).

LHAAP-71 was classified as a CERFA Category 4 site which describes areas where release, disposal, and or migration of hazardous substance has occurred, and all removal or remedial actions to protect human health and the environment have been taken. LHAAP-71 was included in ECOP I (Shaw, 2004) and transferred to the USFWS. The USEPA provided concurrence that the property either had no history of contamination or had been properly remediated and was suitable for transfer to USFWS for refuge purposes in a letter dated April 28, 2004 (**Appendix B**).

None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure protection of human health and the environment.

3.0 References

PRIMARY BACKGROUND DOCUMENTS FOR LHAAP-05, LHAAP-09, LHAAP-15, LHAAP-34, LHAAP-52, LHAAP-57, LHAAP-61, LHAAP-63, LHAAP-70 AND LHAAP-71 SITES

CES (Complete Environmental Service), 1999, *Brine Pond, NOR Unit Number 004, Closure Report*, Located at Longhorn Army Ammunition Plant, Karnack, Texas, EPA ID TX6213820529, Solid Waste Registration 30990. April. Administrative Record Bates Stamp 00113638 – 00113740.

CES, 1999a, *Final Closure Report, Hazardous Waste Storage Area 31-W RCRA Permit 50195 Unit No. 001, Longhorn Army Ammunition Plant, Karnack, Texas*, October. Administrative Record Bates Stamp 00188532 – 00189424.

CES, 1999b, *Final Closure Report, Hazardous Waste Storage Area 49-W, RCRA Permitted Unit No. 002, Longhorn Army Ammunition Plant*, September.

CES (Complete Environmental Service), 2000a, *Building 701, Closure Report*, Located at Longhorn Army Ammunition Plant, Karnack, Texas, April. Administrative Record Bates Stamp 00189425 – 00189540.

Environmental Protection Agency (EPA), 1998, *Letter Regarding Longhorn Army Ammunition Plant Group 5 Final Site Characterization Investigation Report*, May. Administrative Record Bates Stamp 022459 – 022468.

EPA, 2004, *Letter Regarding Longhorn Army Ammunition Plant (LHAAP) Evaluation of Site 45 Surface Soil Analytical Data*, August. Administrative Record Bates Stamp 034727-034728.

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Shaw, 2004, *Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas*, May. Administrative Record Bates Stamp 032311 – 032432.

Shaw, 2004a, *Final Evaluation of LHAAP-45 Surface Soil Analytical Data*, Longhorn Army Ammunition Plant, September. Administrative Record Bates Stamp 00038850-00039075.

Shaw, 2005, Final Environmental Condition of Property III (ECOP) for the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas, Aug. Administrative Record Bates Stamp 00113741 – 00113777.

Shaw, 2007, *Final Environmental Condition of Property IV (ECOP)*, Longhorn Army Ammunition Plant, Karnack, Texas, March. Administrative Record Bates Stamp 00113778 – 00113814.

Shaw, 2008, *Final Data Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps, Volume I of III, Longhorn Army Ammunition Plant, Karnack, Texas, Houston, Texas*, January. Administrative Record Bates Stamp 00065806-00065901.

SvE, 1995, *Final Chemical Data Acquisition Plan for the Preliminary Assessment Site Investigations Group No. V Sites at Longhorn Army Ammunition Plant*, September. Administrative Record Bates Stamp 015431-015527.

SvE, 1997, *Final Site Characterization Investigation Report, Group 5 Sites (50, 52, 60, and 63) Site Investigation, Longhorn Army Ammunition Plant, Karnack, Texas*, June. Administrative Record Bates Stamp 020640 – 020791.

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TCEQ, 2007, Notice of Registration, Industrial and Hazardous Waste, May. Administrative Record Bates Stamp 00113815.

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TWC (Texas Water Commission), 1988, *RCRA Facility Assessment Conducted by Texas Water Commission.* April 8. Administrative Record Bates Stamp 001252-0019009.

U.S. Army Corps of Engineers (USACE), Tulsa District, 1995, *Soil Background Concentration Report, Final Report, Longhorn Army Ammunition Plant, Karnack, Texas*, May. Administrative Record Bates Stamp 012374 – 012590.

USACE, 1996, *Final DERPMIS/RMIS Resolution Document, Longhorn Army Ammunition Plant*, April. Administrative Record Bates Stamp 00047932 – 00048112.

PUBLIC INFORMATION REPOSITORIES FOR
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Figures

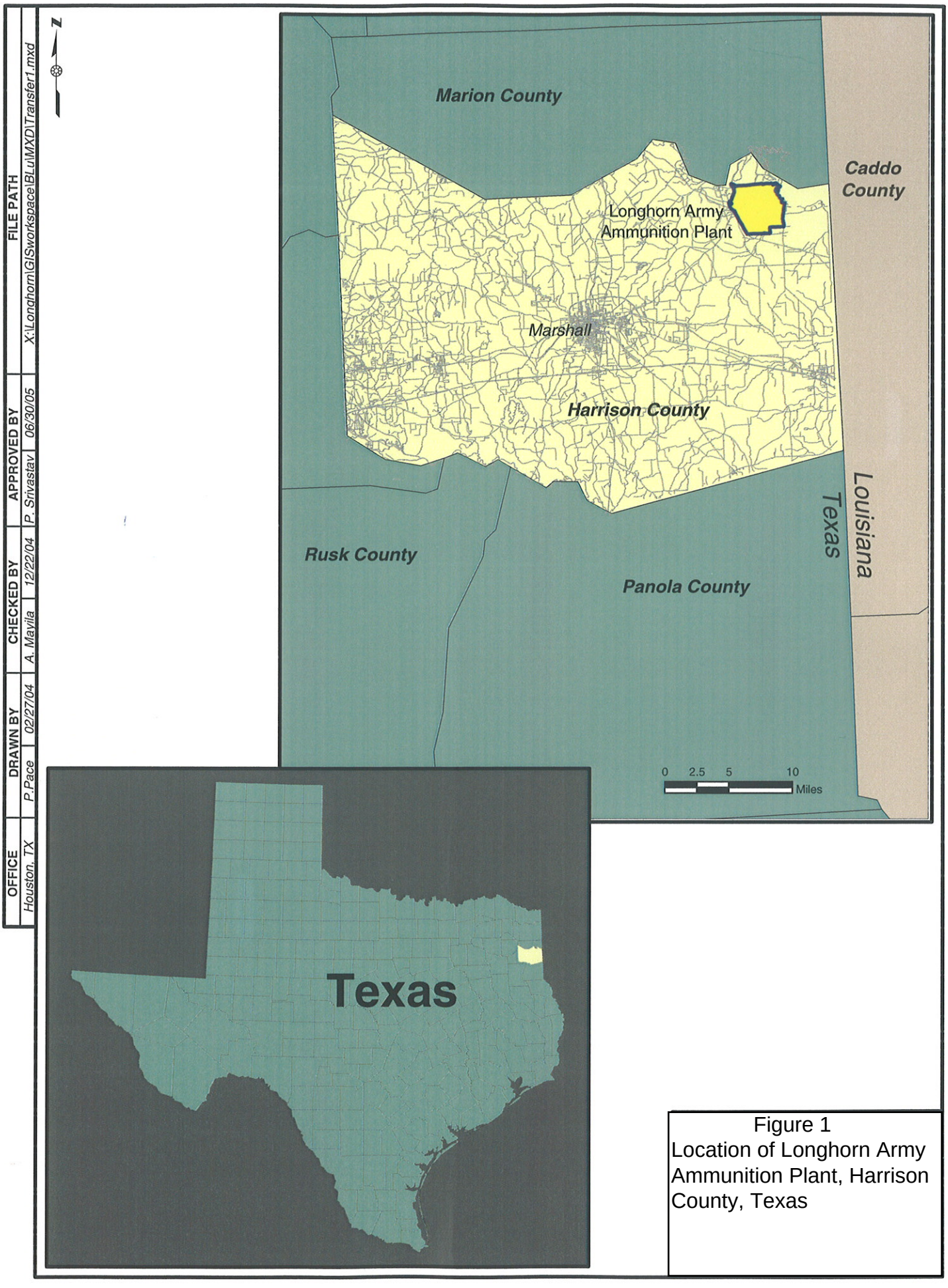
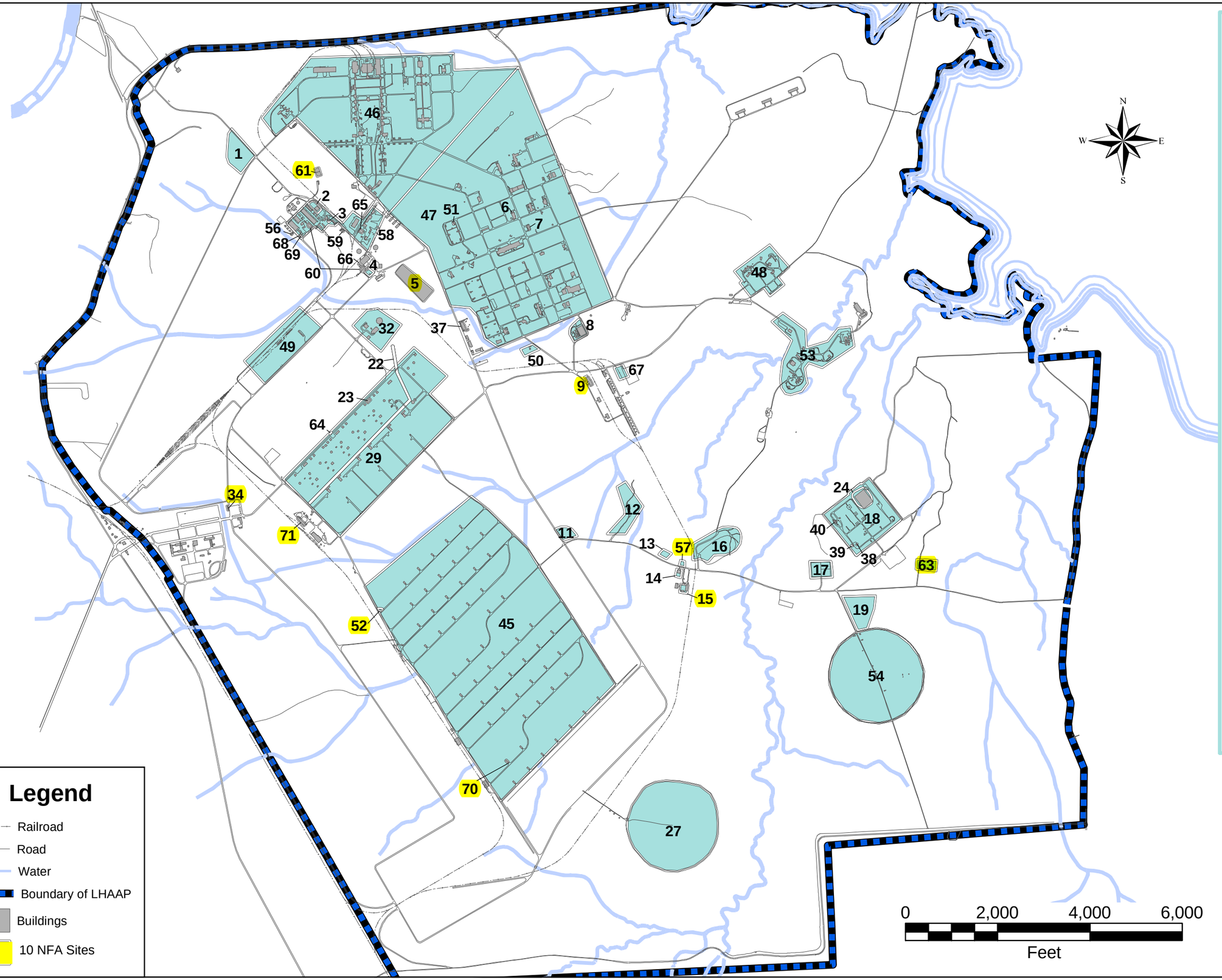


Figure 1
Location of Longhorn Army Ammunition Plant, Harrison County, Texas



DSERTS/IRP

1 Inert Burning Ground
2 Vacuum Truck Overnight Parking Lot
3 Building 722-Paint Shop
4 Pilot Waste Water Treatment Plant
5 Power House Boiler Pond
6 Building 54F Solvent
7 Building 50G Drum Processing
8 Sewage Treatment Plant
9 Building 31W Drum Storage
11 Suspected TNT Burial Site
12 Active Landfill
13 Suspected TNT Burial Site
14 Area 54W Burial Site
15 Area 49W Drum Storage
16 Old Landfill
17 No. 2 Flashing Area Burning Ground
18 Burning Ground No. 3
19 Construction Materials Landfill
22 TNT Pipeline
23 Building 707 Storage for PCBs
24 Former Unlined Evaporation Pond
27 South Test Area/Bomb Test Area
29 Former TNT Production Area
32 Former TNT Waste Disposal Plant
34 Building 701- PCB Storage
37 Quality Assurance Laboratory Building 29A
38 24-X Holding Area
39 25X Washout Pad
40 Air Curtain Destructor
45 Magazine Area
46 Plant 2/ Pyrotechnic Operation
47 Plant 3/ Produces Hand Signal Assemblies
48 Y Area/ Produces Hand Signal Assemblies
49 Acid Storage Area
50 Former Waste Disposal Facility
51 Building 60-B Photo Lab
52 Magazine Washout Area
53 Static Test Area
54 Ground Signal Test Area
56 Building 744-A Wash Rack
57 Rubble Burial Site
58 Maintenance Complex
59 Storage Building 725
60 Former Storage Building 411 & 714
61 Water Treatment Plant
63 Burial Pits
64 Transformer Storage
65 Building 209
66 405-L Transformer Yard
67 Above Ground Storage Tanks
68 Mobile Storage Tank Parking Area
69 Service Station Underground Storage Tanks
70 Loading Dock of Magazine 811-50
71 Building 813 Oil Spill

Legend

- Railroad
- Road
- Water
- Boundary of LHAAP
- Buildings
- 10 NFA Sites

Figure 2
Location of 10 No Further Action (NFA) Sites

Appendix A

Support Documentation Table

US ARMY CORPS OF ENGINEERS, TULSA DISTRICT, SUPPORT DOCUMENTATION TABLE
LONGHORN ARMY AMMUNITION PLANT
SITES LHAAP-5, 9, 15, 34, 52, 57, 61, 63, 70, AND 71

Site	Description	Documentation	References	Recommendation/Conclusion	Status
LHAAP-5	Power House Boiler Pond	TWC, 1988, RCRA Facility Assessment Conducted by Texas Water Commission, April.	Page 46 (BS001927)	This unit does not manage hazardous waste, or waste having hazardous constituents. Because this is a well-managed unit, no further RFA action is recommended.	Non-NPL
		U.S. Army Corps of Engineers, Tulsa District, 1996, Final DERPMIS/RMIS Resolution Document, April 1996.	Table 1 DERPMIS/RMIS Cross Reference Table (BS47942)	Table 1 lists the site status as Active.	
			b. Site Description, LHAAP-5 PowerHouse Boiler Pond (BS47947)	Although this site was identified as an SWMU in the RFA, the TNRCC determined that there were no additional investigations required at this site.	
			Table 2 LHAAP Restoration Management Information System Site Summary Chart (BS47966)	Table 2 shows the preliminary assessment completed and current phase of investigation as None.	
		CES, 1999, Brine Pond, NOR Unit 004, Closure Report, EPA ID TX 6213820529, Solid Waste Registration 30990, April.	Page 1 (Executive Summary) (BS00113648)	The site was closed to the attainment of Risk Reduction Standard Number 2: Closure to Groundwater Protection Standard for Residential Use	
		TNRCC, 2002, Letter Regarding Approval of Closure Final Report - Risk Reduction Standard No. 2 Brine Pond (Surface Impoundment), 2 pages, 17 May 2002.	Page 1, (BS00113638)	Based upon the information contained in the Final Report and other information available to staff, it appears that the cleanup has achieved KRS No. 2. Therefore, the TNRCC releases LHAAP from post-closure care responsibilities for the former brine pond.	
		Shaw, 2005, Final Environmental Condition of Property III (ECOP) for the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas, Aug.	Page 3 (BS00113747) & Figure 3, (BS00113774)	The site was closed to the attainment of Risk Reduction Standard Number 2: Closure to Groundwater Protection Standard for Residential Use	
LHAAP-9	Building 31W Drum Storage	TWC, 1988, RCRA Facility Assessment Conducted by Texas Water Commission, April.	Page 73 (BS001324)	Because this is a well-managed unit, and because there is no evidence that suggests past mismanagement, no further RFA action is recommended.	Non-NPL
		CES, 1999, Final Closure Report, Hazardous Waste Storage Area 31-W RCRA Permit 50195 Unit No. 001, October.	Page 27 (BS00188562)	The semi-volatile bis(2-ethylhexylphthalate) was detected in rinsewater verification sample from container storage area 31-W and were included in the deed recording as a constituent left in place. Barium and Cadmium were detected in some of the soil samples and appeared to be above background. Both were included in the deed recording as constituents left in place. The container storage area 31-W has been decontaminated and meets criteria for health-based closure/remediation based on Title 30 Chapter 335 Subchapter S Part 568 Appendix II	
		Shaw, 2004, Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant, May.	Page 2 (BS032320)	LHAAP-09 was reclassified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas).	
		EPA, 2005, Letter Regarding Longhorn Army Ammunition Plant (LHAAP) Evaluation of Warehouse Area Surface Soil, March.	Located in Appendix B	Based on EPA's review of the information provided for the Warehouse Area and the nature of activities known to have occurred in this area (i.e. storage of finished products), the EPA concurs with the Army's conclusion that the Warehouse Area is suitable for transfer to the USFWS for refuge purposes	
		Texas Commission on Environmental Quality, 2007, Notice of Registration, Industrial and Hazardous Waste, 1 page, 8	Page 1 (BS00113815)	RCRA permitted - closed 11/18/00	
LHAAP-15	Area 49W Drum Storage	TWC, 1988, RCRA Facility Assessment Conducted by Texas Water Commission, April.	Page 107 (BS001357)	Because this is a well-managed unit, no further RFA action is recommended.	Non-NPL
		CES, 1999, Final Closure Report, Hazardous Waste Storage Area 49-W RCRA Permitted Unit No. 002, September.	Page 21 (No BS Number)	No contaminants were found in the verification samples of the rinsewater of the structure or the soil verification samples. This supplemental information, together with the information in the Closure Report for 49-W, and the Addendum One to the Closure Report for 49-W, effectively determines that the container storage area has been decontaminated and closed to background levels.	
		U.S. Army Corps of Engineers, Tulsa District, 1996, Final DERPMIS/RMIS Resolution Document, April 1996.	Appendix C, Resource Conservation & Recovery Act Facility Assessment, Part II Unit Evaluation (BS48028-29).	4. Upon inspection it is unlikely that this unit would contribute to any significant groundwater contamination.	
		Shaw, 2004, Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant, May.	Page 2 (BS032320)	LHAAP-15 was reclassified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas).	
		Texas Commission on Environmental Quality, 2007, Notice of Registration, Industrial and Hazardous Waste, 1 page, 8	Page 1 (BS00113815)	RCRA Permitted - closed 10/14/99	
LHAAP-34	Building 703 PCB Storage	TWC, 1988, RCRA Facility Assessment Conducted by Texas Water Commission, April.	Page 213 (BS001463)	Because this unit shows no manifestations of past mismanagement, no further RFA action is recommended.	Non-NPL

US ARMY CORPS OF ENGINEERS, TULSA DISTRICT, SUPPORT DOCUMENTATION TABLE
LONGHORN ARMY AMMUNITION PLANT
SITES LHAAP-5, 9, 15, 34, 52, 57, 61, 63, 70, AND 71

Site	Description	Documentation	References	Recommendation/Conclusion	Status
		U.S. Army Corps of Engineers, Tulsa District, 1996, Final DERPMIS/RMIS Resolution Document, April 1996.	Section III. Contamination Assessment, Subsection B. Site Description, LHAAP-	Although this site was identified as an SWMU in the RFA, the TNRCC determined that there were no additional investigations required at this site.	
		CES, 2000, Building 701, NOR 009, Closure Report, Located at Longhorn Army Ammunition Plant, EPA ID TX6213820529, Solid Waste Registration 30990, April.	Page 9 (BS00189435)	Closure of building 701 has been accomplished in accordance with the requirements as stated in 30 TAC Chapter 335 and the requirements of Longhorn Army Ammunition Plant Part B Hazardous Waste Permit 50195.	
		Shaw, 2004, Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant, May.	Page 2 (BS032320)	LHAAP-34 was reclassified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas).	
LHAAP-52	Magazine Area-Truck Wash-out	Sverdrup Environmental, Inc, 1995, Final Chemical Data Acquisition Plan for the Preliminary Assessment Site Investigations Group No. V Sites at Longhorn Army Ammunition Plant Karnack, Texas, September 1995.	Page 2 of 7, section 1.2 Site Description (BS15437)	"… it was determined that LHAAP 70 and 71 will require no further environmental investigations. Therefore, the four sites LHAAP 50, 52, 60, and 63 will be the Group V sites that are part of the PA/SI."	Non-NPL
		Sverdrup Environmental, Inc, 1997, Final Site Characterization Investigation Report for the Group 5 Sites (50, 52, 60, and 63) at Longhorn Army Ammunitions Plant (LHAAP) Karnack, Texas, June 1997.	Section 7.0 Conclusions and Recommendations, Site 52 - Magazine Area Washout (BS20688)	Based on the data presented in Section 3, no further action is required at this site since no significant release of contaminants has been identified.	
		USEPA, 1998, Letter Regarding Longhorn Army Ammunition Plant Group 5 Final Site Characterization Investigation Report, 10 page, 11 May 1998.	EPA has completed its review of the Final Site Characterization Investigation Report for the Group 5 Sites (50, 52, 60, and 63) Site Investigation (report)(Sverdrup, June 1997) (BS22460)	Page 2, The investigations at Sites 52 and 63 leads to the conclusion that no discernable concentrations of chemical compounds reflecting a release into the environment is present at these two sites. Therefore, the EPA concurs with the Army's recommendation that no further action is warranted at sites 52 and 63.	
		TNRCC, 1998, Letter Regarding Longhorn Army Ammunition Plant Group 5 - Final Sited Characterization Report, 3 pages, 21 May 1998.	Page 1 (BS22481)	Both the EPA and the Army agreed that no further action was necessary for Sites 52 and 63, and that investigations should continue for sites 50 and 60. The TNRCC concurs with the EPA's and the Army's conclusions.	
		Shaw, 2004, Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant, May.	Table 3 (BS032331)	LHAAP-52 was classified as a CERFA Category 3 site which describes areas where release, disposal, and or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial	
LHAAP-57	Rubble Burial Site	U.S. Army Corps of Engineers, Tulsa District, 1996, Final DERPMIS/RMIS Resolution Document, April 1996.	Section III. Contamination Assessment, Subsection B. Site Description, LHAAP-57 Rubble Burial Site (BS47961)	This site is used for burial of inert materials that were cleared from the property after acquisition. Findings from the preliminary assessment concluded that no further action is necessary at this site.	Non-NPL
		Shaw, 2004, Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant, May.	Page 2 (BS032320)	LHAAP-57 was reclassified as a CERFA Category 1 site which describes areas where no release or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas).	
LHAAP-61	Potable Water Treatment Plant Sediment Ponds	U.S. Army Corps of Engineers, Tulsa District, 1996, Final DERPMIS/RMIS Resolution Document, April 1996.	Section III. Contamination Assessment, Subsection B. Site Description, LHAAP-61 Water Treatment Plant Effluent Settling Pond (BS47962); and Table 2 Restoration Management Information System Site Summary Chart (BS47968)	Findings from the Army's preliminary assessment concluded that no further action is necessary at this site. No Further Action after completed PA on Table 2.	Non-NPL
		EPA, 2007, Letter Regarding March 2007 Final Environmental Condition of Property IV (ECOP IV) document for Longhorn Army Ammunition Plant (LHAAP), April.	Located in Appendix B	The EPA concurs with the Army's determination that the property identified for transfer in the ECOP IV either had no history of contamination or had been properly remediated and is suitable for transfer to the FWS for refuge purposes.	
LHAAP-63	Burial Pits	U.S. Army Corps of Engineers, Tulsa District, 1996, Final DERPMIS/RMIS Resolution Document, April 1996.	Section III. Contamination Assessment, Subsection B. Site Description, LHAAP-63 Burial Pits (BS47963)	Findings from the Army's preliminary assessment and recent re-evaluation concluded that a site investigation would be initiated	Non-NPL
		Sverdrup, 1997, Final Site Characterization Investigation Report, Group 5 Sites (50, 52, 60, and 63) Site Investigation, Longhorn Army Ammunition Plant, June.	Pages 7-2, 7-3 (BS020688-020689)	Based on the data presented in Section 6, no further action is required at this site since no significant release of contaminants has been identified.	
		USEPA, 1998, Letter Regarding Longhorn Army Ammunition Plant Group 5 Final Site Characterization Investigation Report, 10 page, 11 May 1998.	EPA has completed its review of the Final Site Characterization Investigation Report for the Group 5 Sites (50, 52, 60, and 63) Site Investigation (report)(Sverdrup, June 1997) (BS22460)	Page 2, The investigations at Sites 52 and 63 leads to the conclusion that no discernable concentrations of chemical compounds reflecting a release into the environment is present at these two sites. Therefore, the EPA concurs with the Army's recommendation that no further action is warranted at sites 52 and 63	
		TNRCC, 1998, Letter Regarding Longhorn Army Ammunition Plant Group 5 - Final Site Characterization Report, 3 pages, 21 May 1998.	Page 1 (BS22481-22483).	Both the EPA and the Army agreed that no further action was necessary for Sites 52 and 63... The TNRCC concurs with the EPA's and the Army's conclusions.	

US ARMY CORPS OF ENGINEERS, TULSA DISTRICT, SUPPORT DOCUMENTATION TABLE
LONGHORN ARMY AMMUNITION PLANT
SITES LHAAP-5, 9, 15, 34, 52, 57, 61, 63, 70, AND 71

Site	Description	Documentation	References	Recommendation/Conclusion	Status
		Shaw, 2004, Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant, May.	Page 2 (BS032320) & Table 3 (BS032332)	LHAAP-63 was classified as a CERFA Category 3 site which describes areas where release, disposal, and or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response.	
LHAAP-70	Loading Dock Magazine Area	Sverdrup Environmental, Inc, 1995, Final Chemical Data Acquisition Plan for the Preliminary Assessment Site Investigations Group No. V Sites at Longhorn Army Ammunition Plant Karnack, Texas, September 1995.	Page 2 of 7, section 1.2 Site Description (BS15437)	Identifies LHAAP NO. 70 as Loading Dock Magazine Area. After a site inspection conducted by USACE reps in January 1995, it was determined that LHAAP 70 and 71 will require no further environmental investigations.	Non-NPL
			Page 6 and 7, LHAAP 70 Loading Dock Magazine Area (BS15460-15461)	On January 1995, a site inspection was conducted by USACE reps of the magazine and surrounding area. No visual evidence of contamination from TNT or related compounds relating to the spill in December 1952. No further environmental study will be conducted at this area.	
		Shaw, 2004, Final Evaluation of LHAAP-45 Surface Soil Analytical Data, Longhorn Army Ammunition Plant, September.	Page 4-1 (BS00038866)	Analysis of 22 LHAAP-45 surface soil samples from the USFWS and 14 samples from USACHPPM shows that chemicals were detected at low concentrations, often consistent with LHAAP background levels. Individual measured concentrations were compared with risk-based soil screening concentrations developed by the TCEQ and the USEPA to be protective of human health and the environment.	
		EPA, 2004, Letter Regarding Longhorn Army Ammunition Plant (LHAAP) Evaluation of Site 45 Surface Soil Analytical Data, August.	(BS034727-034728)	Based on EPA's review of the Draft Final Evaluation of LHAAP-45 Surface Soil Analytical Data, the USFWS LHAAP-45 soil data, and the USACHPPM LHAAP-45 soil data, the EPA concurs with the recommendation that no further environmental investigation is necessary in this area	
		Shaw, 2004, Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant, May.	Page 2 (BS032320) & Table 3 (BS032332)	LHAAP-70 was classified as a CERFA Category 3 site which describes areas where release, disposal, and or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response.	
LHAAP-71	Spill at Building 813	Sverdrup Environmental, Inc, 1995, Final Chemical Data Acquisition Plan for the Preliminary Assessment Site Investigations Group No. V Sites at Longhorn Army Ammunition Plant Karnack, Texas, September 1995.	Page 2 of 7, section 1.2 Site Description (BS15437)	Identifies LHAAP NO. 71 as Oil Spill at Building 813. After a site inspection conducted by USACE reps in January 1995, it was determined that LHAAP 70 and 71 will require no further environmental investigations.	Non-NPL
			Page 7, LHAAP 71 - Oil Spill at Building 813 (BS15461)	On January 1995, a site inspection was conducted by USACE reps at building 813, the location of the above ground storage tank spill occurred December 1978. No remaining visual evidence of contamination from the soil spill were revealed. Since the spill was not released into Central Bayou and no evidence of the spill has been noted, no further environmental study will be conducted at this site.	
		Shaw, 2004, Final Environmental Condition of Property I (ECOP) for the Longhorn Army Ammunition Plant, May.	Page 2 (BS032320) & Table 3 (BS032332)	LHAAP-71 was classified as a CERFA Category 4 site which describes areas where release, disposal, and or migration of hazardous substance has occurred, and all removal or remedial actions to protect human health and the environment have been taken.	
		Shaw, 2008, Final Data Evaluation Report Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps Vol 1-3, January.	Page 3-20 (BS00065856)	Sump 118 is associated with Building 813, an independent production facility located southwest of LHAAP-29. Potential contaminants at Building 813 include SVOCs, VOCs, and TPH DRO-GRO. Results of soil sample analysis are shown in Table 3-106.	
			Page 4-28 (BS00065888)	Screening of soil concentrations versus RBSV concentrations is shown in Table 4-124. Because all chemicals have concentrations below the RBSV, no further action is required at Sump-118.	

BS = bate stamp number from administrative record.

Appendix B

USEPA Environmental Condition of Property Concurrences

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

APR 28 2004

Mr. Thomas E. Lederle
Director, Base Realignment and Closure
U.S. Department of the Army
Hampton Field Office
102 McNair Drive
Fort Monroe, Virginia 23651

Dear Mr. Lederle:

The U.S. Environmental Protection Agency (EPA) has received your April 21, 2004, response to EPA's comments on the Longhorn Army Ammunition Plant (LHAAP) *Draft Environmental Condition of Property I* (ECOP) document. Based on EPA's review of the ECOP, your response to EPA's comments on the ECOP, and pursuant to paragraph four (4) of the *Memorandum of Agreement concerning a Framework for the Potential Establishment of a Caddo Lake National Wildlife Refuge* (May 22, 2000), the EPA herein concurs with the U.S. Department of the Army's (the Army's) determination that the property identified for transfer to the U.S. Department of Interior, Fish and Wildlife Service (FWS) in the ECOP either had no history of contamination or had been properly remediated and is suitable for transfer for refuge purposes, with the exception of the Warehouse Area (which includes Buildings 31-M and 35-M) and the Magazine Area (Site 45). It is EPA's understanding that the Army and the FWS have agreed to exclude these two areas from the initial property transfer pending further evaluation. The EPA herein provides further assurance that, as between the Army and the FWS, the EPA will consider the Army responsible for any contamination caused by the Army's activities at LHAAP, or that of its operator-contractor, as required under the Comprehensive Environmental Response, Compensation, and Liability Act and the LHAAP Federal Facility Agreement.

If you have any questions regarding this matter, please feel free to contact Mr. Chris Villarreal of my staff at (214) 665 – 6758.

Sincerely,

Pamela Phillips, Acting

Samuel Coleman, P.E.
Director
Superfund Division

cc: Geoffrey L. Haskett, Deputy Regional Director,
U.S. Fish and Wildlife Service, Region 2

TOTAL P.03

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

August 18, 2004

Rose M. Zeiler, Ph. D.
Project Manager
Box 3,Building 1440
Fort Chaffee, Arkansas 72905

Re: Longhorn Army Ammunition Plant (LHAAP)
Evaluation of Site 45 Surface Soil Analytical Data

Dear Ms. Zeiler:

The U.S. Environmental Protection Agency (EPA) has completed our review of the information provided in the *Draft Final Evaluation of LHAAP-45 Surface Soil Analytical Data* (Shaw Environmental, Inc., July 2004). This document presents the evaluation of the surface soil samples collected at LHAAP-45 (i.e., Magazine Area used as a storage area for finished munitions) by the U.S. Fish and Wildlife Service (USFWS) and by the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Concentrations of chemicals in the samples were compared to risk-based soil screening levels developed by the Texas Commission on Environmental Quality and by EPA Region 6 to be protective of human health and the environment. Samples exceeding the risk-based screening levels were compared to the LHAAP-specific background concentrations. Based on EPA's review of this information, the EPA concurs with the report's findings that:

- the concentrations of most organic and inorganic chemicals detected at LHAAP-45 are either below the regulatory human health and ecological screening criteria or are within the range of LHAAP soil background concentrations;
- a few chemicals detected at LHAAP-45 (i.e., cadmium, manganese, zinc, hexachloroethane, and pentachlorophenol) exceeded screening criteria and differed from background data set;
- chemical detections that exceeded the screening criteria and differed from background data set occurred only at isolated locations (i.e., for chemicals such as cadmium, manganese, and hexachloroethane); and,
- most of the chemicals that exceeded the screening criteria and differed from background data set (cadmium, manganese, zinc, and pentachlorophenol) are not associated with materials known to be stored at LHAAP-45.

Based on EPA's review of the *Draft Final Evaluation of LHAAP-45 Surface Soil Analytical Data*, the USFWS LHAAP-45 soil data, and the USACHPPM LHAAP-45 soil data, the EPA concurs with the recommendation that no further environmental investigation is necessary in this area.

Sincerely,

Chris G. Villarreal

Chris G. Villarreal
Remedial Project Manager

cc: Cliff Murray, U.S. Army Corps of Engineers

James S. H. Sher, P.E., Texas Commission on Environmental Quality

Barry Forsythe, U.S. Fish and Wildlife Service

Bill Corrigan, Complete Environmental Services

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

July 15, 2005

Mr. Thomas E. Lederle
Director, Base Realignment and Closure
U.S. Department of the Army
Hampton Field Office
102 McNair Drive
Fort Monroe, Virginia 23651

Dear Mr. Lederle:

The U.S. Environmental Protection Agency (EPA) has reviewed the June 2005 *Draft Environmental Condition of Property III* (ECOP III) document for the Longhorn Army Ammunition Plant (LHAAP). The EPA's focus in reviewing this document was to ensure that sufficient information was presented to support a determination that the property either had no history of contamination or had been properly remediated and is suitable for transfer for refuge purposes. The ECOP III documents the environmental condition of approximately 398.5 acres of land which comprise two parcels referred to as the Northwest Block of the Goose Prairie Creek Parcel and the Excluded Area Parcel. The Northwest Block was further divided into the Production Area and the West Further Investigation Area (WFIA). The Excluded Area Parcel, as mentioned in the ECOP III document, will be addressed in a separate transfer document [i.e., Finding of Suitability to Transfer I (FOST I)].

In regards to the Northwest Block/Production Area, it is EPA's understanding that the U.S. Department of Interior, Fish and Wildlife Service (FWS) has recently collected surface soil samples as part of its own evaluation of this area. These surface soil samples are being analyzed for metals, semivolatile organic compounds, organochlorine pesticides, polychlorinated biphenyls, dioxins/furans, and perchlorate. Once the FWS's surface soil sampling results are available for review, the EPA can make a better informed decision regarding the suitability for transfer of the Northwest Block/Production Area.

The Northwest Block/WFIA was one of three parcels excluded from the initial transfer of property from the Department of the Army to the FWS. Historically, the WFIA did have three water towers, a parking lot, weight station, and the Hope No. 2 Cemetery. The WFIA was not used for any of the manufacturing, waste disposal, or finished product storage operations at LHAAP. The WFIA was not subject to a systematic contaminants investigation; however, samples were collected on the property as part of contaminant investigation activities on adjacent sites [i.e., Site 29 (Former TNT Production Area), Site 32 (Former TNT Wastewater Plant), and

Site 49 (Acid Storage Area)]. In 2002, the FWS collected surface soil samples on the property as part of its facility-wide effort targeting areas not previously investigated. Based on its sampling, the FWS excluded the property from the initial transfer pending further investigations. The FWS's principal concern with the property was mercury and lead detected at the site.

In response to FWS's concerns, additional sampling of the WFIA was conducted by the U.S. Army Corps of Engineers in June 2004. The samples were analyzed for mercury and lead at locations between Site 49 and previous FWS sample locations in order to determine if a contaminant gradient (e.g., of mercury and/or lead) was evident from Site 49. In December 2004, additional sampling was conducted by Shaw Environmental, Inc., in support of an engineering evaluation/cost analysis being prepared for Site 49. As a result of the additional sampling, the boundary of the WFIA was redrawn to remove from transfer consideration an area with elevated mercury concentrations. The excluded area will be further evaluated as part of Site 49.

Based on EPA's review of the information provided for the WFIA, the revision of the WFIA boundary to exclude an area where elevated mercury was detected, and pursuant to paragraph four (4) of the *Memorandum of Agreement concerning a Framework for the Potential Establishment of a Caddo Lake National Wildlife Refuge* (May 22, 2000), the EPA herein concurs with the Army's determination that the WFIA property designated for transfer in the ECOP III (i.e., approximately 284 acres) either had no history of contamination or had been properly remediated and is suitable for transfer to the FWS for refuge purposes. The EPA herein provides further assurance that, as between the Army and the FWS, the EPA will consider the Army responsible for any contamination caused by the Army's activities at LHAAP, or that of its operator-contractor, as required under the Comprehensive Environmental Response, Compensation, and Liability Act and the LHAAP Federal Facility Agreement.

If you have any questions regarding this matter, please feel free to contact Mr. Chris Villarreal of my staff at (214) 665-6758.

Sincerely yours,

John R. Hepola

for Samuel Coleman, P.E.
Director
Superfund Division

cc: Geoffrey L. Haskett, Deputy Regional Director,
U.S. Fish and Wildlife Service, Region 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

October 31, 2005

Mr. Thomas E. Lederle
Director, Base Realignment and Closure
U.S. Department of the Army - Hampton Field Office
102 McNair Drive
Fort Monroe, Virginia 23651

Dear Mr. Lederle:

The purpose of this letter is to serve as a follow-up to the previous U.S. Environmental Protection Agency (EPA) correspondence dated July 15, 2005, regarding property identified for transfer in the June 2005 *Draft Environmental Condition of the Property III* (ECOP III) document for the Longhorn Army Ammunition Plant (LHAAP). The EPA's focus in reviewing the ECOP III document was to ensure that sufficient information was presented to support a determination that the property either had no history of contamination or had been properly remediated and is suitable for transfer for refuge purposes. The ECOP III documented the environmental condition of approximately 398.5 acres of land which included the Northwest Block of the Goose Prairie Creek Production Area and the Excluded Area Parcel.

In regards to the Northwest Block of the Goose Prairie Creek Production Area, this area was divided into the West Further Investigation Area and the Production Area. Based on EPA's review of the ECOP III document, the EPA had previously concurred with the Army's determination that the West Further Investigation Area was suitable for transfer to the U.S. Department of Interior, Fish and Wildlife Service (FWS) for refuge purposes. At the time the ECOP III was submitted for review, the EPA was aware that additional information regarding the Production Area was forthcoming. Specifically, the results of additional surface soil sampling conducted by the FWS as part of its own evaluation of the area.

The purpose of the FWS evaluation was to determine surficial soil contaminant levels of metals, organochlorine pesticides, polychlorinated biphenyls, and perchlorate within the former production area. The results of the surficial sampling were provided to the EPA in the FWS's *Contaminants Investigation of Former Production Area Within Caddo Lake National Wildlife Refuge, Texas 2005* (September 2005). FWS's evaluation found that in comparison to available ecological screening criteria, none of the detected surficial soil contaminant concentrations were at levels likely to adversely affect ecological resources. Subsequent evaluation of select metals data (i.e., chromium, lead, manganese, mercury, selenium, vanadium, and zinc) by the EPA was done by calculating the 95% upper confidence levels (UCLs) and comparing these values to various ecological and human health screening levels. This evaluation found that the 95% UCLs for the select metals surface soil data were less than various ecological screening values and the EPA Region 6 human health medium-specific screening level values for residential soils.

In regards to the Excluded Area Parcel, an adjacent 0.75 acre was previously addressed in the U.S. Army's *Finding of Suitability to Transfer I* (FOST I) document. Specifically, the 0.75 acre of encroached land located directly north and beyond the LHAAP perimeter fence has been transferred to a private property owner. EPA's concurrence letter on this transfer is dated July 22, 2005. Adjacent to the 0.75 acre, the 4.5-acre Excluded Area Parcel was identified in the ECOP III document for transfer to the FWS. The 4.5 acres is similar to the 0.75 acre in that no LHAAP activities were performed in this area and there are no adjacent environmental sites.

Based on EPA's review of the information provided for the Excluded Area Parcel and the Northwest Block/Production Area, including the additional information provided by the FWS, and pursuant to paragraph four (4) of the *Memorandum of Agreement concerning a Framework for the Potential Establishment of a Caddo Lake National Wildlife Refuge* (May 22, 2000), the EPA herein concurs with the Army's determination that the 4.5-acre Excluded Area Parcel and the Northwest Block/Production Area property designated for transfer in the ECOP III either have no history of contamination or have been properly remediated and are suitable for transfer to the FWS for refuge purposes. The EPA herein provides further assurance that, as between the Army and the FWS, the EPA will consider the Army responsible for any contamination caused by the Army's activities at LHAAP, or that of its operator-contractor, as required under the Comprehensive Environmental Response, Compensation, and Liability Act and the LHAAP Federal Facility Agreement.

If you have any questions regarding this matter, please feel free to contact Mr. Chris Villarreal of my staff at (214) 665-6758.

Sincerely yours,

Samuel Coleman, P.E.
Director
Superfund Division

cc: Geoffrey L. Haskett, Deputy Regional Director
U.S. Fish and Wildlife Service, Region 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

APR 13 2007

Mr. Thomas E. Lederle
Director, Base Realignment and Closure
U.S. Department of the Army
Hampton Field Office
102 McNair Drive
Fort Monroe, VA 23651

Dear Mr. Lederle:

The U.S. Environmental Protection Agency (EPA) has reviewed the March 2007 Final Environmental Condition of Property IV (ECOP IV) document for the Longhorn Army Ammunition Plant (LHAAP). The EPA's focus in reviewing this document was to ensure that sufficient information was presented to support a determination that the property either had no history of contamination or had been properly remediated and is suitable for transfer for refuge purposes. The ECOP IV documents the environmental condition of approximately 640 acres distributed among seven separate tracts of land. Four of the seven tracts of land consist of approximately 456.72 of the 1,189 acres of the Production Area (Production Areas 1, 2, 3, and 4). The remaining three tracts of land are referred to as the Revised East Further Investigation Area (EFIA) consisting of approximately 182 acres, and two cemeteries: Hayner Cemetery (approximately 1.24 acres) and Hope No. 2 Cemetery (0.04 acres).

In regards to the Production Area:

- Production Area 1: The LHAAP-46 and LHAAP-47 portions proposed for transfer do not have contaminated soils requiring remediation nor does it have underlying groundwater contamination.
- Production Area 2: No release or disposal of hazardous substances or petroleum products have occurred.
- Production Area 3: No release or disposal of hazardous substances or petroleum products have occurred.
- Production Area 4: The U.S. Department of Interior Fish and Wildlife Service (FWS) sampling performed during June 2005 indicated elevated concentrations of several metals but at levels that do not pose an unacceptable risk to human health or the environment.

In regards to the EFIA, the presence of elevated lead and mercury concentrations in EFIA soil represent residual concentrations from upgradient sources that are no longer actively

contributing. These concentrations do not pose an unacceptable risk to human health and with the exception of potential avian risk; the area presents no unacceptable ecological risk. Based on the conservative nature of the ecological screen values used, the impact to potential avian receptors is expected to be negligible.

In regards to the two cemeteries:

- Hayner Cemetery: No release or disposal of hazardous substances or petroleum products have occurred.
- Hope No. 2 Cemetery: No release or disposal of hazardous substances or petroleum products have occurred.

Based on EPA's review of the ECOP IV, and pursuant to paragraph four (4) of the *Memorandum of Agreement concerning a Framework for the Potential Establishment of a Caddo Lake National Wildlife Refuge* (May 22, 2000), the EPA herein concurs with the Army's determination that the property identified for transfer in the ECOP IV (approximately 640 acres) either had no history of contamination or had been properly remediated and is suitable for transfer to the FWS for refuge purposes. The EPA herein provides further assurance that, as between the Army and the FWS, the EPA will consider the Army responsible for any contamination caused by the Army's activities at LHAAP, or that of its operator-contractor, as required under the Comprehensive Environmental Response, Compensation, and Liability Act and the LHAAP Federal Facility Agreement.

If you have any questions regarding this matter, please feel free to contact Mr. Stephen Tzhone of my staff at 214-665-8409.

Sincerely yours,

Pamela Phillips, Acting

Samuel Coleman, P.E.
Director
Superfund Division

Christopher T. Jones

cc: ~~Geoffrey L. Haskett~~, Deputy Regional Director,
U.S. Fish and Wildlife Service, Region 2

04-13-07

Appendix C

Certification of Remediation Recordation

LHAAP-05

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
CERTIFICATION OF REMEDIATION

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Water Commission pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

United States Army, United States Department of Defense, has performed a remediation of the land described herein. A copy of the Notice of Registration No. 30990 description of the facility, NOR Unit 004, is attached hereto and is made part of this filing. A list of the known waste constituents (brine solution), including known concentrations, which have been left in place is attached hereto and is made part of this filing. Further information concerning this matter may be found by an examination of Installation records or in the Notice of Registration No. 30990 files, which are available for inspection upon request at the central office of the Texas Natural Resource Conservation Commission in Austin, Texas.

The Texas Natural Resource Conservation Commission derives its authority to review the remediation of this tract of land from the Texas Solid Waste Disposal Act, § 361.002, Texas Health and Safety Code, Chapter 361, which enables the Texas Natural Resource Conservation Commission to promulgate closure and remediation standards to safeguard the health, welfare and physical property of the people of the State and to protect the environment by controlling the management of solid waste. In addition, pursuant to the Texas Water Code, § 5.012 and § 5.013, Texas Water Code, Annotated, Chapter 5, the Texas Natural Resource Conservation Commission is given primary responsibility for implementing the laws of the State of Texas relating to water and shall adopt any rules necessary to carry out its powers and duties under the Texas Water Code. In accordance with this authority, the Texas Natural Resource Conservation Commission requires certain persons to provide certification and/or recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This deed certification is not a representation or warranty by the Texas Natural Resource Conservation Commission of the suitability of this land for any purpose, nor does it constitute any guarantee by the Texas Natural Resource Conservation Commission that the remediation standards specified in this certification have been met by the United States Army.

II

Being a 6.717-acre tract, more or less, out of the United State Army, Longhorn Army Ammunition Plant's 8,823.96-acre tract lying in Harrison County, State of Texas, said 6.717-acre tract being more particularly described as Attachment One.

Contaminants deposited hereon have been remediated to meet residential soil criteria, in accordance with a plan designed to meet the Texas Natural Resource Conservation Commission's requirements in 31 Texas Administrative Code, Chapter 335.555, which mandates that the remedy be designed to eliminate substantial present and future risk such that no post-closure care or engineering or institutional control measures are required to protect human health and the environment. Future land use is considered suitable for residential purposes in accordance with risk reduction standards applicable at the time of this filing. Future land use is intended to be non-residential.

III

The owner of the site is United States Army, Department of Defense, and its address is Attn: SMCLO-CO, P.O. Box 658, Doyline, LA 71023, where more specific information may be obtained from the owner.

EXECUTED this the 7th day of January, 1999.

United States Army
United States Department of
Defense

Ira Nathan
Chief of Operations Review

BEFORE ME, on this the 7th day of January, personally appeared Ira Nathan, Chief of Operations Review of United States Army, United States Department of Defense, known to me to be the person and agent of said corporation whose name is subscribed to the foregoing instrument, and he acknowledged to me that he executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 7th day of January, 1999.

LAWRENCE LEE
NOTARY PUBLIC
STATE OF TEXAS
EXPIRES
10-4-2002

Notary Public in and
for the State of Texas,
County of

Harrison

My Commission Expires

10-4-02

ARK-LA-TEX SURVEYING CO., INC.
P.O. Box 910 • 315 N. Alamo Blvd. • Marshall, Texas 75671 • 903/938-9939 • FAX 903/938-0601

FIELD NOTES

All that certain lot, tract, or parcel of land situated in Harrison County, Texas, about 16 miles Northeast of the Courthouse in the City of Marshall, being 6.717 acres of land, a part of the JAMES C. HAWLEY SURVEY, A-324, and a part of the GEORGE W. LEWIS SURVEY, A-426, and being a part of that certain called 2887.6 acre tract described in deed from T.J. Taylor to the United States of America, dated August 5, 1942, and recorded in Volume 249, Page 415 of the Harrison County Deed Records, said 6.717 acres being more particularly described as follows:

Beginning at a ½" iron rod set for corner having State Plane Coordinates of North = 6959059.064 and East = 3306534.734, said rod bears South 46 deg 49'01" East – 2447.11 feet from Corps of Engineers Monument "X-11", and also bears North 57 deg 23'21" East – 1582.49 feet from Corps of Engineers Monument "HMX-5";

Thence North 43 deg 25'39" East – 290.53 feet to a ½" iron rod set for corner;

Thence South 48 deg 57'55" East – 898.92 feet to a ½" iron rod set for corner;

Thence South 43 deg 01'36" West – 360.13 feet to a ½" iron rod set for corner;

Thence North 44 deg 32'02" West – 901.23 feet to the place of beginning and containing 6.717 acres of land.

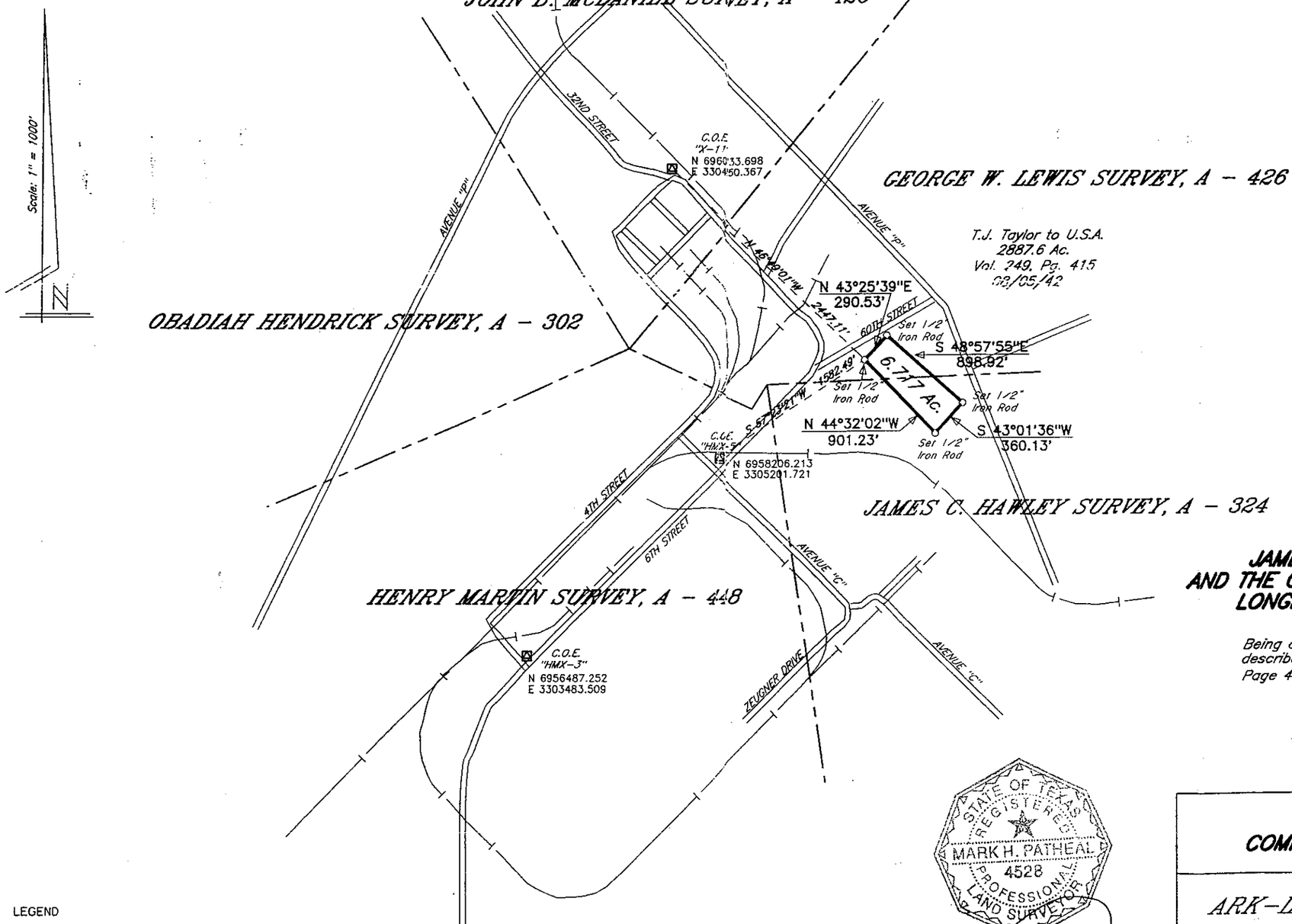
Bearing Basis: Bearings and coordinates are based upon NAD 83, Texas North Central Zone.

Surveyed: November 1998

Mark H. Patheal, R.P.L.S. #4528

Job # 15905

HARRISON COUNTY, TEXAS



Plat Showing

6.717 ACRES OF LAND LOCATED IN THE JAMES C. HAWLEY SURVEY, A – 324, AND THE GEORGE M. LEWIS SURVEY, A – 426, LONGHORN ARMY AMMUNITION PLANT, HARRISON COUNTY, TEXAS.

Being a part of that Certain 2887.2 Acre tract of land described in deed to the U.S.A., recorded in Volume 249, Page 415, H.C.D.R.

LEGEND

Barbed Wire Fence	—X—
Chain Link Fence	—O—
Wood Fence	—□—
Tele. Cable	—T—
Powerline	—E—
Centerline	— - —
Pipeline	—\—

Field Notes To Accompany Plat

To COMPLETE ENVIRONMENTAL SERVICE, exclusively

I, Mark H. Patheal, hereby certify that this survey was made on the ground, under my supervision, and that this plat correctly represents the facts found at the time of survey.

BEARING BASIS: Bearings are oriented to STATE PLANE COORDINATES, N.A.D. 83. TEXAS NORTH CENTRAL ZONE

STATE OF TEXAS REGISTERED MARK H. PATHEAL 4528 PROFESSIONAL LAND SURVEYOR

Mark H. Patheal, R.P.L.S. # 4528

SURVEYED FOR

COMPLETE ENVIRONMENTAL SERVICE

SURVEYING & MAPPING BY

ARK-LA-TEX SURVEYING CO., INC.

315 N. Alamo Marshall, Tx. (903) 938-9939

Scale: 1" = 1000'	Drawn By: BCC	Job No.: 15905
Date: 11/19/98	Surveyed By: DWS	File No.: 324-02

00216416

LHAAP-09

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
CERTIFICATION OF REMEDIATION

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Natural Resource Conservation Commission pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

United States Army, United States Department of Defense, has performed a remediation of the land described herein. A copy of the Notice of Registration No. 30990, including a description of the facility, is attached hereto and is made part of this filing. A list of the known waste constituents, including known concentrations, which have been left in place is attached hereto and is made part of this filing. Further information concerning this matter may be found by an examination of Installation records or in the Notice of Registration No. 30990 files, which are available for inspection upon request at the central office of the Texas Natural Resource Conservation Commission in Austin, Texas.

The Texas Natural Resource Conservation Commission derives its authority to review the remediation of this tract of land from the Texas Solid Waste Disposal Act, § 361.002, Texas Health and Safety Code, Chapter 361, which enables the Texas Natural Resource Conservation Commission to promulgate closure and remediation standards to safeguard the health, welfare and physical property of the people of the State and to protect the environment by controlling the management of solid waste. In addition, pursuant to the Texas Water Code, § 5.012 and § 5.013, Texas Water Code, Annotated, Chapter 5, the Texas Natural Resource Conservation Commission is given primary responsibility for implementing the laws of the State of Texas relating to water and shall adopt any rules necessary to carry out its powers and duties under the Texas Water Code. In accordance with this authority, the Texas Natural Resource Conservation Commission requires certain persons to provide certification and/or recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This deed certification is not a representation or warranty by the Texas Natural Resource Conservation Commission of the suitability of this land for any purpose, nor does it constitute any guarantee by the Texas Natural Resource Conservation Commission that the remediation standards specified in this certification have been met by United States Army.

II

Being a 0.634 acre tract, more or less, out of the United State Army, Longhorn Army Ammunition Plant's 8,823.96 acre tract lying in Harrison County, State of Texas, said 0.634 acre tract being more particularly described as Attachment One.

Contaminants deposited hereon have been remediated to meet "Ground Water and Soil Protection Standards for Residential Use", in accordance with a plan designed to meet the Texas Natural Resource Conservation Commission's requirements in 31 Texas Administrative Code §335.555 which mandates that the remedy be designed to eliminate substantial present or future risk such that no post-closure care or engineering or institutional control measures are required to protect human health and the environment. Future use of the property is considered appropriate for residential use in accordance with risk reduction standards applicable at the time of filing.

III

The owner of the site is United States Army, Department of Defense, and its address is Attn: SMCLO-CO, P.O. Box 658, Doyline, LA 71023, where more specific information may be obtained from the owner.

EXECUTED this the 12th day of October, 1999.

United States Army
United States Department of
Defense

Ira Nathan
Chief of Operations Review

BEFORE ME, on this the 12th day of October, personally appeared Ira Nathan, Chief of Operations Review of United States Army, United States Department of Defense, known to me to be the person and agent of said corporation whose name is subscribed to the foregoing instrument, and he acknowledged to me that he executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 12th day of October, 1999.

LAWRENCE LEE
NOTARY PUBLIC
STATE OF TEXAS
10-4-2002

Notary Public in and
for the State of Texas,
County of

Harrison

My Commission Expires
10-4-02

ARK-LA-TEX SURVEYING CO., INC.
P.O. Box 910 • 315 N. Alamo Blvd. • Marshall, Texas 75671 • 903/938-9939 • FAX 903/938-0601

FIELD NOTES
Container Storage Area 31-W

All that certain lot, tract, or parcel of land situated in Harrison County, Texas, about 16 miles Northeast of the Courthouse in the City of Marshall, being 0.634 acre of land, a part of the JAMES C. HAWLEY SURVEY, A –324, and a part of the GEORGE W. LEWIS SURVEY, A – 426, and being a part of that certain called 2887.6 acre tract described in deed from T.J. Taylor to the United States of America, dated August 5, 1942, and recorded in Volume 249, Page 415 of the Harrison County Deed Records, said 0.634 acres being more particularly described as follows:

Beginning at a ½" iron rod with surveyor's cap set for corner having State Plane Coordinates of North = 6956866.62 and East = 3308796.67, said rod bears North 45 deg 58'07" West, 412.68 feet from Corps of Engineers Concrete Monument "C-21" ;

Thence North 39 deg 28'26" West - 260.60 feet to a ½" iron rod with surveyor's cap set for corner;

Thence North 53 deg 41'56" East - 108.26 feet to a ½" iron rod with surveyor's cap set for corner;

Thence South 38 deg 39'38" East - 258.89 feet to a ½" iron rod with surveyor's cap set for corner;

Thence South 52 deg 51'26" West - 104.51 feet to the place of beginning and containing 0.634 acre of land.
Bearing Basis: Bearings and coordinates are based on NAD 83, Texas North Central Zone.

Surveyed: August 25, 1999

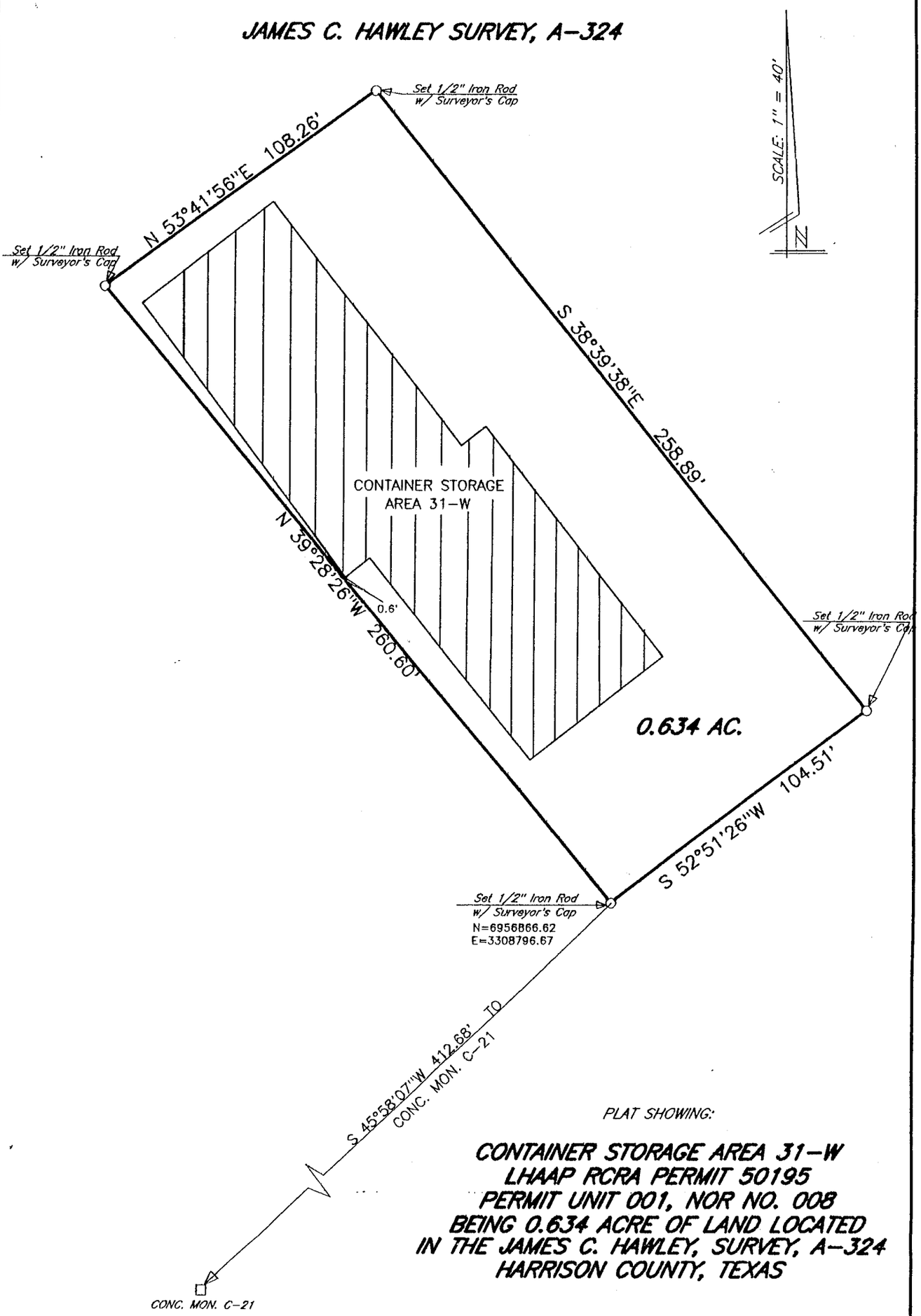
Mark H. Patheal, R.P.L.S. #4528

Job #17206a.

00216420

HARRISON COUNTY, TEXAS

JAMES C. HAWLEY SURVEY, A-324



PLAT SHOWING:

CONTAINER STORAGE AREA 31-W
LHAAP RCRA PERMIT 50195
PERMIT UNIT 001, NOR NO. 008
BEING 0.634 ACRE OF LAND LOCATED
IN THE JAMES C. HAWLEY, SURVEY, A-324
HARRISON COUNTY, TEXAS

Surveying & Mapping By			Surveyed for
ARK-LA-TEX SURVEYING CO., INC. 315 N. Alamo Marshall, Texas (903) 938-9939			COMPLETE ENVIRONMENTAL SERVICE
Scale: 1" = 40'	Drawn By: MJR	Job No.: 17206	
Date: 09/24/99	Surveyed By: JMC	File No.: 324-04A	

00216421

Comprehensive Land Use Control (LUC) Management Plan

Former Longhorn Army Ammunition Plant (LHAAP)
Karnack, Texas

September 14, 2015

COMPREHENSIVE LUC & NOTIFICATION MANAGEMENT PLAN
REVISION LOG

Fiscal Year	Date	Reason for Revision	Approved *		
			Army	EPA	TCEQ
Original	9-13-07	N/A			
2008		None Required			
2009		None Required			
2010		None Required			
2011		None Required			
2012	2-4-13	Add LHAAP-06,-07,-08,-35/36,-35B (37)/67, -46, -49, -50,-51,-55,-35A (58),-59,-60,-66,-68, Pistol Range, LHAAP-001-R-01 and LHAAP-003-R-01			
2013	10-1-13	None Required			
2014	12-17-14	Add LHAAP-02, -03, -19, -56, -65, -68, -69 and Notices for LHAAP-46, and -67			
2015	9-14-15	Add Notices for LHAAP-35B(37), -50 and -35A(58) (LHAAP-02, -03, -56, -59, -60, -65, -68, and -69 are contained within the LHAAP-58 LUC boundary)	ZEILER.ROSE.M.1230811551 Digitally signed by ZEILER.ROSE.M.1230811551 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=ZEILER.ROSE.M.1230811551 Date: 2015.09.28 10:34:34 -05'00'	RICHARD MAYER Digitally signed by RICHARD MAYER DN: c=US, o=U.S. Government, ou=USEPA, ou=Staff, cn=RICHARD MAYER, dnQualifier=0000008252 Date: 2015.09.29 13:22:30 -05'00'	April Palmie Digitally signed by April Palmie DN: cn=April Palmie, o=TCEQ, ou=Superfund Section, email=April.Palmie@tceq.texas.gov, c=US Date: 2015.09.29 11:24:51 -05'00'

* Approval by all three parties required during the first quarter of each fiscal year.

TABLE OF CONTENTS

List of Sites

Notice of Nonresidential Land Use at Septic Tank locations Filed in Public Records of Harrison County, Texas (including survey plat)

LHAAP-56 Grease Rack (LHAAP-56)

Nonresidential Land Use site included within the groundwater use restriction LUC boundary for LHAAP-35A(58)- see LHAAP-35A(58)

LHAAP-58 Shops Area (LHAAP-35A (58))

58-1 LUCs from Final Remedial Design
58-2 Notice of Land Use Controls and Nonresidential Land Use at LHAAP-35A (58) Filed in Public Records of Harrison County, Texas (including survey plat)

LHAAP-59 Former Pesticide Storage Building 725 (LHAAP-59)

Notice of Nonresidential Land Use for LHAAP-59 Filed in Public Records of Harrison County, Texas (including survey plat)
Site included within the groundwater use restriction LUC boundary for LHAAP-35A(58)- see LHAAP-35A(58)

LHAAP-60 Former Storage Building 411 & 714 (LHAAP-60)

Notice of Nonresidential Land Use at LHAAP-60 Filed in Public Records of Harrison County, Texas (including survey plat)
Building 714 included within the groundwater use restriction LUC boundary for LHAAP-35A(58)- see LHAAP-35A(58)

LHAAP-64 Transformer Storage (LHAAP-64)

Notice of Nonresidential Land Use at LHAAP-64 Filed in Public Records of Harrison County, Texas (including survey plat)

LHAAP-65 Flammable Materials Storehouse Building 209 (LHAAP-65)

Nonresidential Land Use site included within the groundwater use restriction LUC boundary for LHAAP-35A(58)- see LHAAP-35A(58)

LHAAP-66 405-L Transformer Yard (LHAAP-66)

Notice of Nonresidential Land Use at LHAAP-66 Filed in Public Records of Harrison County, Texas (including survey plat)

List of Appendices

Comprehensive Land Use Control (LUC) & Notification Management Plan, Former Longhorn Army Ammunition Plant (LHAAP), Texas

The purpose of this management plan is to ensure that all site-specific LUCs are compiled into one comprehensive location for both pre-transfer and post-transfer use. Additionally, all nonresidential use notifications required under 30 TAC §335.560(b) are included. This management plan shall be accessible to the property owner, regulators, local government, and the public and will accompany LHAAP's Administrative Record. This plan will be updated as LUC and notification requirements for additional environmental sites are identified; the revision number, date, reason for revision, and author will be documented in the Revision Log. As a document control measure, an annual approval by the three FFA parties, Army, EPA and TCEQ within the first quarter of the fiscal year will confirm the effective date. This approval is required whether or not a revision took place.

Land Use Controls

Land use controls (LUCs) include any type of physical, legal, or administrative mechanism that restricts the use of, or limits access to, real property. LUCs may be a component of an interim or final remedy selected under CERCLA and used to protect human health, the environment, and/or the integrity of an engineered remedy. The LUC performance objectives are established in the site-specific Record of Decision (ROD). The specific LUCs and implementation details are outlined in the corresponding site-specific Remedial Design (RD), a primary document of the Federal Facilities Agreement.

The land use control area is depicted on Figure 1, the site-specific performance objectives and LUCs are presented in Table 1, and the site-specific section contains a LUC Inspection and Maintenance Log, a copy of an approved LUC Remedial Design, Notice of Land Use Controls (including a survey plat) filed in Harrison County public records, and LUC compliance inspection form. Upon USEPA and TCEQ approval of each LUC RD, the LUC requirements will be effective immediately and this management plan will be updated. Once property is transferred, the plan will be amended to include a copy of the transfer letter describing specific LUC obligations assigned to the transferee.

LUCs will remain in place until applicable or relevant and appropriate requirements (ARARs) as established in accordance with the NCP (40 CFR 300) are met; or in the case of a landfill remedy it will remain in place for perpetuity unless otherwise removed by the U.S. Army per agreement with the USEPA and TCEQ. The continued effectiveness of the selected remedy, including LUCs, will be evaluated with the CERCLA 121(c) five-year review process.

Notifications

The future anticipated use of LHAAP is industrial/refuge and is, therefore, consistent with a nonresidential/industrial reuse under the Risk Reduction Rules. As required by 30 TAC §335.560(b) and in accordance with 30 TAC §335.566, a notification must be filed in the Harrison County records stating that the land is considered suitable for future non-residential use. Limited monitoring will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of the sites is consistent with the non-residential use. The non-residential use notification will remain in place until it is demonstrated that the levels of COCs in soil and groundwater allow for unlimited use and unrestricted exposure.

Table 1 –Summary of Land Use Controls and Notifications

Site Name	Transfer Documents		Decision Documents		Land Use Controls					Notifications
IRP MMRP* LHAAP-	GSA Transfer To USFWS	ECP/ ECOP	ROD	DD	Groundwater Use Restriction	Nonresidential Land Use Restriction	Intrusive Activities Prohibition	MEC Warning	Landfill Cap Maintenance	Nonresidential Use Notification
2					**					**
3					**					**
6				2008						√
7				2008						√
8	2015	VI		2008						√
12	2014	V	2007		√	Cap Only	Cap Only		√	√
19		VII		2014		Cap Only	Cap Only			√
35/36	2015	VI		2010						√
37			2010		√					√
46			2010		√					√
49	2015	VI	2010							√
50			2010		√					√
51				2008						√
55	2015	VI		2008						√
56				2014	**					**
58			2010		√					√
59				2008	**					√
60				2008	**					√
64				2008						√
65				2014	**					**

66				2008						√
67			2010		√					√
68				2008	**					√
69				2014	**					**
Pistol Range		VII	2010							√
001-R-01*/003-R-01*		VII	2012		√	√	√	√		√

Pending- not final

** Nonresidential Land Use site included within the groundwater use restriction LUC boundary for LHAAP-35A(58)- see LHAAP-35A(58)

FIGURES

N
W
E
S

LHAAP-46
LHAAP-02
LHAAP-60D
Bldg 714
LHAAP-56
LHAAP-68
LHAAP-69
LHAAP-58
LHAAP-03
Bldg 722-P
LHAAP-65
Bldg 209
LHAAP-59
Bldg 725
LHAAP-37
LHAAP-50
LHAAP-67
LHAAP-12
LHAAP-19
MMRP Site LHAAP-003-R-01
MMRP Site LHAAP-001-R-01

Legend

- Residental Use and Intrusive Activities Restriction
- Groundwater Use Restriction
- MEC Warning
- Landfill Cap Maintenance
- Buildings
- Installation Boundary

0 1,250 2,500 5,000 7,500 10,000 Feet

LONGHORN ARMY AMMUNITION PLANT

Sites with Land Use Controls
Figure 1

00216433

N
W
E
S

LHAAP-46
LHAAP-02
LHAAP-03 Bldg 722-P
LHAAP-59
LHAAP-60D Bldg 714
LHAAP-56
LHAAP-69
LHAAP-68
LHAAP-58
LHAAP-49
LHAAP-60C Bldg 411-A
LHAAP-64
LHAAP-65 Bldg 209
LHAAP-60A Bldg 411
LHAAP-66
LHAAP-60B Bldg TS-80
LHAAP-51 Bldg 60-B
LHAAP-06 Bldg 51-F
LHAAP-07 Bldg 50-G
LHAAP-07
LHAAP-37
LHAAP-08
LHAAP-50
LHAAP-67
LHAAP-55 ST-01
LHAAP-12
Pistol Range
LHAAP-19
LHAAP-003-R-01
LHAAP-001-R-01

LHAAP-35/36 WRS-002
LHAAP-35/36 S-100
LHAAP-35/36 WRS-003
LHAAP-35/36 S-101
LHAAP-35/36 S-099
LHAAP-55 ST-02
LHAAP-35/36 S-098
LHAAP-35/36 S-123
LHAAP-35/36 S-097
LHAAP-35/36 S-094
LHAAP-35/36 S-096
LHAAP-55 ST-03
LHAAP-35/36 S-095
LHAAP-35/36 WRS-001
LHAAP-55 ST-04
LHAAP-55 ST-05
LHAAP-35/36 S-103
LHAAP-55 ST-06
LHAAP-55 ST-07
LHAAP-55 ST-08
LHAAP-35/36 S-102
LHAAP-35/36 S-104
LHAAP-55 ST-10
LHAAP-55 ST-09
LHAAP-35/36 S-105

Legend

- Suitable for Non-residential Use
- Buildings
- Installation Boundary

0 1,250 2,500 5,000 7,500 10,000 Feet

LONGHORN ARMY AMMUNITION PLANT

Sites with Non-residential Use Notifications
Figure 2

00216434

LHAAP - 06

NOTICE OF NONRESIDENTIAL LAND USE FOR LHAAP-06 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216435

2010-000005555

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

7 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 04/27/2010 04:08 PM **Document Number:** 2010-000005555 **Receipt No:** 1006195 **Amount:** $ 36.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW E & I
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216436

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-06, is the area of a demolished building location known as Building 51-F located within the Plant 3 production area of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-06 is not itself considered an NPL site. Environmental activities at LHAAP-06 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-06 (Building 51-F) was a collection point for waste acids and solvents. Its three-sided shed contained a rack that held a single 55-gallon drum set on a 50-square foot pie-shaped concrete pad. Beginning in 1985, the drum was used to collect waste acids and solvents from bench-scale manufacture of the explosive cyclotetramethylenetetranitramine. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to

5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-06 parcel is 119 square foot, more or less, or 0.00273 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-06 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-06. Contaminants in soil samples from LHAAP-06 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-06 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-06 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951
Or
Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 10th day of March, 2010.

BEFORE ME, on this the 10 th day of March, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 10 day of March, 2010.

Notary Public in and for the State of Texas,
County of Harrison

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

FIELD NOTES DESCRIPTION OF
"LHAAP-06" TRACT
(REMAINS OF DEMOLISHED BUILDING 51-F)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-06" being defined by the four external corners of the three concrete walls remaining at demolished Building 51-F (wall defining the West edge of said building is either gone or never existed) in the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-06" being more particularly described as follows :

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "HORSE" (N=6960008.269 feet E=3309591.340 feet). Said traverse indicates a surface distance of 4895.70 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation E.C.C.W. indicates External Corner of Concrete Wall,

Commencing at monument "HORSE" referenced above,

THENCE N 59deg52'55"W 597.03' to an E.C.C.W. found for the S.E.C. of this tract and this POINT OF BEGINNING,

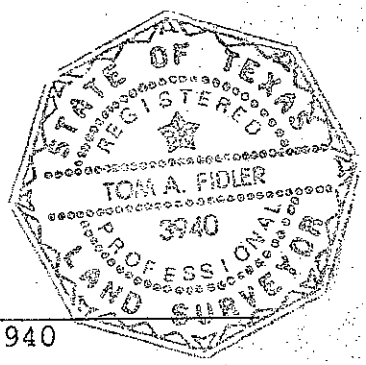
THENCE S 67deg37'19"W 10.93' along the S.B.L. of this tract to an E.C.C.W. found for this tract's S.W.C. ,

THENCE N 22deg14'24"W 10.92' along the W.B.L. of this tract to an E.C.C.W. found for this tract's N.W.C. ,

THENCE N 67deg37'19"E 10.93' along the N.B.L. of this tract to an E.C.C.W. found for this tract's N.E.C. ,

THENCE S 22deg14'24"E 10.92' along the E.B.L. of this tract to this POINT OF BEGINNING. This tract contains 119 square feet, more or less.

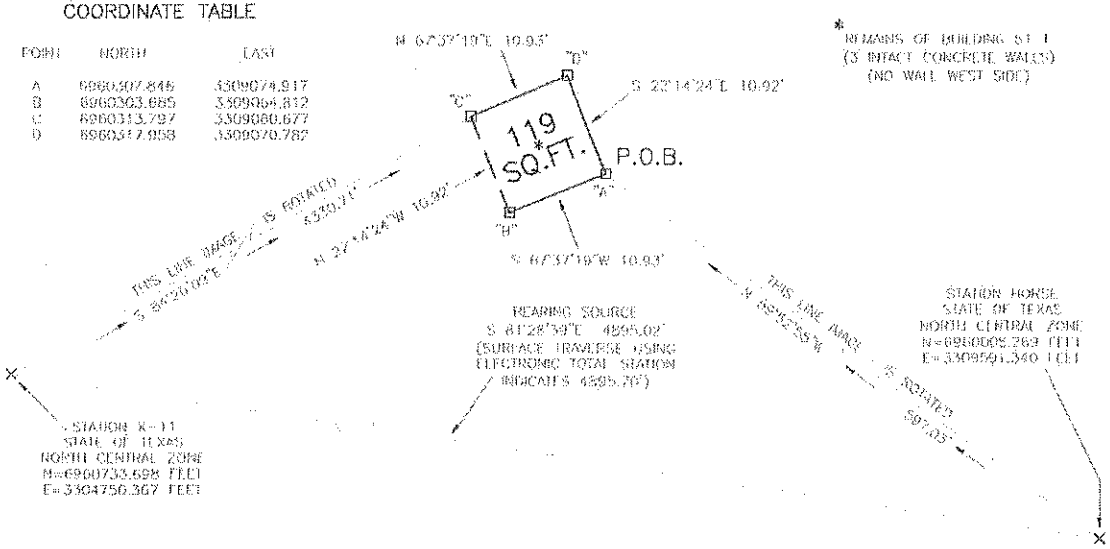
I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

COORDINATE TABLE

POINT	NORTH	EAST
A	6960307.846	3309074.917
B	6960303.685	3309066.812
C	6960313.797	3309060.677
D	6960317.958	3309070.782



* REMAINS OF BUILDING 51-F
(3 INTACT CONCRETE WALLS)
(NO WALL WEST SIDE)

I, Jon A. Tobin, registered professional land surveyor, do hereby certify that this plat represents the location of the courses on this date, based on a survey made by me or under my supervision in August 2009.

Witness my hand and seal this 13th day of August, 2009.

Jon A. Tobin, Registered Professional Land Surveyor No. 5360

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & HORSE. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

NOTES:

X INDICATES TYPE "B" CORPS OF ENGINEERS MONUMENT (FOUND)
□ INDICATES EXTERNAL CORNER OF CONCRETE BUILDING WALL

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 238-3377 FAX (903) 236-3536
E-MAIL landmark@cableone.com

LHAAP--06
(119 SQUARE FEET)
(REMAINS OF BUILDING 51--F)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXA

JOB #0407088	0407088.CRD	CPTS CLED
AUG. 13, 2009	0908074C.DWG	DRAWN BY JAT

00216442

LHAAP-07

NOTICE OF NONRESIDENTIAL LAND USE FOR LHAAP-07 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216443

2010-000005556

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

7 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 04/27/2010 04:08 PM **Document Number:** 2010-000005556 **Receipt No:** 1006195 **Amount:** $ 36.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW E & I
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216444

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-07, is the area of a demolished building location known as Building 50-G located within the Plant 3 production area of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-07 is not itself considered an NPL site. Environmental activities at LHAAP-07 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-07 (Building 50-G) was the former drum processing building which consisted of a wooden frame building 30 feet by 100 feet in size set on a concrete pad located within the boundary of LHAAP-47. Beginning in 1985, Building 50-G had a separate bay (20 by 30 feet in size) used as a washdown area for empty drums and casting equipment used in ammunition production. The washdown area was an above-grade concrete vault where empty drums were rinsed with hot water and spent sulfuric acid neutralized with limestone. The wastes handled included solvents, oils, and organic liquids. The site ceased operation in 1995. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd,

Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-07 parcel is 3,078 square foot, more or less, or 0.07066 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-07 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-07. Contaminants in soil samples from LHAAP-07 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-07 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-07 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951
or
Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 10 th day of March, 2010.

BEFORE ME, on this the 10 th day of March, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 10 day of March, 2010.

Notary Public in and for the State of Texas,
County of Harrison

NOTARY PUBLIC STATE OF TEXAS
ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

FIELD NOTES DESCRIPTION OF
"LHAAP-07" TRACT
(REMAINS OF DEMOLISHED BUILDING 50-G)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-07" being defined by the four external corners of the concrete foundation stem wall of demolished Building 50-G in the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-07" being more particularly described as follows:

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "HORSE" (N=6960008.269 feet E=3309591.340 feet). Said traverse indicates a surface distance of 4895.70 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation E.C.C.F.S.W. indicates External Corner of Concrete Foundation Stem Wall,

Commencing at monument "HORSE" referenced above,

THENCE N 87deg11'48"W 103.14' to an E.C.C.F.S.W. found for the S.E.C. of this tract and this POINT OF BEGINNING,

THENCE S 69deg02'55"W 30.36' along the S.B.L. of this tract to an E.C.C.F.S.W. found for this tract's S.W.C. ,

THENCE N 21deg59'26"W 101.90' along the W.B.L. of this tract to an E.C.C.F.S.W. found for this tract's N.W.C. , and being S 82deg14'17"E 4714.65' from monument "X-11" referenced above,

THENCE N 71deg43'04"E 30.53' along the N.B.L. of this tract to an E.C.C.F.S.W. found for this tract's N.E.C. ,

THENCE S 21deg55'35"E 100.48' along the E.B.L. of this tract to this POINT OF BEGINNING. This tract contains 3,078 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, R.P.L.S. Number 3940

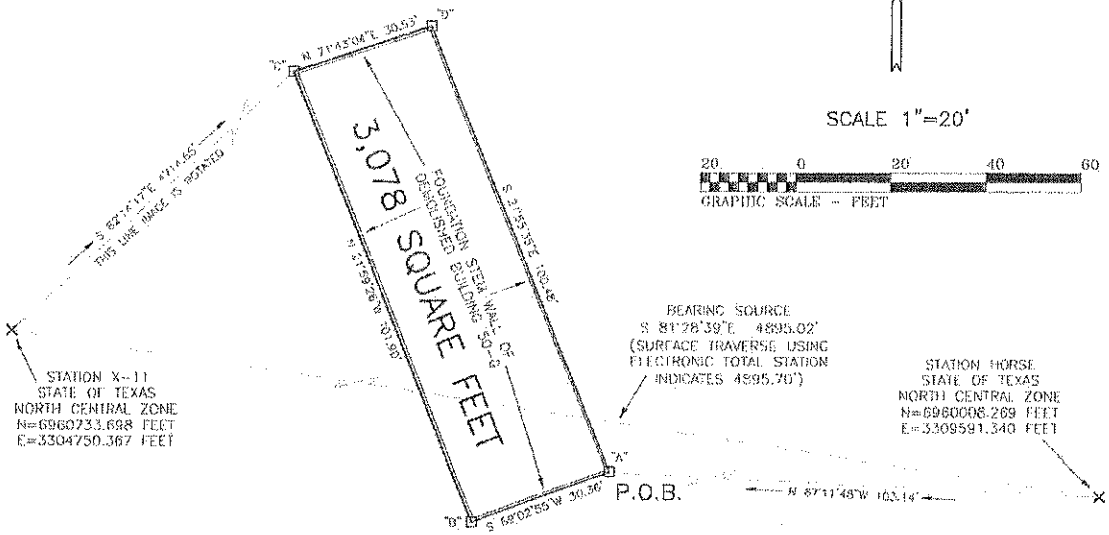
NOTES:

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)

☐ INDICATES EXTERNAL CORNER OF FOUNDATION STEM WALL

COORDINATE TABLE

POINT	NORTH	EAST
A	6960013.313	3309488.323
B	6960002.458	3309459.972
C	6960096.944	3309421.815
D	6960106.521	3309450.803



SCALE 1"=20'

20 0 20 40 60

GRAPHIC SCALE - FEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August, 2009.

Witness my hand and seal this the 13th day of August, 2009.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & HORSE. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cableone.com

LHAAP-07
(3,078 SQUARE FEET)
(REMAINS OF BUILDING 50-G)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	B.PTS B.LCG
AUG. 13, 2009	0908074B.DWG	DRAWN BY JTJ

00216450

LHAAP-08

NOTICE OF NONRESIDENTIAL LAND USE FOR LHAAP-08 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216451

2011-000003377

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

NOTICE

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 03/24/2011 03:52 PM **Document Number:** 2011-000003377 **Receipt No:** 1103745 **Amount:** $ 32.00 **By:** Lauren Boyd, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT CDU OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

AARON WILLIAMS EC-ER
1645 SOUTH 101ST EAST AVENUE

TULSA, OK 74128

00216452

STATE OF TEXAS HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remedial investigation of the land described herein. The site, LHAAP-08, the former Sewage Treatment Plant, operated from 1942 to 1997. LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-08 is not itself considered an NPL site. Environmental activities at LHAAP-08 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-08 included stabilization ponds, Dunbar filters, sludge drying beds, and an Imhoff tank. The plant received storm water, boiler blow down, laundry waste, vehicle wash rack waste, and effluent from film development at the X-ray facility. Treated effluent was discharged into Goose Prairie Creek and Caddo Lake. Soil and groundwater investigations in 2000, 2001, and 2005 included sampling for explosives compounds, metals, semivolatile organic compounds, volatile organic compounds, dioxins and furans, pesticides and PCBs. Soil results included detections of low levels of metals, perchlorate and dioxin. Low levels of metals, dioxin and furan compounds and perchlorate were detected in groundwater. An assessment of risk to exposure to soil and groundwater at LHAAP-08, based on the

nonresidential use scenario, indicated that potential human health risks are within the acceptable range established by EPA. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-08 parcel is a 2.974 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-08 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-08. Contaminants in soil samples from LHAAP-08 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-08 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-08 is consistent with the non-residential use scenario evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multifamily residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through
12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 25 th day of January, 2011 ~~2010~~.

BEFORE ME, on this the 25 th day of Jan 2011, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 25 day of January,

Notary Public in and for the State of Texas,
County of Harrison

NOTARY PUBLIC STATE OF TEXAS
ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

FIELD NOTES DESCRIPTION OF
"LHAAP–08" TRACT
(PROPOSED INDUSTRIAL USE NOTIFICATION AREA)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP–08" being 2.974 acre of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP–08" being more particularly described as follows :

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998636625, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "IGNATIUS–1" (N=6957090.304 feet E=3311081.788 feet) and "IGNATIUS–2" (N=6955582.752 feet E=3311851.704 feet). Said traverse indicates a surface distance of 1693.005 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940", and the abbreviation C.N.I.B.C. indicates concrete nail in bottle cap.

Commencing at monument "IGNATIUS–1" referenced above,

THENCE N 52deg56'26"W 814.32' to an I.R.O.P.C. set for the Southmost corner of this tract and this POINT OF BEGINNING,

THENCE N 28deg08'32"W 374.05' along the S.W. B.L. of this tract to an I.R.O.P.C. set for this tract's Westmost corner,

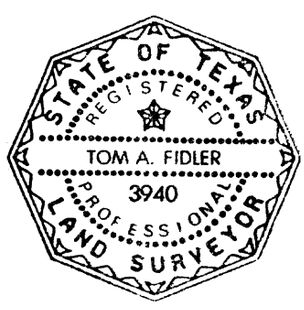
THENCE N 62deg03'14"E 348.01' along the N.W. B.L. of this tract to a C.N.I.B.C. set (in the asphalt pavement of South Houston Road) for this tract's Northmost corner,

THENCE S 27deg43'38"E 328.00' along the N.E. B.L. of this tract to a C.N.I.B.C. set (in the asphalt pavement of South Houston Road) for the North end of a curve,

THENCE along a curve to the right (having a radius of 48.04' and an arc length of 75.57', being subtended by a chord of S 17deg20'14"W 68.02') to a C.N.I.B.C. set (in the asphalt pavement of South Houston Road) for the South end of said curve,

THENCE S 62deg24'07"W 297.15' along the S.E. B.L. of this tract to this POINT OF BEGINNING, containing 2.974 acres, more or less.

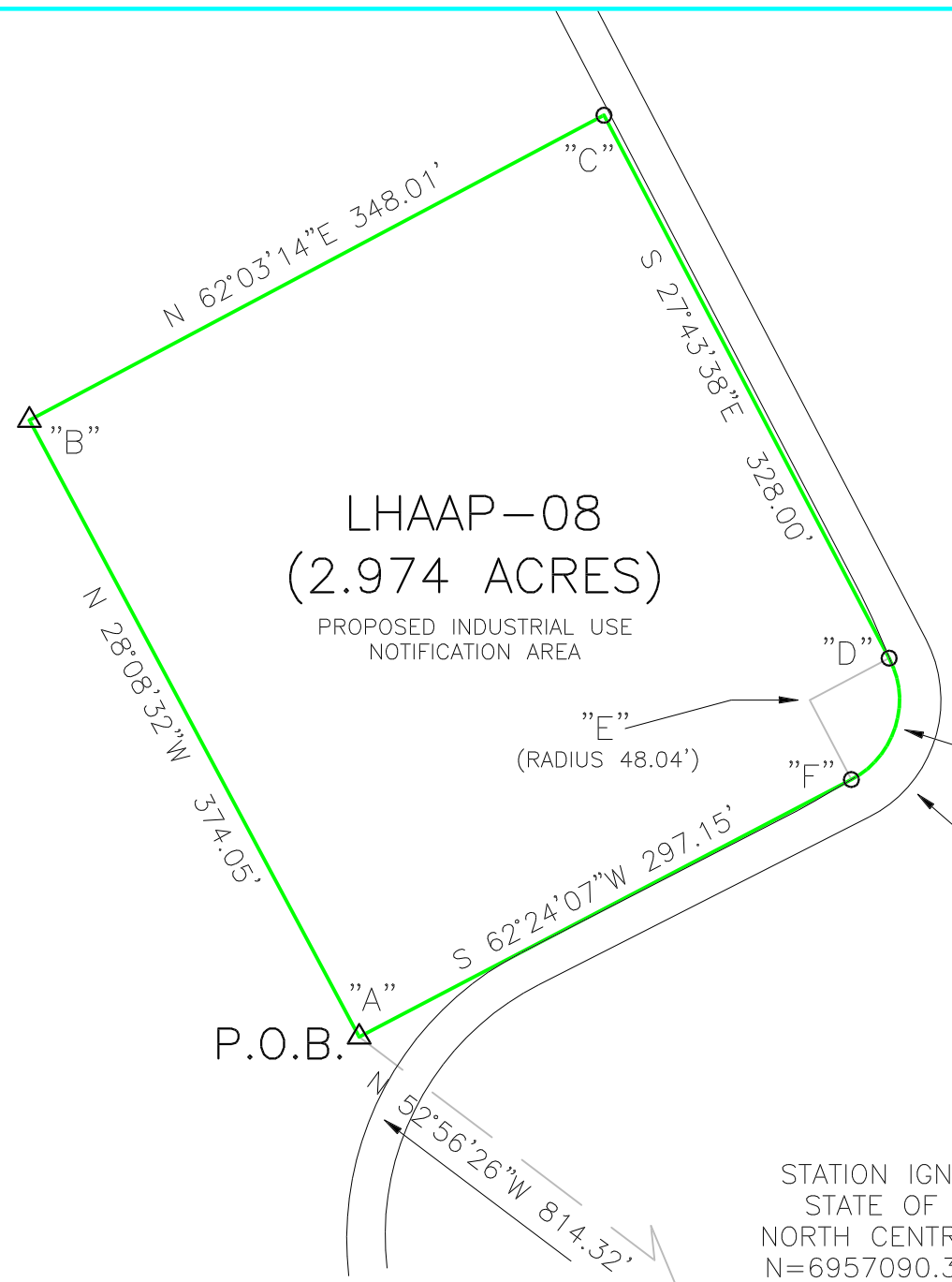
I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler

Tom A. Fidler, R.P.L.S. Number 3940

00216456



ARC 75.57' RADIUS 48.04'
CHORD S 17°20'14"W 68.02'

SOUTH HOUSTON ROAD
(ASPHALT; ATYPICAL WIDTH
AREAS NOT SHOWN)

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998636625 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS IGNATIUS-1 & IGNATIUS-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

STATION IGNATIUS-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957090.304 FEET
E=3311081.788 FEET

BEARING SOURCE
S 27°03'13.2"E 1692.774'
(SURFACE TRAVERSE USING
ELECTRONIC TOTAL STATION
INDICATES 1693.005')

STATION IGNATIUS-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6955582.752 FEET
E=3311851.704 FEET

N

SCALE 1"=100'

100 0 100 200 300
GRAPHIC SCALE - FEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in July 2008.

Witness my hand and seal this the 29th day of July, 2008

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- O INDICATES CONCRETE NAIL IN BOTTLE CAP (SET IN ASPHALT)
- △ INDICATES 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- ——— INDICATES BOUNDARY OF PROPOSED INDUSTRIAL USE NOTIFICATION AREA

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

COORDINATE TABLE

POINT	NORTH	EAST
A	6957581.048	3310431.952
B	6957910.879	3310255.527
C	6958073.970	3310562.954
D	6957783.633	3310715.561
E	6957761.282	3310673.037
F	6957718.708	3310695.292

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

00216457

LHAAP-8
(2.974 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	0605063F.DWG
07/29/2008	0605063.CRD	DRAWN BY JTJ

LHAAP-12, 12-1

LUC INSPECTION AND MAINTENANCE LOG

September 14, 2015

LUC Inspection and Maintenance Log – LHAAP 12

Date	Inspected by:	Inspection / Maintenance Activities					Corrective action or repairs required?	Repairs / Action Taken
		Protect landfill cover integrity				Prevent human exposure to groundwater		
		Vegetative Cover maintained: i.e. grass mowed	Fence and signage maintained	Observance of landfill cover degradation –e.g. desiccation cracks, erosion, or gullying	Continued compliance verified for no digging or disturbance of landfill cover or contents	Verified no withdrawal or use of groundwater (other than environmental testing)		

LHAAP-12, 12-2

LUCs FROM FINAL REMEDIAL DESIGN ADDENDUM

September 14, 2015

FINAL

REMEDIAL DESIGN ADDENDUM
LANDFILL 12 (LHAAP-12)
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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

Prepared by
Shaw Environmental, Inc.
3010 Briarpark Drive, Suite 400
Houston, Texas 77042

Contract Number DACA56-94-D-0020
Task Order No. 0109

June 2007

Table of Contents

List of Figures

List of Appendices

4.0 Land Use Controls for the Site

The LUCs to be implemented by the Army or its representatives for LHAAP-12 include:

- Maintenance of the integrity of the landfill cap, including, at a minimum, repairs to desiccation cracks, erosion, or gullying upon observance.
- Maintenance of a vegetative cover on the landfill cap including regular mowing.
- Maintenance of fence line and signage around landfill cap.
- Prohibition of any activities that would affect the integrity of cap.
- Prohibition of any activities that would cause exposure to the contaminated groundwater.

Although groundwater monitoring is not a LUC, it was included as a component of the remedy for LHAAP-12 identified in the 2006 ROD to evaluate the effectiveness of the landfill cap (Shaw, 2006b). The groundwater monitoring plan is included in **Appendix A**.

6.0 Remedy Implementation Actions

6.1 Land Use Control Implementation Actions

Until LHAAP-12 is transferred, the Army or its representatives will be responsible for LUC implementation, maintenance, inspection, reporting and enforcement. The Army shall address LUC problems within its control that are likely to impact remedy integrity and shall address problems as soon as practicable. If periodic LUC inspections and maintenance are required to address site-specific risks, the Army will be responsible for making the results available to the appropriate regulators.

As a condition of property transfer, the Army may require the transferee to assume responsibility for various implementation actions, as indicated below. Although the Army may transfer responsibility for various implementation actions, the Army shall retain its responsibility for remedy integrity. This means that the Army is responsible for addressing substantive violations of performance objectives that would undermine the Army's CERCLA remedy. The Army also will be responsible for: 1) incorporating RD information and outlining the transferee's LUC obligations into property transfer documentation; 2) recording survey plat and notice of restrictions for both the landfill cap and cover system boundary at the Harrison County Courthouse; 3) recording groundwater use restriction and survey plat at the Harrison County Courthouse; and 4) notifying Texas Department of Licensing and Regulation of the groundwater restriction which includes the prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval from the Army, the USEPA, and the TCEQ.

The following LUC implementation actions shall be undertaken by the Army in order to ensure that the aforementioned LUC performance objectives for LHAAP 12 are met and maintained:

6.1.1 Comprehensive Base-wide Land Use Control Management Plan

Within 30 days of receiving USEPA and TCEQ approval of this RD Addendum, the Army will develop a Comprehensive Base-wide LUC Management Plan which shall initially consist of this document and a survey plat showing the locations where the LHAAP-12 LUCs are applied. The purpose of this Comprehensive Base-wide LUC Management Plan is to ensure the all site-specific LUCs are compiled into one comprehensive location for both pre-transfer use by the installation and for post-transfer use by the transferee. This document is also accessible to regulators, the local government and the public. The Army will locate the Comprehensive Base-wide LUC Management Plan in the City of Marshall Public Library to accompany LHAAP's Administrative Record.

As LUC RD documents for additional environmental sites are approved by USEPA and TCEQ, the Army shall likewise add those documents and survey plats to the Comprehensive Base-wide LUC Management Plan as well as update the previous copy of the plan placed in the City of Marshall Public Library.

6.1.2 Site Inspections and Reporting

Beginning with finalization of this RD Addendum, the Army will undertake annual physical inspections and reporting to confirm continued compliance with all LUC objectives. The Army will provide USEPA and TCEQ with an annual LUC Compliance Inspection document consistent with the form attached hereto as **Appendix B**. In addition, should any deficiency(ies) be found during the annual inspection, the Army will provide to USEPA and TCEQ along with the document, a separate written explanation indicating the specific deficiency(ies) found and what efforts or measures have or will be taken to correct those deficiencies. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the Environmental Condition of Property (ECOP). The need to continue annual inspections will be revisited at five year reviews.

6.1.3 Notice of Planned Property Conveyances

Planned conveyance of LHAAP-12 acreage is to U.S. Fish and Wildlife Service for incorporation into the Caddo Lake National Wildlife Refuge. The Army shall provide notice to USEPA and TCEQ of such intended conveyance. The notice shall describe the mechanism by which LUCs will continue to be implemented, maintained, inspected, reported, and enforced.

6.1.4 Opportunity to Review Text of Intended Land Use Controls

The Army will produce an ECOP for LHAAP-12, but before executing the letter of transfer, the Army will provide USEPA and TCEQ with a draft copy of that ECOP so that they may have reasonable opportunity, before document execution, to review all LUC-related provisions.

6.1.5 Notification Should Action(s) Which Interfere with Land Use Control Effectiveness Be Discovered Subsequent to Conveyance

Should the Army discover after conveyance of the site any activity on the property inconsistent with the LUC performance objectives, the Army shall notify USEPA and TCEQ within 72 hours of such discovery. Consistent with **Section 6.1.6** below, the Army will then work with USEPA, TCEQ and the transferee to correct the problem(s) discovered. This reporting requirement does not preclude the Army from taking immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health or the environment.

6.1.6 Land Use Control Enforcement

Should the LUC remedy reflected in this LUC RD fail, the Army will coordinate with USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. These

actions may range from informal resolutions with the owner or violator, to the institution of judicial action under the auspices of Texas property law or CERCLA. Alternatively, should the circumstances warrant such, the Army could choose to exercise its response authorities under CERCLA, and then seek cost recovery after the fact from the person(s) or entity(ies) who violated a given LUC. Should the Army become aware that any future owner or user of the property has violated any LUC requirement over which a local agency may have independent jurisdiction, the Army will notify these agencies of such violation(s) and work cooperatively with them to re-achieve owner/user compliance with the LUCs.

6.1.7 Modification or Termination of Land Use Controls

The Army shall not, without USEPA concurrence, make a significant modification to, or terminate a LUC, or make a land use change inconsistent with the LUC objectives and use assumptions of the selected remedy. Likewise, the Army shall seek prior USEPA concurrence before commencing actions that may impact remedy integrity. In the case of an emergency action, the Army shall obtain prior USEPA concurrence as appropriate to the exigencies of the situation.

The LUCs shall remain in effect until such time as the Army and USEPA agree that the concentrations of hazardous substances have been reduced to levels that allow for unlimited exposure and unrestricted use. When this occurs, the LUCs will be terminated as needed. The decision to terminate LUCs will be documented consistent with the NCP process for post-ROD changes, potentially including an explanation of significant differences or a remedial action completion report. If the property has been transferred and a determination by the Army and USEPA has been made to terminate one or more of the LUCs, the Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also timely advise other local stakeholders of the action.

6.2 Monitored Natural Attenuation Implementation Actions

Implementation actions include development of a groundwater monitoring plan, monitoring, and reporting. Groundwater monitoring will be conducted to monitor the effectiveness of MNA in reducing contaminant concentrations over time. Monitoring will also be conducted to evaluate plume migration and ensure that TCE-contaminated groundwater does not impact nearby surface water at unacceptable levels. The Groundwater Monitoring Plan, attached as **Appendix A**, describes the wells, their locations, analytical parameters, and the frequency of the monitoring.

Annual reports will be prepared to document the monitoring program. The first year annual report will include a review of the first four quarters of data which include natural attenuation parameters and provide an evaluation for the evidence of MNA as a remedial method. The TCEQ provides guidance for MNA as a remedial action in *Monitored Natural Attenuation*

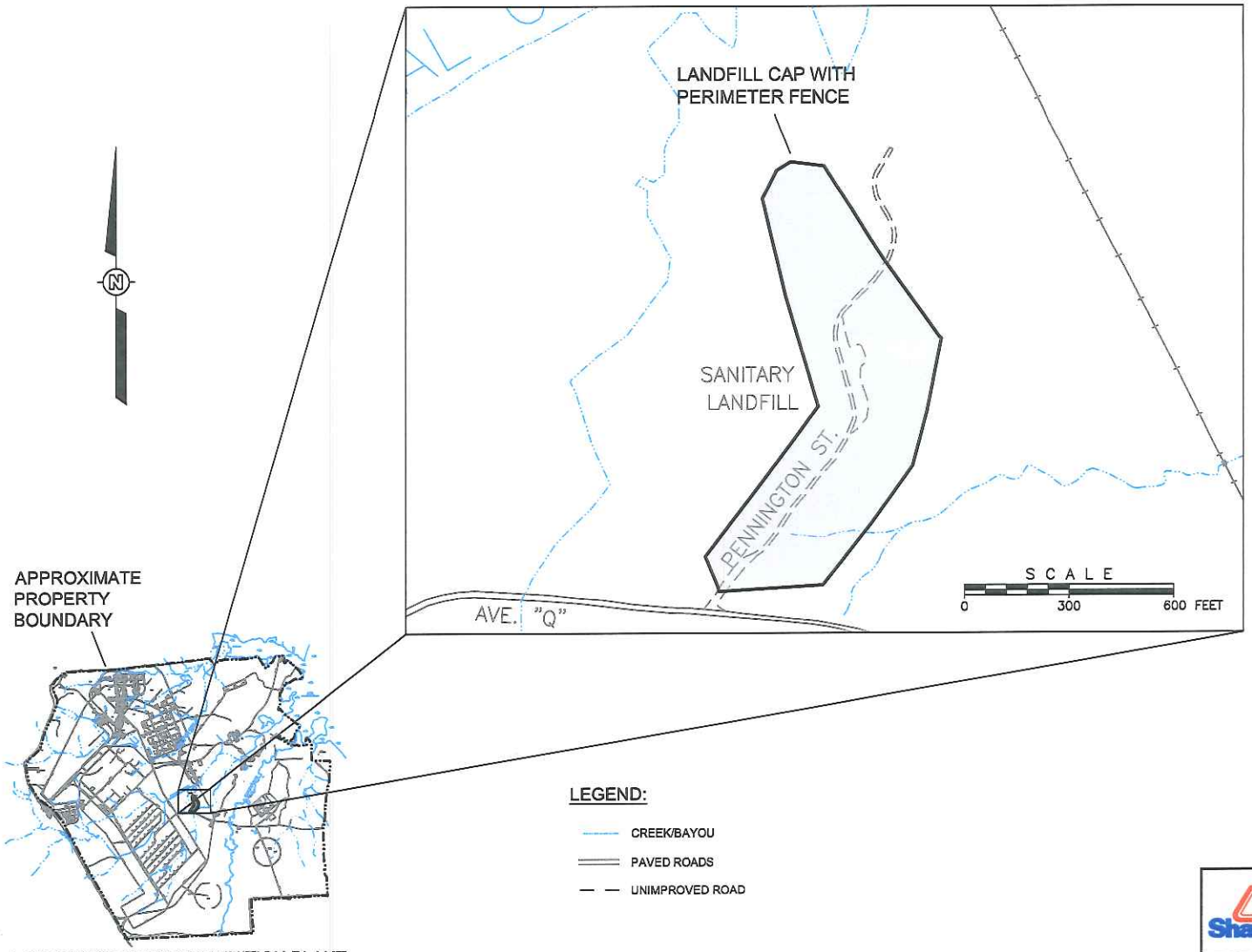


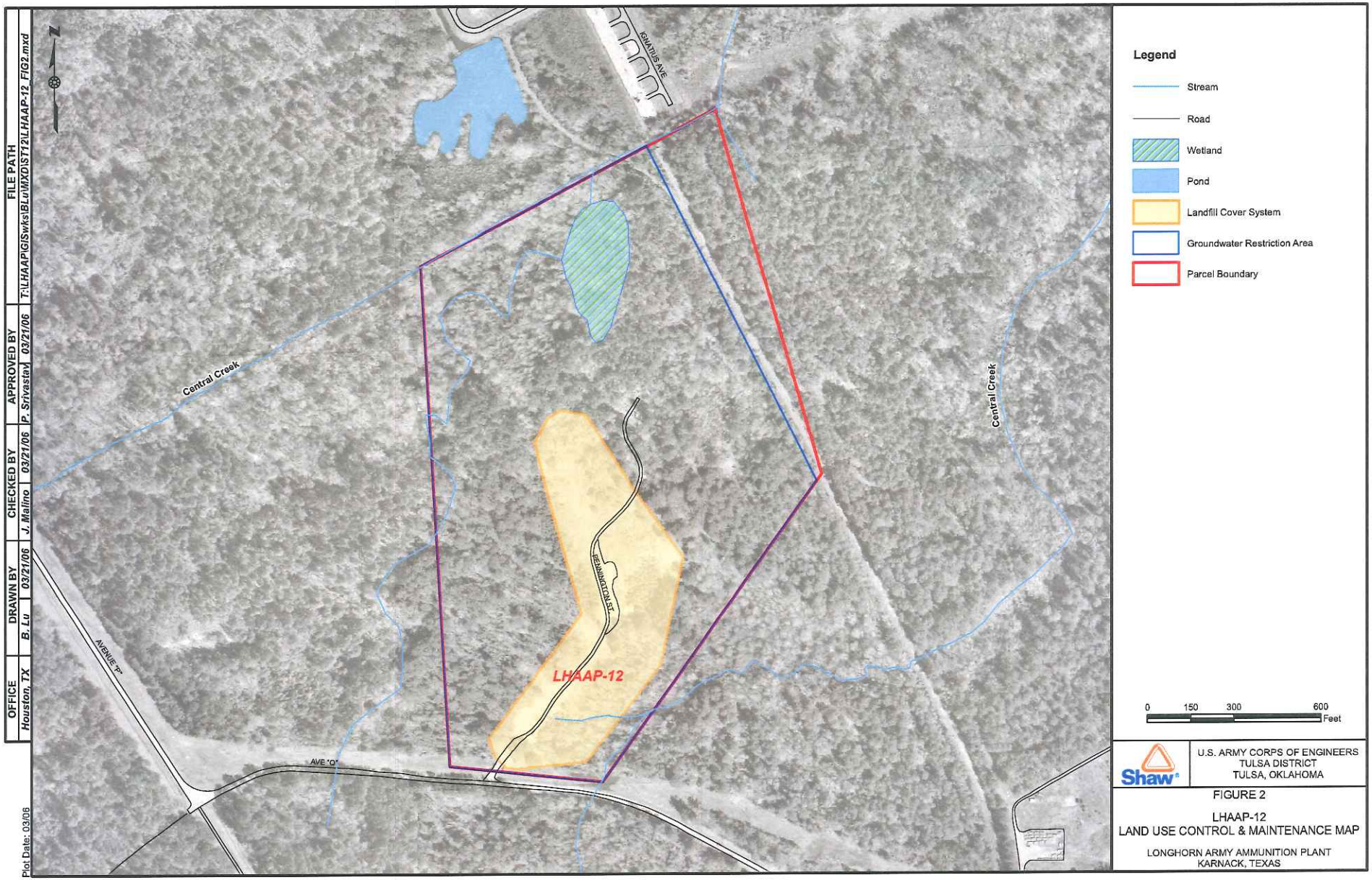
IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
----	----	Houston, Texas	D. DAY 2/14/04	K. EVERETT 6/30/05	P. SRIVASTAV 6/30/05	845714-B44

PLOT DATE: 7/05/05
FORMAT REVISION 3/25/99

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

FIGURE 1
SITE LOCATION MAP
LHAAP-12
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00216467



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

FIGURE 2

LHAAP-12
LAND USE CONTROL & MAINTENANCE MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00216468

Appendix B

Sample Annual Land Use Control Compliance Inspection Documentation

Sample Annual Land Use Control Compliance Inspection Documentation

In accordance with the Remedial Design Addendum dated _____ for LHAAP-12, an inspection of site was conducted by _____ [indicate transferee] on_____.

A summary of land use control mechanisms is as follows:

- Land use and restriction covenants included in ECOP – [Indicate whether the ECOP is on file with the notice of transfer]
- Groundwater restriction – [Indicate whether groundwater restrictions are still required at LHAAP-12]

A summary of compliance with land use and restriction covenants is as follows:

- No use of groundwater, installation of new groundwater wells, or tampering with existing wells at LHAAP-12
- No reuse activity at LHAAP-12 that would adversely affect the integrity of the landfill cap
- The fence and posted signs are properly maintained at LHAAP-12
- The vegetative cover is properly maintained over the landfill
- Landfill cap is properly maintained with no evidence of erosion, cracking, settlement, or other damage to engineered components

I, the undersigned, do document that the inspection was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: _____

Name/Title _____

Signature: _____

Completed annual compliance inspection forms, with relevant annual compliance certification forms, shall be sent no later than March 1 of each year for the previous calendar year.

U.S. Department of the Army
TCEQ
USEPA Region 6

LHAAP-12, 12-3

NOTICE OF LAND USE CONTROLS AND NONRESIDENTIAL LAND USE AT LHAAP-12 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF LAND USE CONTROLS AT LHAAP-12

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The remediation site is a capped landfill located on the Former Longhorn Army Ammunition Plant (LHAAP) and is designated as LHAAP-12. The site is included in TCEQ Notice of Registration No. 30990 as Unit Number 001. LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Remedial activities at LHAAP-12 were performed in accordance with the FFA requirements.

The landfill was used intermittently for the disposal of industrial solid waste, possibly containing small quantities of hazardous constituents generated at LHAAP. A Record of Decision (ROD) for LHAAP-12 was signed by USEPA in 1995 establishing the construction of a cap as an interim remedial action for the site to mitigate potential risks posed by the burial of landfill waste. Construction of the landfill cap was completed in 1998. The final remedy consists of land use controls (LUCs) in conjunction with monitored natural attenuation as documented in the Final ROD signed by USEPA on July 24, 2006. The site was not remediated to levels suitable for unrestricted use. LUCs at LHAAP-12 are required to ensure the integrity of the landfill cap and cover system and prevent human exposure to contaminated groundwater. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the

Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-12 parcel is a 50.541 acre tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A. Within the LHAAP-12 parcel are designated LUC boundaries including a 9.429 acre tract, more or less, and a 45.939 acre tract, more or less, as described in Exhibit A. The LUC boundaries are also presented in the attached Figure 1.

Future use of the parcel is intended as a national wildlife refuge consistent with non-residential use. The United States Department of the Army has undertaken careful environmental study of the LHAAP-12 site and concluded that the LUCs set forth below are required to ensure protection of human health and the environment.

(1) **Landfill Restriction**. A closed non-hazardous landfill (LHAAP-12) of approximately 7 acres is located within the 9.429 acre tract. The landfill restriction boundary consists of the 7-acre capped landfill and an area extending to the surrounding fence. LUCs have been established to protect the integrity of the remedy. No activity shall be conducted or permitted that would damage the integrity of the landfill cover (i.e. digging or disturbing the existing cover or contents of the landfill). The LUCs will remain in place for perpetuity unless otherwise removed by the U.S. Army per agreement with the USEPA and TCEQ.

(2) **Residential Use Restriction**. The residential use restriction boundary consists of the 9.429 acre-tract, more or less, and includes the 7-acre capped landfill and an area extending to the surrounding fence. This tract shall be used solely for the purpose of a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

(3) **Groundwater Restriction**. The groundwater use restriction boundary consists of the 45.939 acre tract, more or less, and extends beyond the landfill

boundary. Groundwater underlying this land is contaminated with trichloroethene (TCE) and other volatile organic compounds and shall not be accessed or used for any purpose without the prior written approval of U.S. Army, the USEPA and the TCEQ. A LUC restricting the use of groundwater has been established for the protection of human health. The U.S. Army will notify the Texas Department of Licensing and Regulation of the groundwater restriction which includes prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval by the U.S. Army, the USEPA and the TCEQ. The LUC will remain in place until applicable or relevant and appropriate requirements (ARARs) as established in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulation 300) are met. Due to the potential for TCE-contaminated groundwater to migrate, monitored natural attenuation will be implemented to assure that TCE-contaminated groundwater will not migrate to nearby surface water at levels that may present an unacceptable risk to human health and the environment. The monitoring and reporting associated with this remedy will continue until ARARs are achieved.

The owner of the site is the Department of the Army, and its address where more specific information may be obtained from is as follows:

ATTN: DAIM-BD-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 13th day of June, 2007.

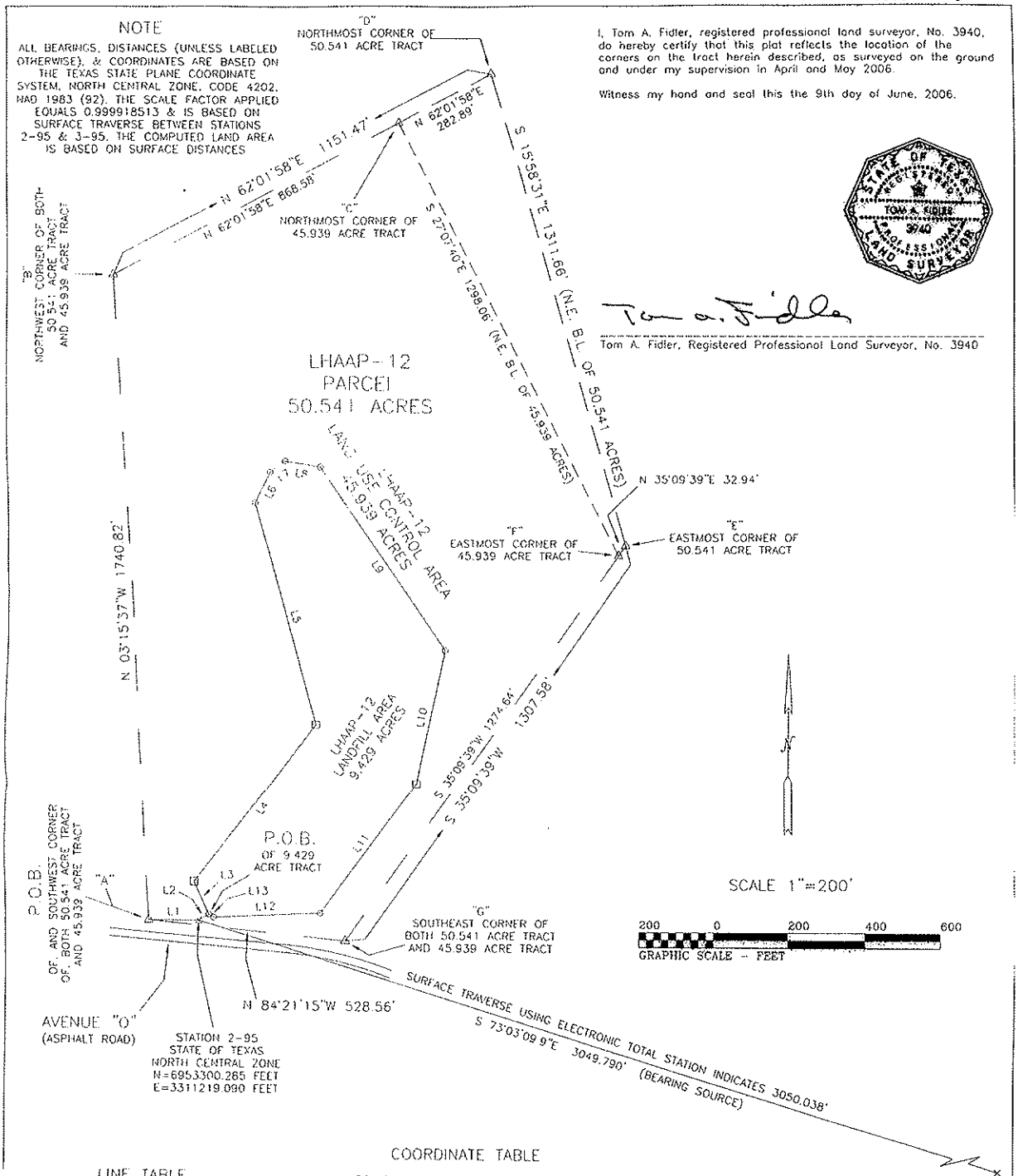
BEFORE ME, on this the 13th day of June, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 13 day of June, 2007.

LYNDA G. HAYS
Notary Public State of Texas
COMM. EXP. 5-02-2010

Lynda G. Hays
Notary Public in and for the State of Texas,
County of Harrison

EXHIBIT A



I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in April and May 2006.

Witness my hand and seal this the 9th day of June, 2006.

STATE OF TEXAS REGISTERED TOM A. FIDLER 3940 PROFESSIONAL LAND SURVEYOR

Tom A. Fidler

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

LINE TABLE

COURSE	BEARING	DISTANCE
L1	S 89°52'35"W	132.09'
L2	N 58°35'33"E	31.72'
L3	N 23°52'43"W	96.81'
L4	N 37°07'57"E	537.87'
L5	N 15°28'17"W	618.92'
L6	N 26°16'28"E	90.81'
L7	N 54°00'30"E	50.67'
L8	S 81°02'29"E	96.24'
L9	S 34°25'01"E	596.16'
L10	S 12°11'35"W	370.18'
L11	S 36°09'00"W	434.64'
L12	S 87°15'04"W	286.47'
L13	N 57°18'20"W	15.33'

COORDINATE TABLE

POINT	NORTH	EAST
A	6953300.000	3311087.000
B	6955038.000	3310988.000
C	6955445.333	3311755.144
D	6955578.000	3312005.000
E	6954317.000	3312366.000
F	6954290.070	3312347.030
G	6953248.000	3311613.000

NOTES:

O INDICATES 12" DIAMETER WOODEN FENCE CORNER POST (FOUND)
□ INDICATES 10" DIAMETER WOODEN FENCE CORNER POST (FOUND)
× INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
△ INDICATES 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET IN CONCRETE)
——— INDICATES BARBED WIRE FENCE AND PERIMETER OF 9.429 ACRE TRACT
— — — — INDICATES PERIMETER OF 50.541 ACRE TRACT ONLY
— · — · — · — INDICATES PERIMETER OF 45.939 ACRE TRACT ONLY
——— INDICATES PERIMETER OF BOTH 50.541 ACRE TRACT AND 45.939 ACRE TRACT

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

SHEET 1 OF 4

50.541 ACRES
45.939 ACRES
9.429 ACRES
LONGHORN army AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	0605063A.DWG
06/09/2006	0605063.CRD	DRAWN BY JTJ

FIELD NOTES DESCRIPTION OF
"LHAAP-12 PARCEL"
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The hereinafter described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-12 Parcel" being 50.541 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-12 Parcel" being more particularly described as follows:

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999918513, and is based on surface traverse (using electronic total station) between type "G" Corps of Engineers monuments "2-95"(N=6953300.285 feet & E=3311219.090 feet) and "3-95"(N=6952411.298 feet & E=3314136.438 feet). Said traverse indicates a surface distance of 3050.038 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940".

Commencing at the monument "2-95" referenced above,

THENCE S 89deg52'35"W 132.09' to an I.R.O.P.C. set in concrete for the S.W.C. of this tract and this POINT OF BEGINNING,

THENCE N 03deg15'37"W 1740.82' along the W.B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Northwest corner,

THENCE N 62deg01'58"E 1151.47' along the N.W. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Northmost corner,

THENCE S 15deg58'31"E 1311.66' along the N.E. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Eastmost corner,

THENCE S 35deg09'39"W 1307.58' along the S.E. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Southeast corner,

THENCE N 84deg21'15"W 528.56' along the S.B.L. of this tract to this POINT OF BEGINNING, containing 50.541 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940

FIELD NOTES DESCRIPTION OF
"LHAAP-12 LAND USE CONTROL AREA"
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The hereinafter described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-12 Land Use Control Area" being 45.939 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said "LHAAP-12 Land Use Control Area" being more particularly described as follows:

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999918513, and is based on surface traverse (using electronic total station) between type "G" Corps of Engineers monuments "2-95"(N=6953300.285 feet & E=3311219.090 feet) and "3-95"(N=6952411.298 feet & E=3314136.438 feet). Said traverse indicates a surface distance of 3050.038 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940".

Commencing at the monument "2-95" referenced above,

THENCE S 89deg52'35"W 132.09' to an I.R.O.P.C. set in concrete for the S.W.C. of this tract and this POINT OF BEGINNING,

THENCE N 03deg15'37"W 1740.82' along the W.B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Northwest corner,

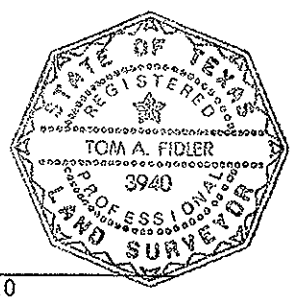
THENCE N 62deg01'58"E 868.58' along the N.W. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Northmost corner,

THENCE S 27deg07'40"E 1298.06' along the N.E. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Eastmost corner,

THENCE S 35deg09'39"W 1274.64' along the S.E. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Southeast corner,

THENCE N 84deg21'15"W 528.56' along the S.B.L. of this tract to this POINT OF BEGINNING, containing 45.939 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

SHEET 4a OF 4

FIELD NOTES DESCRIPTION OF
"LHAAP-12 LANDFILL AREA"
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The hereinafter described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-12 Landfill Area" being 9.429 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said "LHAAP-12 Landfill Area" being more particularly described as follows:

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999918513, and is based on surface traverse (using electronic total station) between type "G" Corps of Engineers monuments "2-95"(N=6953300.285 feet & E=3311219.090 feet) and "3-95"(N=6952411.298 feet & E=3314136.438 feet). Said traverse indicates a surface distance of 3050.038 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940".

Commencing at the monument "2-95" referenced above,

THENCE N 58deg35'33"E 31.72' to a 12" diameter wooden fence corner post found for a Southwest corner of this tract and this POINT OF BEGINNING,

THENCE generally along a barbed wire fence the following eleven courses,

N 23deg52'43"W 96.81' to a 10" diameter wooden fence corner post found for the Westmost corner of this tract,

N 37deg07'57"E 537.87' to a 10" diameter wooden fence corner post,

N 15deg28'17"W 618.92' to a 12" diameter wooden fence corner post,

N 26deg16'28"E 90.81' to a 12" diameter wooden fence corner post,

N 54deg00'30"E 50.67' to a 12" diameter wooden fence corner post found for the Northmost corner of this tract,

SHEET 4b OF 4

S 81deg02'29"E 96.24' to a 12" diameter wooden fence corner post,

S 34deg25'01"E 596.16' to a 12" diameter wooden fence corner post found for the Eastmost corner of this tract,

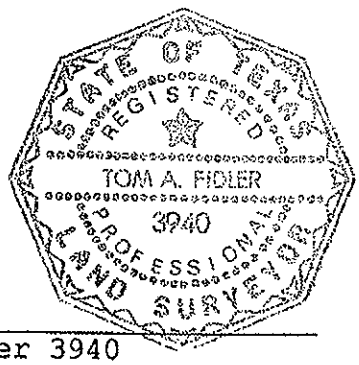
S 12deg11'35"W 370.18' to a 10" diameter wooden fence corner post,

S 36deg09'00"W 434.64' to a 12" diameter wooden fence corner post,

S 87deg15'04"W 286.47' to a 12" diameter wooden fence corner post,

N 57deg18'20"W 15.33' to this POINT OF BEGINNING, containing 9.429 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

FIGURE 1

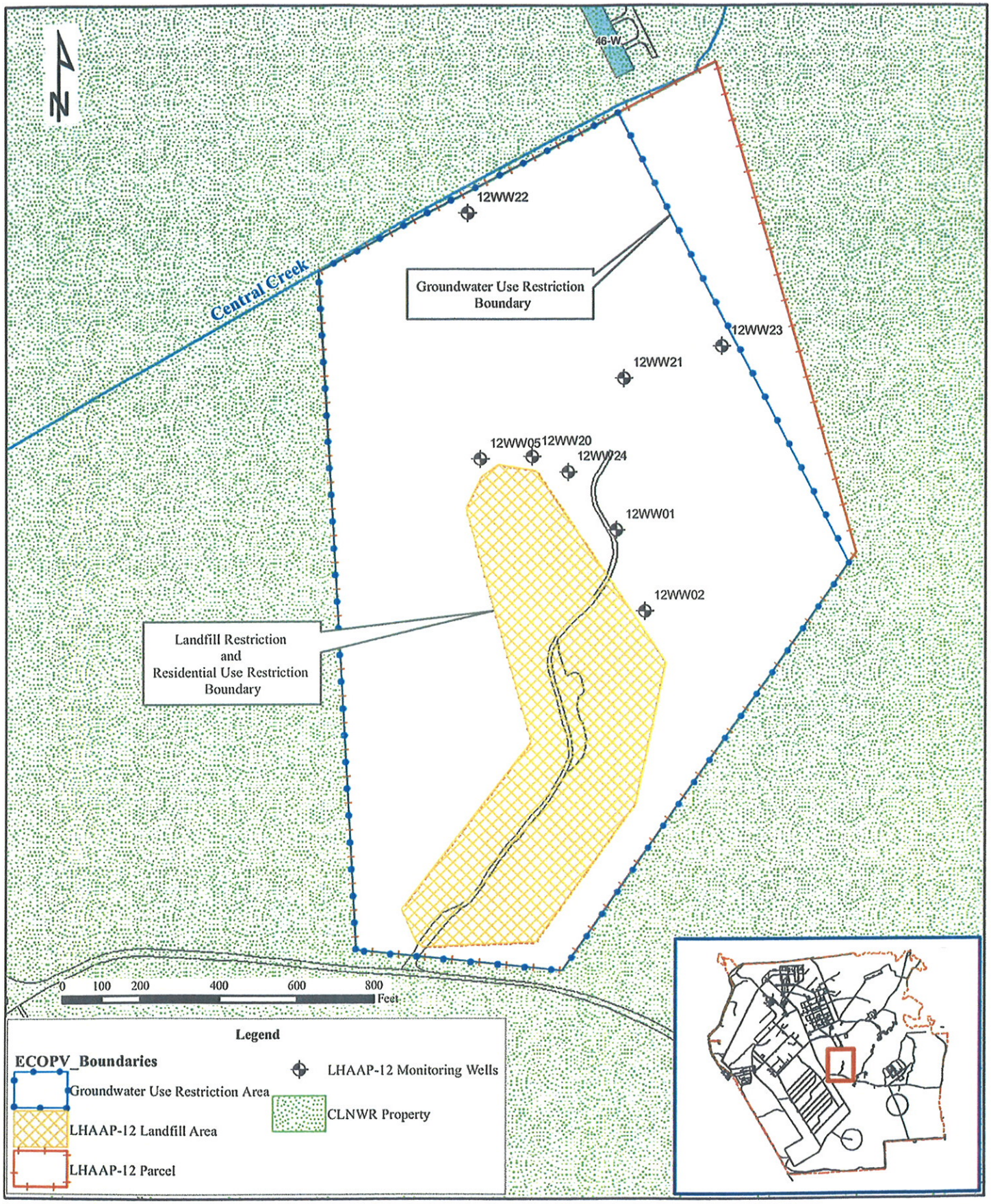


FIGURE 1

Land Use Control Boundaries

STATE OF TEXAS COUNTY OF HARRISON

I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the volume and page of the named records of:

Harrison County

as stamped hereon by me.

Jun 13,2007

HONORABLE PATSY COX, COUNTY CLERK
Harrison County

LHAAP-12, 12-4

LAND USE CONTROL COMPLIANCE INSPECTION FORM

September 14, 2015

LHAAP-12, Landfill 12 Parcel
Annual Land Use Control Compliance Certification

Land use controls (LUC) at LHAAP-12 in the Landfill 12 Parcel:

• Land use restriction – Prohibition of any activities that would affect the integrity of the cap (i.e. no digging or disturbing the existing cover or contents of the landfill) and of residential use or residential development of the property

• Groundwater use restriction – Prohibition of any activities that would cause exposure to contaminated groundwater (i.e. no withdrawal or use of groundwater for other than environmental monitoring and testing)

Compliance with land use controls:

• No use of groundwater or installation of new groundwater wells (except that required for environmental monitoring and testing), or tampering with existing wells at LHAAP-12

• No reuse activity at LHAAP-12 that would adversely affect the integrity of the landfill cap (i.e no digging or disturbing the existing cover or contents of the landfill) and cap protective components (fencing and signage), and no residential use or residential development of the property

Inspection: In accordance with the LHAAP-12 Remedial Design Addendum dated 21 June 2007, an inspection of LHAAP-12 was conducted by _____ on_____ to visually confirm compliance with the LUCs.

I, the undersigned, do document that the inspection was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: _____

Name/Title _____

Signature: _____

Completed annual compliance form, to be kept on file at the Administrative Office of the Caddo Lake National Wildlife Refuge by the Refuge staff and available to EPA, TCEQ and Army upon request. The certification shall be conducted no later than March 1 of each year for the previous calendar year.

LHAAP-19

NOTICE OF NONRESIDENTIAL LAND USE AT LHAAP-19 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216486

2013-000013785

*****DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT*****

MISCELLANEOUS

5 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 11/14/2013 04:23 PM **Document Number:** 2013-000013785 **Receipt No:** 1313735 **Amount:** $ 28.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

AARON WILLIAMS
1645 SOUTH 100 FIRST EAST AVE

TULSA, OK 74128

00216487

STATE OF TEXAS
HARRISON COUNTY

INDUSTRIAL SOLID WASTE
CERTIFICATION OF REMEDIATION

KNOW ALL MEN BY THESE PRESENT THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-19, is a C&D Landfill located within the former Longhorn Army Ammunition Plant (LHAAP) in the northeast corner of Harrison County, Texas approximately 14 miles northeast of Marshall, Texas, and approximately 40 miles west of Shreveport, Louisiana. LHAAP was placed on the National Priorities (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-19 is not itself considered an NPL site. The TCEQ, the lead regulatory agency concurs that the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 3.

The C&D landfill, designated LHAAP-19, covers a 7.91 acre tract of land. The maximum depth of the landfill is believed to be less than 15 feet below ground surface. The C&D landfill was sporadically active from 1985 until recent closure activities were conducted. The C&D landfill was permitted by rule to receive non-friable asbestos and other demolition debris. During periods of activity, the monthly disposal rate ranged from 35 to 400 cubic yards of waste. The C&D landfill (formerly referred to as LHAAP-26) was evaluated in 1988. From the landfill evaluation dated 1988, and the buildings description dated 2004, it is concluded that all of the materials deposited in this landfill were what is normally classified as Construction and Demolition Debris (C&D) consisting of wood and metal studs, corrugated metal walls and roofs, concrete rubble, steel re-bar, dry-wall, transite (non-friable asbestos) siding, cardboard, Class 2 paper, packing, plastics, foil, wood packaging, wood debris, bricks, cement and other inert constituents. Records provided by the site manager indicate that hazardous materials such as friable asbestos were disposed of in other permitted landfills. Based on this information and certification of process knowledge by the owner, this landfill is classified as Non-Hazardous Class 2. The final closure assessment report and its supporting documentation demonstrate that the threat to human health or the environment is at or below those required for Risk Reduction Standard Number 2. However, due to the fact that waste was left in place, a cap was constructed to cover the footprint of the landfill and closure of the landfill meets Risk Reduction Standard Number 3.

Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The Texas Commission on Environmental Quality requires certain persons to provide certification and/or recordation in the real property records to notify the public of the conditions of the land and/or the

occurrence of remediation. This certification is not a representation or warranty by the Texas Commission on Environmental Quality of the suitability of this land for any purpose.

II

Being a 7.91 acre tract of land situated in Harrison County, Texas, being out of and a part of a 8,493 acres tract of land known as the former Longhorn Army Ammunition Plant, situated between Highway 43 at Karnack, Texas, and the southwestern shore of Caddo Lake, and being more particularly described by metes and bounds as follows:

(All coordinates shown here on are NAD 83, Texas State Plane North Central Zone 4202, based on GPS Static Processing verified with OPUS).

Beginning at the northwest corner of the herein described tract with coordinates of North: 6951971.54, East: 3316288.74, from which an iron pin set for a GPS Base Point with coordinates of North 6951987.74, East 3316281.35 bears N 24-31-50 E a distance of 17.81 feet;

Thence N 78-23-54 E, 504.61 feet to a point for an angle point with coordinates of North: 6952073.02, East: 3316783.04

Thence S 52-47-27 E, 137.20 feet to a point for an angle point with coordinates of North: 6951990.05, East: 3316892.31;

Thence S 44-12-24 E, 108.04 feet to a point for an angle point with coordinates of North: 6951912.60, East: 3316967.64;

Thence S 01-33-58 W, 110.10 feet to a point for an angle point with coordinates of North: 6951802.55, East: 3316964.63;

Thence S 11-28-04 W, 121.11 feet to a point for an angle point with coordinates of North: 6951683.85, East: 3316940.56;

Thence S 17-11-28 W, 349.04 feet to a point for the southeast corner of the herein described tract with coordinates of North: 6951350.41, East: 3316837.39;

Thence N 89-11-23 W, 294.12 feet to a point for the southwest corner of the herein described tract with coordinates of North: 6951354.57, East: 3316543.30;

Thence N 22-57-01 W, 332.88 feet to an angle point with coordinates of North: 6951661.10, East: 3316413.50;

Thence N 21-53-42 W , 334.57 feet to the place of beginning and containing 7.91 acres of land according to a survey made on the ground on November 12, 2009 by Ace Surveying, Inc.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-19 site and the TCEQ concluded that no further investigation or remedial action is required for LHAAP-19.

Limited monitoring will take place in the form of inspections of the landfill cap and any maintenance required to maintain the cap integrity for a period of five years. The Army shall correct, as needed, erosion of cover material, lack of vegetative growth, and subsidence or ponding of water. If any of these problems occur after the end of the five-year post-closure period or persist for longer than the first five years of post-closure care, the owner or operator shall be responsible for their correction until all problems have been adequately resolved. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multifamily residences;

child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

Institutional controls placed on the property to ensure appropriate future use include: (1) Use must remain non-residential as described above; and (2) No activity shall be conducted or permitted that would damage the integrity of the landfill cover (i.e. unauthorized digging or disturbing the existing cover or contents of the landfill). These restrictions will be placed in the deed transferring any part of the property out of federal ownership.

III

The owner of the site is the Department of the Army and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington, D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 14th day of December 2013.

STATE OF TEXAS
COUNTY OF Gregg

BEFORE ME, on this the 14th day of Nov, 2013, personally appeared Rose M. Zeiler, of The United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 14th day of Nov, 2013.

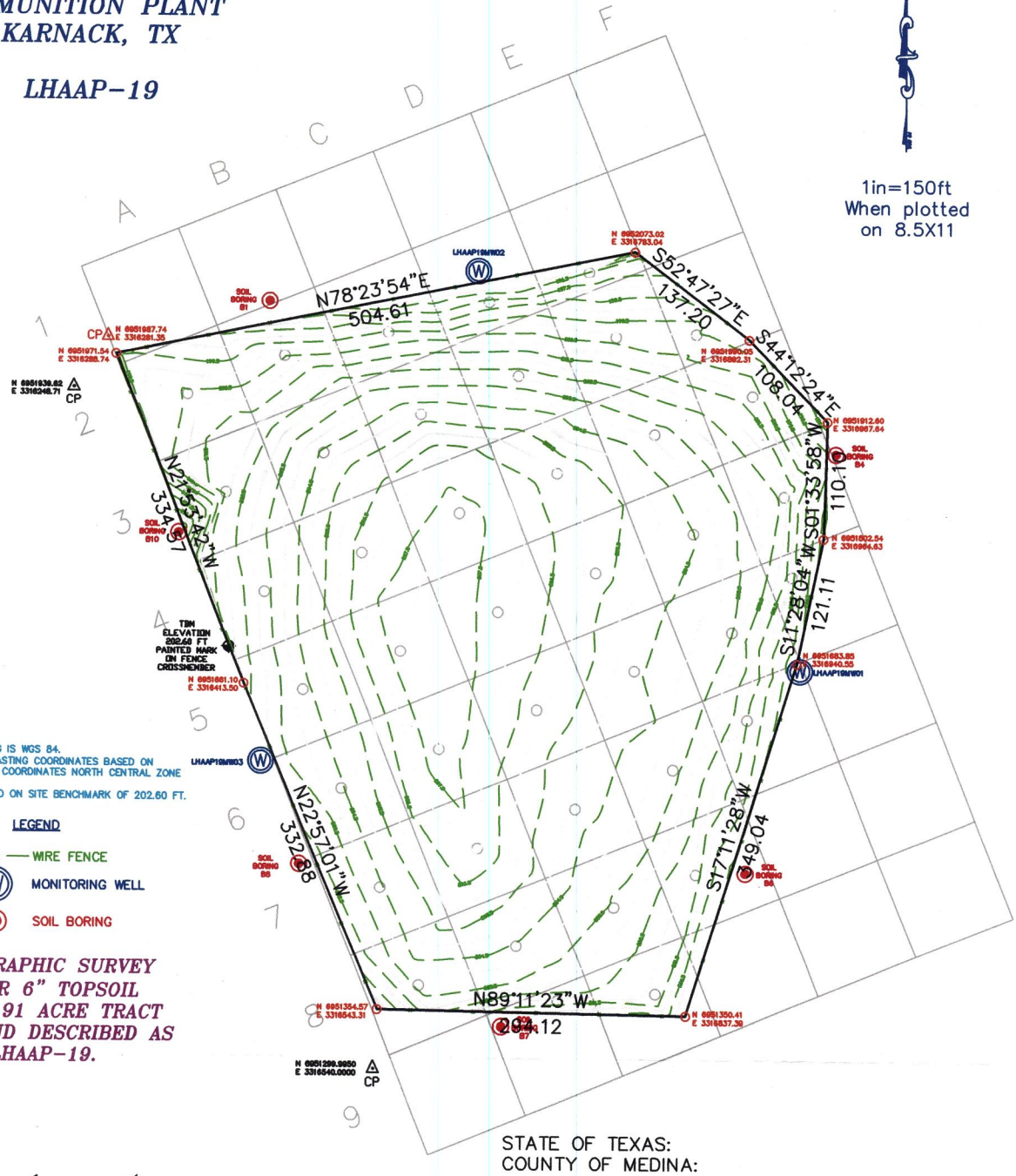
Notary Public in and for the State of Texas,

County of Harrison

NOTARY PUBLIC STATE OF TEXAS
BRENDA McBRIDE
Notary Public State of Texas
COMM. EXP. 5-4-2014

LONGHORN ARMY AMMUNITION PLANT KARNACK, TX

LHAAP-19



NOTES:
1) BASIS OF BEARING IS WGS 84.
2) NORTHING AND EASTING COORDINATES BASED ON TEXAS STATE PLANE COORDINATES NORTH CENTRAL ZONE #4202, NAD83.
3) ELEVATIONS BASED ON SITE BENCHMARK OF 202.60 FT.

LEGEND

— x — WIRE FENCE

MONITORING WELL

SOIL BORING

TOPOGRAPHIC SURVEY AFTER 6" TOPSOIL OF A 7.91 ACRE TRACT OF LAND DESCRIBED AS LHAAP-19.

Ace Surveying, Inc.
P. O. BOX 597
DEVINE, TEXAS 78016
830-334-7264
830-665-5796 FAX
acesurveying@sbcglobal.net

STATE OF TEXAS
REGISTERED
RHONDA K. BUTLER
5409
PROFESSIONAL
LAND SURVEYOR

STATE OF TEXAS:
COUNTY OF MEDINA:

I, RHONDA K. BUTLER, DO HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM AN ACTUAL SURVEY MADE ON THE GROUND BY MEN WORKING UNDER MY SUPERVISION.

RHONDA K. BUTLER
REGISTERED PROFESSIONAL LAND SURVEYOR #5409

SURVEYED: NOVEMBER 12, 2009
FILE NO: ALAMO 1, KARNACK

00216491

LHAAP-35/36

NOTICE OF NONRESIDENTIAL LAND USE AT SUMPS/WASTE RACK SUMP LOCATIONS (LHAAP-35/36) FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216492

2012-000000706

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000706 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump094 (called Sump 094 on the attached Exhibit A) is part of LHAAP-35/36. Sump094 is a former sump location near Building 16-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump094 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump094) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump094 parcel is 64 square feet, more or less, or 0.00146 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump094 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump094 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump094 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump094 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the ____th day of _____, 2011.

BEFORE ME, on this the 30 th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 094
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 64.0 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

THENCE N 07deg59'31"W 569.56' to a point for the Southmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following four courses :

(01) N 37deg59'57"W 8.00' to a point for the Westmost corner of this tract,
(02) N 52deg00'03"E 8.00' to a point for the Northmost corner of this tract,
(03) S 37deg59'57"E 8.00' to a point for the Eastmost corner of this tract,
(04) S 52deg00'03"W 8.00' to this POINT OF BEGINNING.

This tract contains 64.0 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940

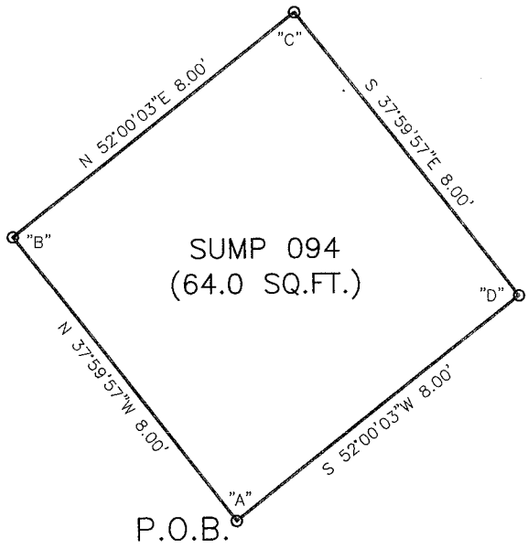
LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

NOTES:

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP



COORDINATE TABLE

POINT	NORTH	EAST
A	6959071.485	3314200.311
B	6959077.789	3314195.385
C	6959082.715	3314201.689
D	6959076.411	3314206.615

SCALE 1"=3'

3 0 3 6 9
GRAPHIC SCALE - FEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 14, 2011.

N 07°59'31"W 569.56'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SUMP 094
(64.0 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	H.PTS H.LEG
03/14/2011	1103025H.DWG	DRAWN BY JTJ

00216498

2012-000000707

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

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6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000707 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216499

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump095 (called Sump 095 on the attached Exhibit A) is part of LHAAP-35/36. Sump095 is a former sump location near Building 34-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump095 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump095) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump095 parcel is 69.6 square feet, more or less, or 0.00159 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump095 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump095 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump095 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump095 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM- ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30 th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 095
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 69.6 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

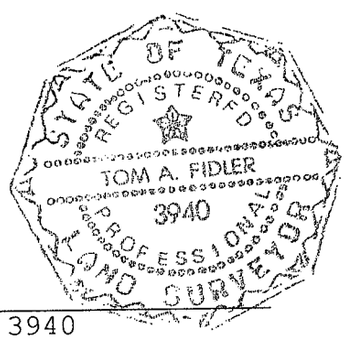
THENCE N 43deg48'28"E 725.22' to a point for the Southmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following eight courses :

(01)	N 37deg59'57"W	12.00'	to a point for tract corner,
(02)	S 52deg00'03"W	3.10'	to a point for tract corner,
(03)	N 37deg59'57"W	6.00'	to a point for the Westmost corner of this tract,
(04)	N 52deg00'03"E	8.00'	to a point for the Northmost corner of this tract,
(05)	S 37deg59'57"E	6.00'	to a point for tract corner,
(06)	S 52deg00'03"W	3.10'	to a point for tract corner,
(07)	S 37deg59'57"E	12.00'	to a point for the Eastmost corner of this tract,
(08)	S 52deg00'03"W	1.80'	to this POINT OF BEGINNING.

This tract contains 69.6 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

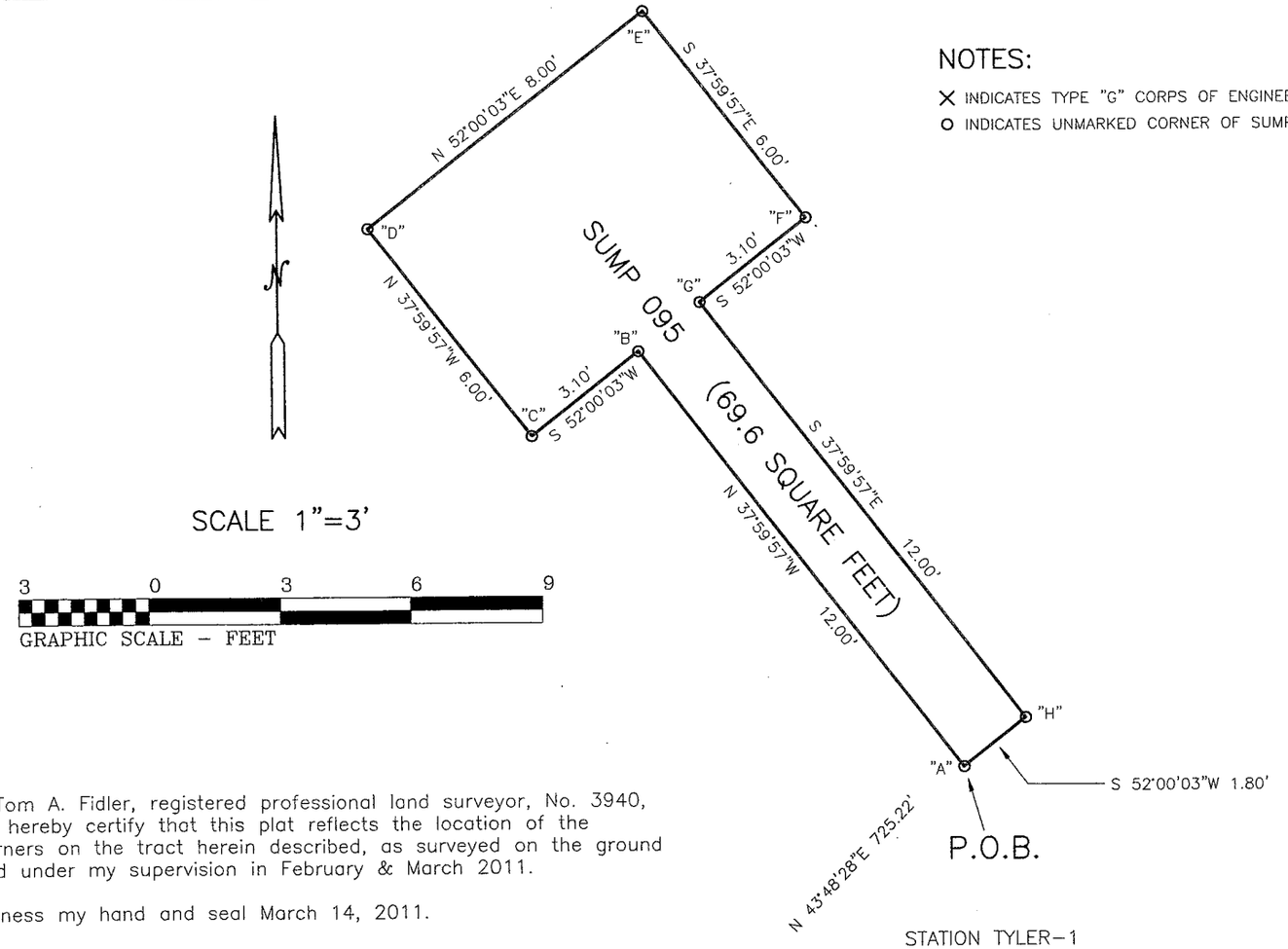


Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTES:

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP



NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6959030.826	3314781.526
B	6959040.282	3314774.138
C	6959038.373	3314771.695
D	6959043.101	3314768.001
E	6959048.027	3314774.305
F	6959043.299	3314777.999
G	6959041.390	3314775.556
H	6959031.934	3314782.944

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 14, 2011.

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEET

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SUMP 095
(69.6 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	F.PTS F.LEG
03/14/2011	1103025F.DWG	DRAWN BY JTJ

00216504

2012-000000708

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000708 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216505

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump096 (called Sump 096 on the attached Exhibit A) is part of LHAAP-35/36. Sump096 is a former sump location near Building 34-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump096 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump096) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump096 parcel is 64 square feet, more or less, or 0.00146 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump096 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump096 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump096 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump096 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM- ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 096
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 64.0 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

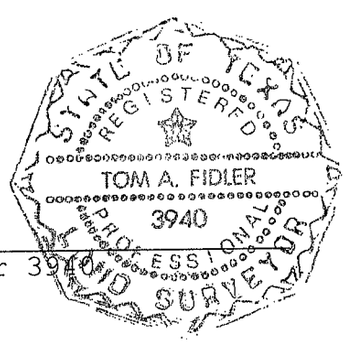
THENCE N 36deg34'53"E 696.04' to a point for the Southmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following four courses :

(01) N 37deg59'57"W 8.00' to a point for the Westmost corner of this tract,
(02) N 52deg00'03"E 8.00' to a point for the Northmost corner of this tract,
(03) S 37deg59'57"E 8.00' to a point for the Eastmost corner of this tract,
(04) S 52deg00'03"W 8.00' to this POINT OF BEGINNING.

This tract contains 64.0 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

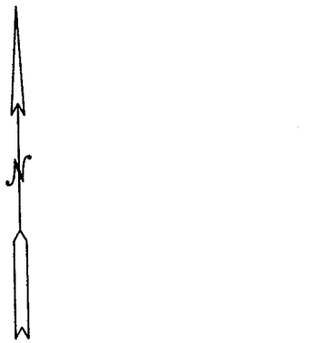


Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

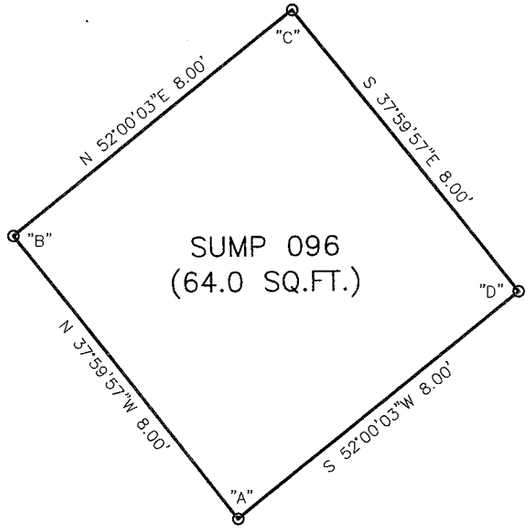
NOTES:

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP



SCALE 1"=3'

3 0 3 6 9
GRAPHIC SCALE - FEET



STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6959066.385	3314694.311
B	6959072.689	3314689.385
C	6959077.615	3314695.689
D	6959071.311	3314700.615

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 14, 2011.

Tom A. Fidler, Registered Professional Land Surveyor No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SUMP 096
(64.0 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	G.PTS G.LEG
03/14/2011	1103025G.DWG	DRAWN BY JTJ

00216510

2012-000000709

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000709 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216511

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump097 (called Sump 097 on the attached Exhibit A) is part of LHAAP-35/36. Sump097 is a former sump location near Building 38-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump097 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump097) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump097 parcel is 76.6 square feet, more or less, or 0.00175 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump097 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump097 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump097 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump097 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30 th day of June, 2011.

BEFORE ME, on this the 30 th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 097
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 76.6 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

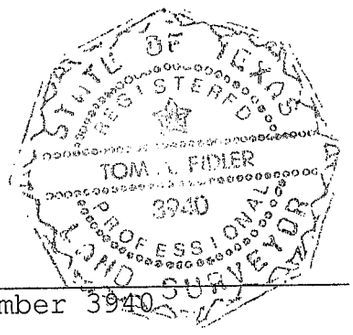
THENCE N 33deg53'28"E 842.86' to this POINT OF BEGINNING, said point being at the Southmost corner of the external face of the concrete which defines this sump,

THENCE along the external face of the concrete which defines this sump the following four courses, each course ending at a corner of the external face of said concrete :

(01)	N 58deg18'32"W	6.20',	being this sump's Westmost corner,
(02)	N 37deg53'34"E	12.45',	being this sump's Northmost corner,
(03)	S 58deg06'49"E	6.18',	being this sump's Eastmost corner,
(04)	S 37deg47'39"W	12.43',	being the aforementioned POINT OF BEGINNING.

This tract contains 76.6 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

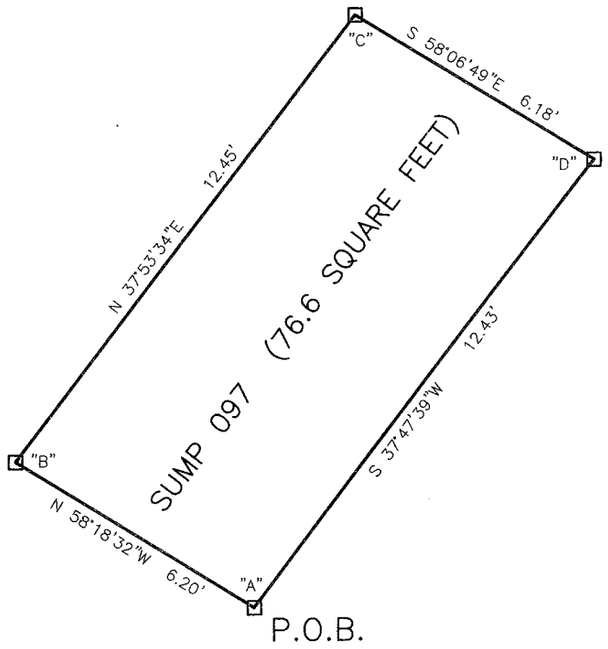
LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

NOTES:

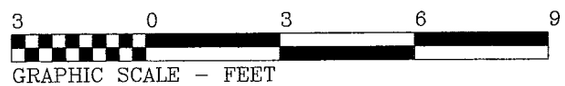
- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- □ INDICATES CORNER OF EXTERNAL FACE OF CONCRETE
- O INDICATES UNMARKED POINT



COORDINATE TABLE

POINT	NORTH	EAST
A	6959207.120	3314749.495
B	6959210.377	3314744.219
C	6959220.206	3314751.868
D	6959216.943	3314757.113

SCALE 1"=3'



I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 4, 2011.

N 33°53'28"E 842.86'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SUMP 097
(76.6 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	Z.PTS Z.LEG
MAR. 4, 2011	0908074Z.DWG	DRAWN BY JTJ

00216516

2012-000000710

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000710 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216517

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump098 (called Sump 098 on the attached Exhibit A) is part of LHAAP-35/36. Sump098 is a former sump location near Building 38-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump098 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump098) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump098 parcel is 39.4 square feet, more or less, or 0.0009 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump098 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump098 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump098 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump098 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 098
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 39.4 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

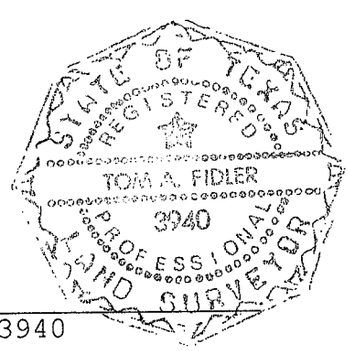
THENCE N 28deg58'18"E 815.98' to this POINT OF BEGINNING, said point being at the Southmost corner of the external face of the concrete which defines this sump,

THENCE along the external face of the concrete which defines this sump the following four courses, each course ending at a corner of the external face of said concrete :

(01)	N 51deg59'37"W	9.74',	being this sump's Westmost corner,
(02)	N 43deg01'55"E	4.05',	being this sump's Northmost corner,
(03)	S 52deg06'01"E	9.75',	being this sump's Eastmost corner,
(04)	S 43deg15'56"W	4.07',	being the aforementioned POINT OF BEGINNING.

This tract contains 39.4 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

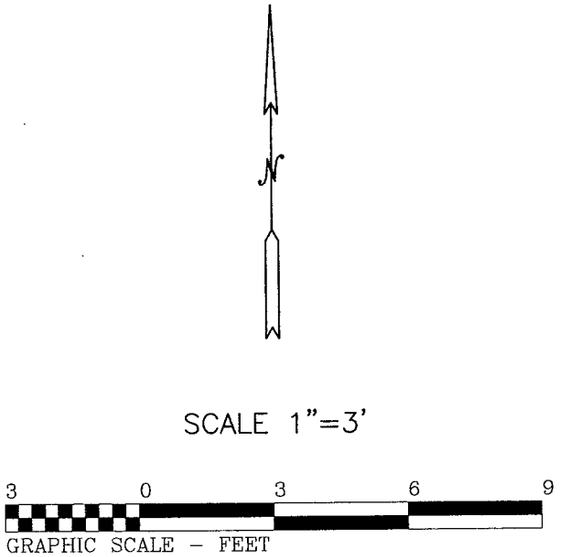


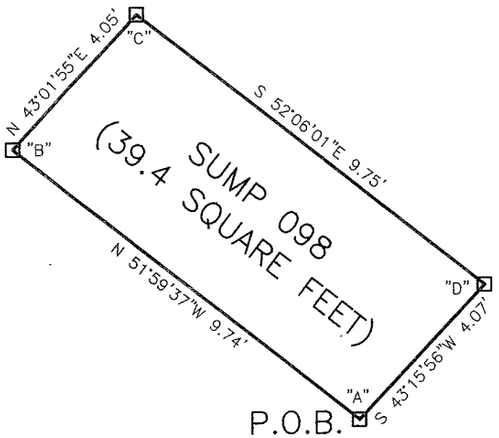
Tom A. Fidler, R.P.L.S. Number 3940

NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- □ INDICATES CORNER OF EXTERNAL FACE OF CONCRETE
- O INDICATES UNMARKED POINT

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com





NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6959221.331	3314674.744
B	6959227.327	3314667.072
C	6959230.288	3314669.837
D	6959224.296	3314677.534

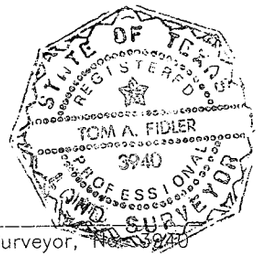
I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 4, 2011.

N 28°58'18"E 815.98'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET



Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SUMP 098
(39.4 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	Y.PTS Y.LEG
MAR. 4, 2011	0908074Y.DWG	DRAWN BY JTJ

00216522

2012-000000711

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000711 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216523

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump099 (called Sump 099 on the attached Exhibit A) is part of LHAAP-35/36. Sump099 is a former sump location near Building 38-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump099 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump099) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump099 parcel is 48 square feet, more or less, or 0.0011 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump099 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump099 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump099 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump099 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30 th day of June, 2011.

BEFORE ME, on this the 30th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 099
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 48.0 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

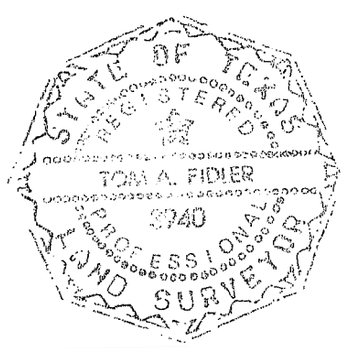
THENCE N 27deg36'35"E 879.49' to a point for the Southmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following four courses :

(01) N 37deg59'57"W 8.00' to a point for the Westmost corner of this tract,
(02) N 52deg00'03"E 6.00' to a point for the Northmost corner of this tract,
(03) S 37deg59'57"E 8.00' to a point for the Eastmost corner of this tract,
(04) S 52deg00'03"W 6.00' to this POINT OF BEGINNING.

This tract contains 48.0 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTE

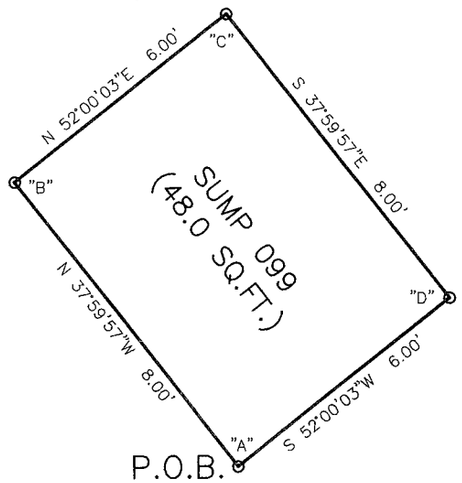
ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

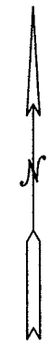
NOTES

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP

COORDINATE TABLE

POINT	NORTH	EAST
A	6959286.801	3314687.099
B	6959293.105	3314682.173
C	6959296.799	3314686.901
D	6959290.495	3314691.827





SCALE 1"=3'

3 0 3 6 9
GRAPHIC SCALE - FEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 14, 2011.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

N 27°36'35"E 879.49'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

SUMP 099
(48.0 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	J.PTS J.LEG
03/14/2011	1103025J.DWG	DRAWN BY JTJ

00216528

2012-000000712

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000712 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216529

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump100 (called Sump 100 on the attached Exhibit A) is part of LHAAP-35/36. Sump100 is a former sump location near Building 45-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump100 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump100) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump100 parcel is 80 square feet, more or less, or 0.00183 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump100 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump100 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump100 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump100 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30 th day of JUNE, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 100
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 80.0 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

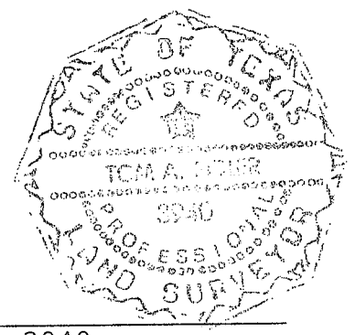
THENCE N 23deg52'16"E 995.90' to a point for the Southmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following four courses :

(01) N 37deg59'57"W 8.00' to a point for the Westmost corner of this tract,
(02) N 52deg00'03"E 10.00' to a point for the Northmost corner of this tract,
(03) S 37deg59'57"E 8.00' to a point for the Eastmost corner of this tract,
(04) S 52deg00'03"W 10.00' to this POINT OF BEGINNING.

This tract contains 80.0 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

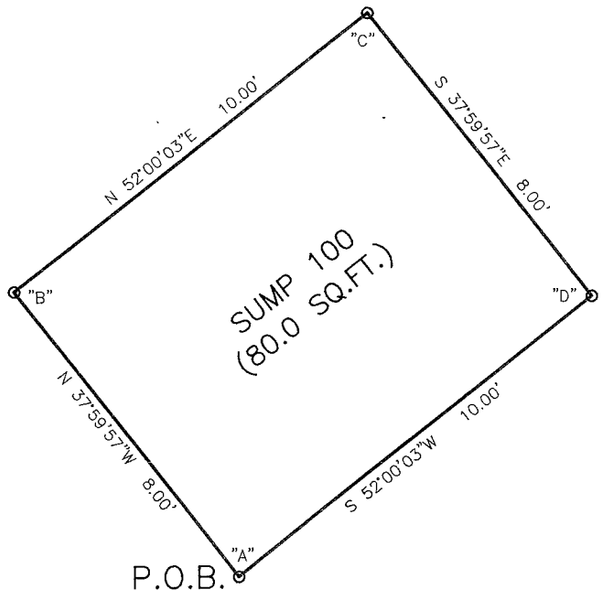


Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.



NOTES

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP

COORDINATE TABLE

POINT	NORTH	EAST
A	6959418.170	3314682.523
B	6959424.474	3314677.597
C	6959430.630	3314685.477
D	6959424.326	3314690.403

SCALE 1"=3'

3 0 3 6 9
GRAPHIC SCALE – FEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 14, 2011.

N 23°52'16"E 995.90'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SUMP 100
(80.0 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	K.PTS K.LEG
03/14/2011	1103025K.DWG	DRAWN BY JTJ

00216534

2012-000000713

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000713 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216535

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump101 (called Sump 101 on the attached Exhibit A) is part of LHAAP-35/36. Sump101 is a former sump location near Building 45-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump101 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump101) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump101 parcel is 67 square feet, more or less, or 0.00153 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump101 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump101 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump101 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump101 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30 th day of June, 2011.

BEFORE ME, on this the 30 th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 101
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 67.0 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

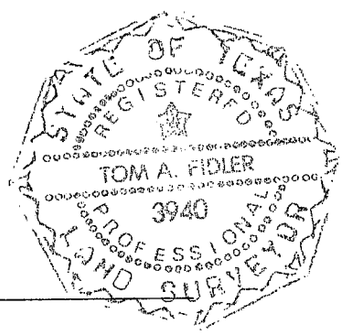
THENCE N 27deg18'47"E 1027.58' to this POINT OF BEGINNING, said point being at the Southmost corner of the external face of the concrete which defines this sump,

THENCE along the external face of the concrete which defines this sump the following four courses, each course ending at a corner of the external face of said concrete :

(01)	N 38deg59'52"W	11.24',	being this sump's Westmost corner,
(02)	N 57deg48'20"E	5.99',	being this sump's Northmost corner,
(03)	S 39deg05'42"E	11.26',	being this sump's Eastmost corner,
(04)	S 57deg59'19"W	6.01',	being the aforementioned POINT OF BEGINNING.

This tract contains 67.0 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

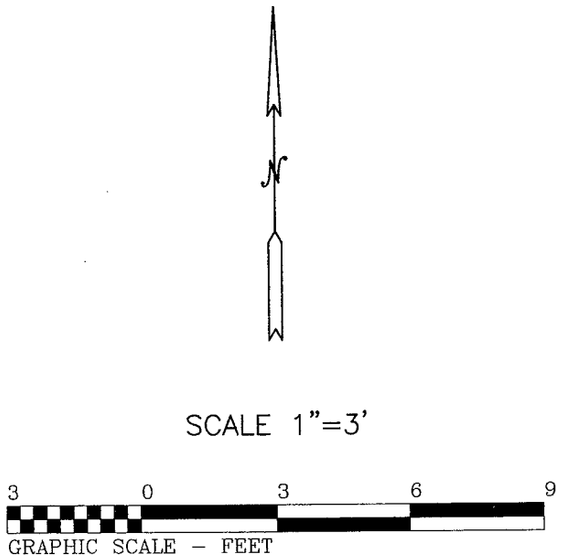


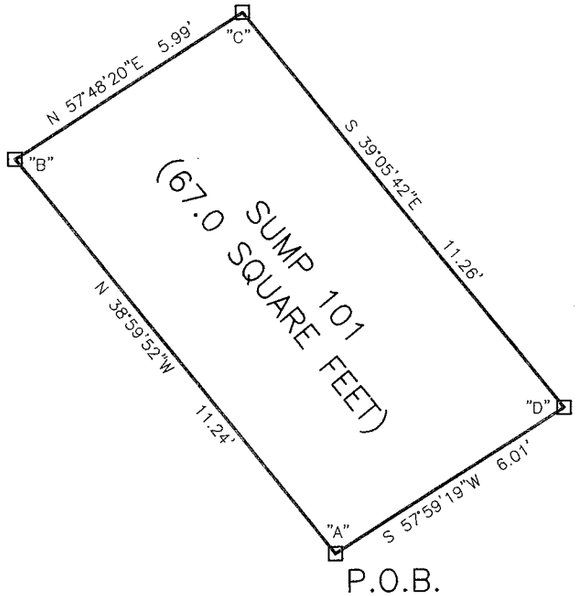
Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- ☐ INDICATES CORNER OF EXTERNAL FACE OF CONCRETE
- O INDICATES UNMARKED POINT





NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6959420.476	3314751.003
B	6959429.211	3314743.930
C	6959432.404	3314749.001
D	6959423.663	3314756.102

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 4, 2011.

N 27°18'47"E 1027.58'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING
ELECTRONIC TOTAL STATION
INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SUMP 101
(67.0 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	A.PTS A.LEG
MAR. 4, 2011	1103025A.DWG	DRAWN BY JTJ

00216540

2012-000000714

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000714 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216541

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump102 (called Sump 102 on the attached Exhibit A) is part of LHAAP-35/36. Sump102 is a former sump location near Building 16-T physically located within site boundary of LHAAP-35C(53) of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump102 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump102) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the

Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump102 parcel is 154.4 square feet, more or less, or 0.00354 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump102 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump102 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump102 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump102 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30 th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 102
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 154.4 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-2" referenced above,

THENCE S 17deg29'41"E 550.28' to a point for the Northmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following ten courses :

(01)	S 15deg52'38"E	7.67'	to a point for the Eastmost corner of this tract,
(02)	S 74deg07'22"W	6.94'	to a point for tract corner,
(03)	N 15deg52'38"W	5.54'	to a point for tract corner,
(04)	S 74deg07'22"W	12.94'	to a point for tract corner,
(05)	S 36deg37'46"W	24.51'	to a point for tract corner,
(06)	S 53deg22'14"E	7.10'	to a point for tract corner,
(07)	S 36deg37'46"W	2.10'	to a point for the Southmost corner of this tract,
(08)	N 53deg22'14"W	9.25'	to a point for the Westmost corner of this tract,
(09)	N 36deg37'46"E	27.31'	to a point for tract corner,
(10)	N 74deg07'22"E	20.63'	to this POINT OF BEGINNING.

This tract contains 154.4 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTES:

× INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
o INDICATES UNMARKED CORNER OF SUMP

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING
ELECTRONIC TOTAL STATION
INDICATES 1116.219')

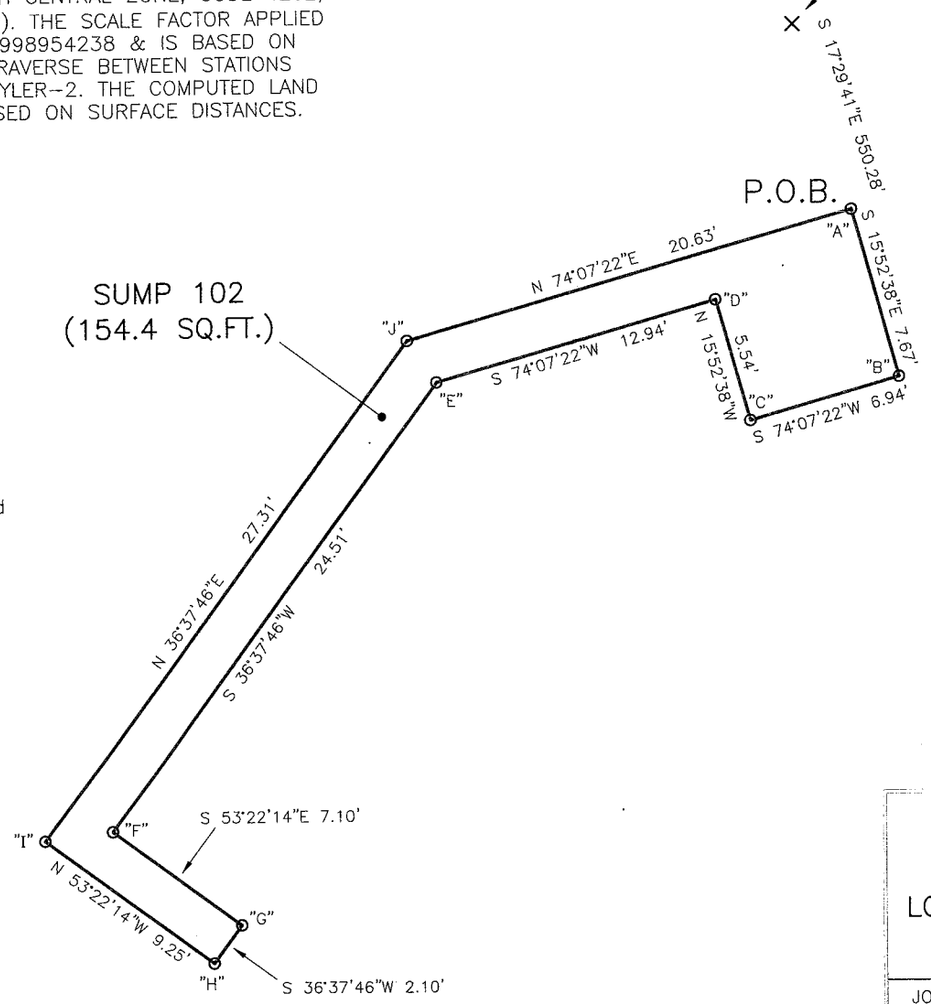
STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

SCALE 1"=6'

6 0 6 12 18
GRAPHIC SCALE – FEET



COORDINATE TABLE

POINT	NORTH	EAST
A	6957307.354	3315333.565
B	6957299.975	3315335.664
C	6957298.077	3315328.991
D	6957303.409	3315327.474
E	6957299.870	3315315.030
F	6957280.203	3315300.409
G	6957275.965	3315306.110
H	6957274.278	3315304.856
I	6957279.797	3315297.433
J	6957301.711	3315313.725

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 11, 2011.

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

SUMP 102
(154.4 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #1101007	0407088.CRD	B.PTS B.LEG
MAR. 11, 2011	1103025B.DWG	DRAWN BY JTJ

00216546

2012-000000715

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000715 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216547

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump103 (called Sump 103 on the attached Exhibit A) is part of LHAAP-35/36. Sump103 is a former sump location near Building 16-T physically located within site boundary of LHAAP-35C(53) of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump103 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump103) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the

Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump103 parcel is 209.1 square feet, more or less, or 0.0048 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump103 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump103 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump103 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump103 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 103
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 209.1 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-2" referenced above,

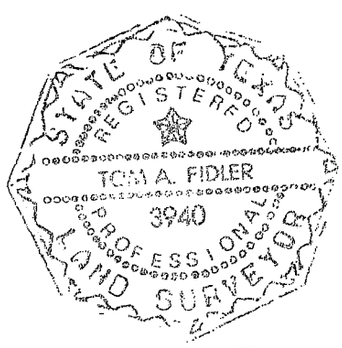
THENCE S 20deg31'34"E 601.43' to a point for the Northmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following ten courses :

(01)	S 16deg10'14"E	10.01'	to a point for the Eastmost corner of this tract,
(02)	S 73deg49'46"W	9.99'	to a point for tract corner,
(03)	N 16deg10'14"W	2.67'	to a point for tract corner,
(04)	S 36deg37'46"W	27.57'	to a point for the Southmost corner of this tract,
(05)	N 53deg22'14"W	29.02'	to a point for the Westmost corner of this tract,
(06)	N 36deg37'46"E	2.10'	to a point for tract corner,
(07)	S 53deg22'14"E	27.18'	to a point for tract corner,
(08)	N 36deg37'46"E	26.86'	to a point for tract corner,
(09)	N 16deg10'14"W	5.03'	to a point for tract corner,
(10)	N 73deg49'46"E	9.99'	to this POINT OF BEGINNING.

This tract contains 209.1 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 11, 2011.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@coblelynx.com

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

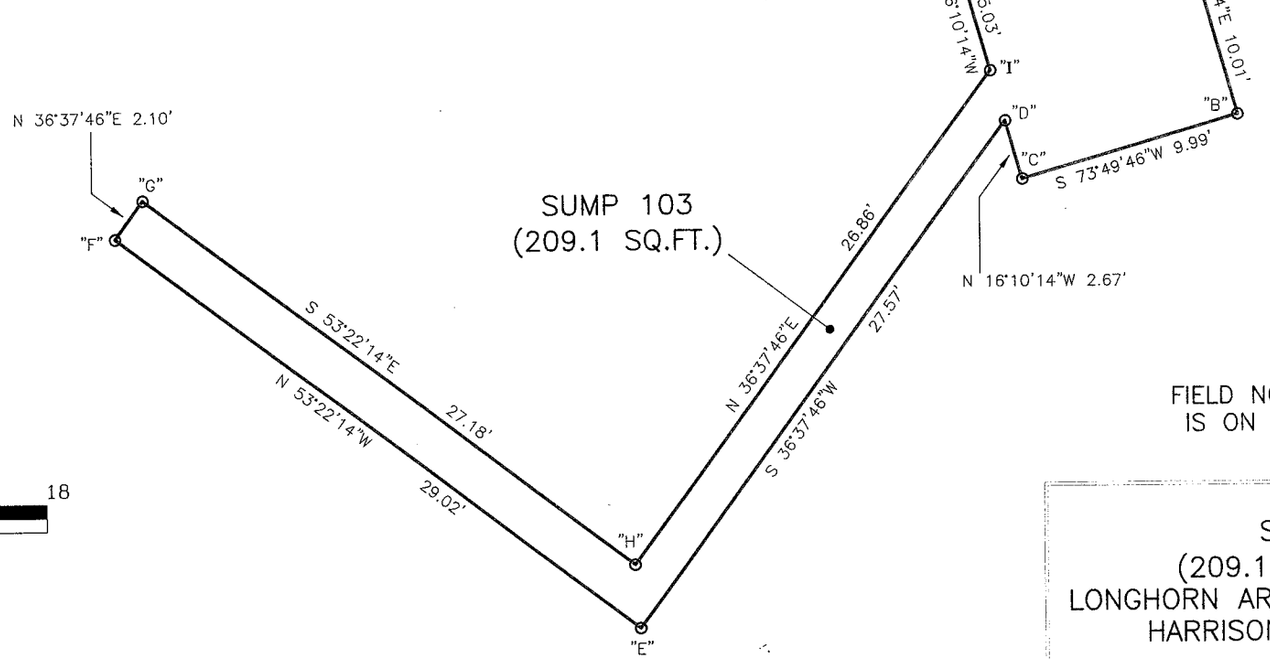
STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

NOTE

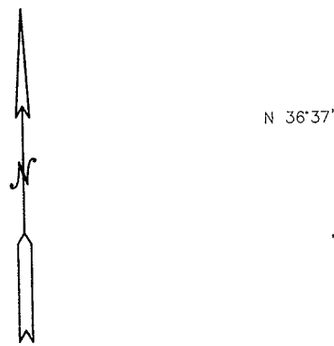
ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6957268.937	3315379.021
B	6957259.319	3315381.810
C	6957256.536	3315372.213
D	6957259.104	3315371.468
E	6957236.982	3315355.021
F	6957254.297	3315331.731
G	6957255.984	3315332.985
H	6957239.765	3315354.800
I	6957261.320	3315370.825
J	6957266.154	3315369.424



FIELD NOTES DESCRIPTION IS ON SEPARATE SHEET



SCALE 1"=6'

6 0 6 12 18
GRAPHIC SCALE - FEET

NOTES:
X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP

SUMP 103
(209.1 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #1101007	0407088.CRD	C.PTS C.LEG
MAR. 11, 2011	1103025C.DWG	DRAWN BY JTJ

00216552

2012-000000716

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000716 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216553

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump104 (called Sump 104 on the attached Exhibit A) is part of LHAAP-35/36. Sump104 is a former sump location near Building 16-T physically located within site boundary of LHAAP-35C(53) of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump104 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump104) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the

Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump104 parcel is 149.2 square feet, more or less, or 0.00342 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump104 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump104 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump104 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump104 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30th day of JUNE, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 104
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 149.2 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-2" referenced above,

THENCE S 09deg38'40"E 580.62' to a point for the Northmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following eight courses :

(01)	S 53deg22'14"E	23.26'	to a point for the Eastmost corner of this tract,
(02)	S 36deg37'46"W	2.24'	to a point for tract corner,
(03)	N 53deg22'14"W	20.93'	to a point for tract corner,
(04)	S 36deg37'46"W	24.04'	to a point for the Southmost corner of this tract,
(05)	N 53deg22'14"W	7.69'	to a point for the Westmost corner of this tract,
(06)	N 36deg37'46"E	7.70'	to a point for tract corner,
(07)	S 53deg22'14"E	5.37'	to a point for tract corner,
(08)	N 36deg37'46"E	18.58'	to this POINT OF BEGINNING.

This tract contains 149.2 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 11, 2011.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

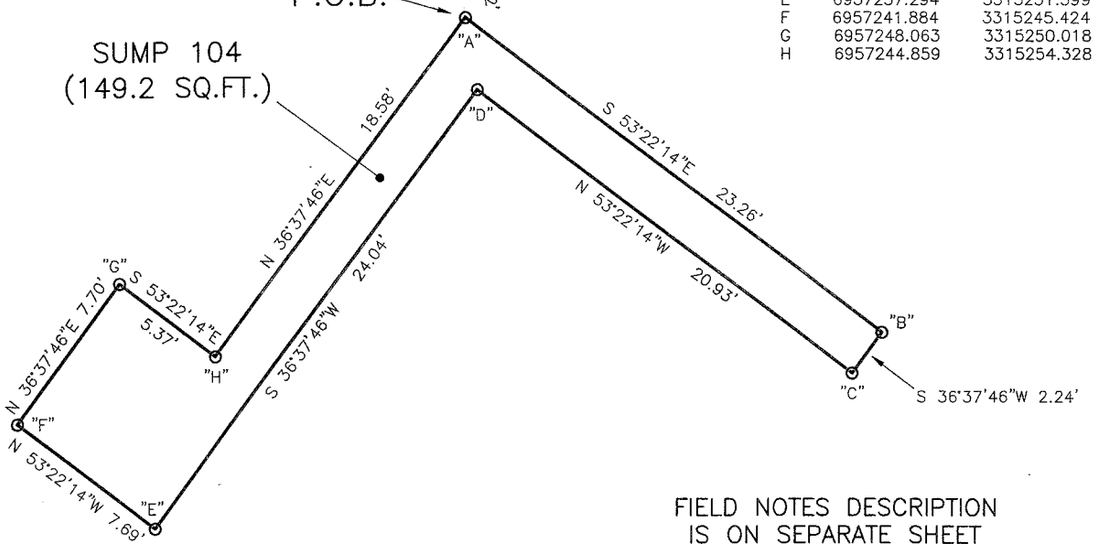
LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

S 09°38'40"E 580.62'



SUMP 104
(149.2 SQ.FT.)

COORDINATE TABLE

POINT	NORTH	EAST
A	6957259.767	3315265.412
B	6957245.891	3315284.077
C	6957244.097	3315282.743
D	6957256.587	3315265.943
E	6957237.294	3315251.599
F	6957241.884	3315245.424
G	6957248.063	3315250.018
H	6957244.859	3315254.328

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEET

SCALE 1"=6'

6 0 6 12 18
GRAPHIC SCALE – FEET

NOTES:

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

SUMP 104
(149.2 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #1101007	0407088.CRD	D.PTS D.LEG
MAR. 11, 2011	1103025D.DWG	DRAWN BY JTJ

00216558

2012-000000717

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000717 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216559

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump105 (called Sump 105 on the attached Exhibit A) is part of LHAAP-35/36. Sump105 is a former sump location near Building 16-T physically located within site boundary of LHAAP-35C(53) of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump105 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump105) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump105 parcel is 201.7 square feet, more or less, or 0.00463 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump105 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump105 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump105 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump105 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30 th day of June, 2011.

BEFORE ME, on this the 30 th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
SUMP 105
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 201.7 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-2" referenced above,

THENCE S 13deg17'42"E 623.38' to a point for the Northmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following eight courses :

(01)	S 53deg22'14"E	26.51'	to a point for the Eastmost corner of this tract,
(02)	S 36deg37'46"W	15.65'	to a point for tract corner,
(03)	S 53deg22'14"E	8.85'	to a point for tract corner,
(04)	S 36deg37'46"W	10.63'	to a point for the Southmost corner of this tract,
(05)	N 53deg22'14"W	10.86'	to a point for tract corner,
(06)	N 36deg37'46"E	24.04'	to a point for tract corner,
(07)	N 53deg22'14"W	24.50'	to a point for the Westmost corner of this tract,
(08)	N 36deg37'46"E	2.24'	to this POINT OF BEGINNING.

This tract contains 201.7 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING
ELECTRONIC TOTAL STATION
INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

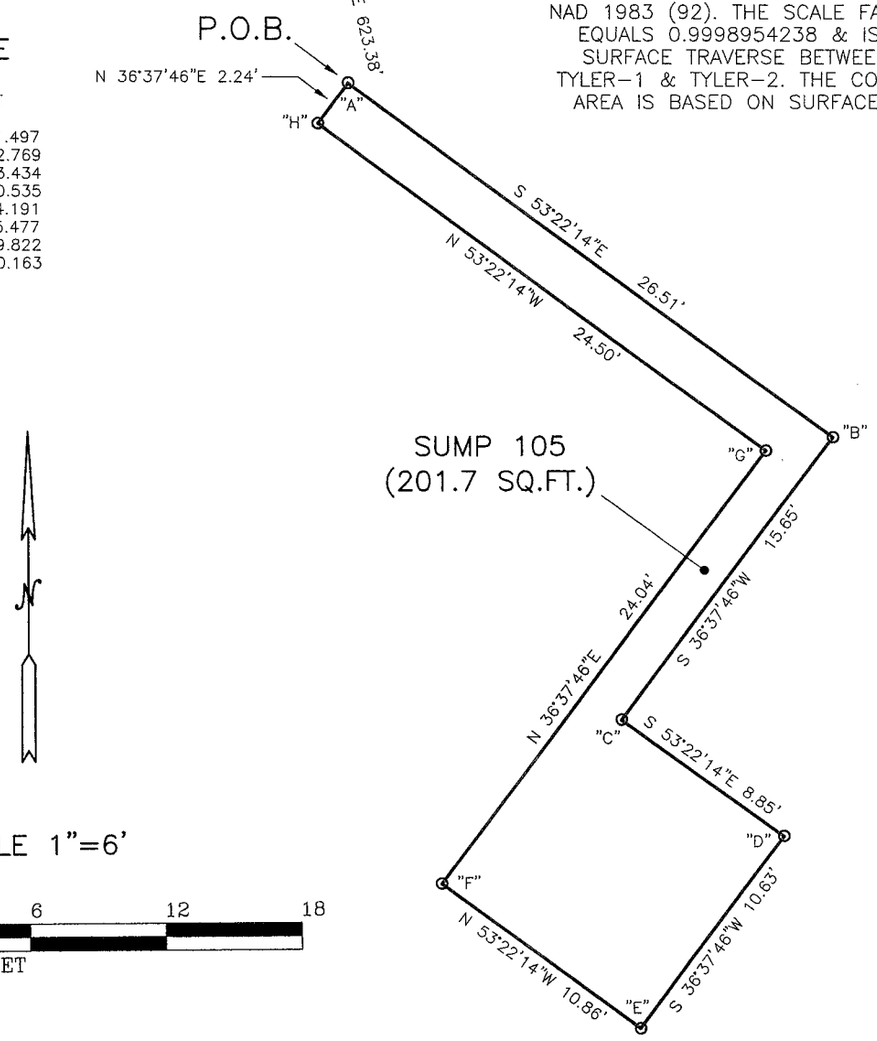
S 13°17'42"E 623.38'

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6957225.505	3315311.497
B	6957209.690	3315332.769
C	6957197.135	3315323.434
D	6957191.856	3315330.535
E	6957183.323	3315324.191
F	6957189.801	3315315.477
G	6957209.095	3315329.822
H	6957223.711	3315310.163



SCALE 1"=6'

6 0 6 12 18
GRAPHIC SCALE - FEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 11, 2011.

NOTES:

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

SUMP 105
(201.7 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #1101007	0407088.CRD	E.PTS E.LEG
MAR. 11, 2011	1103025E.DWG	DRAWN BY JTJ

00216564

2012-000000718

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000718 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216565

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. Sump123 (called Sump 123 on the attached Exhibit A) is part of LHAAP-35/36. Sump123 is a former sump location near Building 18-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which Sump123 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

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 (including Sump123) were also associated with wash racks (waste rack sumps) where containers were cleaned and stored. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at

TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The Sump123 parcel is 60 square feet, more or less, or 0.00137 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the Sump123 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from Sump123 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of Sump123 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of Sump123 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

00216568

FIELD NOTES DESCRIPTION OF
SUMP 123
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 60.0 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

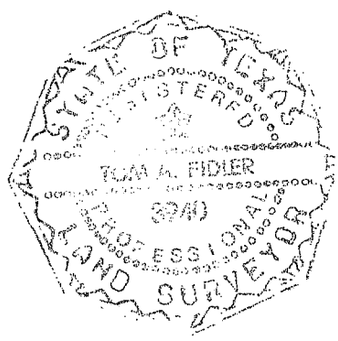
THENCE N 07deg59'31"W 569.56' to a point for the Southmost corner of this sump and this POINT OF BEGINNING,

THENCE along the boundary of this tract the following four courses :

(01) N 37deg59'57"W 6.00' to a point for the Westmost corner of this tract,
(02) N 52deg00'03"E 10.00' to a point for the Northmost corner of this tract,
(03) S 37deg59'57"E 6.00' to a point for the Eastmost corner of this tract,
(04) S 52deg00'03"W 10.00' to this POINT OF BEGINNING.

This tract contains 60.0 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

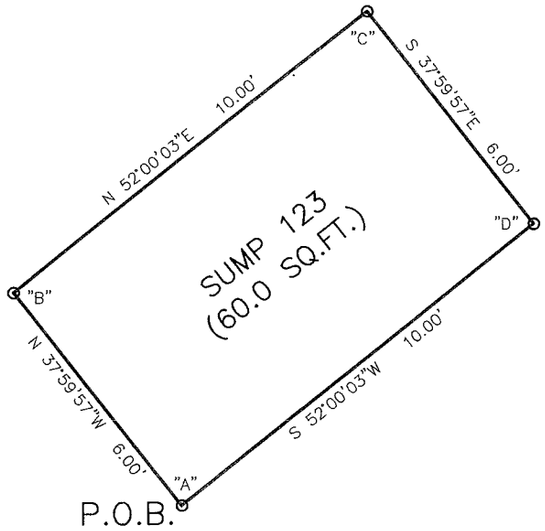
LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

NOTES

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES UNMARKED CORNER OF SUMP



COORDINATE TABLE

POINT	NORTH	EAST
A	6959122.758	3314187.907
B	6959127.486	3314184.213
C	6959133.642	3314192.093
D	6959128.914	3314195.787

SCALE 1"=3'

3 0 3 6 9
GRAPHIC SCALE - FEET

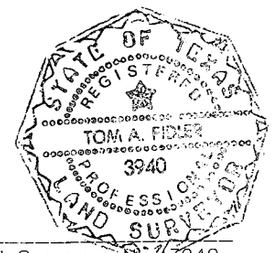
I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 14, 2011.

N 08°28'00"W 622.08'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET



Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SUMP 123
(60.0 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	I.PTS I.LEG
03/14/2011	1103025I.DWG	DRAWN BY JTJ

00216570

2012-000000719

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6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000719 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216571

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. WRSump001 (called W.R. Sump 001 on the attached Exhibit A) is part of LHAAP-35/36. WRSump001 is a former waste rack sump location near Building 34-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36 of which WRSump001 is a part is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2, no further action.

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 including WRSump001) where containers were cleaned and stored. Further information may be found in the

Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The WRSump001 parcel is 57.1 square feet, more or less, or 0.00131 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the WRSump001 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from WRSump001 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of WRSump001 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of WRSump001 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
W.R. SUMP 001
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 57.1 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

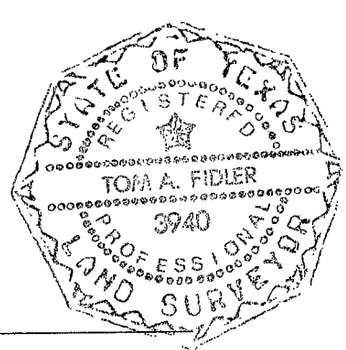
THENCE N 42deg37'08"E 700.32' to this POINT OF BEGINNING, said point being at the Southmost corner of the external face of the concrete wall which defines this sump,

THENCE along the external face of the concrete wall which defines this sump the following twelve courses, each course ending at a corner of the external face of said concrete wall :

(01)	N 36deg36'16"W	4.50',	
(02)	N 51deg51'25"E	1.07',	
(03)	N 38deg08'35"W	2.46',	
(04)	S 63deg07'08"W	0.85',	
(05)	N 38deg08'35"W	7.98',	being this sump's Westmost corner,
(06)	N 51deg51'25"E	3.70',	being this sump's Northmost corner,
(07)	S 39deg59'44"E	8.17',	
(08)	S 52deg07'09"W	1.00',	
(09)	S 39deg59'44"E	2.34',	
(10)	N 50deg00'16"E	1.14',	
(11)	S 39deg59'44"E	4.67',	being this sump's Eastmost corner,
(12)	S 52deg10'33"W	4.68',	being the aforementioned POINT OF BEGINNING.

This tract contains 57.1 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

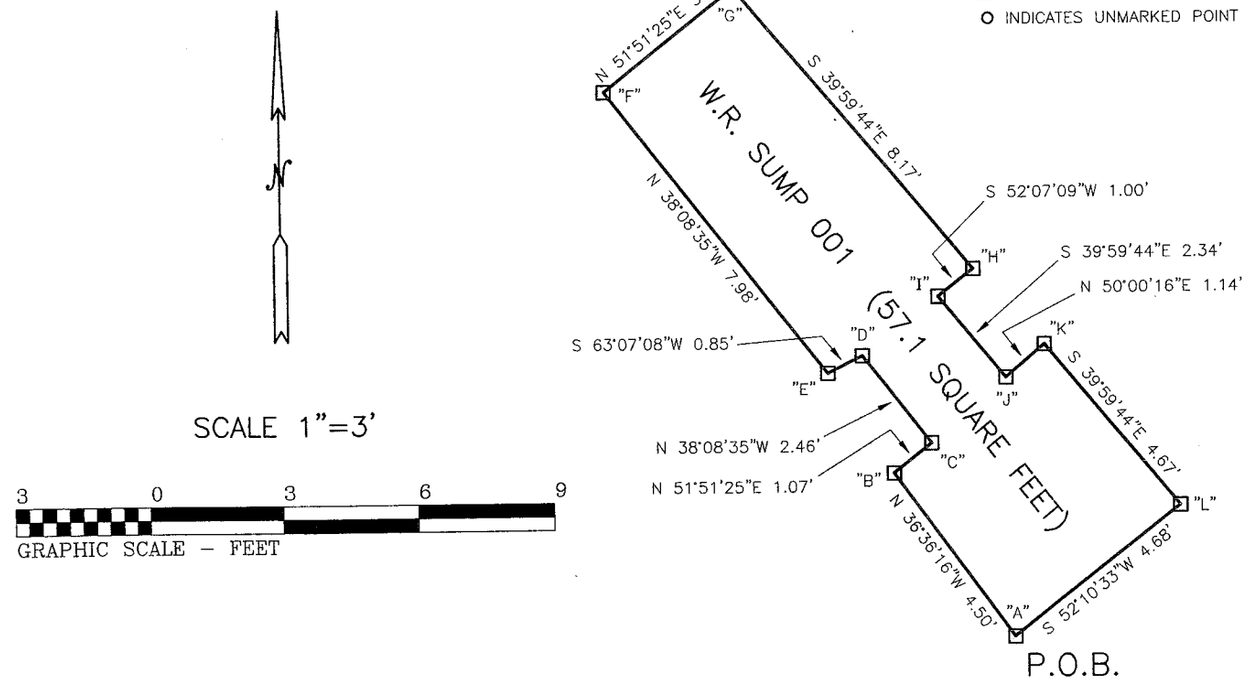


Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- □ INDICATES CORNER OF EXTERNAL FACE OF CONCRETE WALL
- O INDICATES UNMARKED POINT



NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6959022.804	3314753.696
B	6959026.415	3314751.014
C	6959027.074	3314751.854
D	6959029.012	3314750.332
E	6959028.627	3314749.573
F	6959034.899	3314744.647
G	6959037.183	3314747.555
H	6959030.925	3314752.805
I	6959030.313	3314752.018
J	6959028.519	3314753.523
K	6959029.252	3314754.396
L	6959025.676	3314757.396
M	6959022.804	3314753.696

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 1, 2011.

N 42°37'08"E 700.32'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

W.R. SUMP 001
(57.1 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	W.PTS W.LEG
MAR. 1, 2011	0908074W.DWG	DRAWN BY JTJ

00216576

2012-000000720

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000720 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216577

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. WRSump002 (called W.R. Sump 002 on the attached Exhibit A) is part of LHAAP-35/36. WRSump002 is a former waste rack sump location near Building 38-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which WRSump002 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2, no further action.

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 including WRSump002) where containers were cleaned and stored. Further information may be found in the

Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The WRSump002 parcel is 61.1 square feet, more or less, or 0.00140 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the WRSump002 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from WRSump002 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of WRSump002 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of WRSump002 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30th day of June, 2011.

BEFORE ME, on this the 30th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
W.R. SUMP 002
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 61.1 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

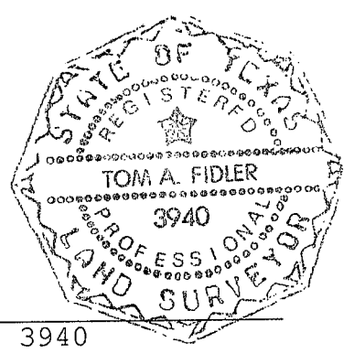
THENCE N 27deg03'19"E 797.78' to this POINT OF BEGINNING, said point being at the Southmost corner of the external face of the concrete wall which defines this sump,

THENCE along the external face of the concrete wall which defines this sump the following twelve courses, each course ending at a corner of the external face of said concrete wall :

(01)	N 50deg15'02"W	4.01',	being this sump's Westmost corner,
(02)	N 38deg19'51"E	7.83',	
(03)	S 58deg29'13"E	0.84',	
(04)	N 41deg11'11"E	3.09',	
(05)	N 51deg30'19"W	1.32',	
(06)	N 40deg19'40"E	4.55',	being this sump's Northmost corner,
(07)	S 54deg31'45"E	4.65',	being this sump's Eastmost corner,
(08)	S 38deg16'58"W	4.65',	
(09)	N 53deg12'50"W	1.23',	
(10)	S 39deg42'05"W	3.32',	
(11)	S 51deg04'42"E	0.79',	
(12)	S 38deg16'58"W	7.89',	being the aforementioned POINT OF BEGINNING.

This tract contains 61.1 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

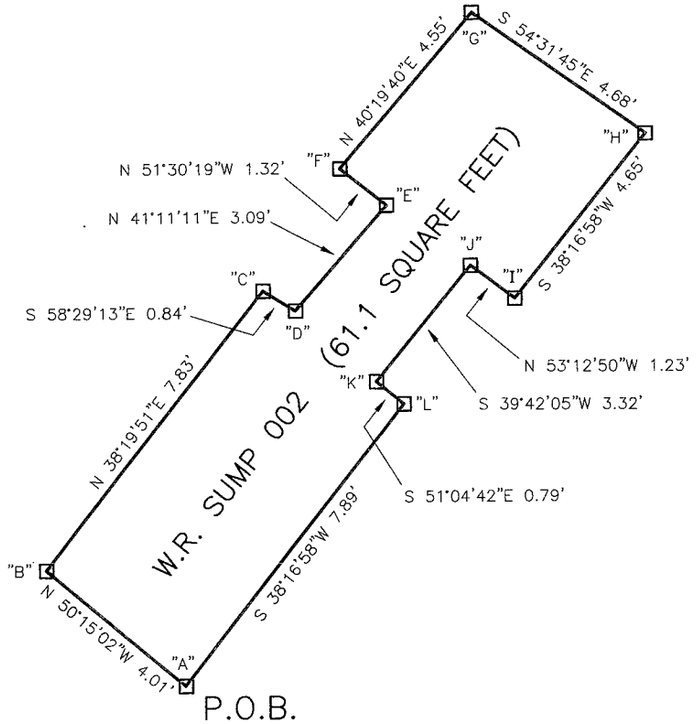
LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- □ INDICATES CORNER OF EXTERNAL FACE OF CONCRETE WALL
- O INDICATES UNMARKED POINT



COORDINATE TABLE

POINT	NORTH	EAST
A	6959217.937	3314642.369
B	6959220.500	3314639.287
C	6959226.642	3314644.143
D	6959226.201	3314644.863
E	6959228.524	3314646.896
F	6959229.343	3314645.866
G	6959232.815	3314648.814
H	6959230.097	3314652.628
I	6959226.443	3314649.744
J	6959227.177	3314648.763
K	6959224.624	3314646.643
L	6959224.129	3314647.256
M	6959217.937	3314642.369

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 1, 2011.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

N 27°03'19"E 797.78'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

SCALE 1"=3'

3 0 3 6 9
GRAPHIC SCALE - FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

W.R. SUMP 002
(61.1 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	X.PTS X.LEG
MAR. 1, 2011	0908074X.DWG	DRAWN BY JTJ

00216582

2012-000000721

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000721 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216583

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. WRSump003 (called W.R. Sump 003 on the attached Exhibit A) is part of LHAAP-35/36. WRSump003 is a former waste rack sump location near Building 16-Y physically located within site boundary of LHAAP-48 of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-35/36, of which WRSump003 is a part, is not considered an NPL site. Environmental activities at LHAAP-35/36 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ, the lead regulatory agency, no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2, no further action.

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 including WRSump003) where containers were cleaned and stored. Further information may be found in the

Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The WRSump003 parcel is 69.5 square feet, more or less, or 0.00159 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the WRSump003 site and USEPA and TCEQ concluded that no further investigation or action is required. Contaminants in soil samples from WRSump003 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of WRSump003 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of WRSump003 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 30 th day of June, 2011.

BEFORE ME, on this the 30 th day of June, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 30 day of June, 2011.

JENNIFER LESTER
Notary Public State of Texas
COMM. EXP. 01/03/2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
W.R. SUMP 003
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 69.5 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "TYLER-1" referenced above,

THENCE N 00deg06'48"W 643.61' to this POINT OF BEGINNING, said point being at the Southmost corner of the external face of the concrete wall which defines this sump,

THENCE along the external face of the concrete wall which defines this sump the following twelve courses, each course ending at a corner of the external face of said concrete wall :

(01)	N 37deg49'35"W 4.09',	being this sump's	Westmost corner,
(02)	N 48deg49'52"E 10.08',		
(03)	S 40deg22'17"E 0.96',		
(04)	N 51deg37'59"E 1.64',		
(05)	N 32deg53'50"W 1.27',		
(06)	N 49deg58'25"E 4.65',	being this sump's	Northmost corner,
(07)	S 41deg50'19"E 4.65',	being this sump's	Eastmost corner,
(08)	S 43deg56'08"W 4.79',		
(09)	N 44deg10'19"W 1.61',		
(10)	S 52deg56'11"W 1.74',		
(11)	S 39deg31'31"E 1.01',		
(12)	S 49deg33'58"W 10.21',	being the aforementioned POINT OF BEGINNING.	

This tract contains 69.5 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

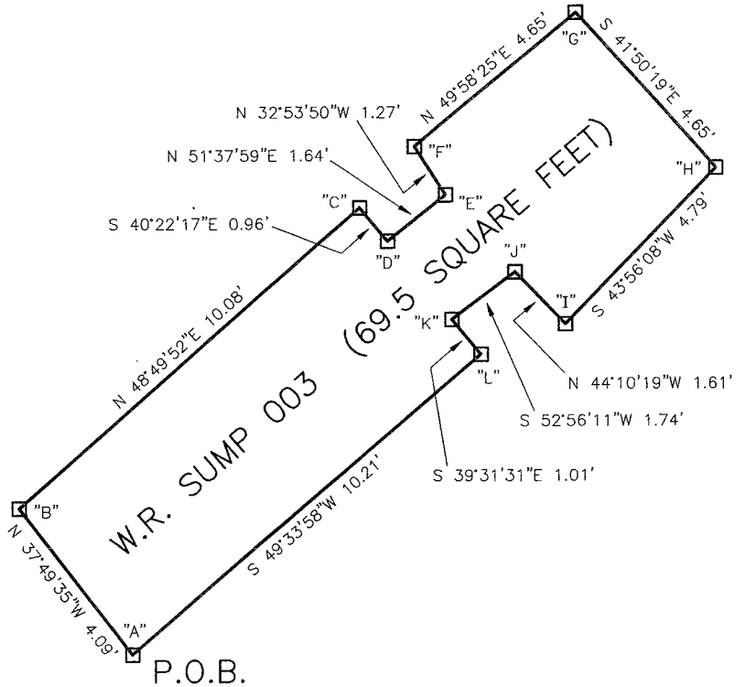
Tom A. Fidler, R.P.L.S. Number 3940

00216587

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.



NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- □ INDICATES CORNER OF EXTERNAL FACE OF CONCRETE WALL
- O INDICATES UNMARKED POINT

COORDINATE TABLE

POINT	NORTH	EAST
A	6959151.071	3314278.227
B	6959154.302	3314275.719
C	6959160.937	3314283.306
D	6959160.202	3314283.931
E	6959161.221	3314285.218
F	6959162.288	3314284.528
G	6959165.278	3314288.088
H	6959161.816	3314291.188
I	6959158.365	3314287.863
J	6959159.516	3314286.744
K	6959158.468	3314285.356
L	6959157.691	3314285.996

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in February & March 2011.

Witness my hand and seal March 1, 2011.

N 00°06'48"W 643.61'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

SCALE 1"=3'

3 0 3 6 9
GRAPHIC SCALE - FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

W.R. SUMP 003
(69.5 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	V.PTS V.LEG
MAR. 1, 2011	0908074V.DWG	DRAWN BY JTJ

00216588

LHAAP-37, 37-1

LUCs FROM FINAL REMEDIAL DESIGN

September 14, 2015

FINAL
REMEDIAL DESIGN
LHAAP-35B (37), CHEMICAL LABORATORY AND LHAAP-67, ABOVEGROUND STORAGE TANK FARM
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared by

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

August 1, 2011

Table of Contents

4.0 Land Use Controls for the Site

The LUCs to be implemented by the Army or its representatives for LHAAP-35B(37) and LHAAP-67 to prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health include:

- Ensure no withdrawal or use of groundwater beneath the sites for anything other than environmental monitoring and testing until cleanup goals are met

Notification of the groundwater use restriction will accompany all transfer documents and will be recorded at the Harrison County Courthouse in accordance with Texas Administrative Code (TAC) Title 30, §335.566.The LUC addresses the areas of LHAAP-35B(37) and LHAAP-67 that include groundwater plumes at LHAAP-35B(37) and LHAAP-67 with levels of contamination that require implementation of a remedy (see **Section 2.0**). The U.S. Army is responsible for implementing, maintaining, monitoring, reporting on, and enforcing the LUC.

U.S. Army and regulators will consult to determine appropriate enforcement actions should there be a failure of an LUC objective at this site after it has transferred. U.S. Army shall obtain USEPA and TCEQ concurrence prior to termination or significant modification of the LUC, or implementation of a change in land use inconsistent with the LUC objectives and use assumptions of the remedy. Although not a remedy, the land use assumption for LHAAP-35B(37) and LHAAP-67 forms the basis for the remedy. The reasonably anticipated future use of the site as part of a national wildlife refuge is consistent with an industrial risk exposure scenario. Notification of the land use assumption of this site will be made in transfer documentation, will be recorded in the Harrison County Courthouse in accordance with TAC Title 30, §335.566 and compliance with the use assumption will be documented in the Five-Year Review reports.

6.2 Land Use Control Implementation Actions

The Army or its representatives will be responsible for LUC implementation and certification, reporting and enforcement. The Army shall address LUC problems within its control that are likely to impact remedy integrity and shall address problems as soon as practicable.

As a condition of property transfer, the Army may require the transferee to assume responsibility for various implementation actions, as indicated below. Although the Army may transfer responsibility for various implementation actions, the Army shall retain its responsibility for remedy integrity. This means that the Army is responsible for addressing substantive violations of performance objectives that would undermine the Army's CERCLA remedy. The Army also will be responsible for: 1) incorporating RD information and outlining the transferee's LUC obligations into property transfer documentation; 2) recording groundwater use restriction and survey plat at the Harrison County Courthouse; and 3) notifying Texas Department of Licensing and Regulation of the groundwater restriction which includes the prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval from the Army, the USEPA, and the TCEQ. The following LUC implementation actions shall be undertaken by the Army in order to ensure that the aforementioned LUC performance objectives for LHAAP-35B(37) and LHAAP-67 are met and maintained:

6.2.1 Comprehensive Land Use Control Management Plan

Within 30 days of receiving USEPA and TCEQ approval of this RD, the Army will incorporate this document into the Comprehensive LUC Management Plan. The Comprehensive LUC Management Plan consists of LHAAP RD documents and a survey plat showing the locations where LUCs being implemented at LHAAP are applied. The purpose of this Comprehensive LUC Management Plan is to ensure all site specific LUCs are compiled into one comprehensive location for both pre-transfer use by the installation and for post-transfer use by the transferee. This document is also accessible to regulators, the local government and the public. The Comprehensive LUC Management Plan is located in the Marshall Public Library to accompany LHAAP's Administrative Record. As LUC RD documents for additional environmental sites are approved by USEPA and TCEQ, the Army shall likewise add those documents and survey plats to the Comprehensive LUC Management Plan as well as update the previous copy of the plan placed in the Marshall Public Library.

6.2.2 Site Certifications and Reporting

Beginning with finalization of this RD, the Army will undertake annual certifications to confirm continued compliance with the LUC objectives. The Army will retain the annual LUC Compliance Certification documents in the project files for incorporation into the Five-Year Review Reports, and these documents will be made available to USEPA and TCEQ upon request. The certification form will be consistent with the form attached as **Appendix B**. In addition, should any violations be found during the annual certification, the Army will provide to USEPA and TCEQ along with the document, a separate written explanation indicating the specific violations found and what efforts or measures have or will be taken to correct those violations**.** Upon transfer, such responsibilities may shift to the transferee via

appropriate provisions placed in the Environmental Condition of Property (ECP) or other environmental transfer document. The need to continue annual certifications will be revisited at Five-Year Reviews.

6.2.3 Notice of Planned Property Conveyances

The Army shall provide notice to USEPA and TCEQ of plans to convey LHAAP-35B(37) and LHAAP-67 acreage. The notice shall describe the mechanism by which LUCs will continue to be implemented, maintained, inspected, reported, and enforced.

6.2.4 Opportunity to Review Text of Intended Land Use Controls

Army will provide a copy of the groundwater use restriction notification to TCEQ for review and approval prior to its recordation in Harrison County. In addition, the Army will produce an ECP or other environmental document for transfer of LHAAP-35B(37) and LHAAP-67, but before executing transfer, the Army will provide USEPA and TCEQ with a draft copy of the ECP or other environmental document for transfer so that they may have reasonable opportunity, before document execution, to review all LUC-related provisions.

6.2.5 Notification Should Action(s) Which Interfere with Land Use Control Effectiveness Be Discovered Subsequent to Conveyance

Should the Army discover after conveyance of the site any activity on the property inconsistent with the LUC performance objectives, the Army shall notify USEPA and TCEQ within 72 hours of such discovery. Consistent with **Section 6.2.6** below, the Army will then work with USEPA, TCEQ and the transferee to correct the problem(s) discovered. This reporting requirement does not preclude the Army from taking immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health or the environment.

6.2.6 Land Use Control Enforcement

Should the LUC remedy reflected in this LUC RD fail, the Army will coordinate with USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. These actions may range from informal resolutions with the owner or violator, to the institution of judicial action under the auspices of Texas property law or CERCLA. Alternatively, should the circumstances warrant such, the Army could choose to exercise its response authorities under CERCLA, and then seek cost recovery after the fact from the person(s) or entity(ies) who violated a given LUC. Should the Army become aware that any future owner or user of the property has violated any LUC requirement over which a local agency may have independent jurisdiction, the Army will notify these agencies of such violation(s) and work cooperatively with them to re-achieve owner/user compliance with the LUCs.

6.2.7 Modification or Termination of Land Use Controls

The Army shall not, without USEPA and TCEQ concurrence, make a significant modification to, or terminate a LUC, or make a land use change inconsistent with the LUC objectives and use assumptions of the selected remedy. Likewise, the Army shall seek prior USEPA and TCEQ concurrence before commencing actions that may impact remedy integrity. In the case of an emergency action, the Army shall obtain prior USEPA and TCEQ concurrence as appropriate to the exigencies of the situation.

The LUCs shall remain in effect until such time as the Army, TCEQ and USEPA agree that the concentrations of COCs have met cleanup levels. When this occurs, the LUCs will be terminated as needed. The decision to terminate LUCs will be documented consistent with the NCP process for post-ROD changes, potentially including an explanation of significant differences or a remedial action completion report. If the property has been transferred and a determination by the Army, TCEQ and USEPA has been made to terminate one or more of the LUCs, the Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also timely advise other local stakeholders of the action.

6.3 Monitored Natural Attenuation Implementation Actions

Implementation actions include installation of additional monitoring wells, plugging and abandonment of monitoring wells not designated for long-term monitoring, implementation of a groundwater monitoring plan, monitoring, and reporting. The project schedule and cost summary for implementation actions are provided in **Appendix H**. Groundwater monitoring will be conducted to monitor the effectiveness of MNA in reducing contaminant concentrations over time. Monitoring will also be conducted to evaluate plume migration and ensure that chlorinated solvents-contaminated groundwater does not impact nearby surface water at unacceptable levels. Surface water sampling will be conducted to confirm contaminated groundwater is not migrating to surface water. The Groundwater Monitoring Plan, attached as **Appendix A**, describes the wells, their locations, analytical parameters, the frequency of the monitoring, surface water sampling, and presents a list of the monitored constituents and their respective MCLs. Groundwater monitoring and surface water sampling conducted at LHAAP-35B(37) and LHAAP-67 will follow the Health and Safety Plan (**Appendix E**), the Contractor Quality Control Plan (**Appendix F**), the Chemical Data Acquisition Plan (**Appendix G**), Field Activities (**Appendix C**) and Field Procedures (**Appendix D**) as contained in the appendices of the Remedial Design LHAAP-35B(37) and LHAAP-67.

Annual reports will be prepared for any year in which sampling occurs to document the monitoring program. The first year's annual report will include a review of the first four quarters of data, which include natural attenuation parameters and provide an evaluation for the evidence of MNA as a remedial method and a review of the first year's surface water sample data. The TCEQ provides guidance for MNA as a remedial action in *Monitored Natural Attenuation Demonstrations* (Texas Natural Resource Conservation Commission [TNRCC], RG-366/TRRP-33, October 2001). Although LHAAP is being addressed under the Risk Reduction Standards rather than Texas Risk Reduction Program (TRRP), this guidance is comparable to USEPA guidance and may be used as a guideline for the evaluation of the groundwater data. TRRP guidance specifies recommended lines of evidence to document the occurrence of natural attenuation at a site. For the first annual report, primary and secondary lines of evidence will be evaluated to document that attenuation is occurring at LHAAP-35B(37) and LHAAP-67. The primary line


LHAAP-35B(37)
AVENUE P
56TH ST.
58TH ST.
BOWIE AVE.
59RD ST.
CROCKETT AVE.
62ND ST.
S.CROCKETT AVE
51ST ST.
48TH ST.
AVE D
0 350 700 1,400
Feet
N
LHAAP-67
S.HOUSTON RD
45TH ST.
IGNATIUS AVE
S.CROCKETT AVE
0 250 500 1,000
Feet
LEGEND
Road
Stream
Site
Approximate LHAAP Boundary
LHAAP Water Supply Well
LHAAP-35B(37)
LHAAP-67
LEGEND
Approximate LHAAP Boundary
Road
Stream
Site
LHAAP Water Supply Well
FILE PATH
T:\GIS\Longhorn\MXD\ST35B67\ROD\SiteLocs.mxd
APPROVED BY
P. Srivastav 10/31/07
CHECKED BY
N. Olson 10/31/07
DRAWN BY
B. Lu 10/12/07
OFFICE
Houston, TX
Shaw
U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA
FIGURE 2-2
SITE LOCATION MAP
REMEDIAL DESIGN
LHAAP-35B(37) AND LHAAP-67, GROUP 4
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00216596

LHAAP-37, 37-2

NOTICE OF LAND USE CONTROLS AND NONRESIDENTIAL LAND USE AT LHAAP-35B (37) FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2015-000002401

*****DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT*****

NOTICE

8 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 03/16/2015 11:17 AM **Document Number:** 2015-000002401 **Receipt No:** 1502837 **Amount:** $ 50.00 **By:** Denise Kio, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

AECOM
112 E. PECAN ST,STE 400
FED-EX ENVELOPE
SAN ANTONIO, TX 78205

00216598

STATE OF TEXAS HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF LAND USE CONTROL AT LHAAP-35B (37)

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed remedial activities at the land described herein. The remediation site is in a former industrial area, located on the Former Longhorn Army Ammunition Plant (LHAAP) and is designated as LHAAP-35B (37) (Chemical Laboratory). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Remedial activities at LHAAP-35B (37) were performed in accordance with the FFA requirements.

The LHAAP-35B (37) was built during the construction of Plant 3 (1953-1955) and was originally used to support the production activities at LHAAP. A Record of Decision (ROD) for LHAAP-35B (37) was signed by the USEPA in 2010 establishing the final remedy which consists of land use control (LUC) in conjunction with monitored natural attenuation (MNA). The site was not remediated to levels suitable for unrestricted use. The LUC at LHAAP-35B (37) is required to prevent human exposure to contaminated groundwater. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-35B (37) parcel is a 12.2-acre tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A. Within the LHAAP-35B (37) parcel is designated a LUC boundary which is a 16.578-acre tract, more or less, as described in Exhibit A. The LUC boundary is also presented in the attached Figure 1.

Future use of the parcel is intended as a national wildlife refuge consistent with non-residential use. For purposes of this certification, residential use includes, but is not limited to, single family or multifamily residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12. The United States Department of the Army has undertaken careful environmental study of the LHAAP-35B (37) site and concluded that the LUC set forth below is required to ensure protection of human health and the environment.

(1) Groundwater Restriction. The groundwater use restriction boundary consists of the 16.578-acre tract, more or less. Groundwater underlying this land is contaminated with trichloroethene (TCE), tetrachloroethene (PCE), and 1,1-dichloroethene (1,1-DCE) and shall not be accessed or used for any purpose without the prior written approval of the U.S. Army, the USEPA, and the TCEQ. A LUC restricting the use of groundwater has been established for the protection of human health. The U.S. Army will notify the Texas Department of Licensing and Regulation of the groundwater restriction which includes prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval by the U.S. Army, the USEPA, and the TCEQ. A restriction against the residential use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE).

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

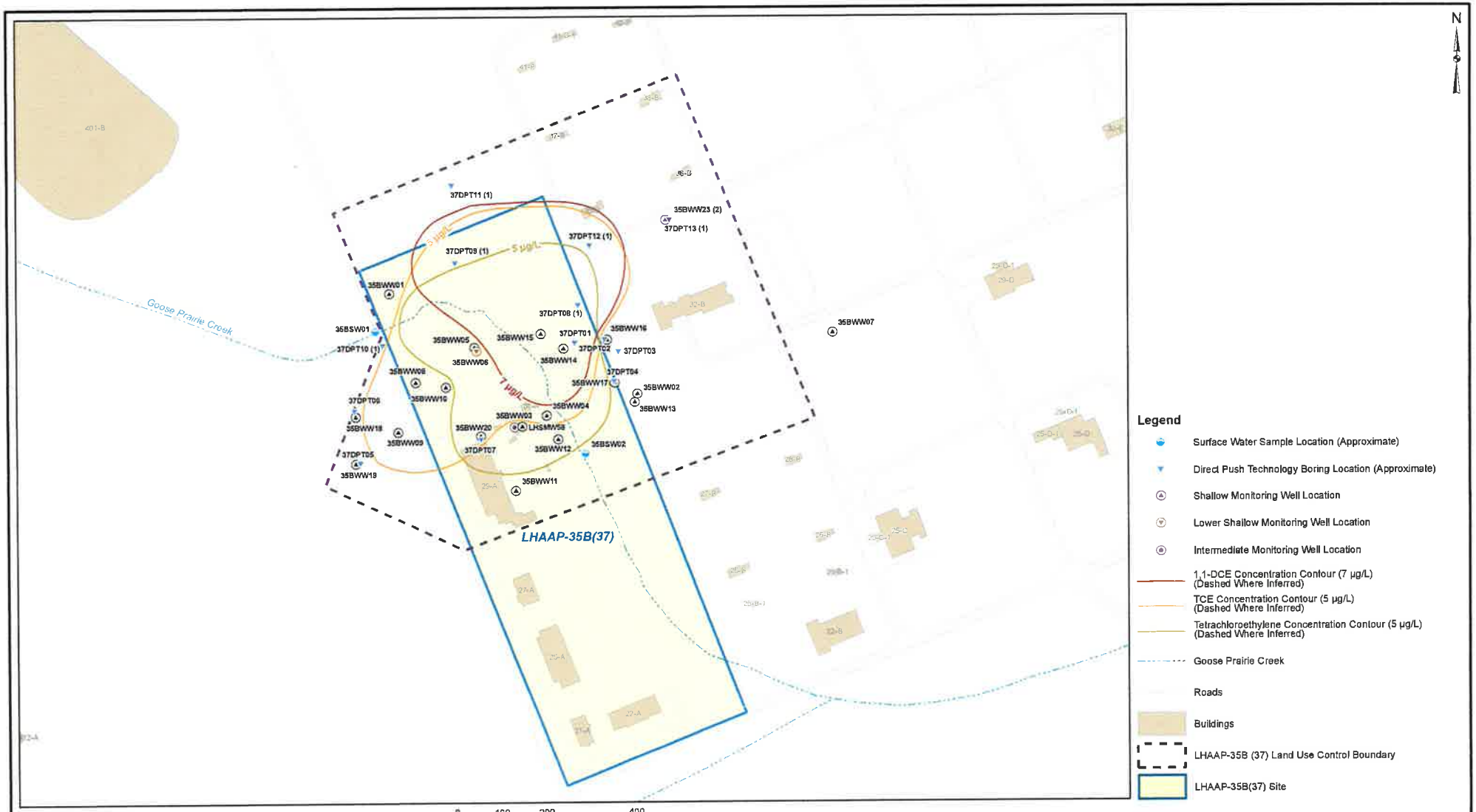
EXECUTED this the 19 th day of February, 2015.

BEFORE ME, on this the 19 th day of February 2015 personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 19th day of February, 2015.

Notary Public in and for the State of Texas,
County of Harrison

GENIE WARNER
Notary Public State of Texas
COMM. EXP. 8/1/2018



Notes:
1. Installed and sampled May 2014.
2. 35BWW23 installed May 2014 and sampled July 2014.

AECOM

Figure 1
Land Use Control Boundary
Remedial Action Completion Report
LHAAP-35B (37)
Longhorn Army Ammunition Plant
Karnack, Texas

60256135 December 2014

\\usgrn1vfp001\data\group\E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-37\RACR\August_2014\Figure 2-1 LHAAP37 Land Use Control Boundary.mxd

00216602

EXHIBIT A
SURVEY PLAT

00216604

FIELD NOTES DESCRIPTION OF
"LHAAP-35B(37)" LAND USE CONTROL AREA
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, "LHAAP-35B(37)" Land Use Control Area being 16.578 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), "LHAAP-35B(37)" Land Use Control Area being more particularly described as follows :

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.99986172702, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "C-21" (N=6956579.781 feet E=3308499.969 feet) and "X-11" (N=6960733.698 feet E=3304750.367 feet). Said traverse indicates a surface distance of 5596.714 feet between said monuments. The computed land area is based on State Plane distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" and "RPLS 3940" .

Commencing at monument "C-21" referenced above,

THENCE N 22deg47'20"W 1290.84' to a concrete nail set (near the centerline of the asphalt pavement of "Avenue P") for the Southmost corner of this tract and this POINT OF BEGINNING,

THENCE N 67deg25'22"W 354.97' along a S.B.L. of this tract to an I.R.O.P.C. set for this tract's Westmost corner,

THENCE N 20deg54'22"E 363.80' along a W.B.L. of this tract to a concrete nail set (near the centerline of the asphalt pavement of "Avenue P") for this tract's Westerly reentrant corner,

THENCE N 22deg33'04"W 285.83' along a W.B.L. of this tract to a concrete nail set (near the centerline of the asphalt pavement of "Avenue P") for this tract's N.W.C., said nail being S 52deg54'59"E 3687.90' from the aforementioned "X-11" monument,

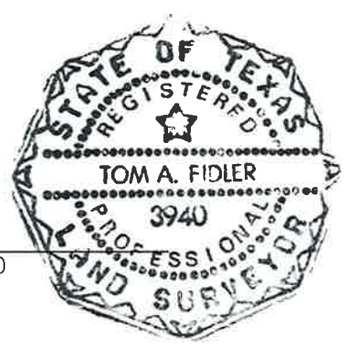
THENCE N 68deg33'30"E 817.56' along the N.B.L. of this tract to a concrete nail set (near the centerline of the asphalt pavement of "Bowie Avenue") for this tract's Northmost corner,

THENCE S 21deg48'41"E 817.92' along the E.B.L. of this tract to a concrete nail set (near the centerline of the asphalt pavement of "Bowie Avenue") for this tract's Eastmost corner,

THENCE S 69deg44'08"W 807.28' along a S.B.L. of this tract to this POINT OF BEGINNING, containing 16.578 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940



FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in January, 2015.

Witness my hand and seal this the 21st day of January, 2015.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), AND COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.99986172702 & IS BASED ON CALCULATED DISTANCE BETWEEN PUBLISHED STATE PLANE COORDINATES OF STATIONS C-21 & X-11 DIVIDED BY SURFACE TRAVERSE CALCULATED DISTANCE BETWEEN SAME TWO STATIONS. THE COMPUTED LAND AREA IS BASED ON STATE PLANE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6957769.855	3307999.979
B	6957906.138	3307672.216
C	6958245.983	3307802.032
D	6958509.961	3307692.413
E	6958808.823	3308453.390
F	6958049.461	3308757.289

LEGEND

- ○ CONCRETE NAIL (SET)
- △ 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- BOUNDARY LINE OF LAND USE CONTROL AREA

SCALE 1"=200'

200 0 200 400 600

GRAPHIC SCALE - FEET

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

LHAAP-35B(37) L.U.C.A.
(16.578 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	I.PTS I.LEG
01/21/2015	0605063I.DWG	DRAWN BY JTJ

00216605

LHAAP-37, 37-3

LAND USE CONTROL COMPLIANCE INSPECTION FORM

September 14, 2015

Sample Annual Land Use Control Compliance Certification Documentation

In accordance with the Remedial Design dated 8/1/11 for LHAAP-35B (37), a certification of site was conducted by _____ [indicate transferee] on _____.

A summary of land use control mechanisms is as follows:

- Groundwater restriction – A restriction against use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE). [Indicate whether groundwater restrictions are still required at LHAAP-35B (37)]

A summary of compliance with land use and restriction covenants is as follows:

- No use of groundwater, installation of new groundwater wells, or tampering with existing wells at LHAAP-35B (37).

I, the undersigned, do document that the certification was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: _____

Name/Title: _____

Signature: _____

Annual compliance certification forms shall be completed no later than March 1 of each year for the previous calendar year.

LHAAP-46, 46-1

LUCs FROM FINAL REMEDIAL DESIGN

September 14, 2015

Final
Remedial Design
LHAAP-46, Plant 2 Area, Group 4
Longhorn Army Ammunition Plant
Karnack, Texas

Prepared for U.S. Army Corps of Engineers – Tulsa District
1645 South 101st, East Avenue
Tulsa, Oklahoma 74128

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

Contract No. W912QR-04-D-0027, Task Order No. DS02
Shaw Project No. 117591
Rev 0
September 2011

Shaw® a world of Solutions™

00216609

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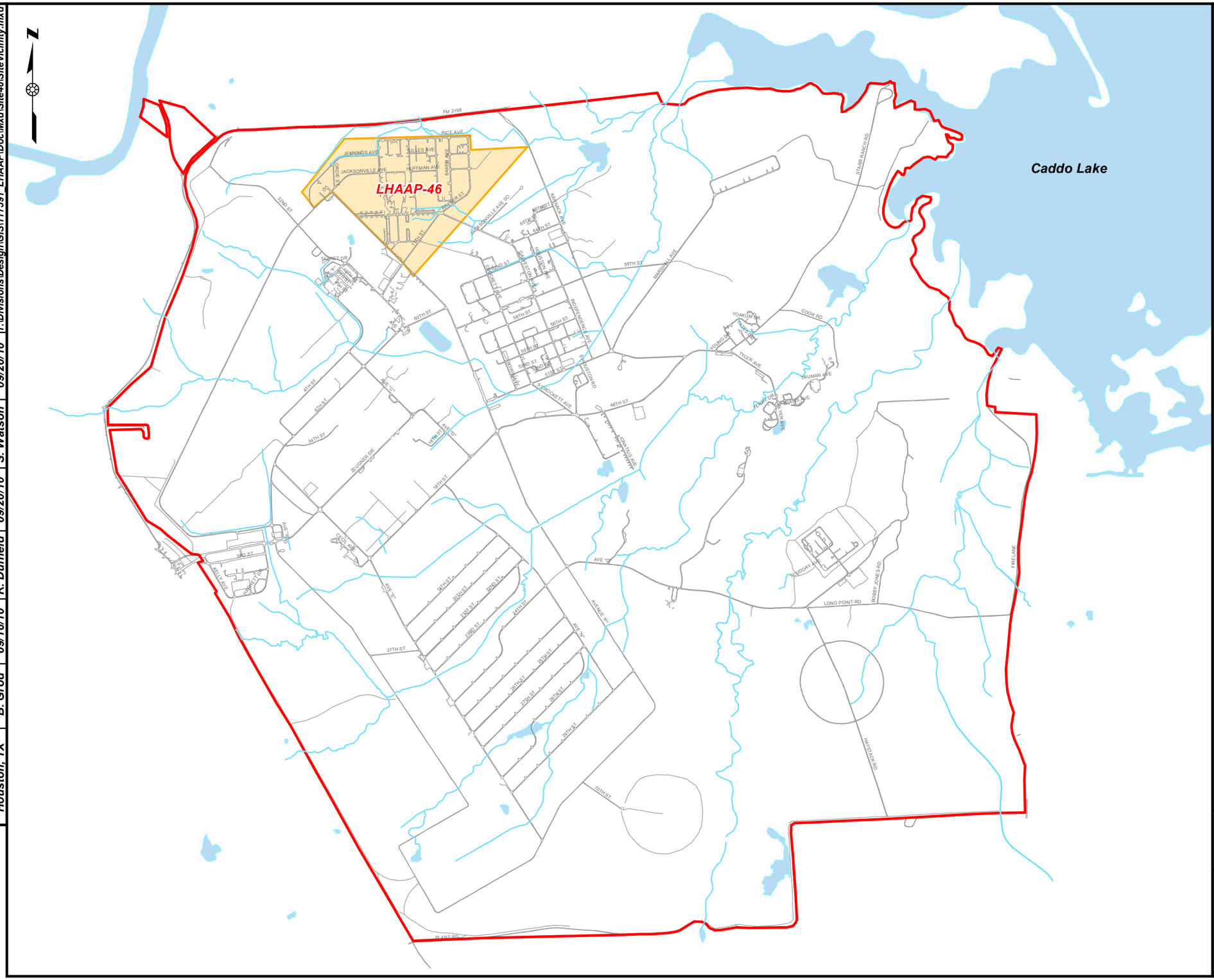
OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Grod 09/16/10	R. Duffield 09/20/10	S. Watson 09/20/10	T:\Divisions\Design\GIS\117591_LHAAP\Doc\Mxd\Site46\SiteVicinity.mxd



LEGEND

- Stream
- Road
- Site
- Lake
- LHAAP Boundary

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

FIGURE 1-2

SITE VICINITY MAP
LHAAP-46, REMEDIAL DESIGN

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00216611

2.0 LAND USE CONTROL

The objective of the LUC at LHAAP-46 is to prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health and ensure that there is no withdrawal or use of groundwater beneath the sites for anything other than environmental monitoring and testing until cleanup goals are met Notification of the groundwater use restriction will accompany all transfer documents and will be recorded at the Harrison County Courthouse in accordance with Texas Administrative Code (TAC) Title 30, §335.566. **Appendix A** provides sample LUC compliance certification documentation.

The LUC addresses the area of LHAAP-46 that includes two groundwater plumes at LHAAP-46 with levels of contamination that require implementation of a remedy (see **Section 1.3**). The U.S. Army is responsible for implementing, maintaining, monitoring, reporting on, and enforcing the LUC.

U.S. Army and regulators will consult to determine appropriate enforcement actions should there be a failure of an LUC objective at this site after it has transferred. U.S. Army shall obtain USEPA and Texas Commission on Environmental Quality (TCEQ) concurrence prior to termination or significant modification of the LUC, or implementation of a change in land use inconsistent with the LUC objectives and use assumptions of the remedy. Although not a remedy, the land use assumption for LHAAP-46 forms the basis for the remedy. The future use of the site as part of a national wildlife refuge is consistent with an industrial risk exposure scenario. Notification of the land use assumption of this site will be made in transfer documentation and will be recorded in the Harrison County Courthouse in accordance with TAC Title 30, §335.566. Compliance with the use assumption will be documented in the five-year review reports.

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Contract No. W912QR-04-D-0027, Task Order No. DS02 • Final • Rev 0 • September 2011

4.0 LAND USE CONTROL DESIGN AND IMPLEMENTATION PLAN

This section describes the LUC design and implementation activities for LHAAP-46. The activities will result in a surveyed and recorded groundwater use restriction boundary and an operation and maintenance plan for the LUC.

The objective of the LUC at LHAAP-46 is to prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health and ensure that there is no withdrawal or use of groundwater beneath the sites for anything other than environmental monitoring and testing until cleanup goals are met. Notification of the groundwater use restriction will accompany all transfer documents. The U.S. Army is responsible for long-term implementation, maintenance, inspection, reporting, and enforcement of the LUC.

The LUC will address the area of LHAAP-46 that includes two groundwater plumes with levels of contamination that require implementation of a remedy (see **Section 1.3**). The Land Use Control Operation and Maintenance (LUC O&M) Plan will identify the measures required for the monitoring and enforcement of the groundwater use restriction.

Upon review and concurrence of this RD, the LUC O&M Plan will be coordinated with regulators, finalized and distributed as part of the Comprehensive LUC Management Plan.

4.1 Land Use Control Implementation

The U.S. Army will undertake the following actions to implement the groundwater restriction LUC for LHAAP-46:

- Define the Area of the Groundwater Use Restriction. The groundwater use restriction boundary will be defined based on the review of the first round of groundwater sampling data in conjunction with historic data. The extent of plume will be bounded by a buffer and may extend to natural groundwater and surface water boundaries.
- Survey the LUC Boundary. The proposed boundary will be finalized after all wells are installed and sampled. Concurrence by USEPA and TCEQ will be obtained, and the LUC boundary will be surveyed by a State-licensed surveyor. A legal description of the surveyed area will be appended to the survey plat.
- Record the LUC in Harrison County. The LUC plat, legal description and groundwater use restriction language will be recorded in the Harrison County Courthouse in accordance with TAC Title 30, §335.56.

- Notify the Texas Department of Licensing and Regulation of the LUC. The Texas Department of Licensing and Regulation will be notified of the groundwater restriction which includes the prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval from the U.S. Army, the USEPA, and the TCEQ. The survey plat, legal boundary and description of the groundwater restriction, in conjunction with a locator map, will be provided in hard and electronic copy.

- Develop the LUC O&M Plan. A LUC O&M Plan for LHAAP-46 will be developed. It will include the elements presented in **Section 4.2** below, the county recordation of the LUC survey plat, legal description and restriction language and the annual inspection/certification form.

4.2 Land Use Control Operation and Maintenance

The U.S. Army or its representatives will be responsible for the operation and maintenance of the LHAAP-46 LUC. This includes certification, reporting and enforcement activities. The U.S. Army shall address LUC problems within its control that are likely to impact remedy integrity and shall address problems as soon as practicable. To facilitate long-term operation and maintenance of the groundwater use restriction LUC remedy, U.S. Army will develop a plan that will encompass the elements described in the following subsections.

4.2.1 Site Certification and Reporting

Beginning with finalization of this RD and approval of the annual inspection form, the U.S. Army will undertake annual inspections and certify continued compliance with the LUC objectives. The U.S. Army, or the transferee after transfer, will retain the annual LUC Inspection/Certification documents in the project files for incorporation into the Five Year Review Reports, and these documents will be made available to USEPA and TCEQ upon request. In addition, should any violations be found during the annual certification, the U.S. Army will provide to USEPA and TCEQ along with the document, a separate written explanation indicating the specific violations found and what efforts or measures have or will be taken to correct those violations. The need to continue annual certifications will be revisited at five year reviews.

4.2.2 Notice of Planned Property Conveyances

The U.S. Army shall provide notice to USEPA and TCEQ of plans to convey the LHAAP-46 acreage. The notice shall describe the mechanism by which the LUC will continue to be implemented, maintained, inspected, reported, and enforced. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the Environmental Condition of Property (ECP) or other environmental document for transfer. Although the U.S. Army may transfer responsibility for various implementation actions, the

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U.S. Army shall retain its responsibility for remedy integrity. This means that the U.S. Army is responsible for addressing substantive violations of the LUC performance objective that would undermine the U.S. Army's CERCLA remedy. The U.S. Army also will be responsible for incorporating RD information and outlining the transferee's LUC obligations into property transfer documentation.

4.2.3 Opportunity to Review Text of Intended Land Use Controls

U.S. Army will provide a copy of the groundwater use restriction notification to TCEQ for review and approval prior to its recordation in Harrison County. USEPA will also receive a copy for review. In addition, the U.S. Army will produce an ECP or other environmental document for transfer of LHAAP-46, but before executing transfer, the U.S. Army will provide USEPA and TCEQ with a copy of the ECP or other environmental document for transfer so that they may have reasonable opportunity, before transfer, to review all LUC-related provisions.

4.2.4 Notification Should Action(s) which Interfere with Land Use Control Effectiveness be Discovered Subsequent to Conveyance

Should the U.S. Army discover after conveyance of the site any activity on the property inconsistent with the LUC performance objective, the U.S. Army shall notify USEPA and TCEQ within 72 hours of such discovery. Consistent with **Section 4.2.5** below, the U.S. Army will then work with USEPA, TCEQ and the transferee to correct the problem(s) discovered. This reporting requirement does not preclude the U.S. Army from taking immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health or the environment.

4.2.5 Land Use Control Enforcement

Should the LUC remedy reflected in this LUC RD fail, the U.S. Army will coordinate with USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. These actions may range from informal resolutions with the U.S. Fish and Wildlife Service or its lessee, to the institution of judicial action against nonfederal third parties. Alternatively, should the circumstances warrant such, the U.S. Army could choose to exercise its response authorities under CERCLA. Should the U.S. Army become aware that any future owner or user of the property has violated any LUC requirement over which a local agency may have independent jurisdiction, the U.S. Army may notify those agencies of such violation(s) and work cooperatively with them to re-achieve owner/user compliance with the LUC.

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4.2.6 Modification or Termination of Land Use Controls

The U.S. Army shall not, without USEPA and TCEQ concurrence, make a significant modification to, or terminate a LUC, or make a land use change inconsistent with the LUC objective. Likewise, the U.S. Army shall seek prior USEPA and TCEQ concurrence before commencing actions that may impact remedy integrity. In the case of an emergency action, the U.S. Army shall obtain prior USEPA and TCEQ concurrence as appropriate to the exigencies of the situation.

The LUCs shall remain in effect until such time as the U.S. Army and USEPA agree that the concentrations of COCs have met cleanup levels. When this occurs, the LUC will be terminated as needed. The decision to terminate the LUC will be documented consistent with the NCP process for post-ROD changes, potentially including an explanation of significant differences or a remedial action completion report. If the property has been transferred and a determination by the U.S. Army and USEPA has been made to terminate the LUC, the U.S. Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also timely advise other local stakeholders of the action.

4.2.7 Comprehensive Land Use Control Management Plan

Upon finalization of the LUC O&M Plan a copy will be inserted into the Comprehensive LUC Management Plan for Longhorn. The Comprehensive LUC Management Plan figure and table will be updated to reflect the inclusion of LHAAP-46.

The Comprehensive LUC Management Plan consists of LHAAP RD documents and a survey plat showing the locations where LUCs being implemented at LHAAP are applied. The purpose of this Comprehensive LUC Management Plan is to ensure all site-specific LUCs are compiled into one comprehensive location for both pre-transfer use by the installation and for post-transfer use by the transferee. This document will be provided to USEPA and TCEQ, and will also be accessible to the local government and the public. The Comprehensive LUC Management Plan is located in the Marshall Public Library to accompany LHAAP's Administrative Record.

The land use assumption of industrial reuse as part of a national wildlife refuge forms the basis for the remedy at LHAAP-46 and this land use assumption will be in included in the Comprehensive LUC Management Plan with supporting documentation.

Contract No. W912QR-04-D-0027, Task Order No. DS02 • Final • Rev 0 • September 2011

LHAAP-46, 46-2

NOTICE OF LAND USE CONTROLS AND NONRESIDENTIAL LAND USE AT LHAAP-46 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2014-000013307

*****DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT*****

NOTICE

8 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 12/09/2014 10:42 AM **Document Number:** 2014-000013307 **Receipt No:** 1415412 **Amount:** $ 50.00 **By:** Pam Rockwell, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

AECOM
ATTN: AMANDA LAGARDE (FEDEX ENV)
112 E PECAN ST., SUITE 400
SAN ANTONIO, TX 78205

00216618

STATE OF TEXAS HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF LAND USE CONTROL AT LHAAP-46

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed remedial activities at the land described herein. The remediation site is in a former industrial area, located on the Former Longhorn Army Ammunition Plant (LHAAP) and is designated as LHAAP-46 (Plant 2 Area). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Remedial activities at LHAAP-46 were performed in accordance with the FFA requirements.

The LHAAP-46 site was used for production of pyrotechnic and illumination devices until 1997. A Record of Decision (ROD) for LHAAP-46 was signed by U.S. Army and USEPA with TCEQ concurrence in 2010 establishing the final remedy which consists of land use control (LUC) in conjunction with monitored natural attenuation (MNA). The LUC will ensure protection of human health by restricting the use of groundwater to environmental monitoring and testing only. MNA will be implemented to establish confidence in attenuation trends and verify that the constituents of concern (COCs) are stable or shrinking and will not migrate to nearby surface water at levels that may present an unacceptable risk to human health or the environment. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at

the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-46 parcel is a 190 acre tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A. Within the LHAAP-46 parcel are designated LUC boundaries including a 63.772-acre tract, more or less, as described in Exhibit A. The LUC boundaries are also presented in the attached Figure 1.

Future use of the parcel is intended as a national wildlife refuge consistent with non-residential use. The United States Department of the Army has undertaken careful environmental study of the LHAAP-46 site and concluded that the LUC set forth below is required to ensure protection of human health and the environment.

(1) Groundwater Restriction. The groundwater use restriction boundary consists of the 63.772-acre tract, more or less. Groundwater underlying this land is contaminated with trichloroethene (TCE) and other volatile organic compounds (VOCs) and shall not be accessed or used for any purpose without the prior written approval of the U.S. Army, the USEPA, and the TCEQ. A LUC restricting the use of groundwater has been established for the protection of human health. The U.S. Army will notify the Texas Department of Licensing and Regulation of the groundwater restriction which includes prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval by the U.S. Army, the USEPA, and the TCEQ. A restriction against the residential use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE).

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 20 th day of November, 2014.

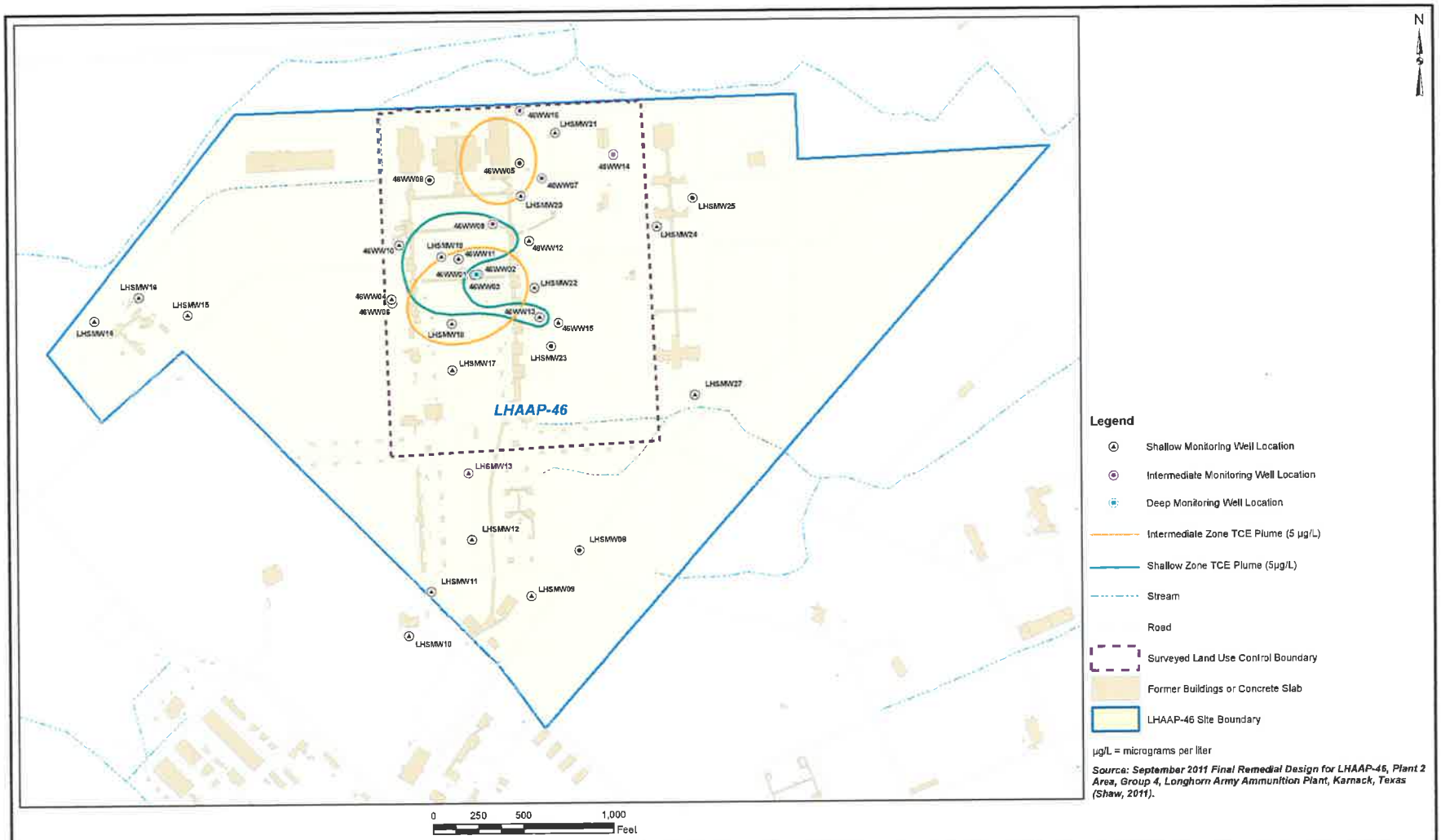
BEFORE ME, on this the 20 th day of November, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 20 day of November, 2014.

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 03-17-2015

Notary Public in and for the State of Texas,
County of Harrison

EXHIBIT A



AECOM

Figure 1
Land Use Control Boundary

LHAAP-46 Site
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

October 2014

Path: E:\Group\1_GIS\GIS Projects\LonghornMXDs\LHAAP-46\Remedial Action Completion Report RACR August 2013\2013-October-17\Figure 2-1 LHAAP-46 Proposed LUC Boundary.mxd

00216623

FIELD NOTES DESCRIPTION OF
"LHAAP-46" LAND USE CONTROL AREA
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, "LHAAP-46" Land Use Control Area being 63.772 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), "LHAAP-46" Land Use Control Area being more particularly described as follows :

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861858, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "HORSE" (N=6960008.269 feet E=3309591.340 feet). Said traverse indicates a surface distance of 4895.701 feet between said monuments. The computed land area is based on grid distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940" .

Commencing at monument "X-11" referenced above,

THENCE N 36deg34'22"E 1386.89' to a concrete nail set (in white paint on asphalt) for the S.W.C. of this tract and this POINT OF BEGINNING,

THENCE N 01deg52'33"W 1886.35' along the W.B.L. of this tract to an I.R.O.P.C. set (in a 6' tall chain link fence running Easterly and Westerly) for this tract's N.W.C. ,

THENCE along said fence, which defines the Northerly Boundary Lines of this tract, the following eleven courses :

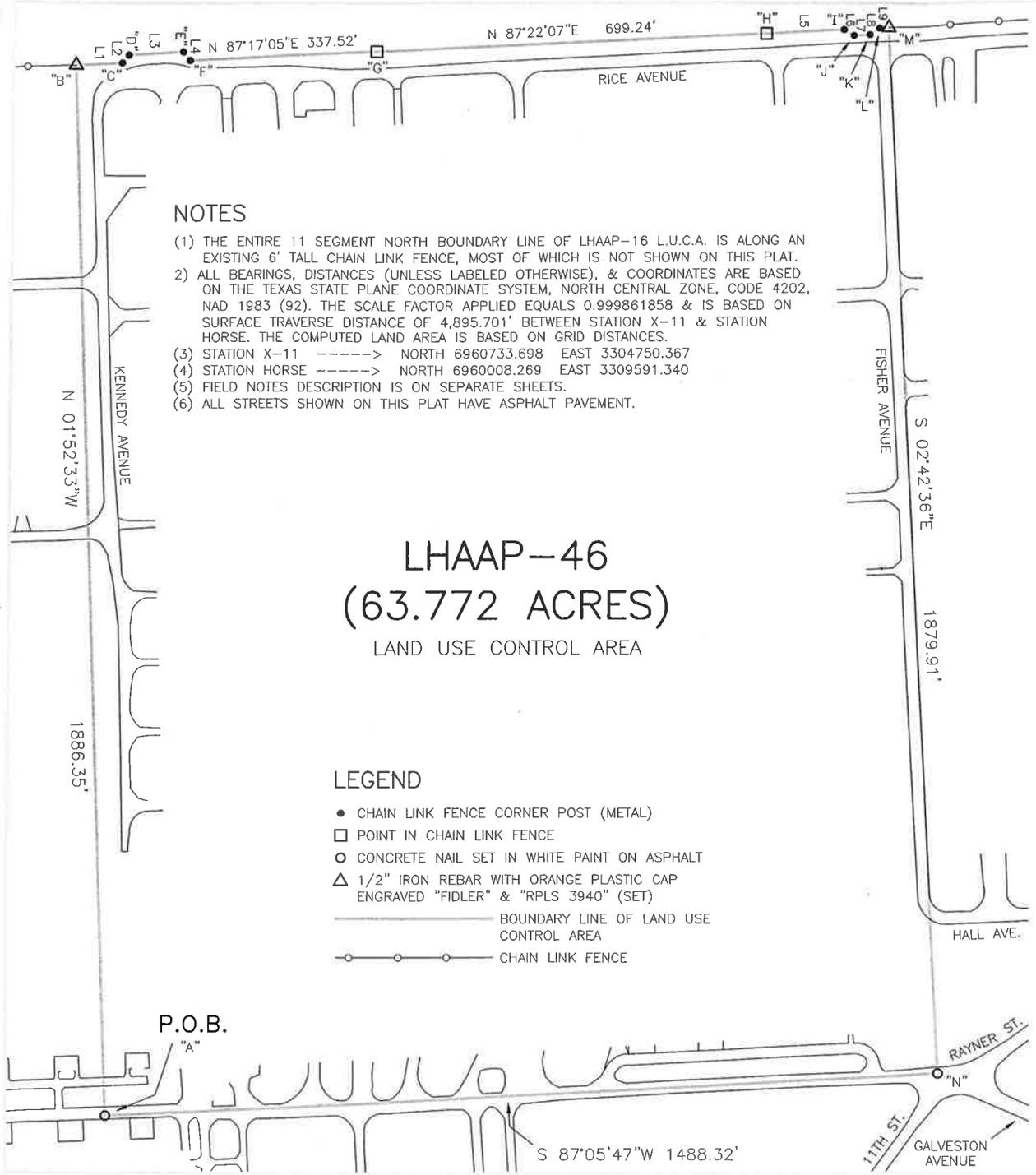
(01) N 86deg41'48"E 82.30' to a fence corner post,
(02) N 39deg20'47"E 18.62' to a bent fence corner post,
(03) N 86deg29'33"E 97.31' to a fence corner post,
(04) S 38deg05'14"E 19.89' to a fence corner post,
(05) N 87deg17'05"E 337.52' to a point in said fence,
(06) N 87deg22'07"E 699.24' to a point in said fence,
(07) N 87deg22'02"E 139.25' to a fence corner post,
(08) S 59deg03'44"E 20.98' to a fence corner post,
(09) N 86deg53'55"E 29.32' to a fence corner post,
(10) N 55deg19'37"E 21.12' to a fence corner post,
(11) N 86deg05'43"E 16.55' to an I.R.O.P.C. set in said fence for this tract's N.E.C. ,

THENCE S 02deg42'36"E 1879.91' along the E.B.L. of this tract to a concrete nail set (in white paint on asphalt) for this tract's S.E.C., from which monument "HORSE" referenced above bears S 52deg51'46"E 3171.37',

THENCE S 87deg05'47"W 1488.32' along the S.B.L. of this tract to this POINT OF BEGINNING. This tract contains 63.772 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940



NOTES

(1) THE ENTIRE 11 SEGMENT NORTH BOUNDARY LINE OF LHAAP-16 L.U.C.A. IS ALONG AN EXISTING 6' TALL CHAIN LINK FENCE, MOST OF WHICH IS NOT SHOWN ON THIS PLAT.
2) ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861858 & IS BASED ON SURFACE TRAVERSE DISTANCE OF 4,895.701' BETWEEN STATION X-11 & STATION HORSE. THE COMPUTED LAND AREA IS BASED ON GRID DISTANCES.
(3) STATION X-11 -----> NORTH 6960733.698 EAST 3304750.367
(4) STATION HORSE -----> NORTH 6960008.269 EAST 3309591.340
(5) FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS.
(6) ALL STREETS SHOWN ON THIS PLAT HAVE ASPHALT PAVEMENT.

LHAAP-46
(63.772 ACRES)
LAND USE CONTROL AREA

LEGEND

- ● CHAIN LINK FENCE CORNER POST (METAL)
- □ POINT IN CHAIN LINK FENCE
- ○ CONCRETE NAIL SET IN WHITE PAINT ON ASPHALT
- △ 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- BOUNDARY LINE OF LAND USE CONTROL AREA
- CHAIN LINK FENCE

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in October, 2014.

Witness my hand and seal this the 20th day of October, 2014.

STATE OF TEXAS REGISTERED TOM A. FIDLER 3940 PROFESSIONAL LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

LINE TABLE

LINE	BEARING	DISTANCE
L1	N 86°41'48"E	82.30'
L2	N 39°20'47"E	18.62'
L3	N 86°29'33"E	97.31'
L4	S 38°05'14"E	19.89'
L5	N 87°22'02"E	139.25'
L6	S 59°03'44"E	20.98'
L7	N 86°53'55"E	29.32'
L8	N 55°19'37"E	21.12'
L9	N 86°05'43"E	16.55'

N

SCALE 1"=200'

200 0 200 400 600
GRAPHIC SCALE - FEET

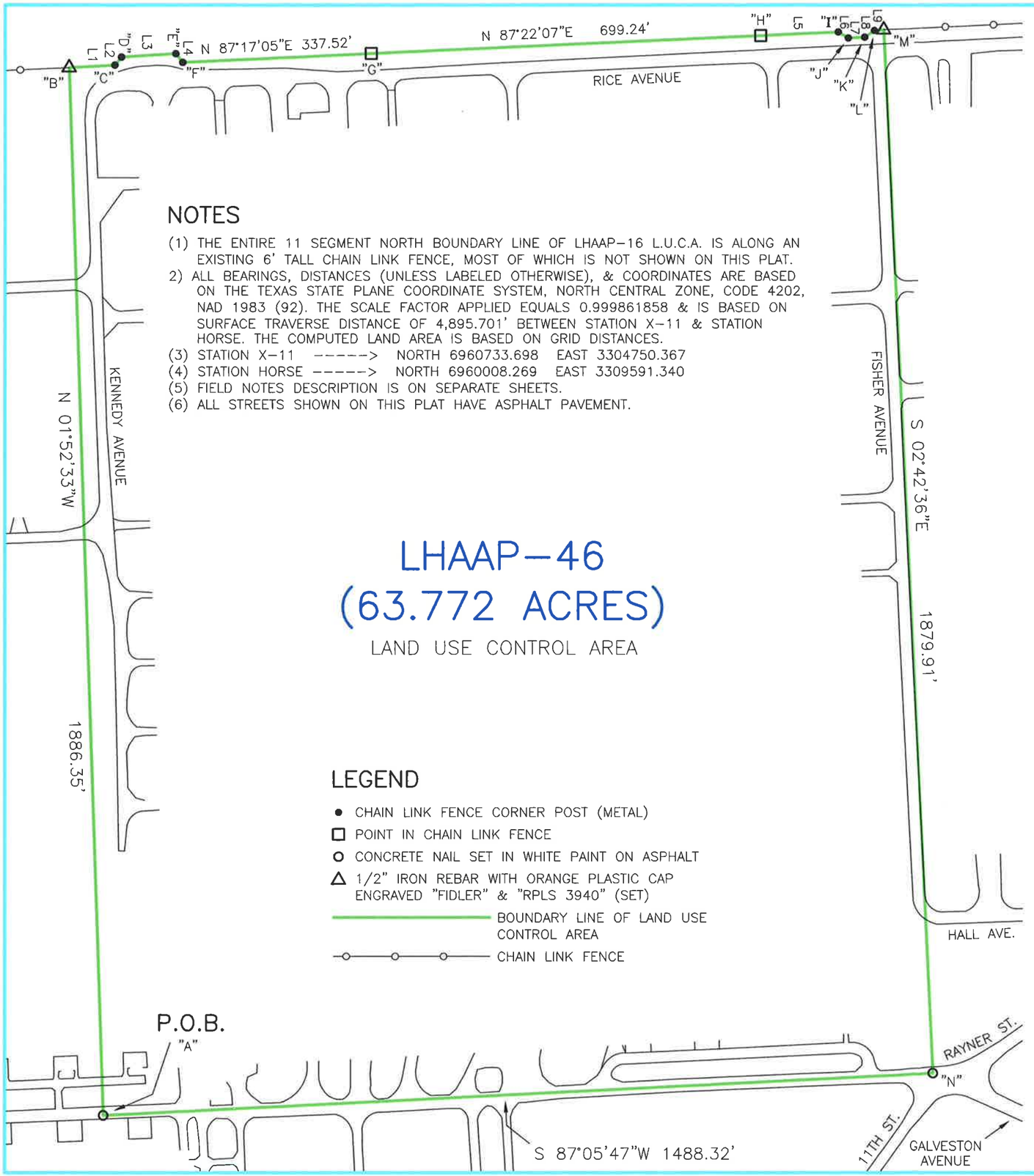
COORDINATE TABLE

POINT	NORTH	EAST
A	6961847.512	3305576.740
B	6963732.849	3305514.995
C	6963737.591	3305597.161
D	6963751.988	3305608.964
E	6963757.942	3305706.095
F	6963742.285	3305718.366
G	6963758.275	3306055.508
H	6963790.379	3306754.008
I	6963796.775	3306893.111
J	6963785.987	3306911.111
K	6963787.573	3306940.387
L	6963799.588	3306957.756
M	6963800.715	3306974.265
N	6961922.907	3307063.146

LHAAP-46 L.U.C.A.
(63.772 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	U.PTS U.LEG
10/20/2014	1103025U.DWG	DRAWN BY JTJ

00216625



LHAAP-46
(63.772 ACRES)
LAND USE CONTROL AREA

NOTES

(1) THE ENTIRE 11 SEGMENT NORTH BOUNDARY LINE OF LHAAP-16 L.U.C.A. IS ALONG AN EXISTING 6' TALL CHAIN LINK FENCE, MOST OF WHICH IS NOT SHOWN ON THIS PLAT.
2) ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861858 & IS BASED ON SURFACE TRAVERSE DISTANCE OF 4,895.701' BETWEEN STATION X-11 & STATION HORSE. THE COMPUTED LAND AREA IS BASED ON GRID DISTANCES.
(3) STATION X-11 -----> NORTH 6960733.698 EAST 3304750.367
(4) STATION HORSE -----> NORTH 6960008.269 EAST 3309591.340
(5) FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS.
(6) ALL STREETS SHOWN ON THIS PLAT HAVE ASPHALT PAVEMENT.

LEGEND

- ● CHAIN LINK FENCE CORNER POST (METAL)
- □ POINT IN CHAIN LINK FENCE
- ○ CONCRETE NAIL SET IN WHITE PAINT ON ASPHALT
- △ 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- BOUNDARY LINE OF LAND USE CONTROL AREA
- CHAIN LINK FENCE

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in October, 2014.

Witness my hand and seal this the 20th day of October, 2014.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

LINE TABLE

LINE	BEARING	DISTANCE
L1	N 86°41'48"E	82.30'
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L3	N 86°29'33"E	97.31'
L4	S 38°05'14"E	19.89'
L5	N 87°22'02"E	139.25'
L6	S 59°03'44"E	20.98'
L7	N 86°53'55"E	29.32'
L8	N 55°19'37"E	21.12'
L9	N 86°05'43"E	16.55'

SCALE 1"=200'

200 0 200 400 600
GRAPHIC SCALE - FEET

COORDINATE TABLE

POINT	NORTH	EAST
A	6961847.512	3305576.740
B	6963732.849	3305514.995
C	6963737.591	3305597.161
D	6963751.988	3305608.964
E	6963757.942	3305706.095
F	6963742.285	3305718.366
G	6963758.275	3306055.508
H	6963790.379	3306754.008
I	6963796.775	3306893.111
J	6963785.987	3306911.111
K	6963787.573	3306940.387
L	6963799.588	3306957.756
M	6963800.715	3306974.265
N	6961922.907	3307063.146

LHAAP-46 L.U.C.A.
(63.772 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	U.PTS U.LEG
10/20/2014	1103025U.DWG	DRAWN BY JTJ

00216626

LHAAP-46, 46-3

LAND USE CONTROL COMPLIANCE INSPECTION FORM

September 14, 2015

Sample Annual Land Use Control Compliance Certification Documentation

In accordance with the Remedial Design dated 9/30/11 for LHAAP-46 a certification of site was conducted by _____ [indicate transferee] on _____.

A summary of land use control mechanisms is as follows:

- Groundwater restriction – A restriction against use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE). [Indicate whether groundwater restrictions are still required at LHAAP-46]

A summary of compliance with land use and restriction covenants is as follows:

- No use of groundwater, installation of new groundwater wells, or tampering with existing wells at LHAAP-46.

I, the undersigned, do document that the certification was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: _____

Name/Title: _____

Signature: _____

Annual compliance certification forms shall be completed no later than March 1 of each year for the previous calendar year.

LHAAP-49

NOTICE OF NONRESIDENTIAL LAND USE AT LHAAP-49 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216629

2012-000000704

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

7 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000704 **Receipt No:** 1200645 **Amount:** $ 36.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216630

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas, in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. LHAAP-49 is a former Acid Storage location at the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA) became effective on December 30, 1991. LHAAP-49 is considered an NPL listed site, and remedial activities at LHAAP-49 were performed in accordance with the FFA requirements.

LHAAP-49 is located in the west-central portion of LHAAP. LHAAP-49 is the former Acid Storage Area, which was used from 1942 to 1945 for storage and formulation of acids and acid mixtures in support of trinitrotoluene production during World War II. Nitric acid and sulfuric acid were manufactured and handled in large quantities in this area. A no further action Record of Decision for LHAAP-49 was signed by USEPA in 2010 establishing no remedy was required. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or

in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

LHAAP-49 is a 30.540 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of LHAAP-49 and USEPA and TCEQ concluded that no further investigation or action is required.

Limited monitoring of LHAAP-49 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-49 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 21 th day of July, 2011.

BEFORE ME, on this the 21 th day of July, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 21 day of July, 2011.

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 03-17-2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
LHAAP-49
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 30.540 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998768897, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "HMX-3" (N=6956487.252 feet E=3303483.509 feet) and "HMX-5" (N=6958206.213 feet E=3305201.721 feet). Said traverse indicates a surface distance of 2430.748 feet between said monuments. The computed land area is based on grid (State Plane) distances.

BEGINNING at a 60d nail set for the Southmost corner of this tract, said nail being in asphalt pavement at the intersection of 6th Street and 4th Street, from which nail the monument "HMX-3" referenced above bears N 09deg00'02"E 74.61' ,

THENCE N 46deg42'14"W crossing some of said asphalt pavement, then generally along 4th Street's Northeast edge of asphalt, then crossing a curved section of 4th Street's asphalt, and continuing beyond 4th Street's asphalt, for a total distance of 509.81', to a 60d nail set for the Southmost West corner of this tract,

THENCE N 45deg04'42"E eventually crossing 4th Street's asphalt, then generally along 4th Street's Southeast edge of asphalt, for a total distance of 1323.80', to a 60d nail set (in the Southeast edge of said asphalt pavement) for the Westerly reentrant corner of this tract,

THENCE N 45deg22'03"W crossing 4th Street's asphalt pavement and continuing for a total distance of 308.18' to a point (in the Southeasterly edge of flowing water [May 3, 2011] of Goose Prairie Creek) for the Northmost West corner of this tract, from which point a 1/2" iron rod with Tom Fidler orange plastic cap set for reference bears S 45deg22'03"E 11.34', said rod being at the top of the Southeasterly bank of Goose Prairie Creek,

THENCE N 47deg40'44"E 331.25' along a N.W. B.L. of this tract to a point (in the Southeasterly edge of flowing water [May 3, 2011] of Goose Prairie Creek) for the Westmost North corner of this tract, from which point a 1/2" iron rod with Tom Fidler orange plastic cap set for reference bears S 44deg45'45"E 13.46', said rod being at the top of the Southeasterly bank of Goose Prairie Creek,

THENCE S 44deg45'45"E along a N.E. B.L. of this tract, and eventually crossing 4th Street's asphalt pavement, for a total distance of 292.85' to a 60d nail set in the Southeast edge of said asphalt pavement for the Northerly reentrant corner of this tract,

THENCE N 44deg47'09"E generally along 4th Street's Southeast edge of asphalt pavement, then entering said pavement at the

intersection of 4th Street and Avenue "C", for a total distance of 781.21' to a 60d nail set in said asphalt pavement for the Eastmost North corner of this tract,

THENCE S 45deg47'29"E crossing some of said pavement, then generally along the Southwest edge of the asphalt pavement of Avenue "C", then entering said pavement at the intersection of Avenue "C" and 6th Street, for a total distance of 507.27' to a 60d nail set for the Eastmost corner of this tract, from which the monument "HMX-5" referenced above bears N 13deg12'58"E 77.94' ,

THENCE S 44deg55'17"W crossing some of said pavement, then generally along the Northwest edge of the asphalt pavement of 6th Street, then entering said pavement at the aforementioned intersection of 6th Street and 4th Street, for a total distance of 2424.55' to this POINT OF BEGINNING.

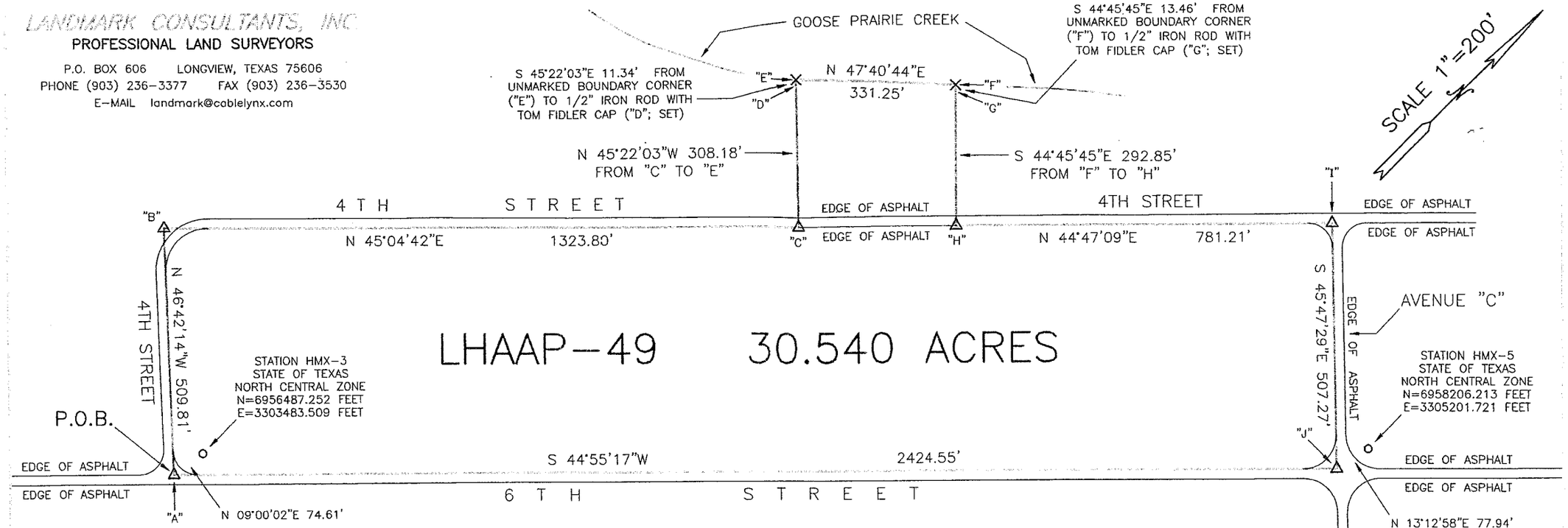
This tract contains 30.540 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com



LEGEND

o INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
△ INDICATES 60d NAIL (SET)
+ INDICATES UNMARKED POINT AT SOUTHEASTERLY EDGE OF CREEK WATER MAY 3, 2011 (GOOSE PRAIRIE CREEK)

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in April 2011.

Witness my hand and seal May 5, 2011.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998768897 & IS BASED ON GRID DISTANCE (BETWEEN STATIONS HMX-3 AND HMX-5) DIVIDED BY SURFACE TRAVERSE DISTANCE (BETWEEN SAME MONUMENTS). THE COMPUTED LAND AREA IS BASED ON GRID DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6956413.564	3303471.837
B	6956763.174	3303100.790
C	6957697.967	3304038.137
D(ROD)	6957906.516	3303826.894
E	6957914.483	3303818.824
F	6958137.506	3304063.741
G(ROD)	6958127.951	3304073.216
H	6957929.573	3304269.956
I	6958484.036	3304820.288
J	6958130.332	3305183.901

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

LHAAP-49
(30.540 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #1104040	0407088.CRD	M.PTS M.LEG
MAY 5, 2011	1103025M.DWG	DRAWN BY JTJ

00216636

LHAAP-50, 50-1

LUCs FROM FINAL REMEDIAL DESIGN

September 14, 2015

Final

Remedial Design
LHAAP-50
Former Sump Water Tank, Group 4
Longhorn Army Ammunition Plant
Karnack, Texas

Prepared for U.S. Army Corps of Engineers – Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma 74128

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

Contract No. W912QR-04-D-0027, Task Order No. DS02
Project No. 117591
Rev 0
September 2011

Shaw® a world of Solutions™

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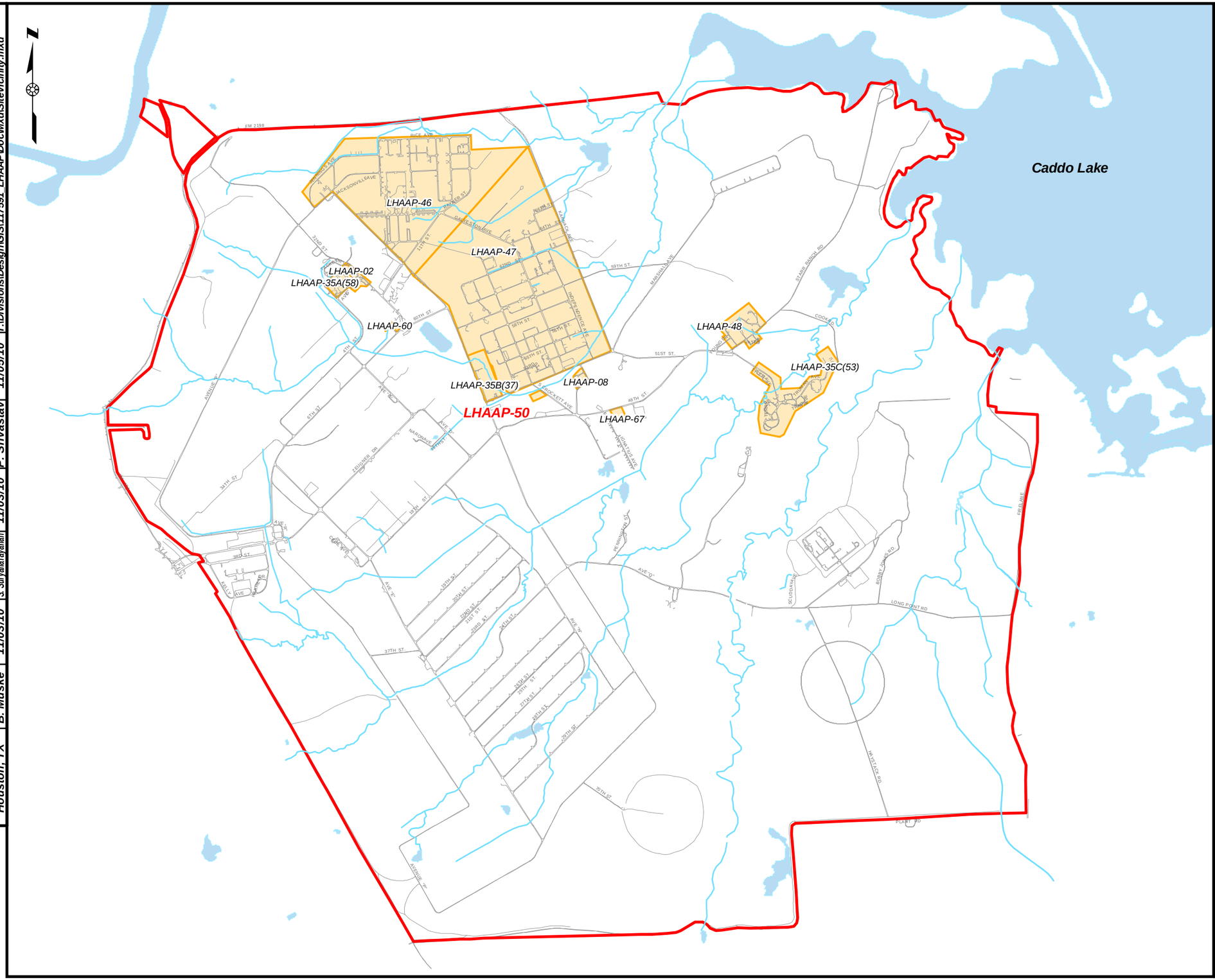
OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Muske 11/03/10	S. Survanarayanan 11/03/10	P. Srivastav 11/05/10	T:\Divisions\Design\GIS\117591_LHAAP\Doc\Mxd\SiteVicinity.mxd



Shaw

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

FIGURE 1-2

SITE VICINITY MAP
LHAAP-50 REMEDIAL DESIGN

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00216640

3.0 LAND USE CONTROL

The objective of LUC at LHAAP-50 is to prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health and ensure that there is no withdrawal or use of groundwater beneath the sites for anything other than environmental monitoring and testing until cleanup levels are met. Notification of the groundwater use restriction will accompany all transfer documents and will be recorded at the Harrison County Courthouse in accordance with Texas Administrative Code (TAC) Title 30, §335.566. **Appendix B** provides sample LUC compliance certification documentation.

The LUC addresses the area of LHAAP-50 that has groundwater plumes (in both the shallow and intermediate groundwater zones) with levels of contamination that require implementation of a remedy (see **Section 2.3**). The groundwater restriction LUC would be maintained until the concentration of contaminants and by-product contaminants have been reduced to below their respective cleanup levels.

The U.S. Army and regulators will consult to determine appropriate enforcement actions should there be a failure of an LUC objective at this site after it has transferred. The U.S. Army shall obtain USEPA and TCEQ concurrence prior to termination or significant modification of the LUC, or implementation of a change in land use inconsistent with the LUC objectives and use assumptions of the remedy. Although not a remedy, the land use assumption for LHAAP-50 forms the basis for the remedy. The future use of the site as part of a national wildlife refuge is consistent with an industrial risk exposure scenario. Notification of the land use assumption of this site will be made in transfer documentation and will be recorded in the Harrison County Courthouse in accordance with TAC Title 30, §335.566. Compliance with the use assumption will be documented in the five-year review reports.

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6.0 LAND USE CONTROL DESIGN AND IMPLEMENTATION PLAN

This section describes the LUC design and implementation activities for LHAAP-50. The activities will result in a surveyed and recorded groundwater use restriction boundary and an operation and maintenance plan for the LUC.

The objective of the LUC at LHAAP-50 is to prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health and ensure that there is no withdrawal or use of groundwater beneath the site for anything other than environmental monitoring and testing until cleanup levels are met. Notification of the groundwater use restriction will accompany all transfer documents. The U.S. Army is responsible for long-term implementation, maintenance, inspection, reporting, and enforcement of the LUC.

The LUC will address the area of LHAAP-50 that includes two groundwater plumes with levels of contamination that require implementation of a remedy (see **Section 1.3**). The Land Use Control Operation and Maintenance Plan (LUC O&M) will identify the measures required for monitoring and enforcement of the groundwater use restriction. Upon review and concurrence of this RD, the LUC O&M Plan will be coordinated with regulators, finalized, and distributed as part of the Comprehensive LUC Management Plan for LHAAP.

6.1 Land Use Control Implementation

The U.S. Army will undertake the following actions to implement the groundwater restriction LUC for LHAAP-50:

- ***Define the Area of the Groundwater Use Restriction.*** The groundwater use restriction boundary will be defined based on the review of the first round of groundwater sampling data in conjunction with historic data. The extent of plume will be bounded by a buffer and may extend to natural groundwater and surface water boundaries.
- ***Survey the LUC Boundary.*** The proposed boundary will be finalized after all wells are installed and sampled. Concurrence by USEPA and TCEQ will be obtained, and the LUC boundary will be surveyed by a State-licensed surveyor. A legal description of the surveyed area will be appended to the survey plat.
- ***Record the LUC in Harrison County.*** The LUC plat, legal description and groundwater use restriction language will be recorded in the Harrison County Courthouse in accordance with TAC Title 30, §335.566.

- ***Notify the Texas Department of Licensing and Regulation of the LUC.*** The Texas Department of Licensing and Regulation will be notified of the groundwater restriction which includes the prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval from the U.S. Army, the USEPA, and the TCEQ. The survey plat, legal boundary and description of the groundwater restriction, in conjunction with a locator map, will be provided in hard and electronic copy.
- ***Develop the LUC O&M Plan.*** An LUC O&M Plan for LHAAP-50 will be developed. It will include the elements presented in **Section 6.2**, the county recordation of the LUC survey plat, legal description and restriction language, and the inspection/certification form.

6.2 Land Use Control Operation and Maintenance

The U.S. Army or its representatives will be responsible for the operation and maintenance of the LHAAP-50 LUC. This includes certification, reporting, and enforcement activities. The U.S. Army shall address LUC problems within its control that are likely to impact remedy integrity and shall address problems as soon as practicable. To facilitate long-term operation and maintenance of the groundwater use restriction LUC remedy, the U.S. Army will develop a plan that will encompass the elements described in the following subsections.

6.2.1 Site Certification and Reporting

Beginning with finalization of this RD and approval of the inspection form, the U.S. Army will undertake inspections and certify continued compliance with the LUC objectives. The U.S. Army or the transferee after transfer will retain the LUC Inspection Certification documents in the project files for incorporation into the five-year review reports, and these documents will be made available to USEPA and TCEQ upon request. In addition, should any violations be found during the certification, the U.S. Army will provide to USEPA and TCEQ, along with the document, a separate written explanation indicating the specific violations found and what efforts or measures have or will be taken to correct those violations. The need to continue certifications will be revisited at five year reviews.

6.2.2 Notice of Planned Property Conveyances

The U.S. Army shall provide notice to USEPA and TCEQ of plans to convey the LHAAP-50 acreage. The notice shall describe the mechanism by which the LUC will continue to be implemented, maintained, inspected, reported, and enforced. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the Environmental Condition of Property (ECP) or other environmental document for transfer. Although the U.S. Army may transfer responsibility for various implementation actions, the U.S. Army shall retain its responsibility for remedy integrity. This means that the U.S. Army

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is responsible for addressing substantive violations of the LUC performance objective that would undermine the U.S. Army's CERCLA remedy. The U.S. Army also will be responsible for incorporating RD information and outlining the transferee's LUC obligations into property transfer documentation.

6.2.3 Opportunity to Review Text of Intended Land Use Controls

The U.S. Army will provide a copy of the groundwater use restriction notification to TCEQ for review and approval prior to its recordation in Harrison County. The USEPA will also receive a copy for review. In addition, the U.S. Army will produce an ECP or other environmental document for transfer of LHAAP-50, but before executing transfer, the U.S. Army will provide USEPA and TCEQ with a copy of the ECP or other environmental document for transfer so that they may have reasonable opportunity, before transfer, to review all LUC-related provisions.

6.2.4 Notification Should Action(s) which Interfere with Land Use Control Effectiveness be Discovered Subsequent to Conveyance

Should the U.S. Army discover after conveyance of the site any activity on the property inconsistent with the LUC performance objective, the U.S. Army shall notify USEPA and TCEQ within 72 hours of such discovery. Consistent with **Section 6.2.5** below, the U.S. Army will then work with USEPA, TCEQ and the transferee to correct the problem(s) discovered. This reporting requirement does not preclude the U.S. Army from taking immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health or the environment.

6.2.5 Land Use Control Enforcement

Should the LUC remedy reflected in this RD fail, the U.S. Army will coordinate with USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. These actions may range from informal resolutions with the USFWS or its lessee, to the institution of judicial action against non-federal third parties. Alternatively, should the circumstances warrant such, the U.S. Army could choose to exercise its response authorities under CERCLA. Should the U.S. Army become aware that any future owner or user of the property has violated any LUC requirement over which a local agency may have independent jurisdiction; the U.S. Army may notify those agencies of such violation(s) and work cooperatively with them to re-achieve owner/user compliance with the LUC.

6.2.6 Modification or Termination of Land Use Controls

The U.S. Army shall not, without USEPA and TCEQ concurrence, make a significant modification to, or terminate an LUC, or make a land use change inconsistent with the LUC objective. Likewise, the U.S. Army shall seek prior USEPA and TCEQ concurrence before

commencing actions that may impact remedy integrity. In the case of an emergency action, the U.S. Army shall obtain prior USEPA and TCEQ concurrence as appropriate to the exigencies of the situation.

The LUC shall remain in effect until such time as the U.S. Army and USEPA agree that the concentrations of COCs have met cleanup levels. When this occurs, the LUC will be terminated as needed. The decision to terminate the LUC will be documented consistent with the NCP process for post-ROD changes, potentially including an explanation of significant differences or a remedial action completion report. If the property has been transferred and a determination by the U.S. Army and USEPA has been made to terminate the LUC, the U.S. Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also timely advise other local stakeholders of the action.

6.2.7 Comprehensive Land Use Control Management Plan

Upon finalization of the LUC O&M Plan, a copy will be inserted into the Comprehensive LUC Management Plan for Longhorn. The Comprehensive LUC Management Plan figure and table will be updated to reflect the inclusion of LHAAP-50.

The Comprehensive LUC Management Plan consists of LHAAP RD documents and a survey plat showing the locations where LUC being implemented at LHAAP are applied. The purpose of this Comprehensive LUC Management Plan is to ensure all site-specific LUC are compiled into one comprehensive location for both pre-transfer use by the installation and for post-transfer use by the transferee. This document will be provided to USEPA and TCEQ and is also accessible to the public. The Comprehensive LUC Management Plan is located in the Marshall Public Library to accompany LHAAP's Administrative Record.

The land use assumption of industrial use as part of a national wildlife refuge forms the basis for the remedy at LHAAP-50 and this land use assumption will be included in the Comprehensive LUC Management Plan with supporting documentation.

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LHAAP-50, 50-2

NOTICE OF LAND USE CONTROLS AND NONRESIDENTIAL LAND USE AT LHAAP-50 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216646

2015-000006109

*****DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT*****

NOTICE

8 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 06/18/2015 01:32 PM **Document Number:** 2015-000006109 **Receipt No:** 1507040 **Amount:** $ 50.00 **By:** Vickie Gagnard, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

AMANDA LAGARDE
112 EAST PECAN ST
SUITE 400
SAN ANTONIO, TX 78205

00216647

STATE OF TEXAS HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF LAND USE CONTROL AT LHAAP-50

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed remedial activities at the land described herein. The remediation site is in a former industrial area, located on the Former Longhorn Army Ammunition Plant (LHAAP) and is designated as LHAAP-50 (Former Sump Water Tank). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Remedial activities at LHAAP-50 were performed in accordance with the FFA requirements.

The LHAAP-50 site, when operational, contained a 47,000-gallon capacity aboveground storage tank (AST) which received industrial wastewater from various industrial waste production sumps throughout LHAAP from 1955 to 1988. After the solids were filtered, the storage tank contents were discharged up stream of the bridge on Crockett Avenue, south of 51st Street into Goose Prairie Creek. The AST has been removed. A Record of Decision (ROD) for LHAAP-50 was signed by the U.S. Army and USEPA with TCEQ concurrence in 2010 establishing the final remedy which consists of a land use control (LUC) in conjunction with monitored natural attenuation (MNA) and limited perchlorate-impacted soil removal. The soil was removed to non-residential levels. The site was not remediated to levels suitable for unrestricted use. The LUC at LHAAP-50 will ensure protection of human health by restricting the use of contaminated groundwater to environmental monitoring and testing only. MNA will be implemented to establish confidence in attenuation trends and verify that the constituents of

concern (COCs) are stable or shrinking and will not migrate to nearby surface water at levels that may present an unacceptable risk to human health or the environment. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8:00 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-50 parcel is a 1 acre tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in **Exhibit A**. Within the LHAAP-50 parcel is designated a LUC boundary which is a 23.891-acre tract, more or less, as described in **Exhibit A**. The LUC boundary is also presented in the attached **Figure 1**.

Future use of the parcel is intended as a national wildlife refuge consistent with non-residential use. For purposes of this certification, residential land use includes, but is not limited to, single family to multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12. The United States Department of the Army has undertaken careful environmental study of the LHAAP-50 site and concluded that the LUC set forth below is required to ensure protection of human health and the environment.

(1) Groundwater Restriction. The groundwater use restriction boundary consists of the 23.891-acre tract, more or less. Groundwater underlying this land is contaminated with tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), cis-1,2-dichloroethylene (cis-1,2-DCE), vinyl chloride and other volatile organic compounds (VOCs) and perchlorate and shall not be accessed or used for any purpose without the prior written approval of the U.S. Army, the USEPA, and the TCEQ. A LUC restricting the use of groundwater has been established for the protection of human health. The U.S. Army will notify the Texas Department of Licensing and Regulation of the groundwater restriction which includes prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval by the U.S. Army, the USEPA, and the TCEQ. A restriction against the residential use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE).

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

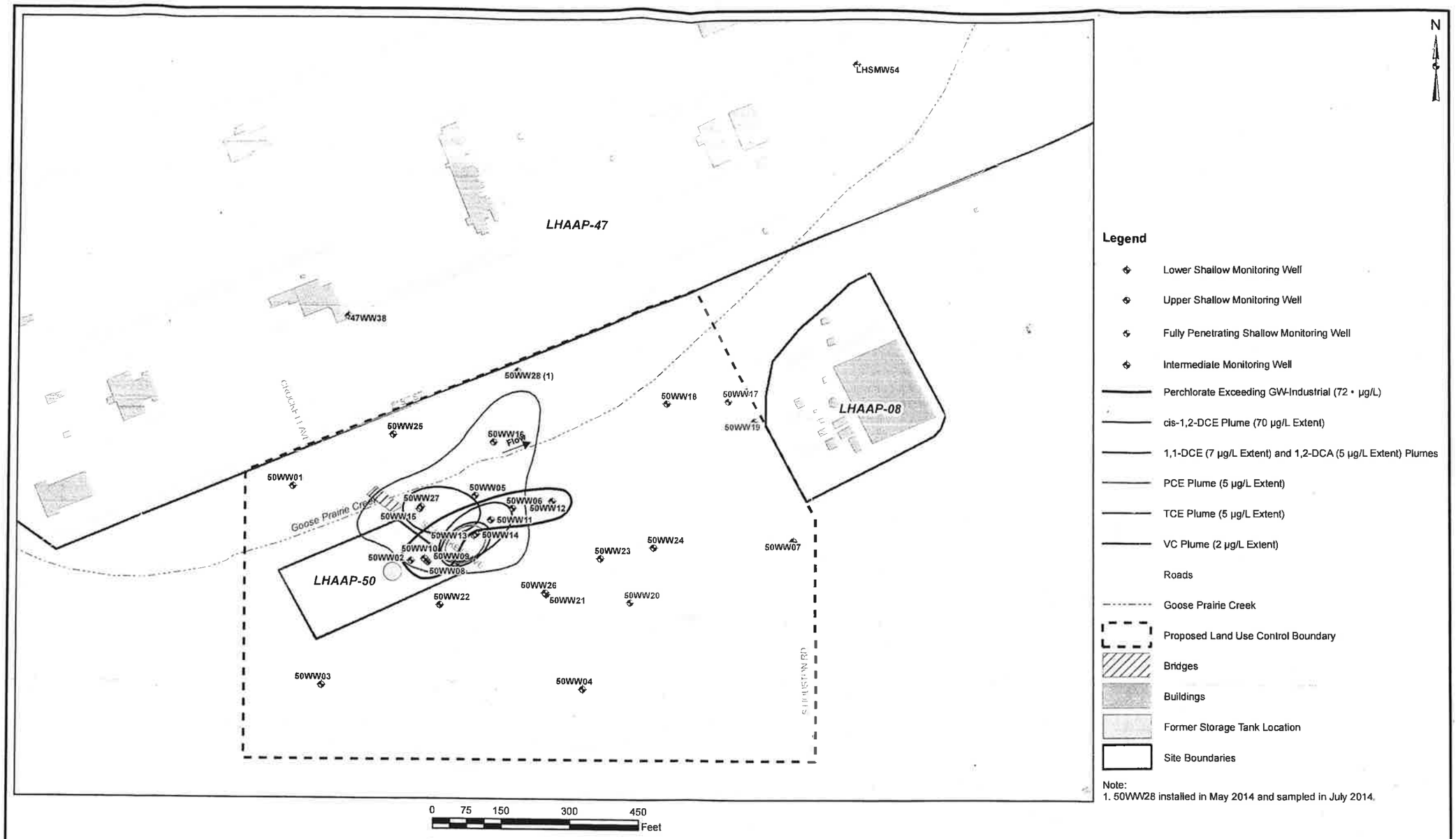
EXECUTED this the 18 th day of June, 2015.

BEFORE ME, on this the 18 th day of June, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 18th day of June, 2015.

GENIE WARNER
Notary Public State of Texas
COMM. EXP. 8/1/2018

Notary Public in and for the State of Texas,
County of Harrison



Note:
1. 50WW28 installed in May 2014 and sampled in July 2014.

AECOM

Figure 1
Land Use Control Boundary
LHAAP-50 Site
Longhorn Army Ammunition Plant
Karnack, Texas

60256135 June 2015

Path: E:\Group\T_GIS\GIS Projects\Longhorn\MXDs\LHAAP-50\RAO Report\2015-Jan-20\Figure 2-1_LHAAP50_Land Use Control Boundary.mxd

EXHIBIT A

FIELD NOTES DESCRIPTION OF
"LHAAP-50" LAND USE CONTROL AREA
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, "LHAAP-50" Land Use Control Area being 23.891 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), "LHAAP-50" Land Use Control Area being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999968791070, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "C-21" (N=6956579.781 feet E=3308499.969 feet), "IGNATIUS-1" (N=6957090.304 feet E=3311081.788 feet), and "RACE" (N=6958817.935 feet E=3310081.598 feet). The computed land area is based on State Plane distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" and "RPLS 3940" .

Commencing at monument "C-21" referenced above,

THENCE N 59deg10'26"E 819.91' to an I.R.O.P.C. set for the Southwest corner of this tract and this POINT OF BEGINNING,

THENCE N 00deg00'15"E 644.05' along the W.B.L. of this tract to a concrete nail set in asphalt pavement for this tract's N.W.C.,

THENCE N 67deg57'46"E 1061.76' along the N.W. B.L. of this tract to a 60d nail set in asphalt pavement for the Northmost corner of this tract,

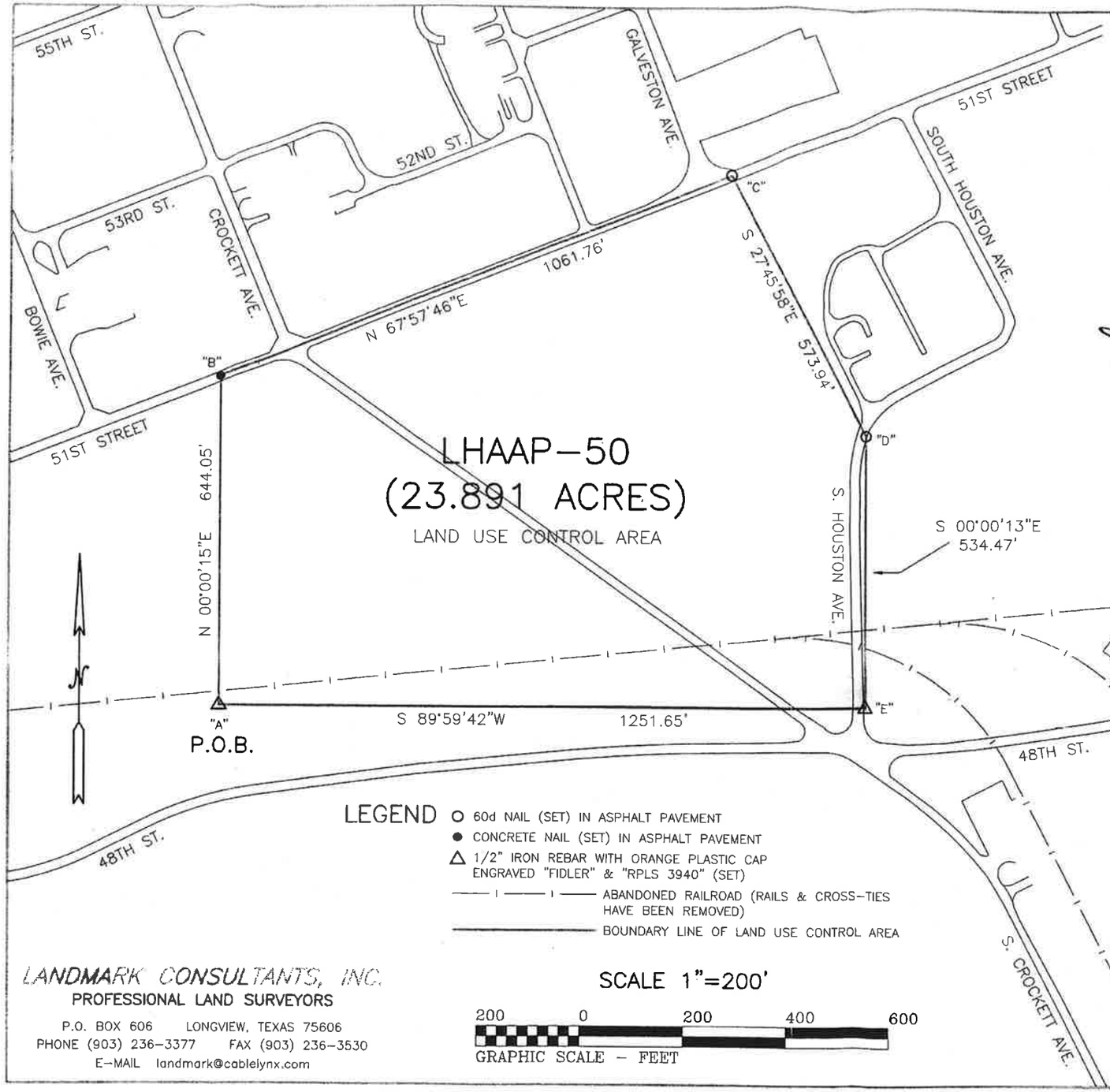
THENCE S 27deg45'58"E 573.94' along the N.E. B.L. of this tract to a 60d nail set for one of this tract's two Eastmost corners,

THENCE S 00deg00'13"E 534.47' along the E.B.L. of this tract to an I.R.O.P.C. set for this tract's S.E.C., from which "IGNATIUS-1" referenced above bears N 81deg47'47"E 632.57',

THENCE S 89deg59'42"W 1251.65' along the S.B.L. of this tract to this POINT OF BEGINNING, containing 23.891 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940



I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision on April 29 & 30, 2015.

Witness my hand and seal this the 4th day of May, 2015.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), AND COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999968791070 AND IS BASED ON CALCULATED DISTANCE BETWEEN PUBLISHED STATE PLANE COORDINATES (OF STATIONS C-21, IGNATIUS-1, & RACE) DIVIDED BY SURFACE TRAVERSE CALCULATED DISTANCE BETWEEN SAME THREE STATIONS. THE COMPUTED LAND AREA IS BASED ON STATE PLANE DISTANCES.

COORDINATE TABLE

	NORTH	EAST
A	6956999.929	3309204.044
B	6957643.979	3309204.091
C	6958042.360	3310188.284
D	6957534.507	3310455.661
E	6957000.041	3310455.696

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEET

LEGEND
- O 60d NAIL (SET) IN ASPHALT PAVEMENT
- ● CONCRETE NAIL (SET) IN ASPHALT PAVEMENT
- △ 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- ABANDONED RAILROAD (RAILS & CROSS-TIES HAVE BEEN REMOVED)
- BOUNDARY LINE OF LAND USE CONTROL AREA

SCALE 1"=200'

200 0 200 400 600
GRAPHIC SCALE - FEET

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

LHAAP-50 L.U.C.A.
(23.891 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	W.PTS W.LEG
05/04/2015	1103025W.DWG	DRAWN BY JTJ

00216654

LHAAP-50, 50-3

LAND USE CONTROL COMPLIANCE INSPECTION FORM

September 14, 2015

Sample Annual Land Use Control Compliance Certification Documentation

In accordance with the Remedial Design dated 9/30/11 for LHAAP-50 a certification of site was conducted by _____ [indicate transferee] on _____.

A summary of land use control mechanisms is as follows:

- Groundwater restriction – A restriction against use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE). [Indicate whether groundwater restrictions are still required at LHAAP-50]

A summary of compliance with land use and restriction covenants is as follows:

- No use of groundwater, installation of new groundwater wells, or tampering with existing wells at LHAAP-50.

I, the undersigned, do document that the certification was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: _____

Name/Title: _____

Signature: _____

Annual compliance certification forms shall be completed no later than March 1 of each year for the previous calendar year.

LHAAP-51

NOTICE OF NONRESIDENTIAL LAND USE AT LHAAP-51 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2010-000005557

*****DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT*****

MISCELLANEOUS

7 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 04/27/2010 04:08 PM **Document Number:** 2010-000005557 **Receipt No:** 1006195 **Amount:** $ 36.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW E & I
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216658

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-51, is the area of a demolished building location known as Building 60-B, former photographic lab, located within the Plant 3 production area of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-51 is not itself considered an NPL site. Environmental activities at LHAAP-51 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-51 (Building 60-B) was constructed in 1945 for the processing of X-ray film. The building had a concrete floor without a floor drain. Spent developing waste was drummed and transferred to another building for disposal. Small quantities of black and white developer and fixer solutions were generated by the X-ray lab. Activities ceased in the late 1970s or early 1980s. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-51 parcel is 5,754 square foot, more or less, or 0.13209 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-51 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-51. Contaminants in soil samples from LHAAP-51 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-51 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-51 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951
or
Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 10th day of March, 2010.

BEFORE ME, on this the 10 th day of March, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 10 day of March, 2010.

Notary Public in and for the State of Texas,
County of Harrison

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

FIELD NOTES DESCRIPTION OF
"LHAAP-51" TRACT
(INCLUDES THE REMAINS OF A DEMOLISHED BUILDING)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-51" including, but not being limited to, the concrete slab of a demolished building in the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-51" being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "HORSE" (N=6960008.269 feet E=3309591.340 feet). Said traverse indicates a surface distance of 4895.70 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied (in the form of an Autocad DXF file) by Shaw Environmental & Infrastructure Group.

Commencing at monument "HORSE" referenced above,

THENCE N 86deg33'08"W 1716.42' to a concrete nail with head dimple set for the S.E.C. of this tract and this POINT OF BEGINNING,

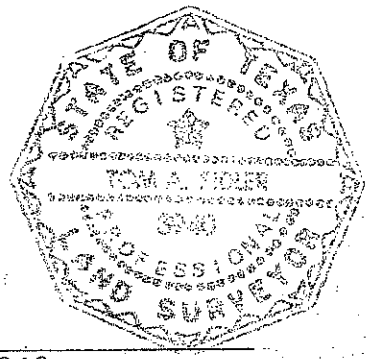
THENCE S 68deg51'01"W 68.17' along the S.B.L. of this tract to a 60d nail set for this tract's S.W.C. ,

THENCE N 21deg08'59"W 84.39' along the W.B.L. of this tract to a 60d nail set for this tract's N.W.C. , said nail being S 79deg23'36"E 3086.37' from said monument "X-11" ,

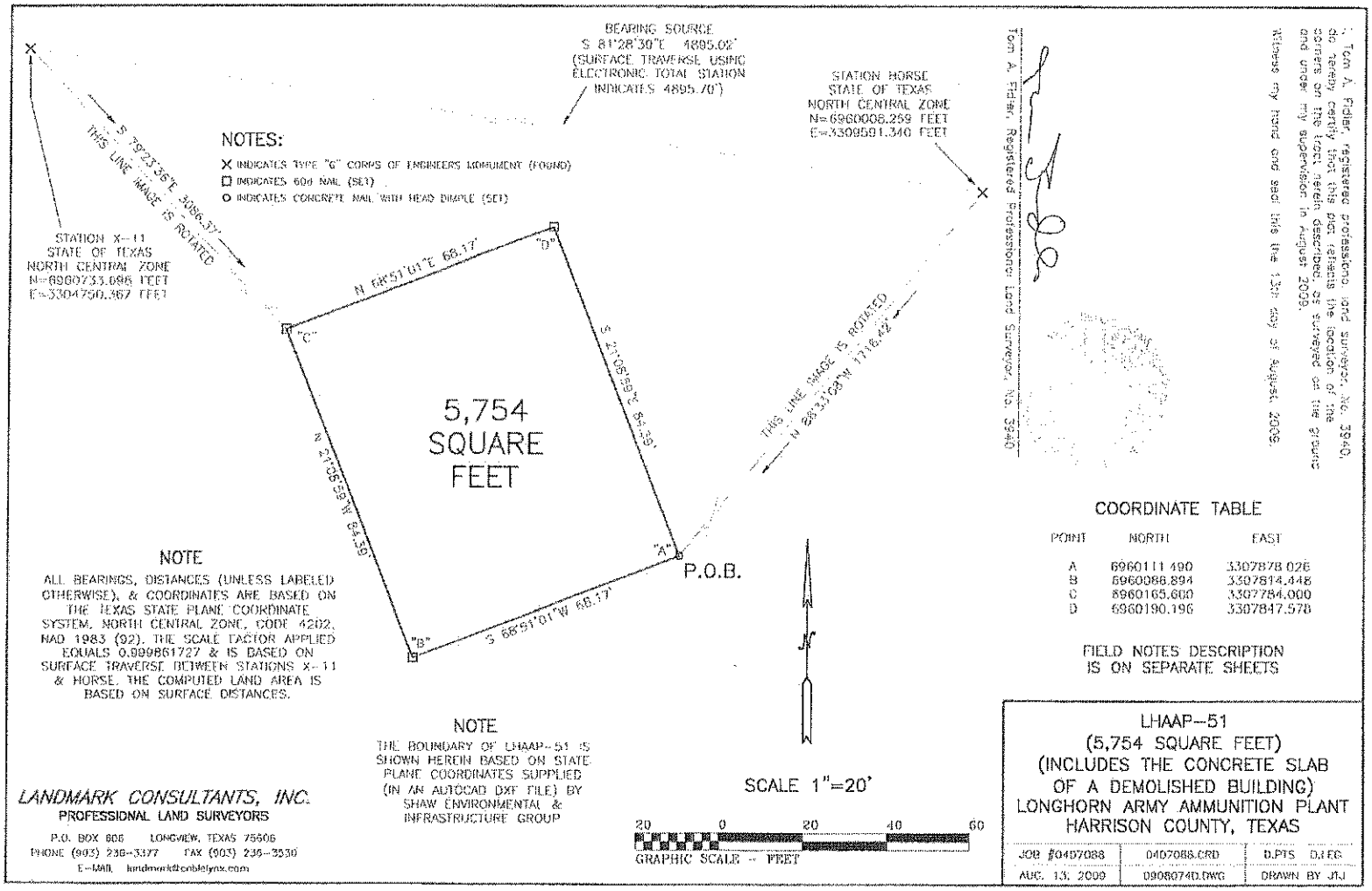
THENCE N 68deg51'01"E 68.17' along the N.B.L. of this tract to a 60d nail set for this tract's N.E.C. ,

THENCE S 21deg08'59"E 84.39' along the E.B.L. of this tract to this POINT OF BEGINNING. This tract contains 5,754 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & HORSE. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

NOTE

THE BOUNDARY OF LHAAP-51 IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP

SCALE 1"=20'

20 0 20 40 60
GRAPHIC SCALE - FEET

COORDINATE TABLE

POINT	NORTH	EAST
A	6960111.490	3307878.026
B	6960086.894	3307814.448
C	6960165.600	3307784.000
D	6960190.196	3307847.578

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 806 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

LHAAP--51
(5,754 SQUARE FEET)
(INCLUDES THE CONCRETE SLAB
OF A DEMOLISHED BUILDING)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	D.PTS	D.FB
AUG. 13, 2009	0908074D.DWG	DRAWN BY	JTJ

00216664

LHAAP-55

NOTICE OF NONRESIDENTIAL LAND USE AT SEPTIC TANK LOCATIONS FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2010-000005562

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

34 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 04/27/2010 04:08 PM **Document Number:** 2010-000005562 **Receipt No:** 1006195 **Amount:** $ 144.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW E & I
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-55, consisted of 10 septic tank and leachate field systems that served outlying areas of the former Longhorn Army Ammunition Plant (LHAAP) within or near LHAAP-48 and LHAAP-35C(53). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-55 is not itself considered an NPL site. Environmental activities at LHAAP-55 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-55 consisted of 10 septic tank and leachate field systems that served outlying areas of LHAAP that could not be connected to the plant sanitary sewer system. Although there was no history of industrial waste being placed into these septic tanks, soil samples were collected from borings installed at septic systems that were associated with industrial processes and analyzed for metals, explosives, semi volatile organic compounds, and volatile organic compounds where appropriate. Further information

may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-55 parcel include: ST-01 with 1,807 square feet, more or less, or 0.04148 acre tract; ST-02 with 1,791 square feet, more or less, or 0.04111 acre tract; ST-03 with 1,784 square feet, more or less, or 0.04095 acre tract; ST-04 with 1,789 square feet, more or less, or 0.04106 acre tract; ST-05 with 1,825 square feet more or less, or 0.04189 acre tract; ST-06 with 1,800 square feet, more or less, or 0.04132 acre tract; ST-07 with 1,865 square feet, more or less, or 0.04281 acre tract; ST-08 with 1,785 square feet, more or less, or 0.04097 acre tract; ST-09 with 2,004 square feet, more or less, or 0.04600 acre tract; and ST-10 with 1,804 square feet, more or less, or 0.04141 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-55 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-55. Contaminants in soil samples from LHAAP-55 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-55 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-55 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951
or
Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 10 th day of March, 2010.

BEFORE ME, on this the 10 th day of March, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 10 day of March, 2010.

Notary Public in and for the State of Texas,
County of Harrison

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-01, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,807 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998636625, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "IGNATIUS-1" (N=6957090.304 feet E=3311081.788 feet) and "IGNATIUS-2" (N=6955582.752 feet E=3311851.704 feet). Said traverse indicates a surface distance of 1693.005 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-01, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "IGNATIUS-1" referenced above,

THENCE S 37deg17'23"E 1017.21' to a 60d nail set for the Westmost N.W.C. of this tract and this POINT OF BEGINNING,

THENCE N 63deg19'52"E 19.74' along a N.B.L. of this tract to a 60d nail set for this tract's Westmost N.E.C. ,

THENCE S 26deg40'08"E 4.90' along an E.B.L. of this tract to a 60d nail set for this tract's Northeast reentrant corner ,

THENCE N 89deg25'37"E 24.40' along a N.B.L. of this tract to a 60d nail set for this tract's Northwest reentrant corner ,

THENCE N 00deg00'00"E 18.03' along a W.B.L. of this tract to a 60d nail set for this tract's Eastmost N.W.C. ,

THENCE N 90deg00'00"E 46.53' along a N.B.L. of this tract to a 60d nail set for this tract's Eastmost N.E.C. ,

THENCE S 00deg00'00"E 32.43' along an E.B.L. of this tract to a 60d nail set for this tract's Eastmost S.E.C. ,

THENCE N 90deg00'00"W 46.53' along a S.B.L. of this tract to a 60d nail set for this tract's Eastmost S.W.C. ,

THENCE N 00deg00'00"E 12.40' along a W.B.L. of this tract to a 60d nail set for this tract's Southwest reentrant corner,

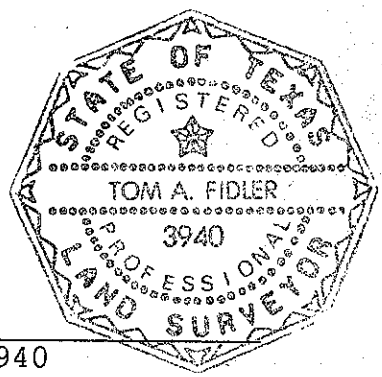
THENCE S 89deg25'37"W 23.40' along a S.B.L. of this tract to a 60d nail set for this tract's Southeast reentrant corner,

THENCE S 26deg40'08"E 5.57' along an E.B.L. of this tract to a 60d nail set for this tract's Westmost S.E.C. ,

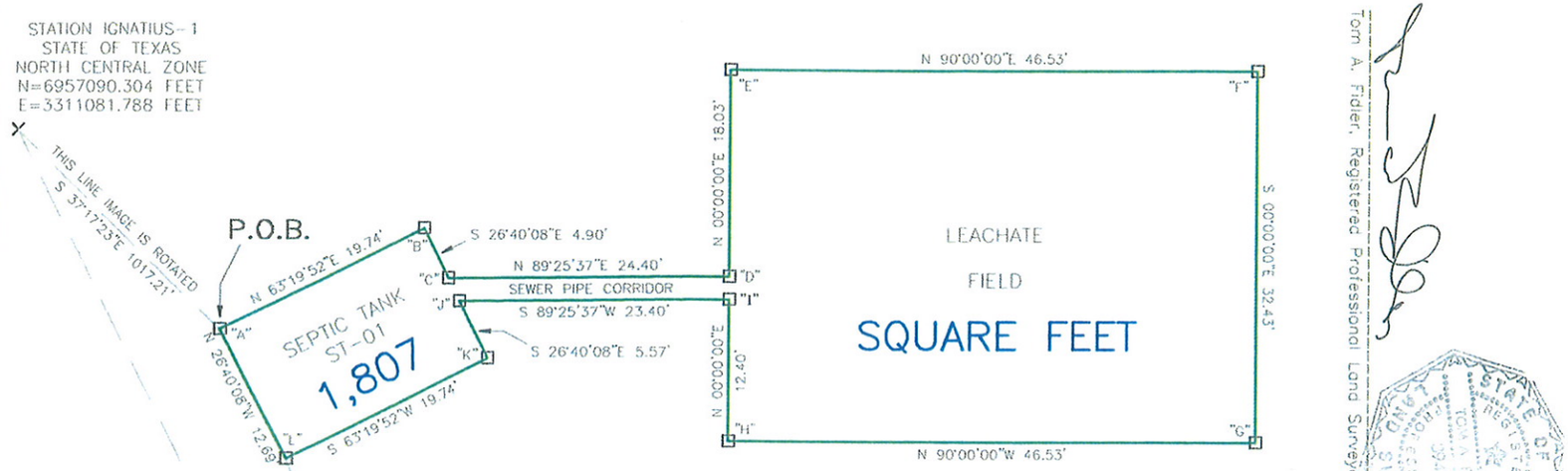
THENCE S 63deg19'52"W 19.74' along a S.B.L. of this tract to a 60d nail set for this tract's Westmost S.W.C., from which station "IGNATIUS-2" referenced above bears S 12deg09'16"E 702.69' ,

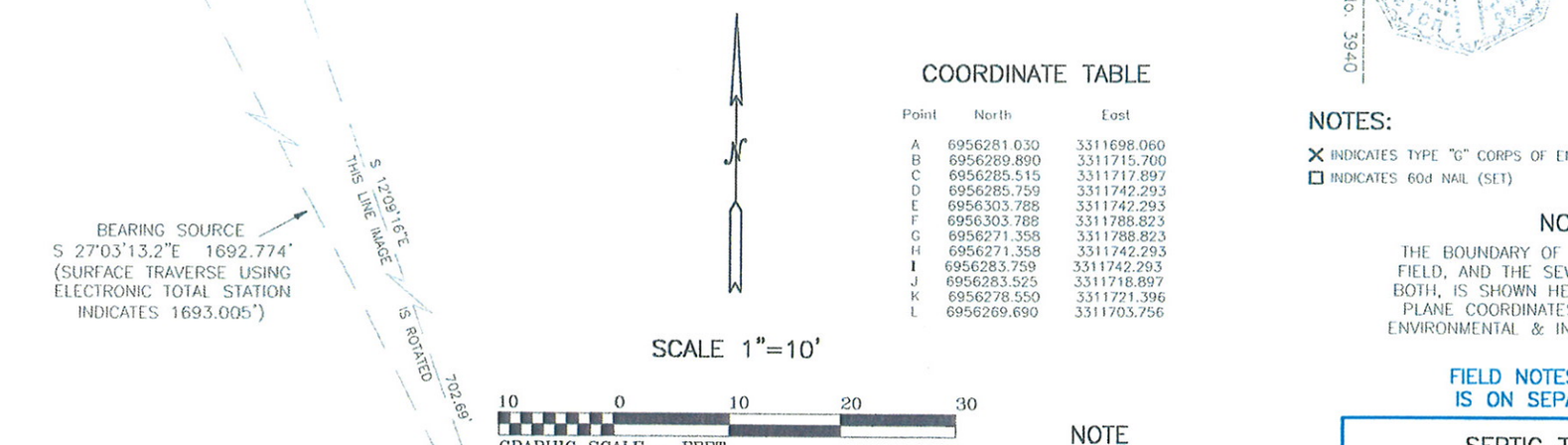
THENCE N 26deg40'08"W 12.69' along a W.B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,807 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940





COORDINATE TABLE

Point	North	East
A	6956281.030	3311698.060
B	6956289.890	3311715.700
C	6956285.515	3311717.897
D	6956285.759	3311742.293
E	6956303.788	3311742.293
F	6956303.788	3311788.823
G	6956271.358	3311788.823
H	6956271.358	3311742.293
I	6956283.759	3311742.293
J	6956283.525	3311718.897
K	6956278.550	3311721.396
L	6956269.690	3311703.756

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998636625 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS IGNATIUS-1 & IGNATIUS-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August 2009.

Witness my hand and seal this the 13th day of August, 2009.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTES:

X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)

☐ INDICATES 60d NAIL (SET)

NOTE

THE BOUNDARY OF ST-01, ITS LEACHATE FIELD, AND THE SEWER PIPE CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

SEPTIC TANK ST-01 WITH LEACHATE FIELD (1,807 SQUARE FEET) (PART OF LHAAP-55) LONGHORN ARMY AMMUNITION PLANT HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	A.PTS A.LEG
AUG. 13, 2009	0908074A.DWG	DRAWN BY JTJ

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-02, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,791 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-02, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-1" referenced above,

THENCE N 05deg57'31"W 746.36' to a 60d nail set for the Eastmost S.E.C. of this tract and this POINT OF BEGINNING,

THENCE N 90deg00'00"W 19.74' along a S.B.L. of this tract to a 60d nail set (in an abandoned utility pole lying on the ground) for this tract's Eastmost S.W.C. ,

THENCE N 00deg00'00"E 5.36' along a W.B.L. of this tract to a 60d nail set for this tract's Southwest reentrant corner,

THENCE N 90deg00'00"W 15.73' along a S.B.L. of this tract to a 60d nail set for this tract's Southeast reentrant corner,

THENCE S 00deg00'00"W 15.91' along an E.B.L. of this tract to a 60d nail set for this tract's Westmost S.E.C. ,

THENCE N 90deg00'00"W 46.53' along a S.B.L. of this tract to a 60d nail set for this tract's Westmost S.W.C. ,

THENCE N 00deg00'00"E 32.43' along a W.B.L. of this tract to a 60d nail set for this tract's Westmost N.W.C. ,

THENCE N 90deg00'00"E 46.53' along a N.B.L. of this tract to a 60d nail set for this tract's Westmost N.E.C. ,

THENCE S 00deg00'00"E 14.52' along an E.B.L. of this tract to a 60d nail set for this tract's Northeast reentrant corner,

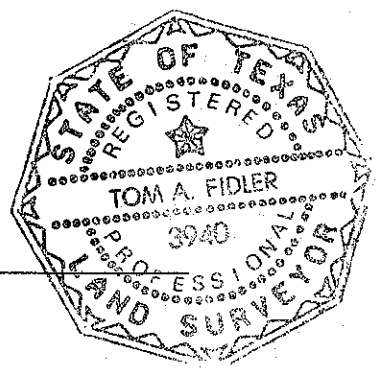
THENCE S 90deg00'00"E 15.73' along a N.B.L. of this tract to a 60d nail set for this tract's Northwest reentrant corner,

THENCE N 00deg00'00"W 5.33' along a W.B.L. of this tract to a 60d nail set for this tract's Eastmost N.W.C. ,

THENCE N 90deg00'00"E 19.74' along a N.B.L. of this tract to a 60d nail set for this tract's Eastmost N.E.C. ,

THENCE S 00deg00'00"E 12.69' along an E.B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,791 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

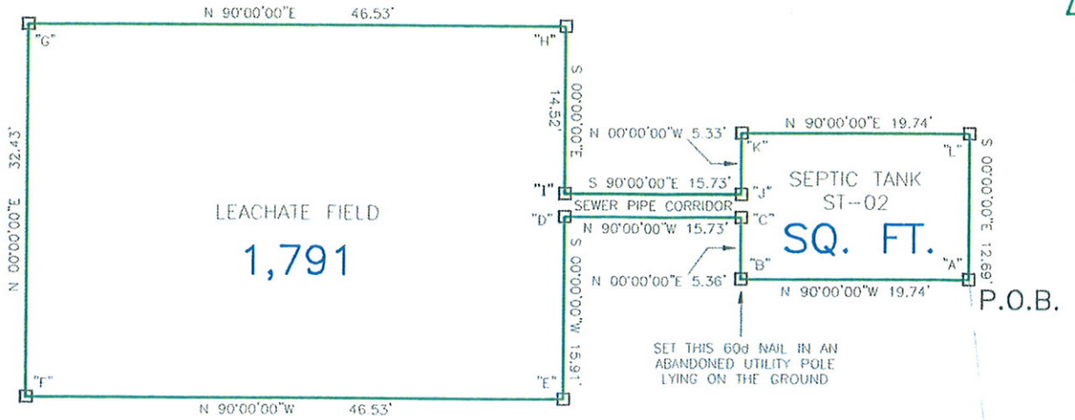


Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202. NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999895238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.



COORDINATE TABLE

Point	North	East
A	6959249.790	3314202.020
B	6959249.790	3314182.280
C	6959255.150	3314182.280
D	6959255.150	3314166.552
E	6959239.240	3314166.552
F	6959239.240	3314120.022
G	6959271.670	3314120.022
H	6959271.670	3314166.552
I	6959257.150	3314166.552
J	6959257.150	3314182.280
K	6959262.480	3314182.280
L	6959262.480	3314202.020

NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- □ INDICATES 60d NAIL (SET)
- o INDICATES UNMARKED POINT

NOTE

THE BOUNDARY OF ST-02, ITS LEACHATE FIELD, AND THE SEWER PIPE CORRIDOR CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

SCALE 1"=10'

N 05°57'31"W 746.36'

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October 2009.

Witness my hand and seal October 26, 2009.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

SEPTIC TANK ST-02 WITH LEACHATE FIELD (1,791 SQUARE FEET) (PART OF LHAAP-55) LONGHORN ARMY AMMUNITION PLANT HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	J.PTS J.LEG
10/26/2009	0908074J.DWG	DRAWN BY JTJ

00216675

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-03, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,784 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-03, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-1" referenced above,

THENCE N 24deg50'41"E 537.01' to a 60d nail set for the Southmost South corner of this tract and this POINT OF BEGINNING,

THENCE N 35deg57'31"W 30.43' along a S.W. B.L. of this tract to a 60d nail set for a South reentrant corner of this tract,

THENCE S 54deg02'29"W 1.92' along a S.E. B.L. of this tract to a 60d nail set for a South corner of this tract,

THENCE N 38deg10'26"W 12.26' along a S.W. B.L. of this tract to a 60d nail set for a South reentrant corner of this tract,

THENCE S 50deg49'08"W 5.10' along a S.E. B.L. of this tract to a 60d nail set for this tract's Northmost South corner,

THENCE N 39deg10'52"W 19.74' along a S.W. B.L. of this tract to a 60d nail set for this tract's Westmost corner,

THENCE N 50deg49'08"E 12.69' along a N.W. B.L. of this tract to a 60d nail set for this tract's Westmost North corner,

THENCE S 39deg10'52"E 19.74' along a N.E. B.L. of this tract to a 60d nail set for this tract's Westmost East corner,

THENCE S 50deg49'08"W 5.58' along a S.E. B.L. of this tract to a 60d nail set for this tract's East reentrant corner,

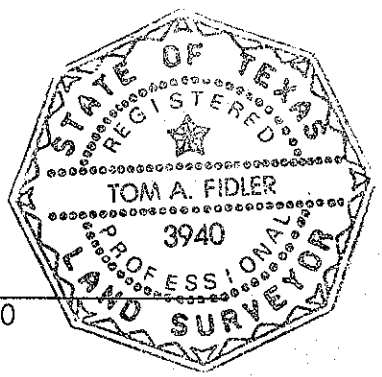
THENCE S 38deg10'26"E 10.37' along a N.E. B.L. of this tract to a 60d nail set for this tract's North reentrant corner,

THENCE N 54deg02'29"E 46.53' along a N.W. B.L. of this tract to a 60d nail set for this tract's Eastmost North corner,

THENCE S 35deg57'31"E 32.43' along a N.E. B.L. of this tract to a 60d nail set for this tract's Eastmost East corner,

THENCE S 54deg02'29"W 46.53' along a S.E. B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,784 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

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NOTE

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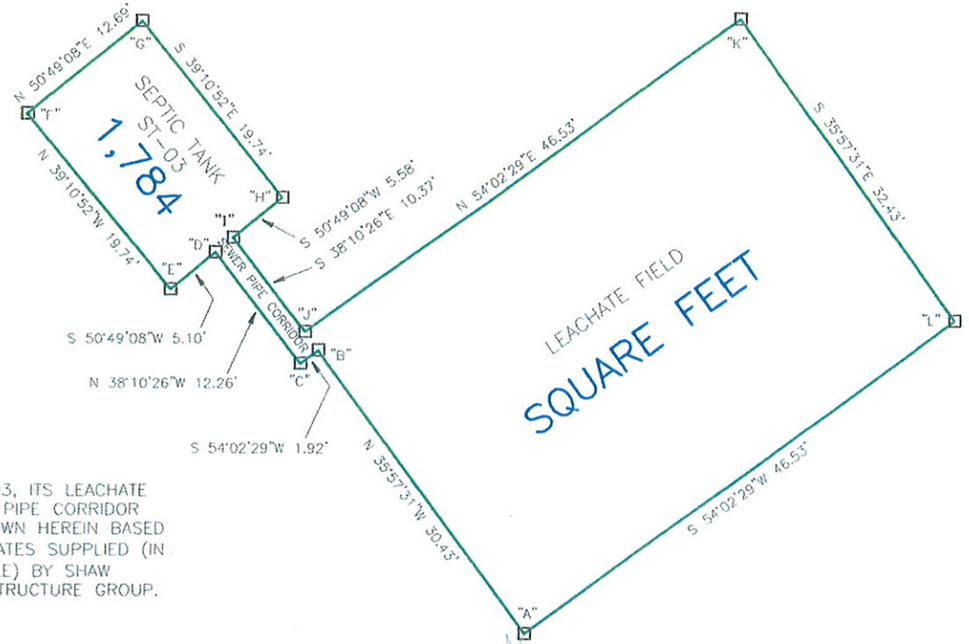


P.O.B.

NOTE

THE BOUNDARY OF ST-03, ITS LEACHATE FIELD, AND THE SEWER PIPE CORRIDOR CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- □ INDICATES 60d NAIL (SET)
- O INDICATES UNMARKED POINT

COORDINATE TABLE

Point	North	East
A	6958994.769	3314505.128
B	6959019.400	3314487.259
C	6959018.270	3314485.702
D	6959027.905	3314478.127
E	6959024.680	3314474.170
F	6959039.982	3314461.699
G	6959047.999	3314471.535
H	6959032.697	3314484.007
I	6959029.169	3314479.678
J	6959021.019	3314486.085
K	6959048.342	3314523.748
L	6959022.091	3314542.791

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October 2009.

Witness my hand and seal October 26, 2009.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 1116.219')

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

SEPTIC TANK ST-03 WITH LEACHATE FIELD (1,784 SQUARE FEET) (PART OF LHAAP-55) LONGHORN ARMY AMMUNITION PLANT HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	K.PTS K.LEG
10/26/2009	0908074K.DWG	DRAWN BY JTJ

00216678

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-04, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,789 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-04, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-1" referenced above,

THENCE S 64deg44'32"W 426.66' to a 60d nail set for the Southmost S.E.C. of this tract and this POINT OF BEGINNING,

THENCE N 89deg51'08"W 32.43' along a S.B.L. of this tract to a 60d nail set for this tract's Southmost S.W.C. ,

THENCE N 00deg08'52"E 46.53' along a W.B.L. of this tract to a 60d nail set for this tract's Southmost N.W.C. ,

THENCE S 89deg51'08"E 14.56' along a N.B.L. of this tract to a 60d nail set for this tract's Northwest reentrant corner,

THENCE N 00deg00'00"W 14.73' along a W.B.L. of this tract to a 60d nail set for this tract's Southwest reentrant corner,

THENCE N 89deg42'35"W 5.65' along a S.B.L. of this tract to a 60d nail set for this tract's Northmost S.W.C. ,

THENCE N 00deg17'25"E 19.74' along a W.B.L. of this tract to a concrete nail with head dimple set (in old asphalt) for this tract's Northmost N.W.C. ,

THENCE S 89deg42'35"E 12.69' along a N.B.L. of this tract to a 60d nail set for this tract's Northmost N.E.C. ,

THENCE S 00deg17'25"W 19.74' along an E.B.L. of this tract to a 60d nail set for this tract's Northmost S.E.C. ,

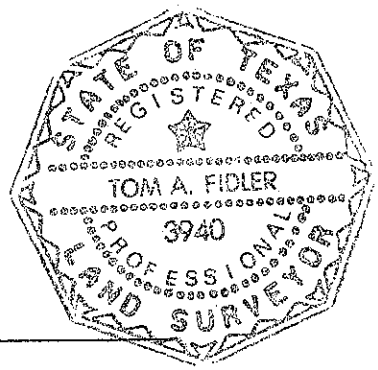
THENCE N 89deg42'35"W 5.04' along a S.B.L. of this tract to a 60d nail set for this tract's Southeast reentrant corner,

THENCE S 00deg00'00"E 14.73' along an E.B.L. of this tract to a 60d nail set for this tract's Northeast reentrant corner,

THENCE S 89deg51'08"E 15.87' along a N.B.L. of this tract to a 60d nail set for this tract's Southmost N.E.C. ,

THENCE S 00deg08'52"W 46.53' along an E.B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,789 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October 2009.

Witness my hand and seal October 26, 2009.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

LANDMARK CONSULTANTS, INC.
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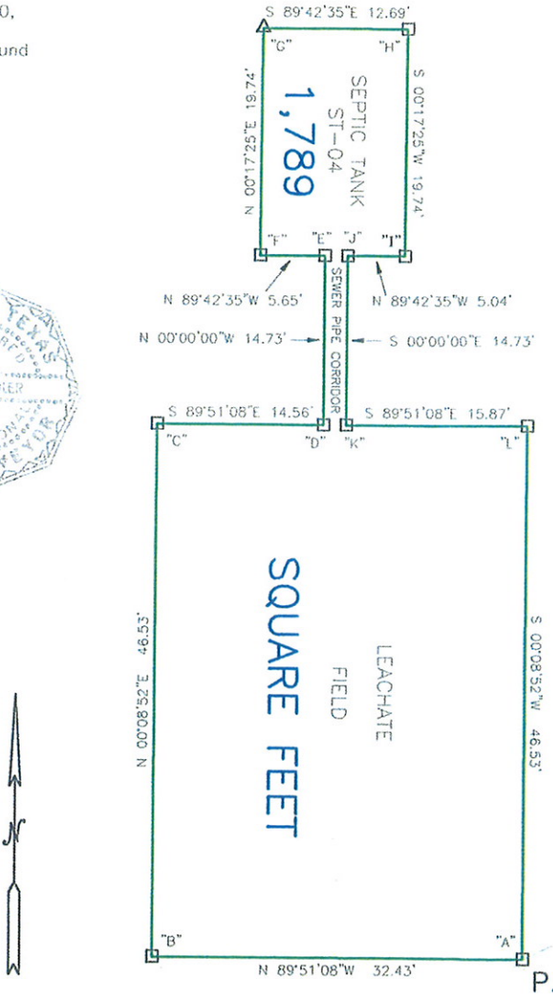


COORDINATE TABLE

Point	North	East
A	6958325.408	3313893.629
B	6958325.492	3313861.199
C	6958372.022	3313861.319
D	6958371.984	3313875.880
E	6958386.716	3313875.880
F	6958386.744	3313870.230
G	6958406.484	3313870.330
H	6958406.420	3313883.020
I	6958386.680	3313882.920
J	6958386.706	3313877.880
K	6958371.979	3313877.880
L	6958371.938	3313893.749

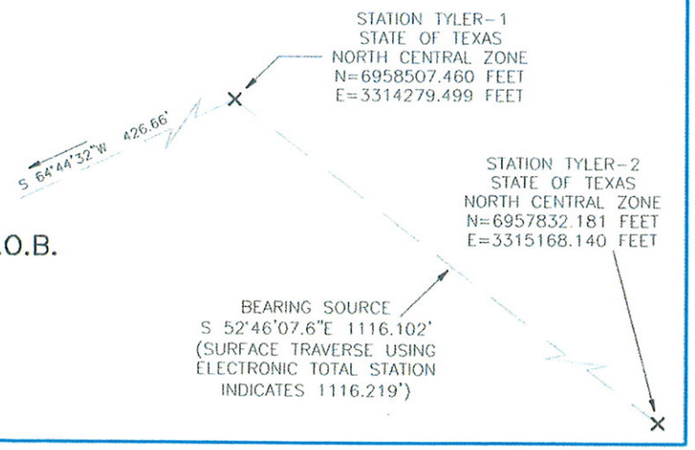
NOTE

THE BOUNDARY OF ST-04, ITS LEACHATE FIELD, AND THE SEWER PIPE CORRIDOR CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

NOTES:

- ✕ INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- □ INDICATES 60d NAIL (SET)
- △ INDICATES CONCRETE NAIL WITH HEAD DIMPLE (SET)

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS



SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

SEPTIC TANK ST-04
WITH LEACHATE FIELD
(1,789 SQUARE FEET)
(PART OF LHAAP-55)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	1.PTS 1.LEG
10/26/2009	09080741.DWG	DRAWN BY JTJ

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-05, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,825 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-05, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-2" referenced above,

THENCE N 52deg46'07.6"W 36.82' to a point, said point being S 52deg46'07.6"E 1079.28' from said monument "TYLER-1" ,

THENCE S 37deg13'52"W 81.68' to a 60d nail set for the Northmost East corner of this tract and this POINT OF BEGINNING ,

THENCE S 33deg39'28"W 12.69' along a S.E. B.L. of this tract to a 60d nail set for this tract's Northmost South corner,

THENCE N 56deg20'32"W 17.74' along a S.W. B.L. of this tract to a chisled "X" set in concrete for this tract's South reentrant corner,

THENCE S 36deg51'06"W 32.79' along a S.E. B.L. of this tract to a 60d nail set for this tract's East reentrant corner,

THENCE S 57deg33'12"E 44.52' along a N.E. B.L. of this tract to a 60d nail set for this tract's Southmost East corner,

THENCE S 32deg26'48"W 32.43' along a S.E. B.L. of this tract to a 60d nail set for this tract's Southmost South corner,

THENCE N 57deg33'12"W 46.53' along a S.W. B.L. of this tract to a 60d nail set for this tract's West corner,

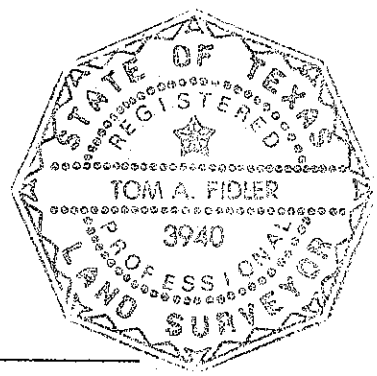
THENCE N 32deg26'48"E 32.43' along a N.W. B.L. of this tract to a 60d nail set for deflection corner,

THENCE N 36deg51'06"E 32.84' along a N.W. B.L. of this tract to a chisled "X" set in concrete for deflection corner,

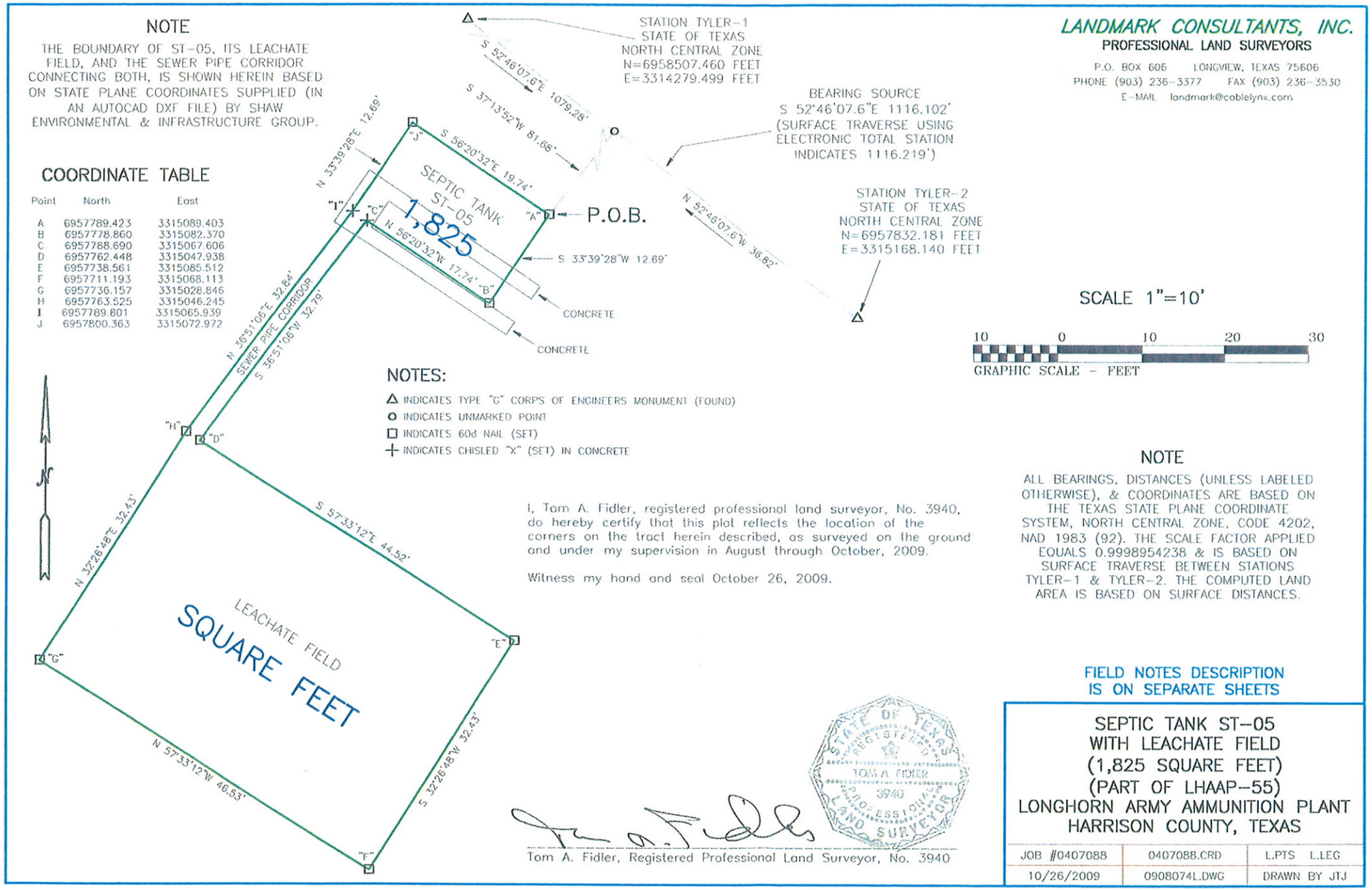
THENCE N 33deg39'28"E 12.69' along a N.W. B.L. of this tract to a 60d nail set for this tract's North corner,

THENCE S 56deg20'32"E 19.74' along a N.E. B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,825 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



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FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-06, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,800 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-06, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-2" referenced above,

THENCE S 85deg57'52"E 1425.64' to a 60d nail set for the Northmost N.W.C. of this tract and this POINT OF BEGINNING,

THENCE N 67deg08'12"E 12.69' along a N.B.L. of this tract to a 60d nail set for this tract's Northmost N.E.C. ,

THENCE S 22deg51'48"E 19.74' along an E.B.L. of this tract to a 60d nail set for this tract's Northmost S.E.C. ,

THENCE S 67deg08'12"W 4.97' along a S.B.L. of this tract to a 60d nail set for this tract's S.E. reentrant corner,

THENCE S 22deg49'50"E 19.87' along an E.B.L. of this tract to a 60d nail set for this tract's N.E. reentrant corner,

THENCE N 64deg30'12"E 16.55' along a N.B.L. of this tract to a

60d nail set for this tract's Southmost N.E.C. ,

THENCE S 25deg29'48"E 46.53' along an E.B.L. of this tract to a 60d nail set for this tract's Southmost S.E.C. ,

THENCE S 64deg30'12"W 32.43' along a S.B.L. of this tract to a 60d nail set for this tract's Southmost S.W.C. ,

THENCE N 25deg29'48"W 46.53' along a W.B.L. of this tract to a 60d nail set for this tract's Southmost N.W.C. ,

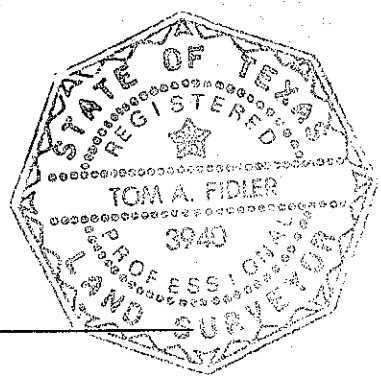
THENCE N 64deg30'12"E 13.88' along a N.B.L. of this tract to a 60d nail set for this tract's N.W. reentrant corner,

THENCE N 22deg49'50"W 19.96' along a W.B.L. of this tract to a 60d nail set for this tract's S.W. reentrant corner,

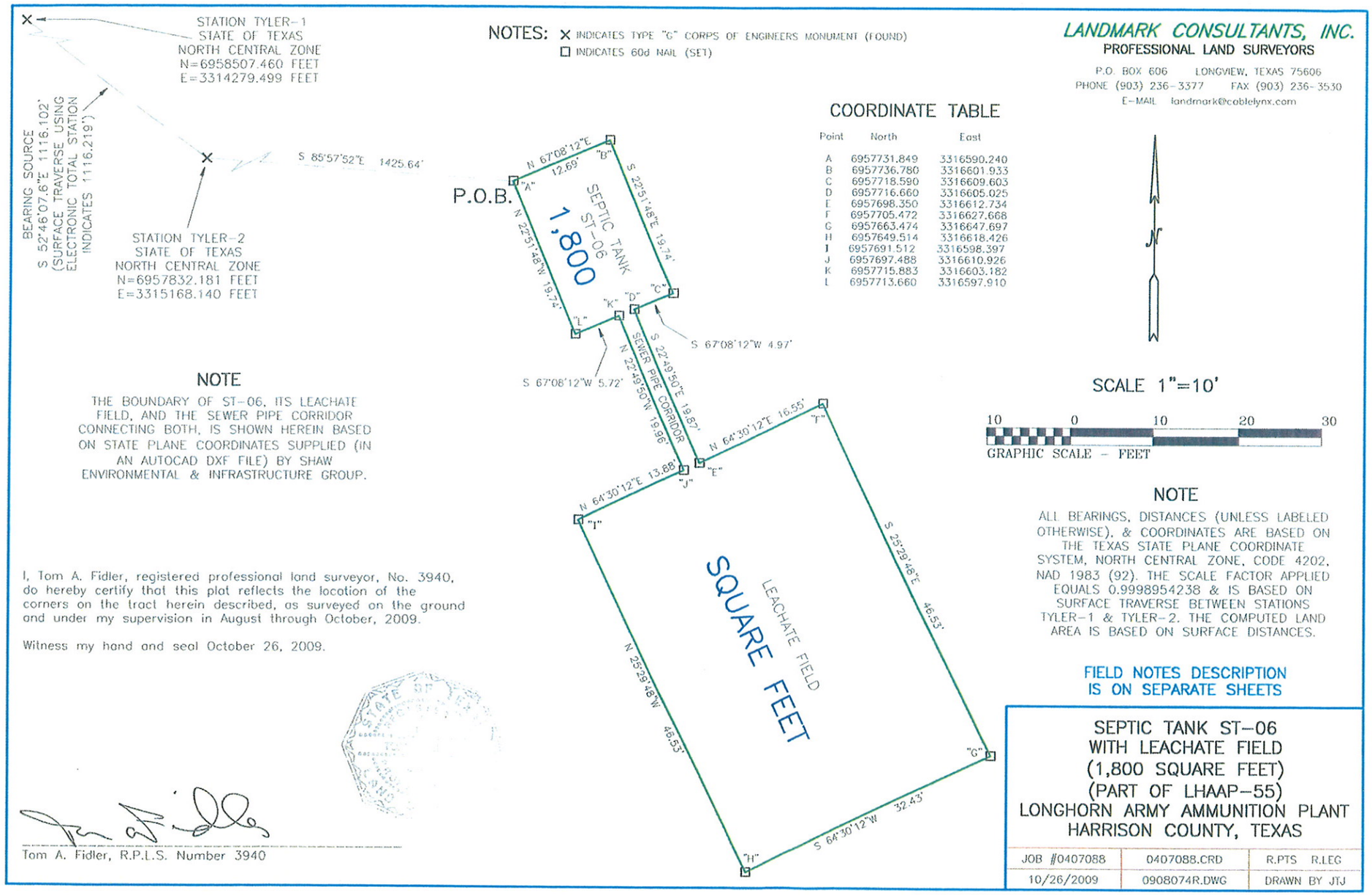
THENCE S 67deg08'12"W 5.72' along a S.B.L. of this tract to a 60d nail set for this tract's Northmost S.W.C. ,

THENCE N 22deg51'48"W 19.74' along a W.B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,800 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



NOTE

THE BOUNDARY OF ST-06, ITS LEACHATE FIELD, AND THE SEWER PIPE CORRIDOR CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October, 2009.

Witness my hand and seal October 26, 2009.

Tom A. Fidler, R.P.L.S. Number 3940

COORDINATE TABLE

Point	North	East
A	6957731.849	3316590.240
B	6957736.780	3316601.933
C	6957718.590	3316609.603
D	6957716.660	3316605.025
E	6957698.350	3316612.734
F	6957705.472	3316627.668
G	6957663.474	3316647.697
H	6957649.514	3316618.426
I	6957691.512	3316598.397
J	6957697.488	3316610.926
K	6957715.883	3316603.182
L	6957713.660	3316597.910

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

SEPTIC TANK ST-06
WITH LEACHATE FIELD
(1,800 SQUARE FEET)
(PART OF LHAAP-55)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	R.PTS R.LEG
10/26/2009	0908074R.DWG	DRAWN BY JTJ

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-07, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,865 square feet of land out of the Longhorn Ordance Works Reservation, (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-07, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-2" referenced above,

THENCE S 20deg14'47"E 467.25' to a 60d nail set for the N.E.C. corner of this tract and this POINT OF BEGINNING ,

THENCE S 13deg37'37"E 32.43' along an E.B.L. of this tract to a 60d nail set for this tract's S.E.C. ,

THENCE S 76deg22'23"W 46.53' along a S.B.L. of this tract to a 60d nail set for this tract's S.W.C. ,

THENCE N 13deg37'37"W 14.74' along a W.B.L. of this tract to a 60d nail set for this tract's Eastmost reentrant corner,

THENCE S 77deg04'57"W 23.21' along a S.B.L. of this tract to a 60d nail set for a somewhat reentrant corner of this tract,

THENCE S 29deg56'20"W 28.62' along a S.E. B.L. of this tract

to a 60d nail set for this tract's Southmost reentrant corner,

THENCE S 54deg24'06"E 5.82' along a N.E. B.L. of this tract to a 60d nail set for this tract's East corner,

THENCE S 35deg35'54"W 19.74' along a S.E. B.L. of this tract to a 60d nail set for this tract's South corner,

THENCE N 54deg24'06"W 12.69' along a S.W. B.L. of this tract to a 60d nail set for this tract's West corner,

THENCE N 35deg35'54"E 19.74' along a N.W. B.L. of this tract to a 60d nail set for this tract's North corner,

THENCE S 54deg24'06"E 4.86' along a N.E. B.L. of this tract to a 60d nail set for this tract's Westmost reentrant corner,

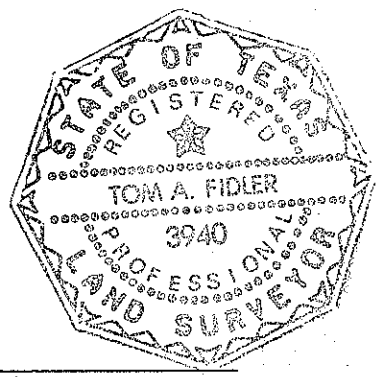
THENCE N 29deg56'20"E 29.29' along a N.W. B.L. of this tract to a 60d nail set for this tract's Southmost N.W.C. ,

THENCE N 77deg04'57"E 24.06' along a N.B.L. of this tract to a 60d nail set for this tract's Northmost reentrant corner,

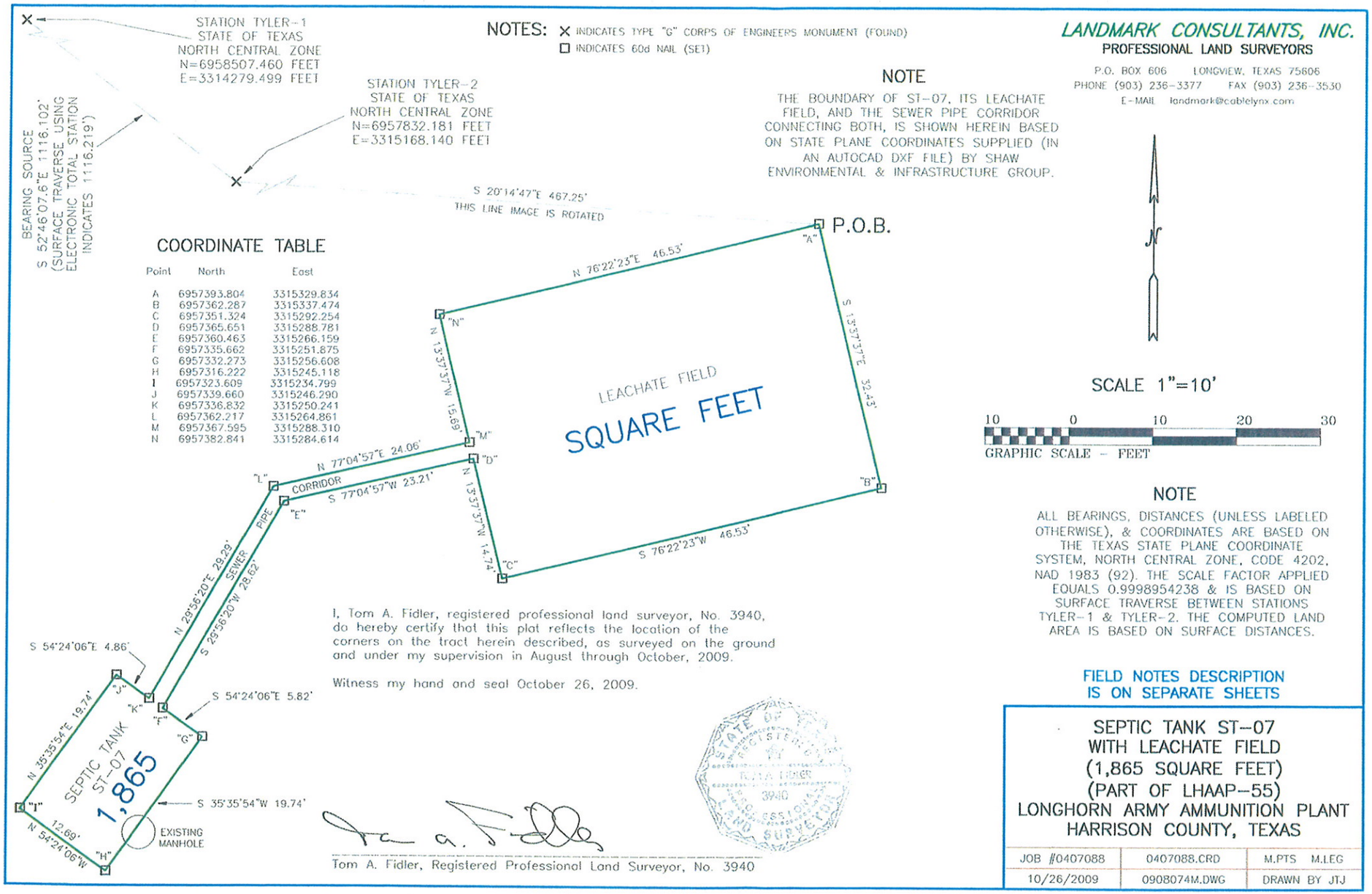
THENCE N 13deg37'37"W 15.69' along a W.B.L. of this tract to a 60d nail set for this tract's Northmost N.W.C. ,

THENCE N 76deg22'23"E 46.53' along a N.B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,865 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



NOTES: × INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
□ INDICATES 60d NAIL (SET)

COORDINATE TABLE

Point	North	East
A	6957393.804	3315329.834
B	6957362.287	3315337.474
C	6957351.324	3315292.254
D	6957365.651	3315288.781
E	6957360.463	3315266.159
F	6957335.662	3315251.875
G	6957332.273	3315256.608
H	6957316.222	3315245.118
I	6957323.609	3315234.799
J	6957339.660	3315246.290
K	6957336.832	3315250.241
L	6957362.217	3315264.861
M	6957367.595	3315288.310
N	6957382.841	3315284.614

NOTE

THE BOUNDARY OF ST-07, ITS LEACHATE FIELD, AND THE SEWER PIPE CORRIDOR CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

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E-MAIL landmark@cablelynx.com

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October, 2009.

Witness my hand and seal October 26, 2009.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

SEPTIC TANK ST-07
WITH LEACHATE FIELD
(1,865 SQUARE FEET)
(PART OF LHAAP-55)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	M.PTS M.LEG
10/26/2009	0908074M.DWG	DRAWN BY JTJ

00216690

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-08, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,785 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-08, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-2" referenced above,

THENCE S 37deg52'57"E 620.24' to a 60d nail set for the Northmost N.E.C. corner of this tract and this POINT OF BEGINNING,

THENCE S 16deg08'12"E 46.53' along an E.B.L. of this tract to a 60d nail set for this tract's Eastmost S.E.C. ,

THENCE S 73deg51'48"W 32.43' along a S.B.L. of this tract to a 60d nail set for slight deflection corner,

THENCE S 70deg49'57"W 12.79' along a S.B.L. of this tract to a 60d nail set for this tract's Southmost reentrant corner,

THENCE S 17deg16'09"E 6.37' along an E.B.L. of this tract to a 60d nail set for this tract's Westmost S.E.C. ,

THENCE S 72deg43'51"W 19.74' along a S.B.L. of this tract to a 60d nail set for this tract's only S.W.C. ,

THENCE N 17deg16'09"W 12.69' along a W.B.L. of this tract to a chisled "X" set in concrete for this tract's Southmost N.W.C. ,

THENCE N 72deg43'51"E 19.74' along a N.B.L. of this tract to a 60d nail set for this tract's Southmost N.E.C. ,

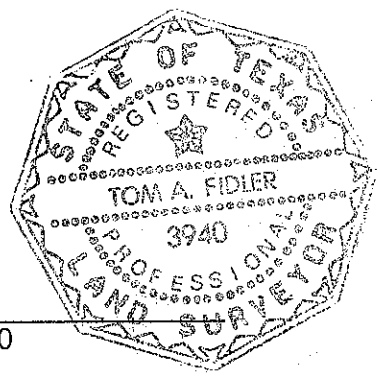
THENCE S 17deg16'09"E 4.32' along an E.B.L. of this tract to a 60d nail set for this tract's Westmost reentrant corner,

THENCE N 70deg49'57"E 12.83' along a N.B.L. of this tract to a 60d nail set for this tract's Eastmost reentrant corner,

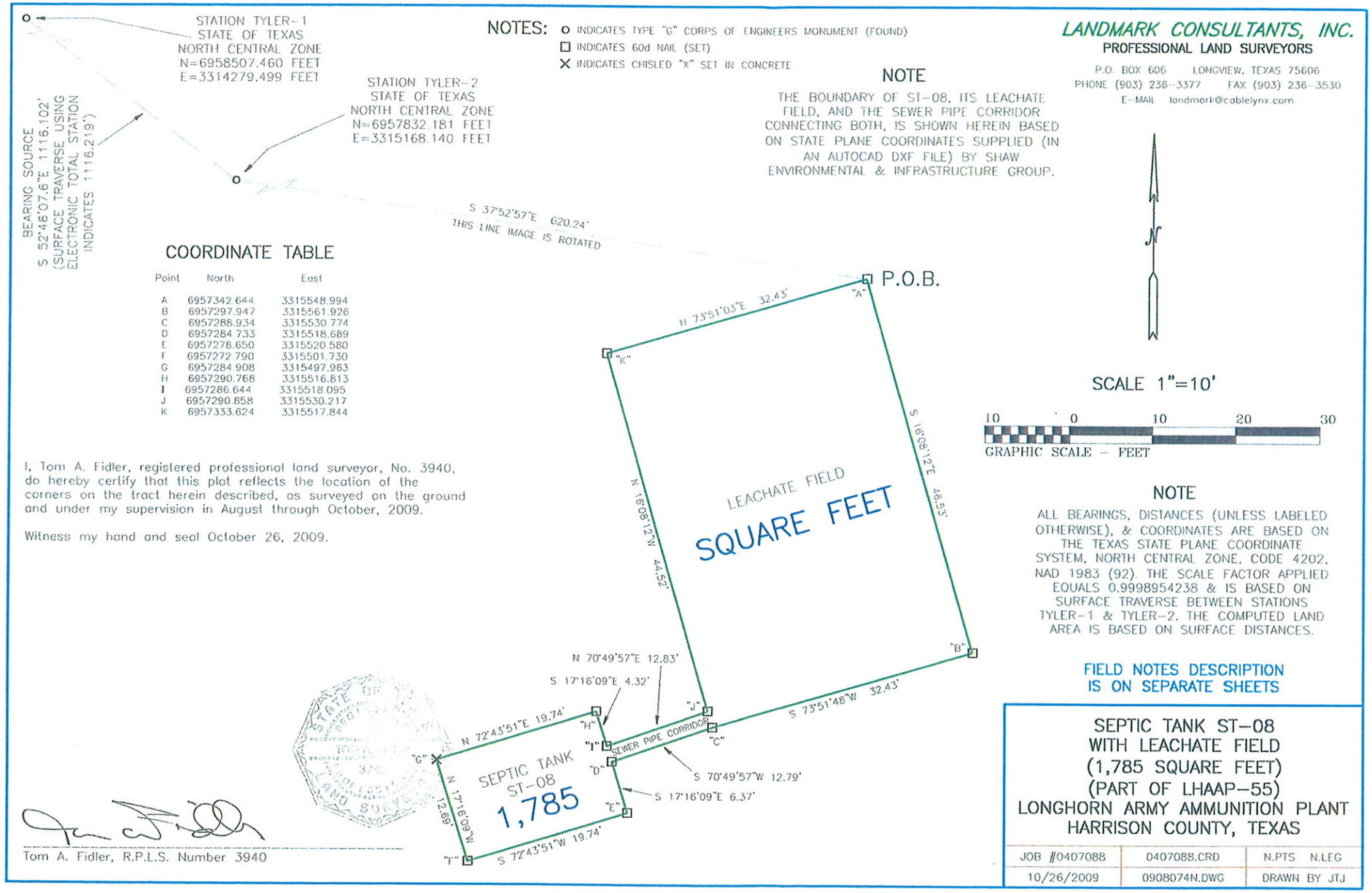
THENCE N 16deg08'12"W 44.52' along a W.B.L. of this tract to a 60d nail set for this tract's Northmost N.W.C. ,

THENCE N 73deg51'03"E 32.43' along a N.B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,785 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



NOTES: o INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
□ INDICATES 60d NAIL (SET)
X INDICATES CHISLED "X" SET IN CONCRETE

NOTE

THE BOUNDARY OF ST-08, ITS LEACHATE FIELD, AND THE SEWER PIPE CORRIDOR CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

COORDINATE TABLE

Point	North	East
A	6957342.644	3315548.994
B	6957297.947	3315561.926
C	6957288.934	3315530.774
D	6957284.733	3315518.689
E	6957278.650	3315520.580
F	6957272.790	3315501.730
G	6957284.908	3315497.963
H	6957290.768	3315516.813
I	6957286.644	3315518.095
J	6957290.858	3315530.217
K	6957333.624	3315517.844

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE – FEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October, 2009.

Witness my hand and seal October 26, 2009.

Tom A. Fidler, R.P.L.S. Number 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

SEPTIC TANK ST-08
WITH LEACHATE FIELD
(1,785 SQUARE FEET)
(PART OF LHAAP-55)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	N.PTS N.LEG
10/26/2009	0908074N.DWG	DRAWN BY JTJ

00216693

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-09, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 2,004 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-09, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-2" referenced above,

THENCE S 03deg30'04"E 1101.12' to a 60d nail set for the North corner of this tract and this POINT OF BEGINNING,

THENCE S 47deg56'14"E 12.69' along a N.E. B.L. of this tract to a 60d nail set for this tract's East corner,

THENCE S 42deg03'46"W 19.74' along a S.E. B.L. of this tract to a 60d nail set for this tract's South corner,

THENCE N 47deg56'14"W 4.08' along a S.W. B.L. of this tract to a 60d nail set for this tract's S.E. reentrant corner,

THENCE S 18deg07'53"E 120.09' along an E.B.L. of this tract to a 60d nail set for this tract's N.E. reentrant corner,

THENCE N 67deg40'46"E 15.01' along a N.B.L. of this tract to a

60d nail set for this tract's N.E.C. ,

THENCE S 22deg19'14"E 46.53' along an E.B.L. of this tract to a 60d nail set for this tract's S.E.C. ,

THENCE S 67deg40'46"W 32.43' along a S.B.L. of this tract to a 60d nail set for this tract's S.W.C. ,

THENCE N 22deg19'14"W 46.53' along a W.B.L. of this tract to a 60d nail set for this tract's N.W.C. ,

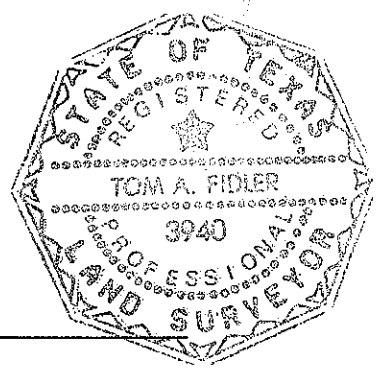
THENCE N 67deg40'46"E 15.42' along a N.B.L. of this tract to a 60d nail set for this tract's N.W. reentrant corner,

THENCE N 18deg07'53"W 123.73' along a W.B.L. of this tract to a 60d nail set for this tract's S.W. reentrant corner,

THENCE N 47deg56'14"W 4.59' along a S.W. B.L. of this tract to a 60d nail set for this tract's West corner,

THENCE N 42deg03'46"E 19.74' along a N.W. B.L. of this tract to this POINT OF BEGINNING. This tract contains 2,004 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

SEPTIC TANK ST-09
WITH LEACHATE FIELD
(2,004 SQUARE FEET)
(PART OF LHAAP-55)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	P.PTS P.LEG
10/26/2009	0908074P.DWG	DRAWN BY JTJ

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October, 2009.

Witness my hand and seal October 26, 2009.

Tom A. Fidler, R.P.L.S. Number 3940

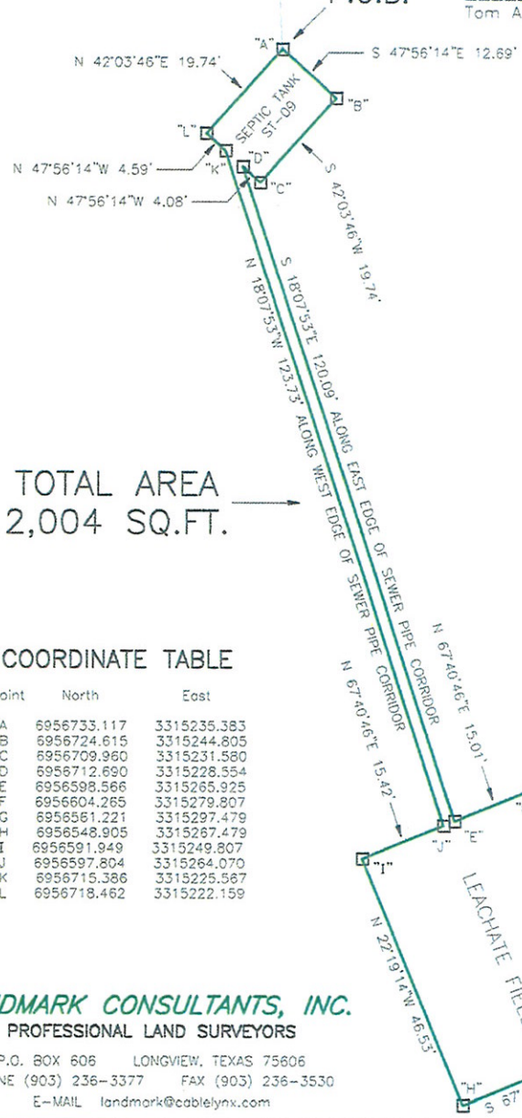
STATION TYLER-1
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6958507.460 FEET
E=3314279.499 FEET

STATION TYLER-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6957832.181 FEET
E=3315168.140 FEET

BEARING SOURCE
S 52°46'07.6"E 1116.102'
(SURFACE TRAVERSE USING
ELECTRONIC TOTAL STATION
INDICATES 1116.219')

S 03°30'04"E 1101.12'

P.O.B.



TOTAL AREA
2,004 SQ.FT.

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

NOTE

THE BOUNDARY OF ST-09, ITS LEACHATE FIELD, AND THE SEWER PIPE CORRIDOR CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

COORDINATE TABLE

Point	North	East
A	6956733.117	3315235.383
B	6956724.615	3315244.805
C	6956709.960	3315231.580
D	6956712.690	3315228.554
E	6956598.566	3315265.925
F	6956604.265	3315279.807
G	6956561.221	3315297.479
H	6956548.905	3315267.479
I	6956591.949	3315249.807
J	6956597.804	3315264.070
K	6956715.386	3315225.567
L	6956718.462	3315222.159

SCALE 1"=20'

20 0 20 40 60
GRAPHIC SCALE - FEET

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

NOTES: × INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
□ INDICATES 60d NAIL (SET)

00216696

FIELD NOTES DESCRIPTION OF
SEPTIC TANK ST-10, ITS LEACHATE FIELD, AND A 2' WIDE
CORRIDOR CENTERED ON THE SEWER PIPE CONNECTING THE TWO

CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 1,804 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note #1: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998954238, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "TYLER-1" (N=6958507.460 feet E=3314279.499 feet) and "TYLER-2" (N=6957832.181 feet E=3315168.140 feet). Said traverse indicates a surface distance of 1116.219 feet between said monuments. The computed land area is based on surface distances.

Surveyor's Note #2: This field notes description is based on State Plane coordinates supplied by Shaw Environmental & Infrastructure Group. Landmark Consultants, Inc. has not probed the ground surface in this area in an attempt to determine the location of Septic Tank ST-10, its leachate field, or the sewer pipe connecting the two.

Commencing at monument "TYLER-2" referenced above,

THENCE S 34deg34'49"E 861.93' to a 60d nail set for the Westmost N.W.C. of this tract and this POINT OF BEGINNING,

THENCE S 81deg33'36"E 46.53' along a N.B.L. of this tract to a 60d nail set for this tract's Westmost N.E.C. ,

THENCE S 08deg26'24"W 13.21' along an E.B.L. of this tract to a 60d nail set for this tract's N.E. reentrant corner,

THENCE S 82deg30'08"E 21.87' along a N.B.L. of this tract to a 60d nail set for this tract's N.W. reentrant corner,

THENCE N 08deg55'06"E 4.34' along a W.B.L. of this tract to a 60d nail set for this tract's Eastmost N.W.C. ,

THENCE S 81deg04'54"E 19.74' along a N.B.L. of this tract to a 60d nail set for this tract's Eastmost N.E.C. ,

THENCE S 08deg55'06"W 12.69' along an E.B.L. of this tract to a 60d nail set for this tract's Eastmost S.E.C. ,

THENCE N 81deg04'54"W 19.74' along a S.B.L. of this tract to a 60d nail set for this tract's Eastmost S.W.C. ,

THENCE N 08deg55'06"E 6.34' along a W.B.L. of this tract to a 60d nail set for this tract's S.W. reentrant corner,

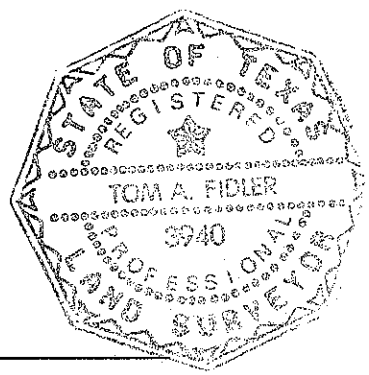
THENCE N 82deg30'08"W 21.85' along a S.B.L. of this tract to a 60d nail set for this tract's S.E. reentrant corner,

THENCE S 08deg26'24"W 17.22' along an E.B.L. of this tract to a 60d nail set for this tract's Westmost S.E.C. ,

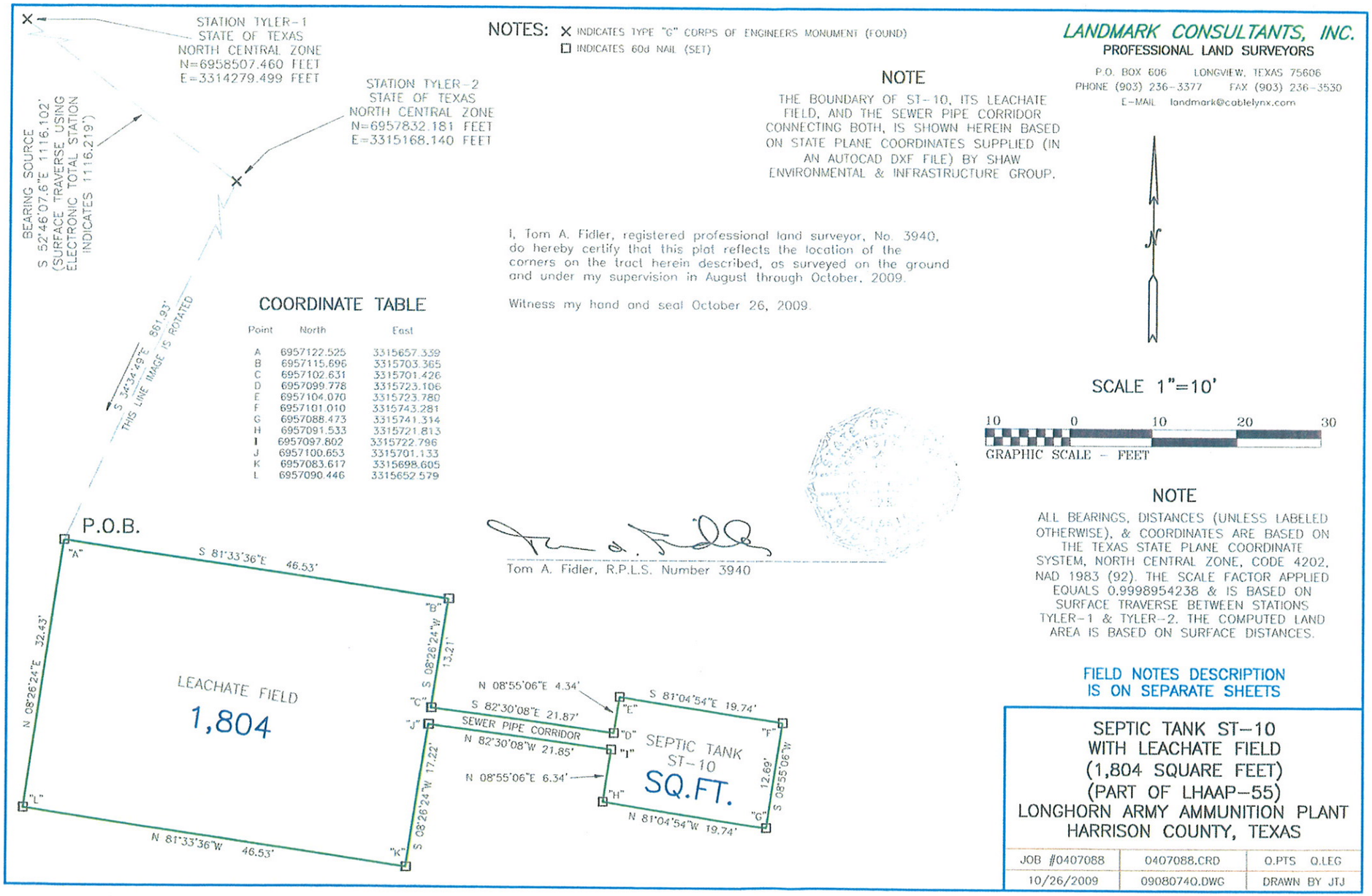
THENCE N 81deg33'36"W 46.53' along a S.B.L. of this tract to a 60d nail set for this tract's Westmost S.W.C. ,

THENCE N 08deg26'24"E 32.43' along a W.B.L. of this tract to this POINT OF BEGINNING. This tract contains 1,804 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



NOTES: X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
☐ INDICATES 60d NAIL (SET)

NOTE

THE BOUNDARY OF ST-10, ITS LEACHATE FIELD, AND THE SEWER PIPE CORRIDOR CONNECTING BOTH, IS SHOWN HEREIN BASED ON STATE PLANE COORDINATES SUPPLIED (IN AN AUTOCAD DXF FILE) BY SHAW ENVIRONMENTAL & INFRASTRUCTURE GROUP.

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October, 2009.

Witness my hand and seal October 26, 2009.

COORDINATE TABLE

Point	North	East
A	6957122.525	3315657.339
B	6957115.696	3315703.365
C	6957102.631	3315701.426
D	6957099.778	3315723.106
E	6957104.070	3315723.780
F	6957101.010	3315743.281
G	6957088.473	3315741.314
H	6957091.533	3315721.813
I	6957097.802	3315722.796
J	6957100.653	3315701.133
K	6957083.617	3315698.605
L	6957090.446	3315652.579

Tom A. Fidler, R.P.L.S. Number 3940

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998954238 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS TYLER-1 & TYLER-2. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

SEPTIC TANK ST-10
WITH LEACHATE FIELD
(1,804 SQUARE FEET)
(PART OF LHAAP-55)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	O.PTS Q.LEG
10/26/2009	09080740.DWG	DRAWN BY JTJ

00216699

LHAAP-35A(58), 58-1

LUCs FROM FINAL REMEDIAL DESIGN

September 14, 2015

Final

Remedial Design
LHAAP-35A(58), Shops Area, Group 4
Longhorn Army Ammunition Plant
Karnack, Texas

Prepared for U.S. Army Corps of Engineers – Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma 74128

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

Contract No. W912QR-04-D-0027, Task Order No. DS02
Project No. 117591
Rev 0
September 2011

Shaw® a world of Solutions™

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OFFICE	DRAWN BY	CHECKED BY
Houston, TX	B. Muske	V. Chan
	11/05/10	07/27/11

FILE PATH	APPROVED BY
T:\GIS\117591_LHAAP\Doc\Mxd\Site58\RD\SiteVicinity.mxd	S. Watson
	07/27/11

N

LHAAP-01

LHAAP-46

LHAAP-47

LHAAP-05

LHAAP-49

LHAAP-32

LHAAP-61

LHAAP-02

LHAAP-03

LHAAP-60

LHAAP-68

LHAAP-69

LHAAP-66

LHAAP-60

LHAAP-04

LHAAP-35A(58)

CURRENT SITE BOUNDARY

Goose Prairie Creek

AVENUE "P"

32ND ST.

HARRELL ST.

TACKET DR.

8TH ST.

9TH ST.

10TH ST.

11TH ST.

4TH ST.

60TH ST.

AVE. "C"

AVE. "L"

LEGEND

- Stream
- Road
- Existing Building
- Historic LHAAP-35A(58) Site Boundary
- Other LHAAP Site
- LHAAP-35A(58) Site
- Lake/Pond

0 200 400 800 Feet

Shaw®

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

FIGURE 1-2

SITE VICINITY MAP
LHAAP-35A(58), GROUP 4

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00216703

2.0 LAND USE CONTROL

The objective of the LUC at LHAAP-35A(58) is to prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health and ensure that there is no withdrawal or use of groundwater beneath the site for anything other than environmental monitoring and testing until cleanup goals are met. Notification of the groundwater use restriction will accompany all transfer documents and will be recorded at the Harrison County Courthouse in accordance with Texas Administrative Code (TAC) Title 30, §335.566. **Appendix A** provides sample LUC compliance certification documentation.

The LUC addresses the two groundwater plumes at LHAAP-35A(58) with levels of contamination that require implementation of a remedy (see **Section 1.3**). The U.S. Army is responsible for implementing, maintaining, monitoring, reporting on, and enforcing the LUC.

U.S. Army and regulators will consult to determine appropriate enforcement actions should there be a failure of an LUC objective at this site after it has transferred. U.S. Army shall obtain USEPA and Texas Commission on Environmental Quality (TCEQ) concurrence prior to termination or significant modification of the LUC, or implementation of a change in land use inconsistent with the LUC objectives and use assumptions of the remedy. Although not a remedy, the land use assumption for LHAAP-35A(58) forms the basis for the remedy. The future use of the site as part of a national wildlife refuge is consistent with the industrial risk exposure scenario. Notification of the land use assumption of this site will be made in transfer documentation and will be recorded in the Harrison County Courthouse in accordance with TAC Title 30, §335.566. Compliance with the use assumption will be documented in the five-year review reports.

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4.0 LAND USE CONTROL DESIGN AND IMPLEMENTATION PLAN

This section describes the LUC design and implementation activities for LHAAP-35A(58). The activities will result in a surveyed and recorded groundwater use restriction boundary and an operation and maintenance plan for the LUC.

The objective of the LUC at LHAAP-35A(58) is to prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health and ensure that there is no withdrawal or use of groundwater beneath the site for anything other than environmental monitoring and testing until cleanup goals are met. Notification of the groundwater use restriction will accompany all transfer documents. The U.S. Army is responsible for long-term implementation, maintenance, inspection, reporting, and enforcement of the LUC.

The LUC will address the area of LHAAP-35A(58) that includes two groundwater plumes with levels of contamination that require implementation of a remedy (see **Section 1.3**). The Land Use Control Operation and Maintenance (LUC O&M) Plan will identify the measures required for monitoring and enforcement of the groundwater use restriction. Upon review and concurrence of this RD, the LUC O&M Plan will be coordinated with regulators, finalized, and distributed as part of the Comprehensive LUC Management Plan.

4.1 Land Use Control Implementation

The U.S. Army will undertake the following actions to implement the groundwater restriction LUC for LHAAP-35A(58):

- Define the Area of the Groundwater Use Restriction. The groundwater use restriction boundary will be defined based on the review of the first round of groundwater sampling data in conjunction with historic data. The extent of plume will be bounded by a buffer and may extend to natural groundwater and surface water boundaries.

- Survey the LUC Boundary. The proposed boundary will be finalized after all wells are installed and sampled. Concurrence by USEPA and TCEQ will be obtained, and the LUC boundary will be surveyed by a State-licensed surveyor. A legal description of the surveyed area will be appended to the survey plat.

- Record the LUC in Harrison County. The LUC plat, legal description and groundwater use restriction language will be recorded in the Harrison County Courthouse in accordance with TAC Title 30, §335.566.

- Notify the Texas Department of Licensing and Regulation of the LUC. The Texas Department of Licensing and Regulation will be notified of the groundwater restriction which includes the prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval from the Army, the USEPA, and the TCEQ. The survey plat, legal boundary and description of the groundwater restriction, in conjunction with a locator map, will be provided in hard and electronic copy.

- Develop the LUC O&M Plan. A LUC O&M Plan for LHAAP-35A(58) will be developed. It will include the elements presented in **Section 4.2**, the county recordation of the LUC survey plat, legal description and restriction language, and the inspection/certification form.

4.2 Land Use Control Operation and Maintenance

The U.S. Army or its representatives will be responsible for the operation and maintenance of the LHAAP-35A(58) LUC. This includes certification, reporting and enforcement activities. The U.S. Army shall address LUC problems within its control that are likely to impact remedy integrity and shall address problems as soon as practicable. To facilitate long-term operation and maintenance of the groundwater use restriction LUC remedy, the U.S. Army will develop a plan that will encompass the elements described in the following subsections.

4.2.1 Site Certification and Reporting

Beginning with finalization of this RD and approval of the inspection form, the U.S. Army will undertake inspections and certify continued compliance with the LUC objectives. The U.S. Army, or the transferee after transfer, will retain the LUC Inspection Certification documents in the project files for incorporation into the five-year review reports, and these documents will be made available to USEPA and TCEQ upon request. In addition, should any violations be found during the certification, the U.S. Army will provide to USEPA and TCEQ, along with the document, a separate written explanation indicating the specific violations found and what efforts or measures have or will be taken to correct those violations. The need to continue certifications will be revisited at five year reviews.

4.2.2 Notice of Planned Property Conveyances

The U.S. Army shall provide notice to USEPA and TCEQ of plans to convey the LHAAP-35A(58) acreage. The notice shall describe the mechanism by which the LUC will continue to be implemented, maintained, inspected, reported, and enforced. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the Environmental Condition of Property (ECP) or other environmental document for transfer. Although the U.S. Army may transfer responsibility for various implementation actions, the U.S. Army shall retain its responsibility for remedy integrity. This means that the U.S. Army

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is responsible for addressing substantive violations of the LUC performance objective that would undermine the U.S. Army's CERCLA remedy. The U.S. Army also will be responsible for incorporating RD information and outlining the transferee's LUC obligations into property transfer documentation.

4.2.3 Opportunity to Review Text of Intended Land Use Controls

U.S. Army will provide a copy of the groundwater use restriction notification to TCEQ for review and approval prior to its recordation in Harrison County. USEPA will also receive a copy for review. In addition, the U.S. Army will produce an ECP or other environmental document for transfer of LHAAP-35A(58), but before executing transfer, the U.S. Army will provide USEPA and TCEQ with a copy of the ECP or other environmental document for transfer so that they may have reasonable opportunity, before transfer, to review all LUC-related provisions.

4.2.4 Notification Should Action(s) Which Interfere with Land Use Control Effectiveness be Discovered Subsequent to Conveyance

Should the U.S. Army discover after conveyance of the site any activity on the property inconsistent with the LUC performance objective, the U.S. Army shall notify USEPA and TCEQ within 72 hours of such discovery. Consistent with **Section 4.2.5** below, the U.S. Army will then work with USEPA, TCEQ and the transferee to correct the problem(s) discovered. This reporting requirement does not preclude the U.S. Army from taking immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health or the environment.

4.2.5 Land Use Control Enforcement

Should the LUC remedy reflected in this RD fail, the U.S. Army will coordinate with USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. These actions may range from informal resolutions with the United States Fish and Wildlife Service (USFWS) or its lessee, to the institution of judicial action against non-federal third-parties. Alternatively, should the circumstances warrant such, the U.S. Army could choose to exercise its response authorities under CERCLA. Should the U.S. Army become aware that any future owner or user of the property has violated any LUC requirement over which a local agency may have independent jurisdiction, the U.S. Army may notify those agencies of such violation(s) and work cooperatively with them to re-achieve owner/user compliance with the LUC.

4.2.6 Modification or Termination of Land Use Controls

The U.S. Army shall not, without USEPA and TCEQ concurrence, make a significant modification to, or terminate a LUC, or make a land use change inconsistent with the LUC

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objective. Likewise, the U.S. Army shall seek prior USEPA and TCEQ concurrence before commencing actions that may impact remedy integrity. In the case of an emergency action, the U.S. Army shall obtain prior USEPA and TCEQ concurrence as appropriate to the exigencies of the situation.

The LUC shall remain in effect until such time as the U.S. Army and USEPA agree that the concentrations of COCs have met cleanup levels. When this occurs, the LUC will be terminated as needed. The decision to terminate the LUC will be documented consistent with the NCP process for post-ROD changes, potentially including an explanation of significant differences or a remedial action completion report. If the property has been transferred and a determination by the U.S. Army and USEPA has been made to terminate the LUC, the U.S. Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also timely advise other local stakeholders of the action.

4.2.7 Comprehensive Land Use Control Management Plan

Upon finalization of the LUC O&M Plan, a copy will be inserted into the Comprehensive LUC Management Plan for Longhorn. The Comprehensive LUC Management Plan figure and table will be updated to reflect the inclusion of LHAAP-35A(58).

The Comprehensive LUC Management Plan consists of LHAAP RD documents and a survey plat showing the locations where LUCs being implemented at LHAAP are applied. The purpose of this Comprehensive LUC Management Plan is to ensure all site specific LUCs are compiled into one comprehensive location for both pre-transfer use by the installation and for post-transfer use by the transferee. This document will be provided to USEPA and TCEQ, and is also accessible to the local government and the public. The Comprehensive LUC Management Plan is located in the Marshall Public Library to accompany LHAAP's Administrative Record.

The land use assumption of industrial use as part of a national wildlife refuge forms the basis for the remedy at LHAAP-35A(58) and this land use assumption will be included in the Comprehensive LUC Management Plan with supporting documentation.

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LHAAP-35A(58), 58-2

NOTICE OF LAND USE CONTROLS AND NONRESIDENTIAL LAND USE AT LHAAP-35A (58) FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2015-000002402

*****DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT*****

NOTICE

8 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 03/16/2015 11:17 AM **Document Number:** 2015-000002402 **Receipt No:** 1502837 **Amount:** $ 50.00 **By:** Denise Kio, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

AECOM
112 E. PECAN ST,STE 400
FED-EX ENVELOPE
SAN ANTONIO, TX 78205

00216710

STATE OF TEXAS HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF LAND USE CONTROL AT LHAAP-35A (58)

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed remedial activities at the land described herein. The remediation site is in a former industrial area, located on the Former Longhorn Army Ammunition Plant (LHAAP) and is designated as LHAAP-35A (58) (Shops Area). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Remedial activities at LHAAP-35A (58) were performed in accordance with the FFA requirements.

The Shops Area now designated as LHAAP-35A (58) was established in 1942 as part of the installation's initial construction (Shaw, 2011). The facility was used to provide plant-operated laundry, automotive, woodworking, metalworking, painting, refrigeration, and electrical services. The site was active throughout LHAAP's mission and was deactivated along with the rest of the installation in 1996-1997. A Record of Decision (ROD) for LHAAP-35A (58) was signed by the U.S. Army and USEPA with TCEQ concurrence in 2010 establishing the final remedy which is separated into two areas: 1) eastern plume; and 2) western plume. The eastern plume remedy includes land use control (LUC); enhanced in-situ bioremediation (EISB) in the area of highest levels of constituents of concern (COCs) followed by monitored natural attenuation (MNA). The western plume remedy consists of LUC and MNA. The site was not remediated to levels suitable for unrestricted use. The LUC at LHAAP-35A (58) is required to prevent human exposure to contaminated groundwater. Further information may be found by

examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-35A (58) parcel is a 11-acre tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A. Associated with the LHAAP-35A (58) parcel is designated a LUC boundary which is a 46.524-acre tract, more or less, as described in Exhibit A. The LUC boundary is also presented in the attached Figure 1. Contained within the LHAAP-35A (58) LUC boundary are sites LHAAP-02, LHAAP-03, LHAAP-56, LHAAP-59, LHAAP-60, LHAAP-65, LHAAP-68 and LHAAP-69.

Future use of the parcel is intended as a national wildlife refuge consistent with non-residential use. For purposes of this certification, residential use includes, but is not limited to, single family or multifamily residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12. The United States Department of the Army has undertaken careful environmental study of the LHAAP-35A (58) site and concluded that the LUC set forth below is required to ensure protection of human health and the environment.

(1) Groundwater Restriction. The groundwater use restriction boundary consists of the 46.524-acre tract, more or less. Groundwater underlying this land is contaminated with tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), cis-1,2-DCE), trans-1,2-DCE, and vinyl chloride (VC) and shall not be accessed or used for any purpose without the prior written approval of the U.S. Army, the USEPA, and the TCEQ. A LUC restricting the use of groundwater has been established for the protection of human health. The U.S. Army will notify the Texas Department of Licensing and Regulation of the groundwater restriction which includes prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval by the U.S. Army, the USEPA, and the TCEQ. A restriction against the residential use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE).

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the ____th day of _____, 2015.

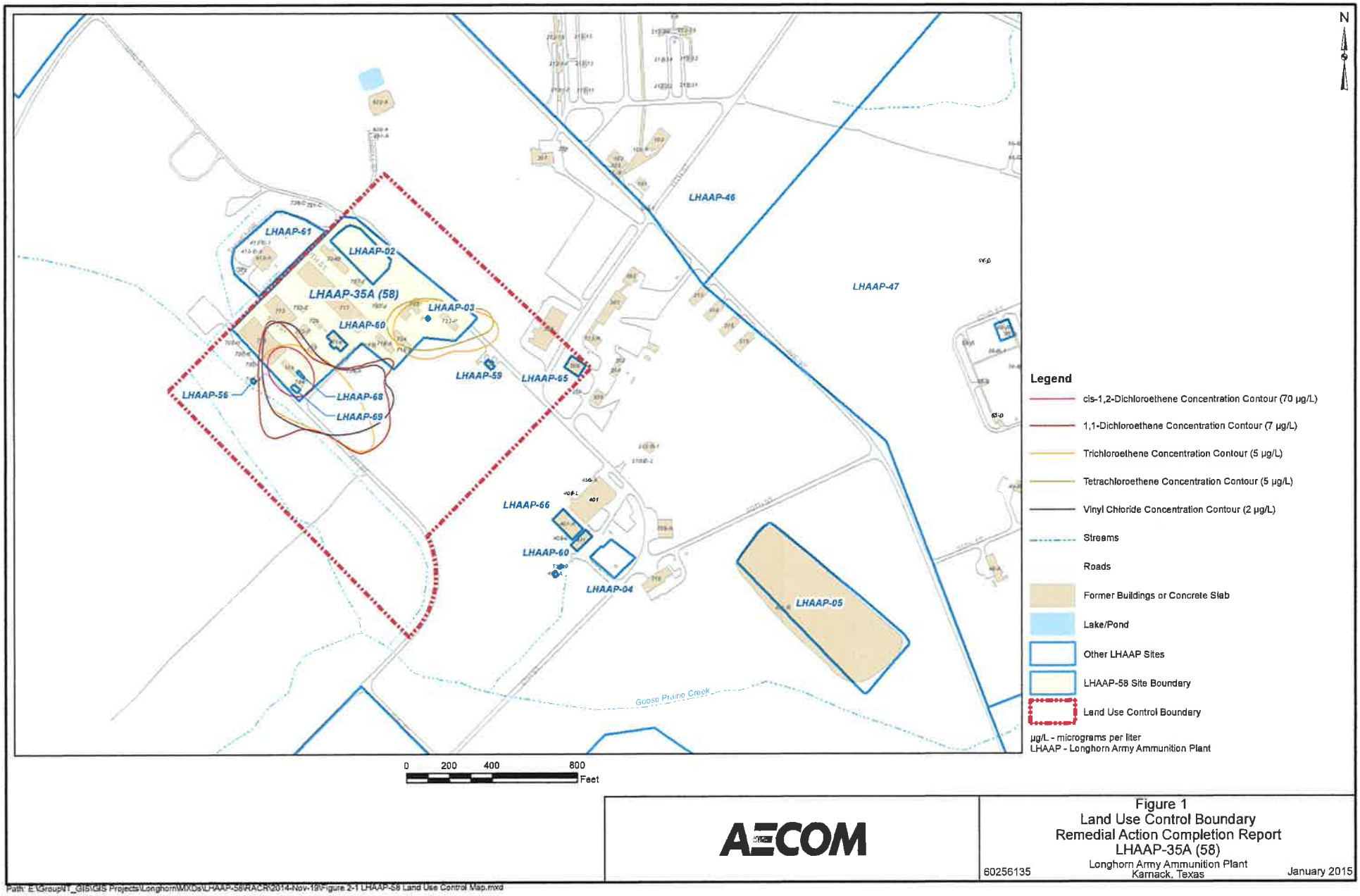
BEFORE ME, on this the 19 th day of February 2015, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 19th day of February, 2015.

Notary Public in and for the State of Texas,
County of Harrison

GENIE WARNER
Notary Public State of Texas
COMM. EXP. 8/1/2018

00216713



AECOM

Figure 1
Land Use Control Boundary
Remedial Action Completion Report
LHAAP-35A (58)
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

January 2015

Path: E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-58\RACR\2014-Nov-19\Figure 2-1 LHAAP-58 Land Use Control Map.mxd

00216714

EXHIBIT A
SURVEY PLAT

00216716

FIELD NOTES DESCRIPTION OF
"LHAAP-35A(58)" LAND USE CONTROL AREA
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, "LHAAP-35A(58)" Land Use Control Area being 46.524 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), "LHAAP-35A(58)" Land Use Control Area being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.99991470929, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "HMX-5" (N=6958206.213 feet E=3305201.721 feet). Said traverse indicates a surface distance of 2567.689 feet between said monuments. The computed land area is based on State Plane distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" and "RPLS 3940" .

Commencing at monument "X-11" referenced above,

THENCE N 52deg16'47"E 216.98' to an I.R.O.P.C. set for the North corner of this tract and this POINT OF BEGINNING,

THENCE S 47deg09'34"E 1327.84' along the N.E. B.L. of this tract to an I.R.O.P.C. set for this tract's East corner,

THENCE S 44deg05'45"W 1089.57' along a S.E. B.L. of this tract to a 60d nail set (near the Easterly edge of the asphalt pavement of "4th Street") for this tract's only reentrant corner,

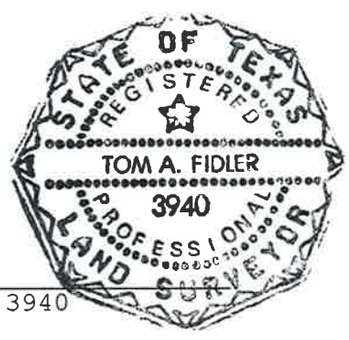
THENCE along a curve to the right (having a radius of 397.10' and an arc length of 496.33', being subtended by a chord of S 09deg27'29"W 464.64') defining this tract's E.B.L., said curve approximating the curved Easterly edge of the asphalt pavement of "4th Street", to a 60d nail found for the South end of said curve,

THENCE S 45deg14'57"W 21.48' along a S.E. B.L. of this tract to a point for this tract's Southmost corner, said point being N 17deg16'14"W 525.07' from the aforementioned "HMX-5" monument and S 44deg25'14"E 8.86' from a concrete nail set for reference near the centerline of the asphalt pavement of "4th Street",

THENCE N 44deg25'14"W 1614.70' along the S.W. B.L. of this tract to an I.R.O.P.C. set for this tract's West corner,

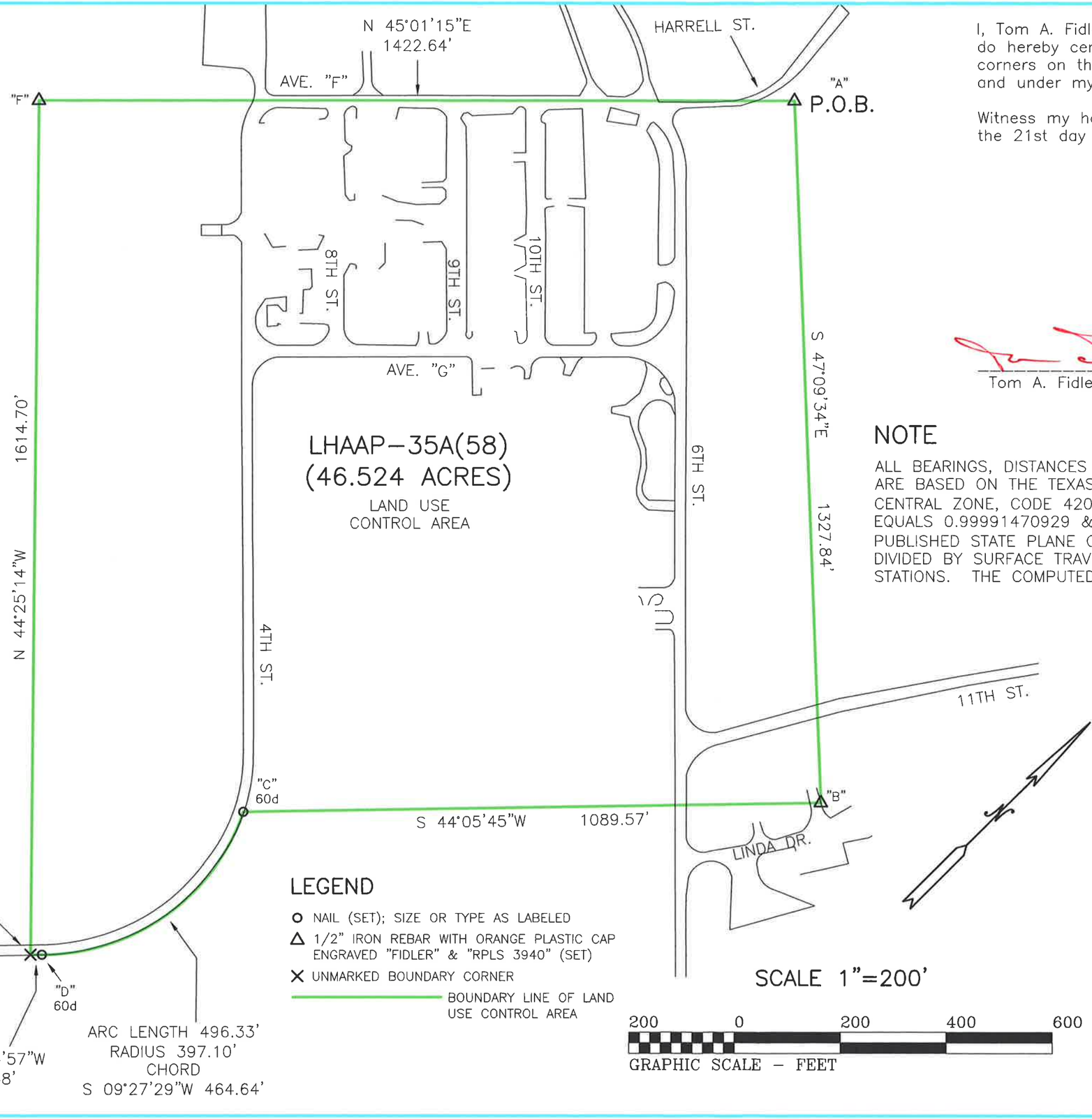
THENCE N 45deg01'15"E 1422.64' along the N.W. B.L. of this tract to this POINT OF BEGINNING, containing 46.524 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com



LEGEND

- NAIL (SET); SIZE OR TYPE AS LABELED
- 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- UNMARKED BOUNDARY CORNER
- BOUNDARY LINE OF LAND USE CONTROL AREA

SCALE 1"=200'

200 0 200 400 600
GRAPHIC SCALE – FEET

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in January, 2015.

Witness my hand and seal this the 21st day of January, 2015.

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), AND COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.99991470929 & IS BASED ON CALCULATED DISTANCE BETWEEN PUBLISHED STATE PLANE COORDINATES (OF STATIONS X-11 & HMX-5) DIVIDED BY SURFACE TRAVERSE CALCULATED DISTANCE BETWEEN SAME TWO STATIONS. THE COMPUTED LAND AREA IS BASED ON STATE PLANE DISTANCES.

COORDINATE TABLE

	NORTH	EAST
A	6960866.446	3304921.998
B	6959963.566	3305895.634
C	6959181.058	3305137.444
D	6958722.729	3305061.091
E	6958707.606	3305045.836
F	6959860.854	3303915.676

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

LHAAP-35A(58) L.U.C.A.
(46.524 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	V.PTS V.LEG
01/21/2015	1103025V.DWG	DRAWN BY JTJ

00216717

LHAAP-35A(58), 58-3

LAND USE CONTROL COMPLIANCE INSPECTION FORM

September 14, 2015

Sample Annual Land Use Control Compliance Certification Documentation

In accordance with the Remedial Design dated 9/30/11 for LHAAP-35A (58) a certification of site was conducted by _____ [indicate transferee] on _____.

A summary of land use control mechanisms is as follows:

- Groundwater restriction – A restriction against use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE). [Indicate whether groundwater restrictions are still required at LHAAP-35A (58)]

A summary of compliance with land use and restriction covenants is as follows:

- No use of groundwater, installation of new groundwater wells, or tampering with existing wells at LHAAP-35A (58).

I, the undersigned, do document that the certification was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: _____

Name/Title: _____

Signature: _____

Annual compliance certification forms shall be completed no later than March 1 of each year for the previous calendar year.

LHAAP-59

NOTICE OF NONRESIDENTIAL LAND USE FOR LHAAP-59 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216720

2011-000003378

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

NOTICE

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 03/24/2011 03:52 PM **Document Number:** 2011-000003378 **Receipt No:** 1103745 **Amount:** $ 32.00 **By:** Lauren Boyd, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

AARON WILLIAMS EC-ER
1645 SOUTH 101ST EAST AVENUE

STATE OF TEXAS HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remedial investigation of the land described herein. The site, LHAAP-59, the former Pesticide Storage Building 725, was constructed in 1984 to support maintenance activities at the plant as a pesticide storage building. LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-59 is not itself considered an NPL site. Environmental activities at LHAAP-59 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-59 consists of a Building 725 and the surrounding area. The building, now removed, contained a concrete floor with floor drains that discharged to two nearby sumps. Soil samples were collected near the building and sumps and analyzed for metals, semivolatile organic compounds, volatile organic compounds, dioxins and furans in the 1990s and in 2007 additional samples were collected and analyzed for pesticides and herbicides near the sumps and at the building. Low levels of pesticides were detected. An analysis demonstrated that

these chemicals in soil did not exhibit a potential for release to the groundwater in excess of the groundwater MSC (GW-Ind) and were considered to be protective for nonresidential worker exposure, as specified in 30 TAC §335.559(g)(2)(B). Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30
p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-59 parcel is a 0.2537 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-59 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-59. Contaminants in soil samples from LHAAP-59 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-59 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-59 is consistent with the non-residential use scenario evaluated in the risk screening. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multifamily residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through
12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 25 th day of January, 2011~~0~~.

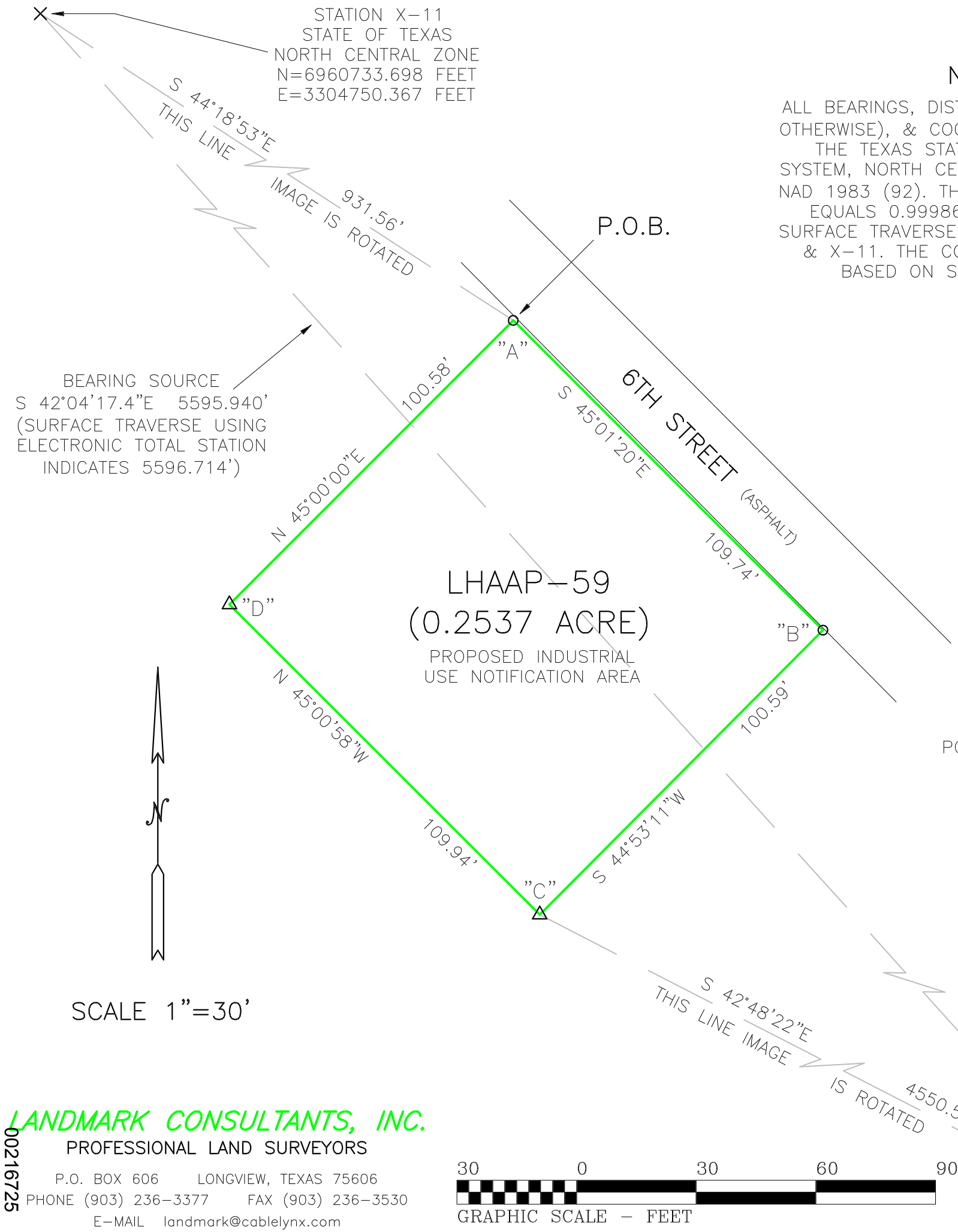
BEFORE ME, on this the 25 th day of Jan 2011, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 25 day of January, 2011~~0~~.

Notary Public in and for the State of Texas,
County of Harrison

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

00216724



NOTE

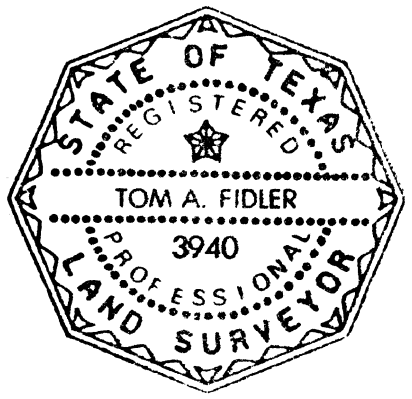
ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS C–21 & X–11. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

COORDINATE TABLE

POINT	NORTH	EAST
A	6960067.154	3305401.154
B	6959989.588	3305478.780
C	6959918.320	3305407.794
D	6959996.035	3305330.035

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in July 2008.

Witness my hand and seal this the 29th day of July, 2008



Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTES:

- X INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- O INDICATES CONCRETE NAIL IN BOTTLE CAP (SET IN ASPHALT)
- △ INDICATES 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- INDICATES BOUNDARY OF PROPOSED INDUSTRIAL USE NOTIFICATION AREA

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236–3377 FAX (903) 236–3530
E–MAIL landmark@cablelynx.com

00216725

LHAAP–59
(0.2537 ACRE)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	0605063D.DWG
07/29/2008	0605063.CRD	DRAWN BY JTJ

FIELD NOTES DESCRIPTION OF
"LHAAP–59" TRACT
(PROPOSED INDUSTRIAL USE NOTIFICATION AREA)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP–59" being 0.2537 acre of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP–59" being more particularly described as follows :

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X–11" (N=6960733.698 feet E=3304750.367 feet) and "C–21" (N=6956579.781 feet E=3308499.969 feet). Said traverse indicates a surface distance of 5596.714 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940", and the abbreviation C.N.I.B.C. indicates concrete nail in bottle cap.

Commencing at monument "X–11" referenced above,

THENCE S 44deg18'53"E 931.56' to a C.N.I.B.C. set (in the asphalt pavement of the road known as 6th Street) for the North corner of this tract and this POINT OF BEGINNING,

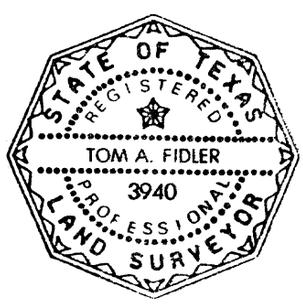
THENCE S 45deg01'20"E 109.74' along the N.E. B.L. of this tract to a C.N.I.B.C. set (in the asphalt pavement of the road known as 6th Street) for this tract's East corner,

THENCE S 44deg53'11"W 100.59' along the S.E. B.L. of this tract to an I.R.O.P.C. set for this tract's South corner, from which the monument "C–21" referenced above bears S 42deg48'22"E 4550.54',

THENCE N 45deg00'58"W 109.94' along the S.W. B.L. of this tract to an I.R.O.P.C. set for this tract's West corner,

THENCE N 45deg00'00"E 100.58' along the N.W. B.L. of this tract to this POINT OF BEGINNING, containing 0.2537 acre, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler

Tom A. Fidler, R.P.L.S. Number 3940

00216726

LHAAP-60

NOTICE OF NONRESIDENTIAL LAND USE AT LHAAP-60 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2010-000005561

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

16 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 04/27/2010 04:08 PM **Document Number:** 2010-000005561 **Receipt No:** 1006195 **Amount:** $ 72.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW E & I
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216728

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-60, consisted of four pesticide storage buildings located in the steam plant and shops area of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-60 is not itself considered an NPL site. Environmental activities at LHAAP-60 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-60 consisted of buildings 411, 411-A, 714, and shed TS-80, which were located in the northwestern portion of LHAAP near the steam plant and shops area in the general vicinity of sites LHAAP-02, LHAAP-04, LHAAP-35A(58), and LHAAP-66. Pesticides and herbicides were stored in the now demolished buildings. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at

the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-60 parcels include: Building 411 with 4,242 square feet, more or less, or 0.09738 acre tract; Building TS-80 with 186 square feet, more or less, or 0.00426 acre tract; Building 411-A with 484 square feet, more or less, or 0.01111 acre tract; and Building 714 with 4,468 square feet, more or less, or 0.10463 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-60 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-60. Contaminants in soil samples from LHAAP-60 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-60 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-60 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951
or
Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 10 th day of March 2010.

BEFORE ME, on this the 10 th day of March, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 10 day of March, 2010.

Notary Public in and for the State of Texas,
County of Harrison

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

FIELD NOTES DESCRIPTION OF
"LHAAP-60A" TRACT
(FOUNDATION SLAB OF DEMOLISHED BUILDING 411)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-60A" being the concrete foundation slab of demolished Building 411, "LHAAP-60A" being located within the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-60A" being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "C-21" (N=6956579.781 feet E=3308499.969 feet). Said traverse indicates a surface distance of 5596.714 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "X-11" referenced above,

THENCE S 42deg04'17.4"E 1875.89' to a point, from which point monument "C-21" referenced above bears S 42deg04'17.4"E 3720.05',

(as used below, the abbreviation C.C.F.S. indicates corner of concrete foundation slab)

THENCE S 47deg55'43"W 188.47' to a C.C.F.S. found for the Northmost corner of this tract and this description's POINT OF BEGINNING,

THENCE S 45deg09'46"E 41.80' along the Northeast B.L. of this tract to a C.C.F.S. found for this tract's Eastmost corner,

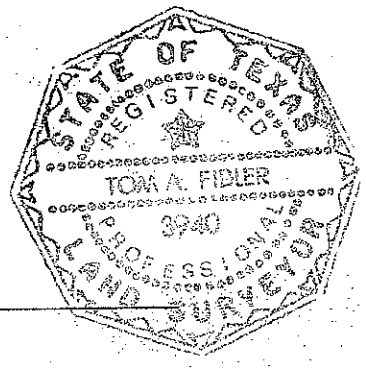
THENCE S 44deg51'53"W 101.29' along the Southeast B.L. of this

tract to a C.C.F.S. found for this tract's Southmost corner,

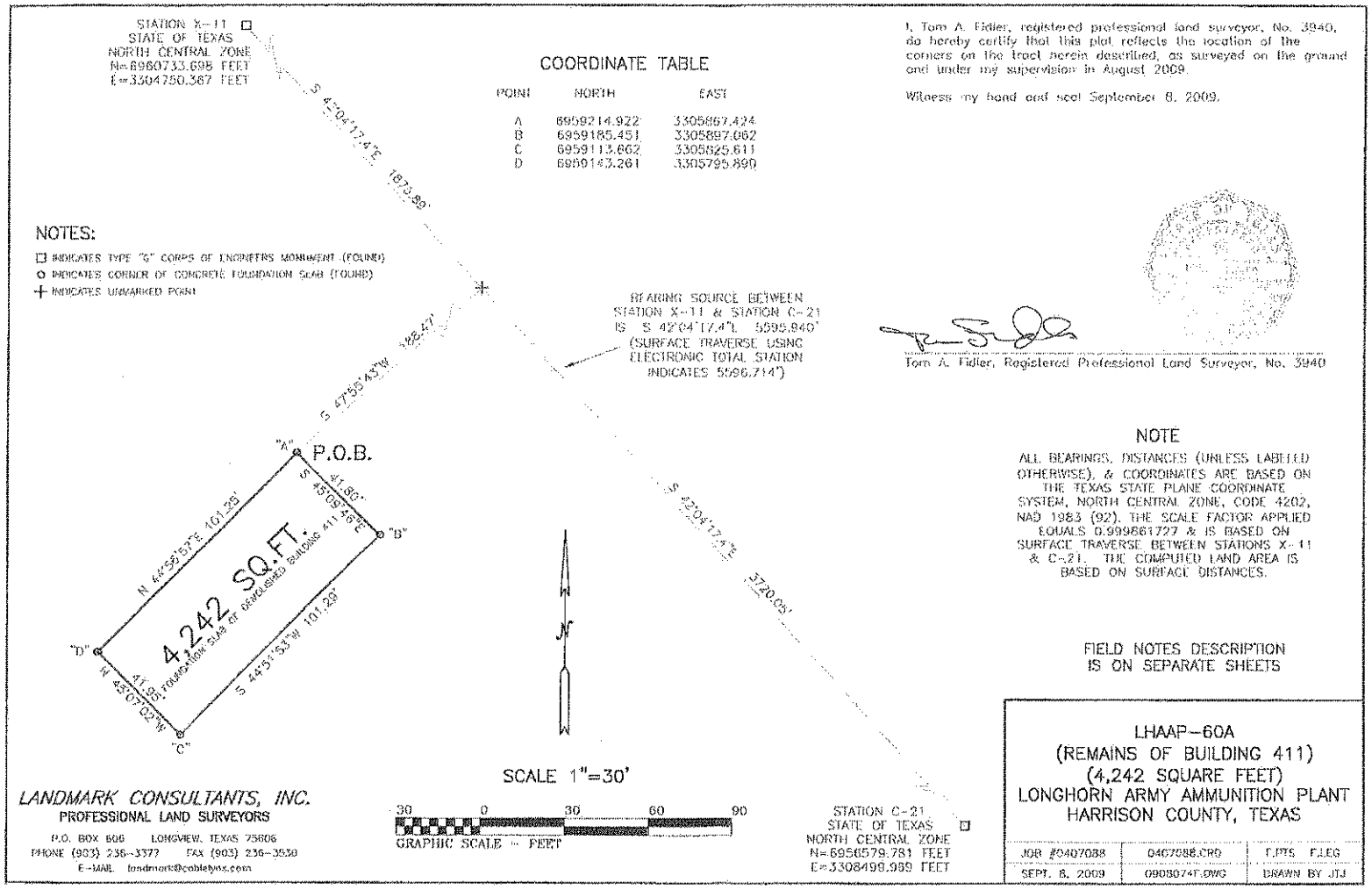
THENCE N 45deg07'02"W 41.95' along the Southwest B.L. of this tract to a C.C.F.S. found for this tract's Westmost corner,

THENCE N 44deg56'57"E 101.25' along the Northwest B.L. of this tract to this POINT OF BEGINNING. This tract contains 4,242 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



COORDINATE TABLE

POINT	NORTH	EAST
A	6959214.922	3305867.424
B	6959185.451	3305897.062
C	6959113.662	3305825.611
D	6959143.261	3305795.890

NOTES:

- ☐ INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- ○ INDICATES CORNER OF CONCRETE FOUNDATION SLAB (FOUND)
- + INDICATES UNMARKED POINT

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August 2009.

Witness my hand and seal September 8, 2009.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & C-21. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 806 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cobleyinc.com

LHAAP-60A
(REMAINS OF BUILDING 411)
(4,242 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	F.PTS F.LEG
SEPT. 8, 2009	0908074F.DWG	DRAWN BY JTJ

"LHAAP-60B" TRACT
(BUILDING TS-80)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, the perimeter of tract "LHAAP-60B" being defined by the four corners of the external face of the exterior walls of Building TS-80 (said Building is constructed of galvanized corrugated sheet metal), tract "LHAAP-60B" being located within the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-60B" being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "C-21" (N=6956579.781 feet E=3308499.969 feet). Said traverse indicates a surface distance of 5596.714 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "X-11" referenced above,

THENCE S 42deg04'17.4"E 1919.72' to a point, from which point monument "C-21" referenced above bears S 42deg04'17.4"E 3676.22',

(as used below, the abbreviation C.E.F.E.W. indicates Corner of the External Face of the Exterior Walls of Building TS-80)

THENCE S 47deg55'43"W 378.14' to a C.E.F.E.W. found for the Northmost corner of this tract and this description's POINT OF BEGINNING,

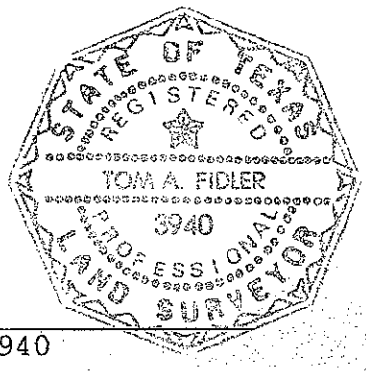
THENCE S 41deg54'33"E 8.55' along the Northeast B.L. of this tract to a C.E.F.E.W. found for this tract's Eastmost corner,

THENCE S 48deg12'22"W 22.54' along the Southeast B.L. of this tract to a C.E.F.E.W. found for this tract's Southmost corner,

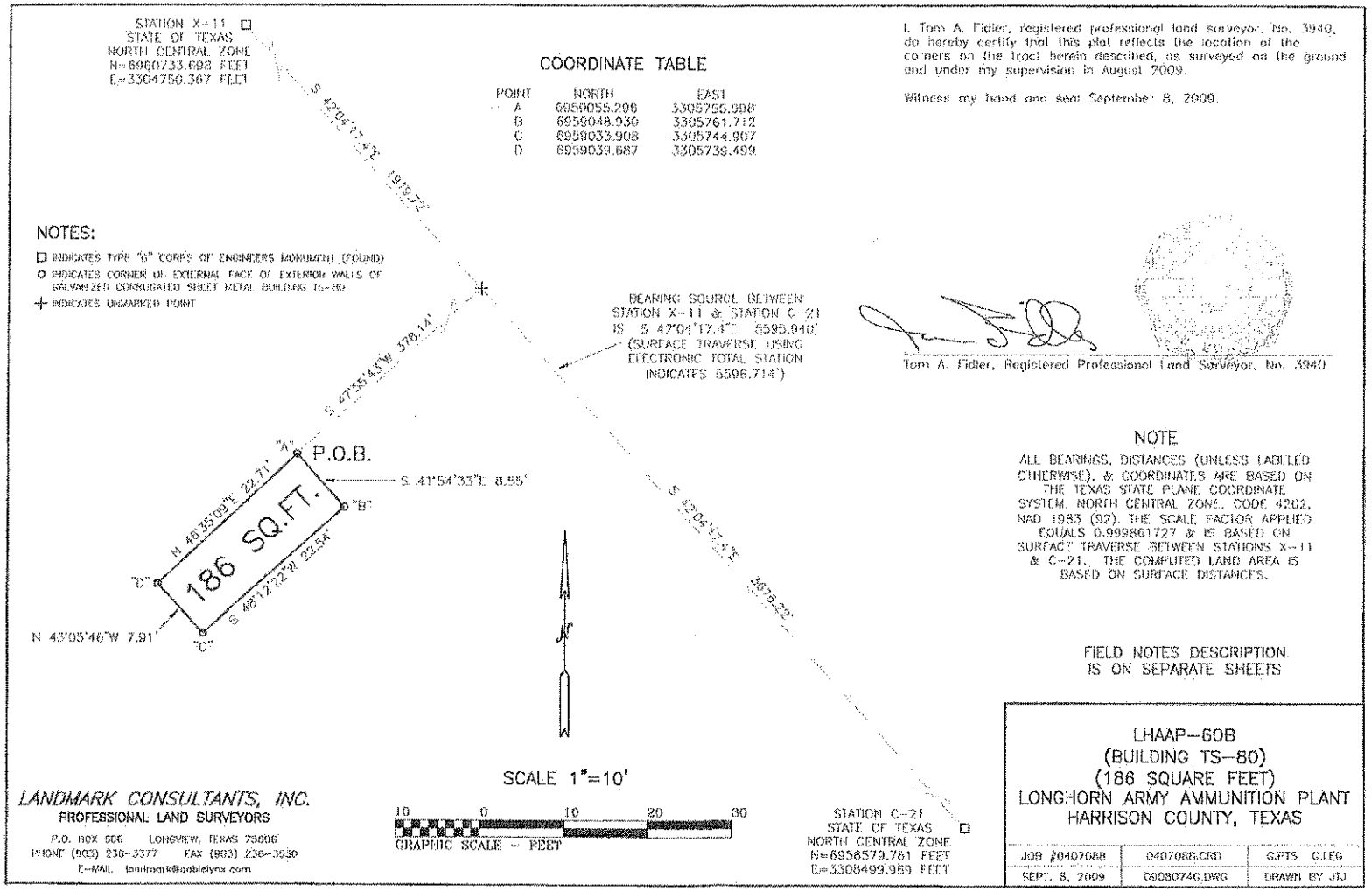
THENCE N 43deg05'46"W 7.91' along the Southwest B.L. of this tract to a C.E.F.E.W. found for this tract's Westmost corner,

THENCE N 46deg35'09"E 22.71' along the Northwest B.L. of this tract to this POINT OF BEGINNING. This tract contains 186 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



COORDINATE TABLE

POINT	NORTH	EAST
A	6959055.296	3305755.988
B	6959048.930	3305761.712
C	6959033.908	3305744.907
D	6959039.687	3305739.499

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August 2009.

Witness my hand and seal September 8, 2009.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940.

NOTES:

- ☐ INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- O INDICATES CORNER OF EXTERNAL FACE OF EXTERIOR WALLS OF GALVANIZED CORRUGATED SHEET METAL BUILDING TS-80
- + INDICATES UNMARKED POINT

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & C-21. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 506 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3550
E-MAIL landmark@cablelynx.com

LHAAP-60B
(BUILDING TS-80)
(186 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	G.PTS C.LEG
SEPT. 8, 2009	0908074C.DWG	DRAWN BY JTJ

FIELD NOTES DESCRIPTION OF
"LHAAP-60C" TRACT
(FOUNDATION SLAB OF DEMOLISHED BUILDING 411-A)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-60C" being the concrete foundation slab of demolished Building 411-A, tract "LHAAP-60C" being located within the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-60C" being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "C-21" (N=6956579.781 feet E=3308499.969 feet). Said traverse indicates a surface distance of 5596.714 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "X-11" referenced above,

THENCE S 42deg04'17.4"E 1924.12' to a point, from which point monument "C-21" referenced above bears S 42deg04'17.4"E 3671.82',

(as used below, the abbreviation C.C.F.S. indicates corner of concrete foundation slab)

THENCE S 47deg55'43"W 418.77' to a C.C.F.S. found for the Northmost corner of this tract and this description's POINT OF BEGINNING,

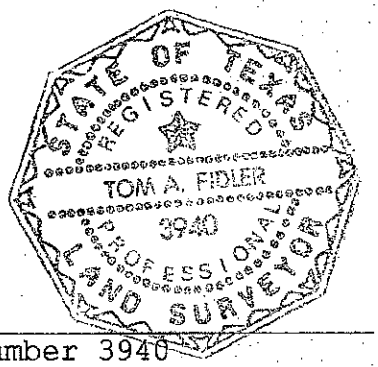
THENCE S 28deg26'16"E 24.08' along the Northeast B.L. of this tract to a C.C.F.S. found for this tract's Eastmost corner,

THENCE S 61deg38'48"W 20.15' along the Southeast B.L. of this tract to a C.C.F.S. found for this tract's Southmost corner,

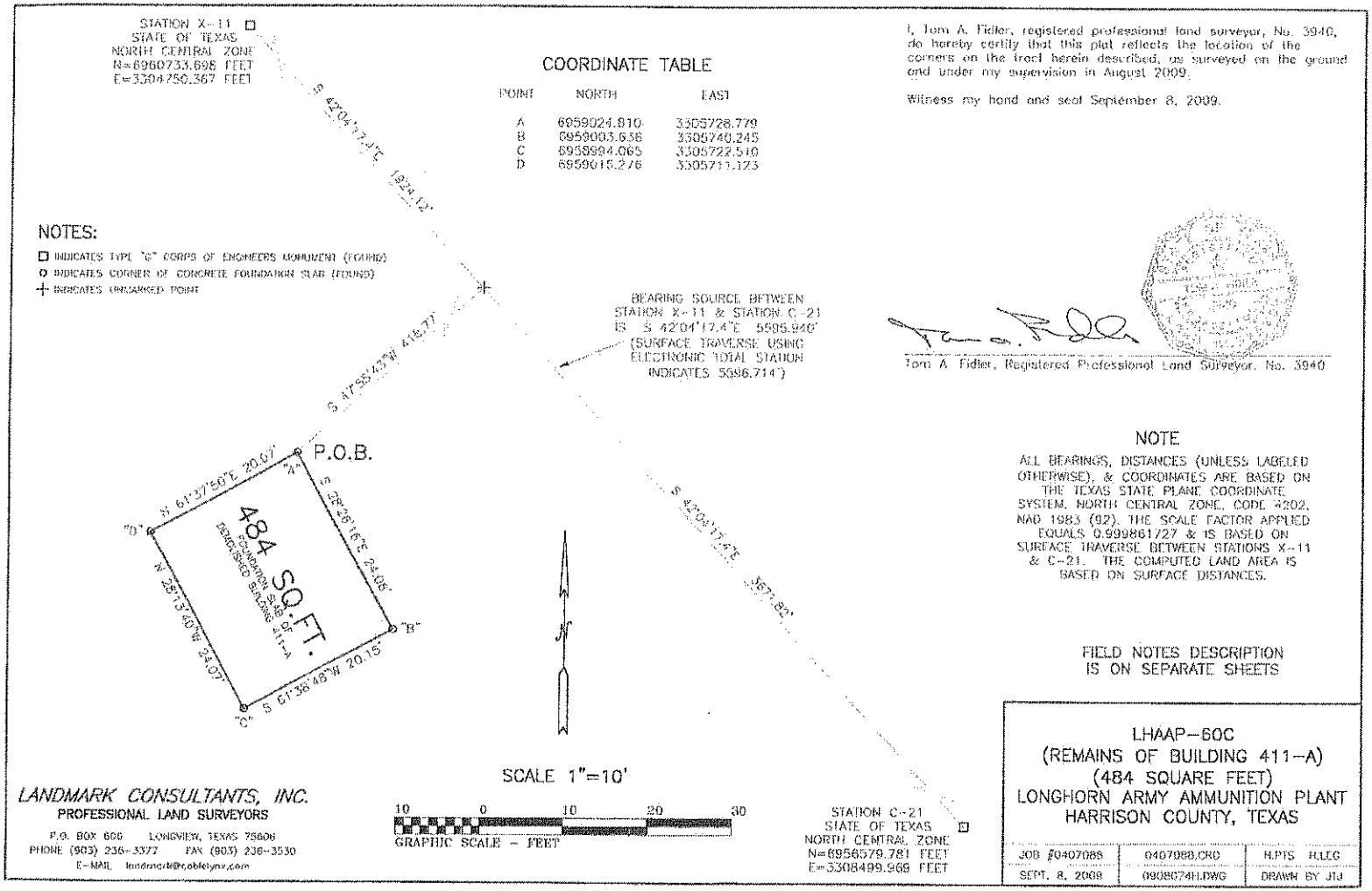
THENCE N 28deg13'40"W 24.07' along the Southwest B.L. of this tract to a C.C.F.S. found for this tract's Westmost corner,

THENCE N 61deg37'50"E 20.07' along the Northwest B.L. of this tract to this POINT OF BEGINNING. This tract contains 484 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



COORDINATE TABLE

POINT	NORTH	EAST
A	6959024.810	3305728.779
B	6959003.636	3305740.245
C	6958994.065	3305722.510
D	6959015.276	3305711.173

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August 2009.

Witness my hand and seal September 8, 2009.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTES:

- ☐ INDICATES TYPE "C" CORPS OF ENGINEERS MONUMENT (FOUND)
- O INDICATES CORNER OF CONCRETE FOUNDATION SLAB (FOUND)
- ⊕ INDICATES UNMARKED POINT

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & C-21. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cableone.com

LHAAP-60C
(REMAINS OF BUILDING 411-A)
(484 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	H.PTS H.LLG
SEPT. 8, 2009	0908074HLDWG	DRAWN BY JTJ

00216740

FIELD NOTES DESCRIPTION OF
"LHAAP-60D" TRACT
(INCLUDES FOUNDATION SLAB OF DEMOLISHED BUILDING #714)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-60D" including the concrete foundation slab of demolished Building #714 plus an area adjacent to the Southwest edge of said slab, "LHAAP-60D" being located within the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-60D" being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "C-21" (N=6956579.781 feet E=3308499.969 feet). Said traverse indicates a surface distance of 5596.714 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "X-11" referenced above,

THENCE S 42deg04'17.4"E 395.512' to a point, from which point monument "C-21" referenced above bears S 42deg04'17.4"E 5200.428'

(as used below, the abbreviation C.C.F.S. indicates corner of concrete foundation slab)

THENCE S 47deg55'43"W 442.92' to a C.C.F.S. found for the Northmost corner of this tract and this description's POINT OF BEGINNING,

THENCE S 44deg51'26"E 91.43' along the Northeast B.L. of this tract, and generally along the Northeast edge of said concrete slab, to a C.C.F.S. found for this tract's Eastmost corner,

THENCE S 44deg50'54"W 44.35' along a Southeast B.L. of this tract, and generally along the Southeast edge of said concrete slab, to a C.C.F.S. found for this tract's Southmost corner,

THENCE N 44deg59'57"W 29.43' along a Southwest B.L. of this tract, and generally along the Southwest edge of said concrete slab, to a point for this tract's Southmost reentrant corner,

THENCE S 45deg00'03"W 14.90' along a Southeast B.L. of this tract to a 60d nail set for this tract's Westmost South corner,

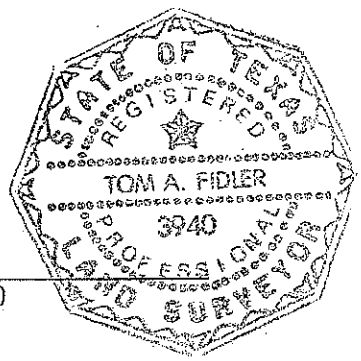
THENCE N 44deg59'57"W 32.36' along a Southwest B.L. of this tract to a 60d nail set for this tract's Southmost West corner,

THENCE N 45deg00'03"E 14.90' along a Northwest B.L. of this tract to a point for this tract's Northmost reentrant corner,

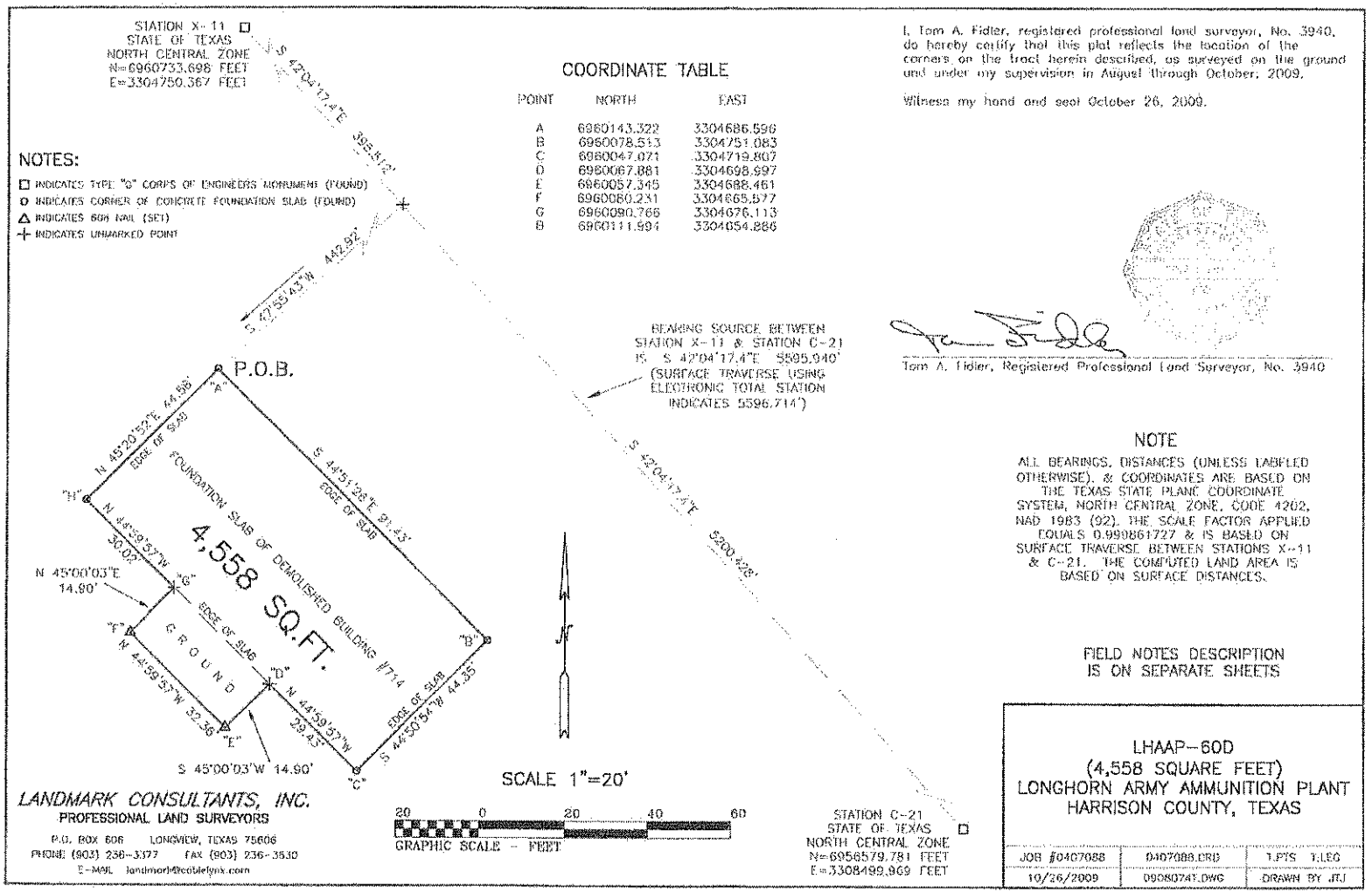
THENCE N 44deg59'57"W 30.02' along a Southwest B.L. of this tract, and generally along the Southwest edge of said concrete slab, to a C.C.F.S. found for this tract's Northmost West corner,

THENCE N 45deg20'52"E 44.58' along a Northwest B.L. of this tract, and generally along the Northwest edge of said concrete slab, to this POINT OF BEGINNING. This tract contains 4,558 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



NOTES:

- □ INDICATES TYPE "B" CORPS OF ENGINEERS MONUMENT (FOUND)
- o INDICATES CORNER OF CONCRETE FOUNDATION SLAB (FOUND)
- △ INDICATES 60d NAIL (SET)
- ┼ INDICATES UNMARKED POINT

COORDINATE TABLE

POINT	NORTH	EAST
A	6960143.322	3304686.596
B	6960078.513	3304751.083
C	6960047.071	3304719.807
D	6960067.881	3304698.997
E	6960057.345	3304688.461
F	6960080.231	3304665.577
G	6960090.766	3304676.113
B	6960111.994	3304654.886

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October, 2009.

Witness my hand and seal October 26, 2009.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & C-21. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cebridgelynx.com

LHAAP-60D
(4,558 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.DRJ	1 PTS 1 LEG
10/26/2009	09080747.DWG	DRAWN BY JRJ

00216743

LHAAP-64

NOTICE OF NONRESIDENTIAL LAND USE AT LHAAP-64 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2010-000005558

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

7 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 04/27/2010 04:08 PM **Document Number:** 2010-000005558 **Receipt No:** 1006195 **Amount:** $ 36.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW E & I
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216745

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-64, is the location of a former transformer storage area located in the western portion of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-64 is not itself considered an NPL site. Environmental activities at LHAAP-64 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-64 is located next to site LHAAP-29. Polychlorinated biphenyl (PCB)-containing transformers were stored on a pad on Zeugner Drive immediately southwest of Building 707-B. Approximately 20 out-of-service non-PCB transformers were stored on pallets with no curbs or other containment. The site was used for the storage of transformer oil. The contaminants of concern were petroleum and oil lubricants and PCBs. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas

75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-64 parcel is 847 square feet, more or less, or 0.01944 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-64 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-64. Contaminants in soil samples from LHAAP-64 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-64 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-64 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951
or
Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 10th day of March, 2010.

BEFORE ME, on this the 10 th day of March, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 10 day of March, 2010.

Notary Public in and for the State of Texas,
County of Harrison

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

FIELD NOTES DESCRIPTION OF
"LHAAP-64" TRACT
(ADJACENT TO FOUNDATION SLAB OF DEMOLISHED BUILDING #707-B)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-64" being located within the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), tract "LHAAP-64" being adjacent to the Southwest edge of the concrete foundation slab of demolished Building #707-B, tract "LHAAP-64" being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998463585, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "C-1" (N=6955947.067 feet E=3305400.600 feet) and "C-22" (N=6955892.461 feet E=3307823.958 feet). Said traverse indicates a surface distance of 2424.346 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "C-1" referenced above,

THENCE S 32deg52'16"W 338.58' to the West corner of the concrete slab of demolished building 707-B, said slab corner marking the North corner of this tract and this POINT OF BEGINNING,

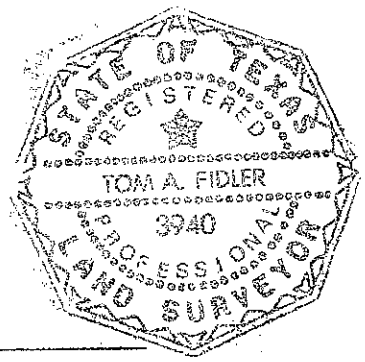
THENCE S 45deg00'47"E 29.76' along the N.E. B.L. of this tract, and generally along the Southwest edge of said concrete slab, to the South corner of said concrete slab, said slab corner marking the East corner of this tract,

THENCE S 44deg55'45"W 28.44' along the S.E. B.L. of this tract to a concrete nail with head dimple set (in asphalt) for the South corner of this tract,

THENCE N 45deg00'47"W 29.75' along the S.W. B.L. of this tract to a concrete nail with head dimple set (in asphalt) for the West corner of this tract,

THENCE N 44deg54'27"E 28.44' along the N.W. B.L. of this tract to this POINT OF BEGINNING. This tract contains 847 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



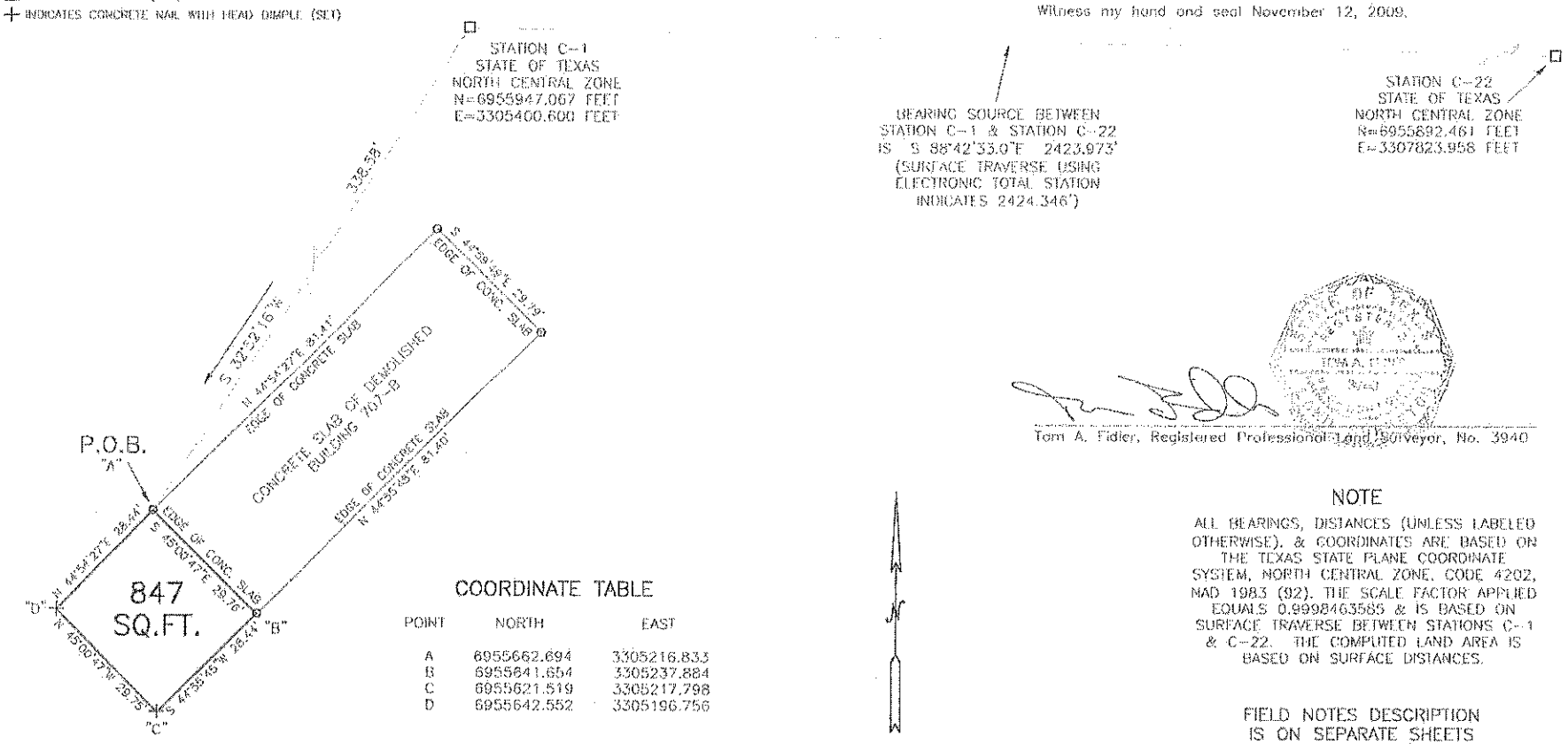
Tom A. Fidler, R.P.L.S. Number 3940

NOTES:

□ INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
O INDICATES CORNER OF CONCRETE FOUNDATION SLAB (FOUND)
△ INDICATES 60d NAIL (SET)
+ INDICATES CONCRETE NAIL WITH HEAD DIMPLE (SET)

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through November, 2009.

Witness my hand and seal November 12, 2009.



COORDINATE TABLE

POINT	NORTH	EAST
A	6955662.694	3305216.833
B	6955641.654	3305237.884
C	6955621.519	3305217.798
D	6955642.552	3305196.756

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999846358S & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS C-1 & C-22. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

SCALE 1"=20'

20 0 20 40 60
GRAPHIC SCALE – FEET

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-5377 FAX (903) 236-3530
E-MAIL landmark@cobleyne.com

LHAAP-64
(847 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	0 PTS 0 LEG
NOV. 12, 2009	090807AU.DWG	DRAWN BY JDJ

LHAAP-66

NOTICE OF NONRESIDENTIAL LAND USE AT LHAAP-66 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216752

2010-000005559

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

7 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 04/27/2010 04:08 PM **Document Number:** 2010-000005559 **Receipt No:** 1006195 **Amount:** $ 36.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW E & I
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216753

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-66, is the location of a leaking transformer from the electric power substation and transformer area, near Building 401. Building 401 housed gas-fired boilers that generated steam for distribution throughout the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-66 is not itself considered an NPL site. Environmental activities at LHAAP-66 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-66 is located at the electric power substation and includes several transformers. One of these transformers was reported to be leaking, but subsequent environmental activities confirmed there was no release to the soil from polychlorinated biphenyls. The electric power substation still provides power to parts of LHAAP. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465,

Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-66 parcel is 8,616 square foot, more or less, or 0.19779 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-66 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-66. Contaminants in soil samples from LHAAP-66 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-66 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-66 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951
or
Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D:C. 20310-0600

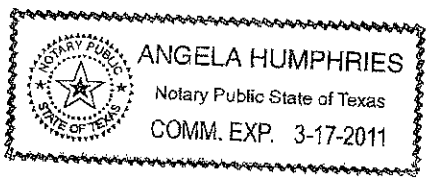
Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 10th day of March, 2010.

BEFORE ME, on this the 10 th day of March, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 10 day of March, 2010.

Notary Public in and for the State of Texas,
County of Harrison



FIELD NOTES DESCRIPTION OF
"LHAAP-66" TRACT
(CONTAINS AN ELECTRIC POWER SUBSTATION)
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-66" containing an electric power substation, including transformers, "LHAAP-66" being located within the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-66" being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "C-21" (N=6956579.781 feet E=3308499.969 feet). Said traverse indicates a surface distance of 5596.714 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "X-11" referenced above,

THENCE S 42deg04'17.4"E 1722.19' to a point, from which point monument "C-21" referenced above bears S 42deg04'17.4"E 3873.75',

(as used below, the abbreviation F.C.P. indicates 2-1/2" diameter chain link fence corner pipe)

THENCE S 47deg55'43"W 210.22' to an F.C.P. found (leaning approximately 15 degrees) for the Northmost corner of this tract and this description's POINT OF BEGINNING,

THENCE S 45deg10'23"E 130.14' along a chain link fence found for the Northeast B.L. of this tract to an F.C.P. found for this tract's Eastmost corner,

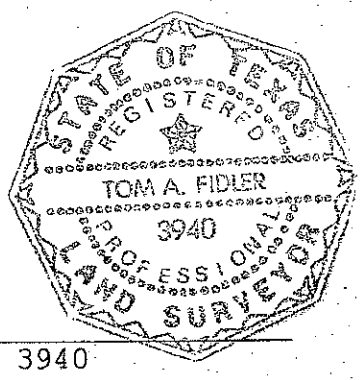
THENCE S 44deg46'19"W 65.93' along a chain link fence found for

the Southeast B.L. of this tract to an F.C.P. found for this tract's Southmost corner,

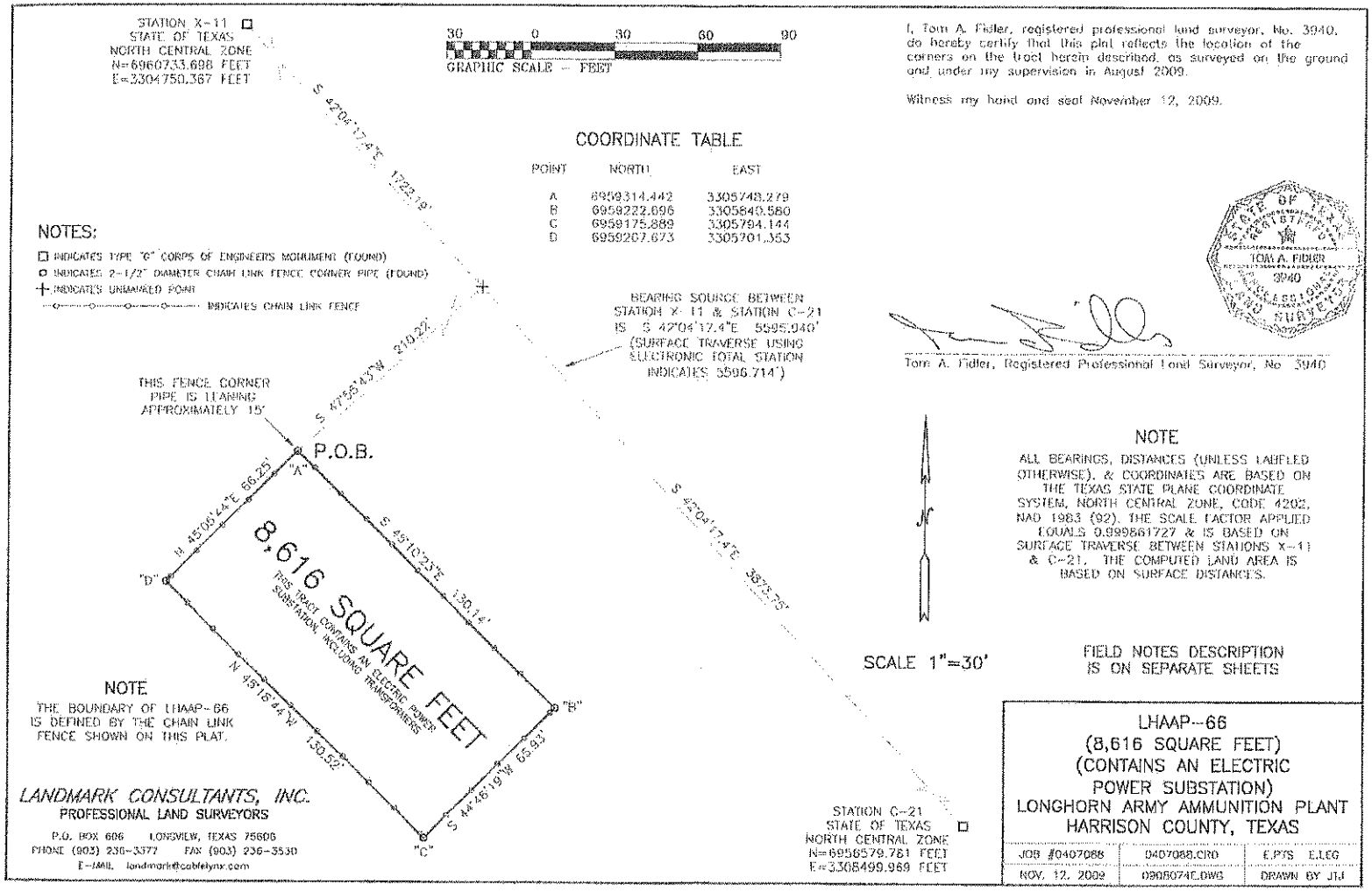
THENCE N 45deg18'44"W 130.52' along a chain link fence found for the Southwest B.L. of this tract to an F.C.P. found for this tract's Westmost corner,

THENCE N 45deg05'44"E 66.25' along a chain link fence found for the Northwest B.L. of this tract to this POINT OF BEGINNING. This tract contains 8,616 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



COORDINATE TABLE

POINT	NORTH	EAST
A	6959314.442	3305748.279
B	6959222.696	3305840.580
C	6959175.889	3305794.144
D	6959267.673	3305701.353

BEARING SOURCE BETWEEN STATION X-11 & STATION C-21 IS S 42°04'17.4"E 5595.940' (SURFACE TRAVERSE USING ELECTRONIC TOTAL STATION INDICATES 5596.714')

NOTES:

- ☐ INDICATES TYPE "C" CORPS OF ENGINEERS MONUMENT (FOUND)
- ○ INDICATES 2-1/2" DIAMETER CHAIN LINK FENCE CORNER PIPE (FOUND)
- ┼ INDICATES UNMARKED POINT
- ——o——o—— INDICATES CHAIN LINK FENCE

NOTE

THE BOUNDARY OF LHAAP-66 IS DEFINED BY THE CHAIN LINK FENCE SHOWN ON THIS PLAT.

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August 2009.

Witness my hand and seal November 12, 2009.

STATE OF TEXAS REGISTERED TOM A. FIDLER 3940 LICENSED LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & C-21. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

SCALE 1"=30'

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEETS

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

LHAAP-66
(8,616 SQUARE FEET)
(CONTAINS AN ELECTRIC POWER SUBSTATION)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	E.PTS E.LEG
NOV. 12, 2009	0908074C.DWG	DRAWN BY JTJ

LHAAP-67, 67-1

LUCs FROM FINAL REMEDIAL DESIGN

September 14, 2015

FINAL
REMEDIAL DESIGN
LHAAP-35B (37), CHEMICAL LABORATORY AND LHAAP-67, ABOVEGROUND STORAGE TANK FARM
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared by

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

August 1, 2011

Table of Contents

4.0 Land Use Controls for the Site

The LUCs to be implemented by the Army or its representatives for LHAAP-35B(37) and LHAAP-67 to prevent human exposure to residual groundwater contamination presenting an unacceptable risk to human health include:

- Ensure no withdrawal or use of groundwater beneath the sites for anything other than environmental monitoring and testing until cleanup goals are met

Notification of the groundwater use restriction will accompany all transfer documents and will be recorded at the Harrison County Courthouse in accordance with Texas Administrative Code (TAC) Title 30, §335.566.The LUC addresses the areas of LHAAP-35B(37) and LHAAP-67 that include groundwater plumes at LHAAP-35B(37) and LHAAP-67 with levels of contamination that require implementation of a remedy (see **Section 2.0**). The U.S. Army is responsible for implementing, maintaining, monitoring, reporting on, and enforcing the LUC.

U.S. Army and regulators will consult to determine appropriate enforcement actions should there be a failure of an LUC objective at this site after it has transferred. U.S. Army shall obtain USEPA and TCEQ concurrence prior to termination or significant modification of the LUC, or implementation of a change in land use inconsistent with the LUC objectives and use assumptions of the remedy. Although not a remedy, the land use assumption for LHAAP-35B(37) and LHAAP-67 forms the basis for the remedy. The reasonably anticipated future use of the site as part of a national wildlife refuge is consistent with an industrial risk exposure scenario. Notification of the land use assumption of this site will be made in transfer documentation, will be recorded in the Harrison County Courthouse in accordance with TAC Title 30, §335.566 and compliance with the use assumption will be documented in the Five-Year Review reports.

6.2 Land Use Control Implementation Actions

The Army or its representatives will be responsible for LUC implementation and certification, reporting and enforcement. The Army shall address LUC problems within its control that are likely to impact remedy integrity and shall address problems as soon as practicable.

As a condition of property transfer, the Army may require the transferee to assume responsibility for various implementation actions, as indicated below. Although the Army may transfer responsibility for various implementation actions, the Army shall retain its responsibility for remedy integrity. This means that the Army is responsible for addressing substantive violations of performance objectives that would undermine the Army's CERCLA remedy. The Army also will be responsible for: 1) incorporating RD information and outlining the transferee's LUC obligations into property transfer documentation; 2) recording groundwater use restriction and survey plat at the Harrison County Courthouse; and 3) notifying Texas Department of Licensing and Regulation of the groundwater restriction which includes the prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval from the Army, the USEPA, and the TCEQ. The following LUC implementation actions shall be undertaken by the Army in order to ensure that the aforementioned LUC performance objectives for LHAAP-35B(37) and LHAAP-67 are met and maintained:

6.2.1 Comprehensive Land Use Control Management Plan

Within 30 days of receiving USEPA and TCEQ approval of this RD, the Army will incorporate this document into the Comprehensive LUC Management Plan. The Comprehensive LUC Management Plan consists of LHAAP RD documents and a survey plat showing the locations where LUCs being implemented at LHAAP are applied. The purpose of this Comprehensive LUC Management Plan is to ensure all site specific LUCs are compiled into one comprehensive location for both pre-transfer use by the installation and for post-transfer use by the transferee. This document is also accessible to regulators, the local government and the public. The Comprehensive LUC Management Plan is located in the Marshall Public Library to accompany LHAAP's Administrative Record. As LUC RD documents for additional environmental sites are approved by USEPA and TCEQ, the Army shall likewise add those documents and survey plats to the Comprehensive LUC Management Plan as well as update the previous copy of the plan placed in the Marshall Public Library.

6.2.2 Site Certifications and Reporting

Beginning with finalization of this RD, the Army will undertake annual certifications to confirm continued compliance with the LUC objectives. The Army will retain the annual LUC Compliance Certification documents in the project files for incorporation into the Five-Year Review Reports, and these documents will be made available to USEPA and TCEQ upon request. The certification form will be consistent with the form attached as **Appendix B**. In addition, should any violations be found during the annual certification, the Army will provide to USEPA and TCEQ along with the document, a separate written explanation indicating the specific violations found and what efforts or measures have or will be taken to correct those violations**.** Upon transfer, such responsibilities may shift to the transferee via

appropriate provisions placed in the Environmental Condition of Property (ECP) or other environmental transfer document. The need to continue annual certifications will be revisited at Five-Year Reviews.

6.2.3 Notice of Planned Property Conveyances

The Army shall provide notice to USEPA and TCEQ of plans to convey LHAAP-35B(37) and LHAAP-67 acreage. The notice shall describe the mechanism by which LUCs will continue to be implemented, maintained, inspected, reported, and enforced.

6.2.4 Opportunity to Review Text of Intended Land Use Controls

Army will provide a copy of the groundwater use restriction notification to TCEQ for review and approval prior to its recordation in Harrison County. In addition, the Army will produce an ECP or other environmental document for transfer of LHAAP-35B(37) and LHAAP-67, but before executing transfer, the Army will provide USEPA and TCEQ with a draft copy of the ECP or other environmental document for transfer so that they may have reasonable opportunity, before document execution, to review all LUC-related provisions.

6.2.5 Notification Should Action(s) Which Interfere with Land Use Control Effectiveness Be Discovered Subsequent to Conveyance

Should the Army discover after conveyance of the site any activity on the property inconsistent with the LUC performance objectives, the Army shall notify USEPA and TCEQ within 72 hours of such discovery. Consistent with **Section 6.2.6** below, the Army will then work with USEPA, TCEQ and the transferee to correct the problem(s) discovered. This reporting requirement does not preclude the Army from taking immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health or the environment.

6.2.6 Land Use Control Enforcement

Should the LUC remedy reflected in this LUC RD fail, the Army will coordinate with USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. These actions may range from informal resolutions with the owner or violator, to the institution of judicial action under the auspices of Texas property law or CERCLA. Alternatively, should the circumstances warrant such, the Army could choose to exercise its response authorities under CERCLA, and then seek cost recovery after the fact from the person(s) or entity(ies) who violated a given LUC. Should the Army become aware that any future owner or user of the property has violated any LUC requirement over which a local agency may have independent jurisdiction, the Army will notify these agencies of such violation(s) and work cooperatively with them to re-achieve owner/user compliance with the LUCs.

6.2.7 Modification or Termination of Land Use Controls

The Army shall not, without USEPA and TCEQ concurrence, make a significant modification to, or terminate a LUC, or make a land use change inconsistent with the LUC objectives and use assumptions of the selected remedy. Likewise, the Army shall seek prior USEPA and TCEQ concurrence before commencing actions that may impact remedy integrity. In the case of an emergency action, the Army shall obtain prior USEPA and TCEQ concurrence as appropriate to the exigencies of the situation.

The LUCs shall remain in effect until such time as the Army, TCEQ and USEPA agree that the concentrations of COCs have met cleanup levels. When this occurs, the LUCs will be terminated as needed. The decision to terminate LUCs will be documented consistent with the NCP process for post-ROD changes, potentially including an explanation of significant differences or a remedial action completion report. If the property has been transferred and a determination by the Army, TCEQ and USEPA has been made to terminate one or more of the LUCs, the Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also timely advise other local stakeholders of the action.

6.3 Monitored Natural Attenuation Implementation Actions

Implementation actions include installation of additional monitoring wells, plugging and abandonment of monitoring wells not designated for long-term monitoring, implementation of a groundwater monitoring plan, monitoring, and reporting. The project schedule and cost summary for implementation actions are provided in **Appendix H**. Groundwater monitoring will be conducted to monitor the effectiveness of MNA in reducing contaminant concentrations over time. Monitoring will also be conducted to evaluate plume migration and ensure that chlorinated solvents-contaminated groundwater does not impact nearby surface water at unacceptable levels. Surface water sampling will be conducted to confirm contaminated groundwater is not migrating to surface water. The Groundwater Monitoring Plan, attached as **Appendix A**, describes the wells, their locations, analytical parameters, the frequency of the monitoring, surface water sampling, and presents a list of the monitored constituents and their respective MCLs. Groundwater monitoring and surface water sampling conducted at LHAAP-35B(37) and LHAAP-67 will follow the Health and Safety Plan (**Appendix E**), the Contractor Quality Control Plan (**Appendix F**), the Chemical Data Acquisition Plan (**Appendix G**), Field Activities (**Appendix C**) and Field Procedures (**Appendix D**) as contained in the appendices of the Remedial Design LHAAP-35B(37) and LHAAP-67.

Annual reports will be prepared for any year in which sampling occurs to document the monitoring program. The first year's annual report will include a review of the first four quarters of data, which include natural attenuation parameters and provide an evaluation for the evidence of MNA as a remedial method and a review of the first year's surface water sample data. The TCEQ provides guidance for MNA as a remedial action in *Monitored Natural Attenuation Demonstrations* (Texas Natural Resource Conservation Commission [TNRCC], RG-366/TRRP-33, October 2001). Although LHAAP is being addressed under the Risk Reduction Standards rather than Texas Risk Reduction Program (TRRP), this guidance is comparable to USEPA guidance and may be used as a guideline for the evaluation of the groundwater data. TRRP guidance specifies recommended lines of evidence to document the occurrence of natural attenuation at a site. For the first annual report, primary and secondary lines of evidence will be evaluated to document that attenuation is occurring at LHAAP-35B(37) and LHAAP-67. The primary line


LHAAP-35B(37)
AVENUE P
56TH ST.
55TH ST.
BOWIE AVE.
53RD ST.
CROCKETT AVE.
52ND ST.
S.CROCKETT AVE
51ST ST.
48TH ST.
AVE D
0 350 700 1,400
Feet
N
LHAAP-67
S.HOUSTON RD
45TH ST.
IGNATIUS AVE
S.CROCKETT AVE
0 250 500 1,000
Feet
LEGEND
Road
Stream
Site
Approximate LHAAP Boundary
LHAAP Water Supply Well
LHAAP-35B(37)
LHAAP-67
LEGEND
Approximate LHAAP Boundary
Road
Stream
Site
LHAAP Water Supply Well
FILE PATH
T:\GIS\Longhorn\MXD\ST35B67\ROD\SiteLocs.mxd
APPROVED BY
P. Srivastav 10/31/07
CHECKED BY
N. Olson 10/31/07
DRAWN BY
B. Lu 10/12/07
OFFICE
Houston, TX
Shaw
U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA
FIGURE 2-2
SITE LOCATION MAP
REMEDIAL DESIGN
LHAAP-35B(37) AND LHAAP-67, GROUP 4
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00216767

LHAAP-67, 67-2

NOTICE OF LAND USE CONTROLS AND NONRESIDENTIAL LAND USE AT LHAAP-67 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2014-000013308

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

NOTICE

8 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 12/09/2014 10:42 AM **Document Number:** 2014-000013308 **Receipt No:** 1415412 **Amount:** $ 50.00 **By:** Pam Rockwell, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT
COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox

Patsy Cox, Harrison County Clerk

Record and Return To:

AECOM
ATTN: AMANDA LAGARDE (FEDEX ENV)
112 E PECAN ST., SUITE 400
SAN ANTONIO, TX 78205

00216769

STATE OF TEXAS HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF LAND USE CONTROL AT LHAAP-67

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed remedial activities at the land described herein. The remediation site is in a former industrial area, located on the Former Longhorn Army Ammunition Plant (LHAAP) and is designated as LHAAP-67 (Underground Storage Tank Farm Area). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Remedial activities at LHAAP-67 were performed in accordance with the FFA requirements.

The LHAAP-67 site, when operational, consisted of seven aboveground storage tanks used for storage of No. 2 fuel oil, kerosene, and solvents. The tanks were surrounded by earthen dikes designed to contain potential spills. A Record of Decision (ROD) for LHAAP-67 was signed by the U.S. Army and USEPA with TCEQ concurrence in 2010 establishing the final remedy which consists of a land use control (LUC) in conjunction with monitored natural attenuation (MNA). The site was not remediated to levels suitable for unrestricted use. The LUC at LHAAP-67 is required to prevent human exposure to contaminated groundwater. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public

Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-67 parcel is a 4 acre tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A. Within the LHAAP-67 parcel is designated a LUC boundary which is a 6.088-acre tract, more or less, as described in Exhibit A. The LUC boundary is also presented in the attached Figure 1.

Future use of the parcel is intended as a national wildlife refuge consistent with non-residential use. For purposes of this certification, residential use includes, but is not limited to, single family or multifamily residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.The United States Department of the Army has undertaken careful environmental study of the LHAAP-67 site and concluded that the LUC set forth below is required to ensure protection of human health and the environment.

(1) Groundwater Restriction. The groundwater use restriction boundary consists of the 6.088-acre tract, more or less. Groundwater underlying this land is contaminated with trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), 1,1,1-trichloroethane (1,1,1-TCA), and 1,1,2-trichloroethane (1,1,2-TCA), and other volatile organic compounds (VOCs) and shall not be accessed or used for any purpose without the prior written approval of the U.S. Army, the USEPA, and the TCEQ. A LUC restricting the use of groundwater has been established for the protection of human health. The U.S. Army will notify the Texas Department of Licensing and Regulation of the groundwater restriction which includes prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval by the U.S. Army, the USEPA, and the TCEQ. A restriction against the residential use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE).

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 20 th day of November, 2014.

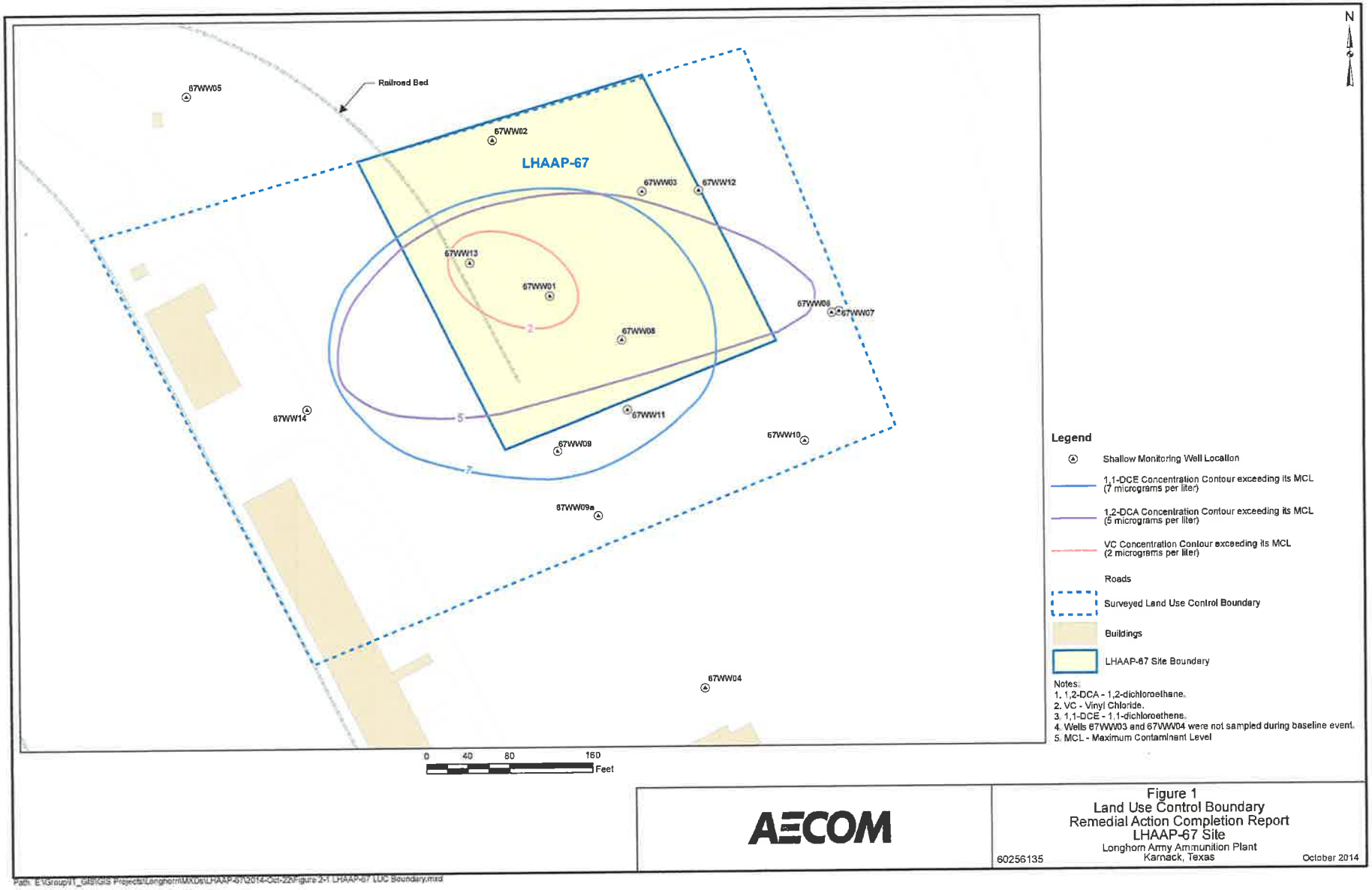
BEFORE ME, on this the 20 th day of November, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 20 day of November, 2014.

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 03-17-2015

Notary Public in and for the State of Texas,
County of Harrison

EXHIBIT A
SURVEY PLAT



AECOM

Figure 1
Land Use Control Boundary
Remedial Action Completion Report
LHAAP-67 Site
Longhorn Army Ammunition Plant
Karnack, Texas

60256135 October 2014

Path: E:\Group\1_GIS\GIS Projects\Longhorn\MXDs\LHAAP-67\2014-Oct-22\Figure 2-1 LHAAP-67 LUC Boundary.mxd

FIELD NOTES DESCRIPTION OF
"LHAAP-67" LAND USE CONTROL AREA
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, "LHAAP-67" Land Use Control Area being 6.088 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), "LHAAP-67" Land Use Control Area being more particularly described as follows :

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9998636625, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "IGNATIUS-1" (N=6957090.304 feet E=3311081.788 feet) and "IGNATIUS-2" (N=6955582.752 feet E=3311851.704 feet). Said traverse indicates a surface distance of 1693.005 feet between said monuments. The computed land area is based on grid distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940" .

Commencing at monument "IGNATIUS-1" referenced above,

THENCE S 32deg49'15"W 145.39' to an I.R.O.P.C. set for the N.W.C. of this tract and this POINT OF BEGINNING,

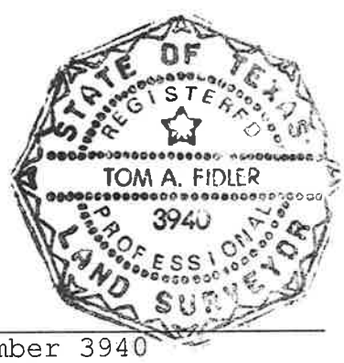
THENCE N 74deg08'33"E 654.97' along the N.B.L. of this tract to an I.R.O.P.C. set for this tract's N.E.C. ,

THENCE S 21deg34'17"E 390.25' along the E.B.L. of this tract to an I.R.O.P.C. set for this tract's S.E.C. ,

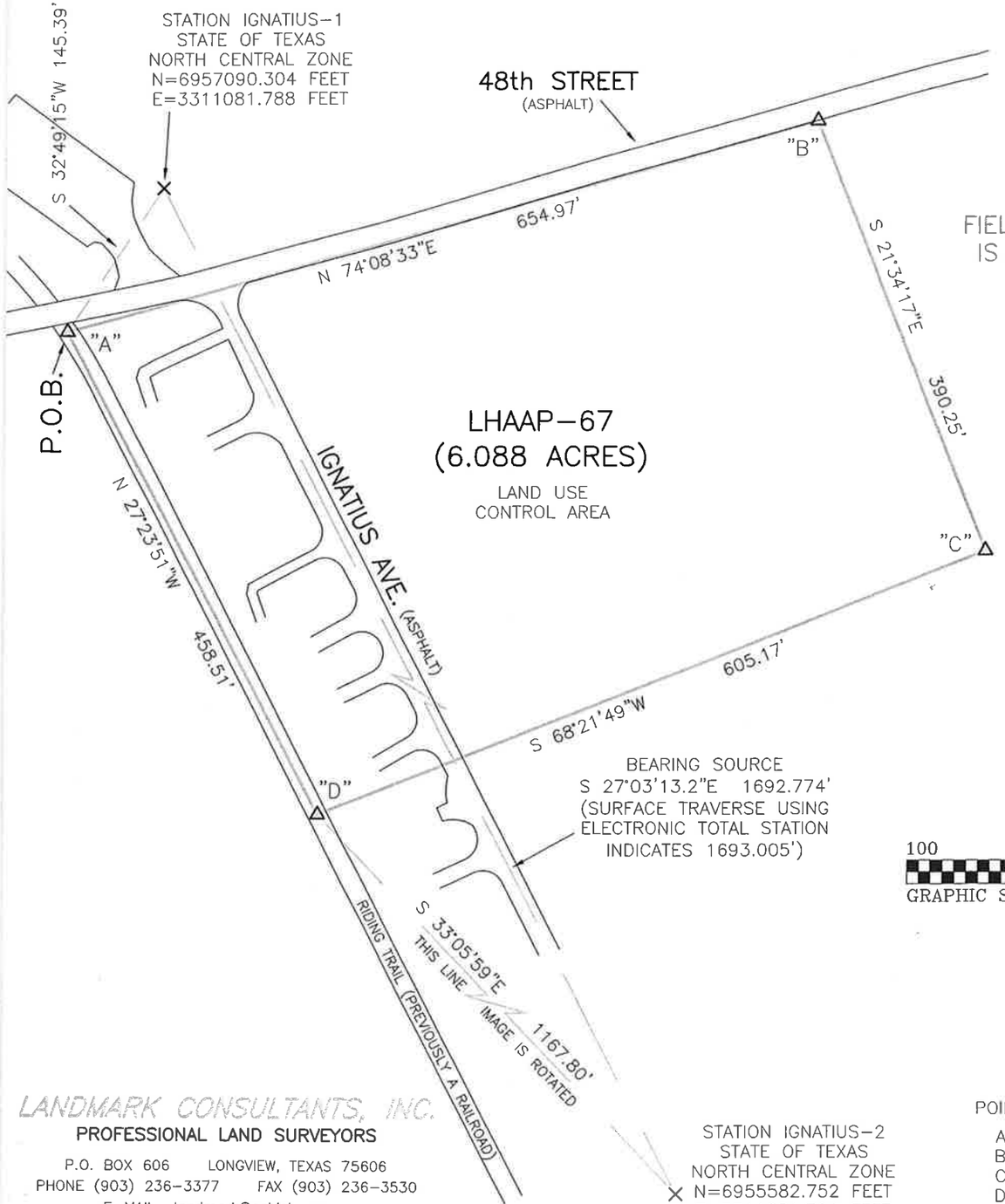
THENCE S 68deg21'49"W 605.17' along the S.B.L. of this tract to an I.R.O.P.C. set for this tract's S.W.C., from which monument "IGNATIUS-2" referenced above bears S 33deg05'59"E 1167.80' ,

THENCE N 27deg23'51"W 458.51' along the W.B.L. of this tract to this POINT OF BEGINNING, containing 6.088 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940



I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in October, 2014.

Witness my hand and seal this the 16th day of October, 2014.

FIELD NOTES DESCRIPTION IS ON SEPARATE SHEET

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

SCALE 1"=100'

100 0 100 200 300

GRAPHIC SCALE – FEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998636625 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS IGNATIUS-1 & IGNATIUS-2. THE COMPUTED LAND AREA IS BASED ON GRID DISTANCES.

LEGEND

- X TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- O CONCRETE NAIL IN BOTTLE CAP (SET IN ASPHALT)
- △ 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- BOUNDARY LINE OF LAND USE CONTROL AREA

COORDINATE TABLE

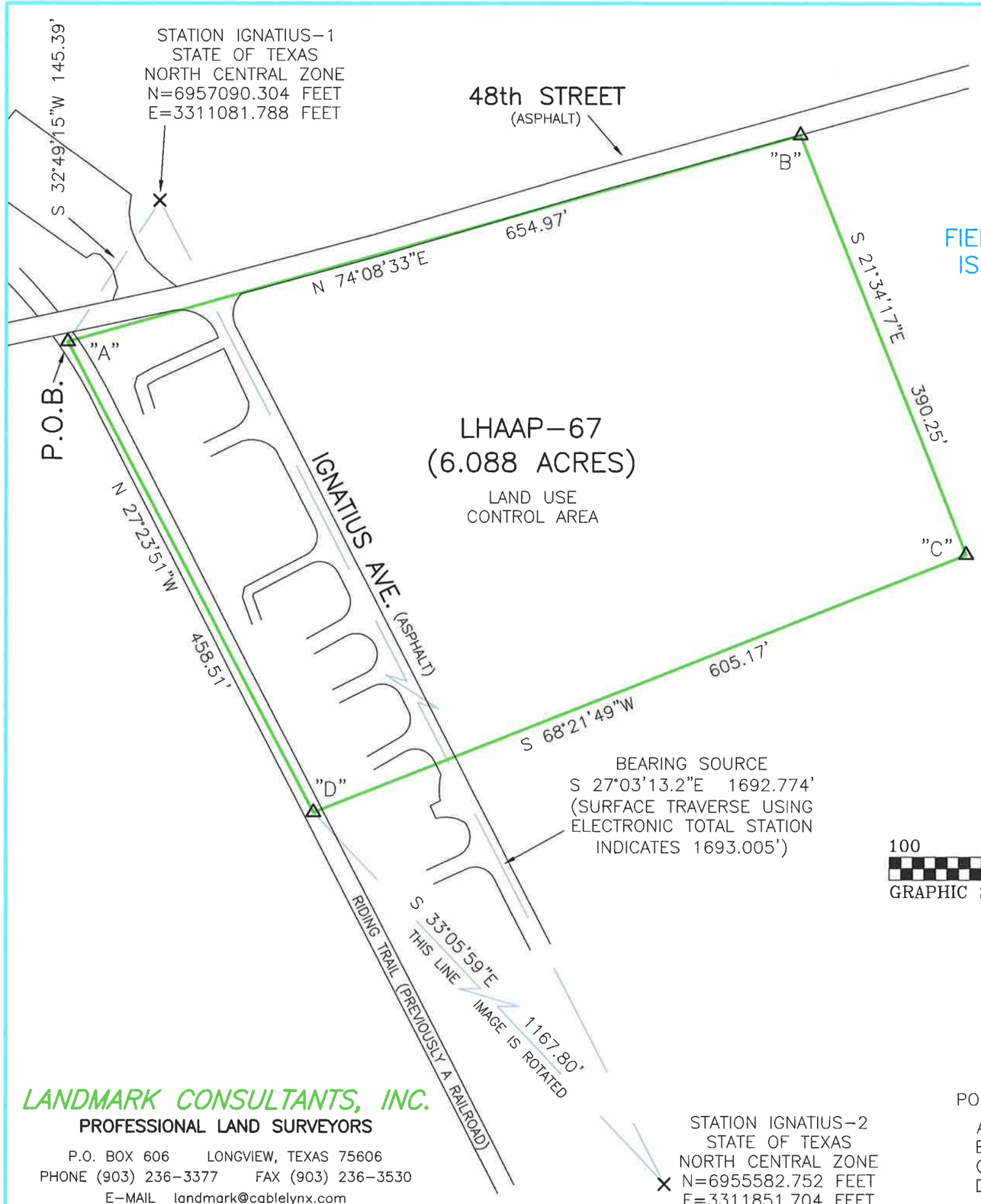
POINT	NORTH	EAST
A	6956968.123	3311002.985
B	6957147.091	3311633.031
C	6956784.178	3311776.509
D	6956561.041	3311213.974

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

LHAAP-67 L.U.C.A.
(6.088 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	H.PTS H.LEG
10/16/2014	0605063H.DWG	DRAWN BY JTJ

00216776



I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in October, 2014.

Witness my hand and seal this the 16th day of October, 2014.

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEET

STATE OF TEXAS
REGISTERED
TOM A. FIDLER
3940
PROFESSIONAL
LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

SCALE 1"=100'

100 0 100 200 300
GRAPHIC SCALE – FEET

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.9998636625 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS IGNATIUS–1 & IGNATIUS–2. THE COMPUTED LAND AREA IS BASED ON GRID DISTANCES.

LEGEND

- X TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- o CONCRETE NAIL IN BOTTLE CAP (SET IN ASPHALT)
- △ 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET)
- BOUNDARY LINE OF LAND USE CONTROL AREA

COORDINATE TABLE

POINT	NORTH	EAST
A	6956968.123	3311002.985
B	6957147.091	3311633.031
C	6956784.178	3311776.509
D	6956561.041	3311213.974

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236–3377 FAX (903) 236–3530
E–MAIL landmark@cablelynx.com

LHAAP–67 L.U.C.A.
(6.088 ACRES)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	H.PTS H.LEG
10/16/2014	0605063H.DWG	DRAWN BY JTJ

00216777

LHAAP-67, 67-3

LAND USE CONTROL COMPLIANCE INSPECTION FORM

September 14, 2015

Sample Annual Land Use Control Compliance Certification Documentation

In accordance with the Remedial Design dated 8/1/11 for LHAAP-67, a certification of site was conducted by _____ [indicate transferee] on _____.

A summary of land use control mechanisms is as follows:

- Groundwater restriction - A restriction against use of groundwater will remain in effect until the levels of the COCs in groundwater and soil allow unrestricted use and unlimited exposure (UUUE). [Indicate whether groundwater restrictions are still required at LHAAP-67]

A summary of compliance with land use and restriction covenants is as follows:

- No use of groundwater, installation of new groundwater wells, or tampering with existing wells at LHAAP-67.

I, the undersigned, do document that the certification was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: _____

Name/Title: _____

Signature: _____

Annual compliance certification forms shall be completed no later than March 1 of each year for the previous calendar year.

LHAAP-68

NOTICE OF NONRESIDENTIAL LAND USE AT LHAAP-68 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

2010-000005560

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

7 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 04/27/2010 04:08 PM **Document Number:** 2010-000005560 **Receipt No:** 1006195 **Amount:** $ 36.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW E & I
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, LHAAP-68, is located near the service station in the maintenance shops and power area of the former Longhorn Army Ammunition Plant (LHAAP). LHAAP-68 consisted of two mobile 600-gallon storage tanks on trucks that were parked on the asphalt surface at the service station of the maintenance complex. LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as the Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Although there are many sites at LHAAP that are specifically NPL listed, LHAAP-68 is not itself considered an NPL site. Environmental activities at LHAAP-68 progressed through the site investigation, at which point it was agreed by the Army and the TCEQ as the lead regulatory agency that no significant releases had occurred and the site could be closed under Texas Administrative Code (TAC) Risk Reduction Rule Standard 2.

LHAAP-68 is located at the maintenance complex next to the service station. Two mobile 600-gallon storage tanks on trucks were parked on the asphalt surface with no curb or other containment present. The mobile storage tanks contained No. 2 diesel and gasoline fuel. In 2006, six soil samples were collected, two from each of three borings that were installed at the site, and analyzed for semi volatile organic compounds, volatile organic compounds, and total petroleum hydrocarbons. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday

through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-68 parcel is 426 square foot, more or less, or 0.00977 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the LHAAP-68 site and USEPA and TCEQ concluded that no further investigation or action is required for LHAAP-68. Contaminants in soil samples from LHAAP-68 meet non-residential soil criteria in accordance with 30TAC§335.560(b).

Limited monitoring of LHAAP-68 will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of LHAAP-68 is consistent with the non-residential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951
or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-BDO (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 10 th day of March, 2010.

BEFORE ME, on this the 10 th day of March, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 10 day of March, 2010.

Notary Public in and for the State of Texas,
County of Harrison

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 3-17-2011

FIELD NOTES DESCRIPTION OF
"LHAAP-68" TRACT
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-68" being located within the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-68" being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999861727, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "X-11" (N=6960733.698 feet E=3304750.367 feet) and "C-21" (N=6956579.781 feet E=3308499.969 feet). Said traverse indicates a surface distance of 5596.714 feet between said monuments. The computed land area is based on surface distances.

Commencing at monument "X-11" referenced above,

THENCE S 42deg04'17.4"E 428.46' to a point, from which point monument "C-21" referenced above bears S 42deg04'17.4"E 5167.48',

THENCE S 47deg55'43"W 686.07' to a concrete nail (with head dimple) set in asphalt for the Northmost corner of this tract and this description's POINT OF BEGINNING,

THENCE S 44deg35'24"E 41.58' along the Northeast B.L. of this tract to an "X" set (chisled in concrete) for this tract's Eastmost corner,

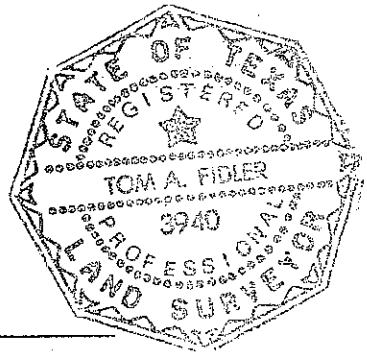
THENCE S 41deg38'18"W 9.34' along the Southeast B.L. of this tract to an "X" set (chisled in concrete) for this tract's Southmost corner,

THENCE N 46deg59'28"W 41.90' along the Southwest B.L. of this tract to a concrete nail (with head dimple) set in asphalt for this tract's Westmost corner,

THENCE N 43deg41'50"E 11.08' along the Northwest B.L. of this

tract to this POINT OF BEGINNING. This tract contains 426 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

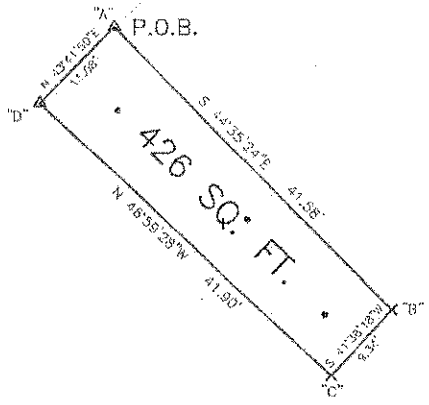
STATION X-11 □
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6960733.696 FEET
E=3304750.367 FEET

S 42°04'17.4"E 428.46'

COORDINATE TABLE

POINT	NORTH	EAST
A	6959955.942	3304528.186
B	6959926.330	3304557.376
C	6959919.350	3304551.170
D	6959947.931	3304520.531

S 47°55'43"W 686.07'



BEARING SOURCE BETWEEN
STATION X-11 & STATION C-21
IS S 42°04'17.4"E 5595.940'
(SURFACE TRAVERSE USING
ELECTRONIC TOTAL STATION
INDICATES 5596.714')

S 42°04'17.4"E 5167.48'

NOTES:

□ INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
△ INDICATES CONCRETE NAIL WITH LEAD DIMPLE (SET)
X INDICATES X CHISLED IN CONCRETE (SET)
O INDICATES UNMARKED POINT
* INDICATES BORE HOLE AS MARKED BY SHAW ENVIRONMENTAL

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in August through October 2009.

Witness my hand and seal October 26, 2009.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999861727 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS X-11 & C-21. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES.

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

SCALE 1"=10'

10 0 10 20 30
GRAPHIC SCALE - FEET

STATION C-21
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6956579.781 FEET
E=3308490.969 FEET

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-5377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

LHAAP-68
(426 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	S.PTS S.LEG
10/26/2009	09080745.DWG	DRAWN BY JTF

PISTOL RANGE

NOTICE OF NONRESIDENTIAL LAND USE AT PISTOL RANGE FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216788

2012-000000705

DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT

MISCELLANEOUS

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
On: 01/19/2012 10:41 AM **Document Number:** 2012-000000705 **Receipt No:** 1200645 **Amount:** $ 32.00 **By:** Ann Turner, **Deputy** **Patsy Cox, County Clerk** **Harrison County, Texas**	

COUNTY COURT COUNTY OF HARRISON, TEXAS

STATE OF TEXAS
COUNTY OF HARRISON
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

Record and Return To:

SHAW ENVIRONMENTAL & INFRASTRUCTION GROUP
1401 ENCLAVE PARKWAY, SUITE 250

HOUSTON, TX 77077

00216789

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF NONRESIDENTIAL LAND USE

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas, in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The site, the former Pistol Range is located at the former Longhorn Army Ammunition Plant (LHAAP). LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA) became effective on December 30, 1991. The former Pistol Range is an NPL site and a removal action was performed in 2009 in accordance with the FFA requirements. As a result of the removal action, the lead agency has determined that no further CERCLA action is necessary at the former Pistol Range to protect public health, welfare or the environment.

The former Pistol Range is located in the southeastern portion of LHAAP, approximately 280 feet south of Avenue Q at the end of Robert Avenue. The site is the eastern portion of a rectangular field and is approximately 110 feet north to south by 150 feet east to west. The former Pistol Range was known to have been used by LHAAP security personnel for small arms target qualification and recertification. The former Pistol Range was established in the 1950s and was used intermittently through 2004. A no further action Record of Decision for the former Pistol Range was signed by USEPA in 2010

establishing no remedy was required. Further information may be found in the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or in the Administrative Record available at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The former Pistol Range is a 0.3879 acre tract located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A.

The United States Department of the Army has undertaken careful environmental study of the former Pistol Range and USEPA and TCEQ concluded that no further investigation or action is required.

Limited monitoring of the former Pistol Range will take place in the form of Letters of Certification from the Army or the Transferee to TCEQ every five years to document that the use of the former Pistol Range is consistent with the nonresidential use scenarios evaluated in the risk assessment. Future use of the parcel is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

III

The owner of the site is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

or

Assistant Chief of Staff for Installation Management
ATTN: DAIM-ODB (T. Lederle)
600 Army Pentagon
Washington D.C. 20310-0600

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 21 th day of July, 2011.

BEFORE ME, on this the 21 th day of July, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 21 day of July, 2011.

ANGELA HUMPHRIES
Notary Public State of Texas
COMM. EXP. 03-17-2015

Notary Public in and for the State of Texas,
County of Harrison

FIELD NOTES DESCRIPTION OF
FORMER PISTOL RANGE
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

The herein described tract of land is located in Harrison County, Texas, near the town of Karnack, being 16,897 square feet of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract being more particularly described as follows :

Surveyor's Note : All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.9999146277, and is based on surface traverse using electronic total station between type "G" Corps of Engineers monuments "C-19-2" (N=6952844.320 feet E=3312839.019 feet) and "3-95" (N=6952411.298 feet E=3314136.438 feet). Said traverse indicates a surface distance of 1367.890 feet between said monuments. The computed land area is based on grid (State Plane) distances.

Commencing at monument "3-95" referenced above,

(As used herein, the abbreviation I.R.C. indicates 1/2" iron rod with R.P.L.S. #3940 orange plastic cap)

THENCE S 45deg51'27"E 855.98' to an I.R.C. set for the S.W.C. of this tract and this POINT OF BEGINNING,

THENCE N 00deg00'20"W 107.99' along the W.B.L. of this tract to an I.R.C. set for this tract's N.W.C. ,

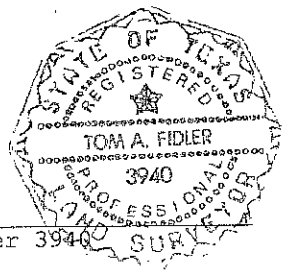
THENCE N 89deg59'47"E 155.96' along the N.B.L. of this tract to an I.R.C. set for this tract's N.E.C. ,

THENCE S 00deg32'56"E 107.99' along the E.B.L. of this tract to an I.R.C. set for this tract's S.E.C. ,

THENCE S 89deg59'43"W 156.98' along the S.B.L. of this tract to this POINT OF BEGINNING.

This tract contains 16,897 square feet, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

STATION C-19-2
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6952844.320 FEET
E=3312839.019 FEET

BEARING SOURCE BETWEEN
STATION C-19-2 & STATION 3-95
IS S 71°32'35.6"E 1367.773'
(SURFACE TRAVERSE USING
ELECTRONIC TOTAL STATION
INDICATES 1367.890')

STATION 3-95
STATE OF TEXAS
NORTH CENTRAL ZONE
N=6952411.298 FEET
E=3314136.438 FEET

COORDINATE TABLE

POINT	NORTH	EAST
A	6951923.143	3314750.686
B	6951815.153	3314750.697
C	6951815.166	3314907.681
D	6951923.153	3314906.647

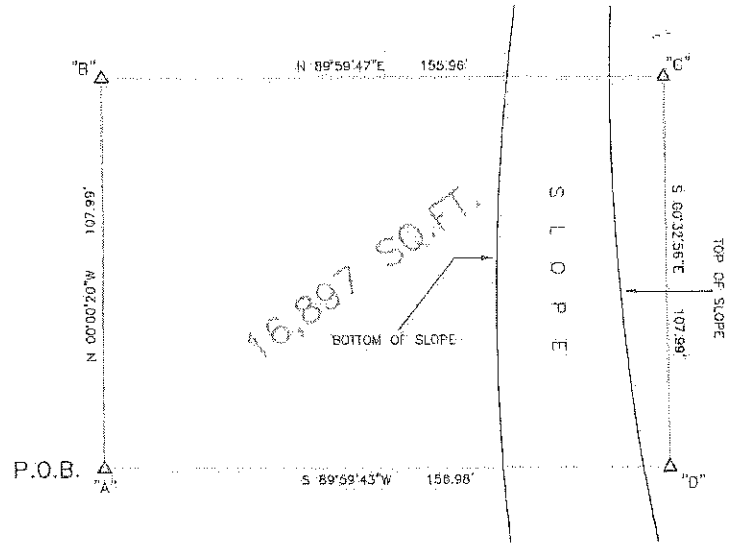
LEGEND

□ INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
△ INDICATES 1/2" IRON ROD WITH R.P.L.S. #3940 CAP (SET)

S 45°51'27"E 855.98'

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999914277 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS C-19-2 AND 3-95. THE COMPUTED LAND AREA IS BASED ON GRID DISTANCES.



LANDMARK SURVEYS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in April 2011.

Witness my hand and seal May 2, 2011.

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940

SCALE 1"=30'

30 0 30 60 90
GRAPHIC SCALE - FEET

FIELD NOTES DESCRIPTION
IS ON SEPARATE SHEETS

FORMER PISTOL RANGE
(16,897 SQUARE FEET)
LONGHORN ARMY AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #1104040	0407088.CRD	L.PTS L.LEG
MAY 2, 2011	1103025L.DWG	DRAWN BY JTJ

00216794

LHAAP-001-R-01 AND LHAAP-003-R-01, MMRP-1

LUC INSPECTION AND MAINTENANCE LOG

September 14, 2015

Draft LUC Inspection and Maintenance Log – LHAAP-001-R-01 and LHAAP-003-R-01

Date	Inspected by:	Inspection/Maintenance Activities				Corrective action or repairs required?	Repairs/Action Taken
		Maintain Land Use Controls		Prohibit residential development/use	Prevent explosive safety risks		
		Signage maintained e.g. replace damaged or weathered signs to the full count of signs	Signage visible from one sign to the next: i.e. grass mowed around signage	Verified no residential development/use	Verified no intrusive activities i.e. digging		

LHAAP-001-R-01 AND LHAAP-003-R-01, MMRP-2

LUCs FROM FINAL REMEDIAL DESIGN PENDING

September 14, 2015

LHAAP-001-R-01 AND LHAAP-003-R-01, MMRP-3

NOTICE OF LAND USE CONTROLS AND NONRESIDENTIAL LAND USE AT LHAAP-001-R-01 AND LHAAP-003-R-01 FILED IN PUBLIC RECORDS OF HARRISON COUNTY, TEXAS (INCLUDING SURVEY PLAT)

September 14, 2015

00216798

APPENDIX A

GSA TRANSFER LETTERS

GSA Public Buildings Service
Tel: (817) 978-3856
Fax: (817) 978-2063
melvin.freeman@gsa.gov

February 21, 2014

Mr. Thomas E. Lederle
Chief, ACSIM BRAC Division
600 Army Pentagon
Washington D.C. 20310-0600

Dear Mr. Lederle:

Your report of excess dated July 29, 2002, covered 8,492.02 acres of land (later corrected to 8,416 acres), more or less, and improvements at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. GSA Control No. 7-D-TX-0692.

As set forth in the enclosed letter, an additional 50.54 acres of land, more or less, of the LHAAP property known as Tract No. 7 – Landfill 12 Area, described in Attachment 1 of the transfer letter has been transferred without reimbursement to the U.S. Department of the Interior, Fish and Wildlife Service (FWS) under the authority of 16 U.S.C. 667b. Additional transfers will be made when approvals are obtained from the Army on lands currently not suitable for transfer. Future requests for transfers will identify requested land by legal description or map overlay.

Upon finalization of transfer of the total land requested by FWS, a complete boundary legal description will be provided by FWS identifying all former Army land that had been transferred. Any map overlays used in the interim to identify previously transferred land will be voided for use to identify former Army land at LHAAP subsequently controlled by FWS.

Custody and accountability of the property identified by legal description in Attachment 1 to the transfer letter, together with any necessary documentation, should be transferred to FWS by your agency as soon as practicable. We will appreciate your prompt advice as to the date such action is accomplished. We understand that the FWS, Region 2 Acting Regional Director, Ms. Joy Nicholopoulos, P.O. Box 1306, Albuquerque, NM 87103 will represent the FWS in this matter.

Please acknowledge receipt of this communication in the space provided on the enclosed copy of this letter and return it to this office. You may contact Veronica Capron Vorva, Realty Specialist at telephone 817-978-4246 if there are questions.

U.S. General Services Administration
Real Property Utilization and Disposal
Division (7PZ)
819 Taylor Street, Room 11A30
Fort Worth, TX 76102-6112

Sincerely,

Melvin E. Freeman, Director
Real Property Utilization and Disposal
Division (7PZ)

Enclosures

Receipt acknowledged:

Name THOMAS E LEDERLE

Title Chief, ACSIM BRAC DIV

Date 03/07/2014

cc: Ms. Joy Nicholopoulos, Acting Regional Director
U.S. Fish and Wildlife Service, Region 2
Division of Realty
P.O. Box 1306
Albuquerque, NM 87103-1306

GSA Public Buildings Service
Tel. (817) 978-3856
Fax (817) 978-2063
melvin.freeman@gsa.gov

February 21, 2014

Joy Nicholopoulos, Acting Regional Director
U.S. Fish and Wildlife Service, Region 2
Division of Realty
P.O. Box 1306
Albuquerque, NM 87103-1306

RE: Transfer of 50.54 acres of land at the Longhorn Army Ammunition Plant, Harrison County, Texas

Dear Ms. Nicholopoulos:

Your letter of April 27, 2004, requested transfer to the U.S. Department of the Interior, Fish and Wildlife Service (FWS), under the authority of P.L. 80-537, 16 U.S.C. 667b, a total of 8,404 acres of land (later corrected to 8,416 acres, more or less), at the Longhorn Army Ammunition Plant (LHAAP), City of Karnack, Harrison County, State of Texas, together with all the improvements found on the real estate, and all related personal property located thereon (hereinafter referred to as the "Property"), reported July 29, 2002, as excess to the needs of the U.S. Army. The first transfer of 5,031.75 acres was accepted into primary jurisdiction by FWS on April 30, 2004. It was agreed that as parcels met the specifications of transfer, additional parcels would be transferred by means of a letter request, a map, and a legal description to GSA.

All the rights to be transferred herein have heretofore been declared excess to the needs of the United States Department of the Army. The respective interests to be transferred hereby have been reported to the General Services Administration (GSA) and have been determined to be excess for disposal pursuant to P.L. 107-217, (40 U.S.C. §§550, et. seq.) as amended.

In accordance with your subsequent letter of February 4, 2014, an additional 50.54 acres, more or less, known as Tract No. 7 – Landfill 12 Area (hereinafter referred to as the "Property") are now suitable for transfer to add to the 6,364.35 acres, more or less, previously transferred on nine separate occasions. A true and complete legal description of Tract No. 7 – Landfill 12 Area is included in **Attachment 1**.

Accordingly, pursuant to 40 U.S.C. 501, et seq. and Public Law 80-537, 16 U.S.C. 667b, and acting under authority delegated to me, I hereby transfer 50.54 acres, more

U.S. General Services Administration
Real Property Utilization and Disposal Division (7PZ)
819 Taylor Street, Room 11A30
Fort Worth, TX 76102-6112

or less, as described in **Attachment 1** to the custody and accountability of the U.S. Department of Interior, Fish and Wildlife Service.

Additional transfers covering the remainder of the real estate comprising the LHAAP will be made when approvals are obtained from the Army on lands currently not suitable for transfer. Future requests for other transfers will specifically identify such requested land by legal description and/or map overlay.

This transfer is expressly made subject to all environmental notices, exceptions, restrictions, agreements, and covenants affecting the Property identified in the Environmental Condition of Property V, Longhorn Army Ammunition Plant, Karnack, Texas, dated September 2007 and revised December 6, 2013, (hereinafter referred to as the "ECOP V") which is incorporated herein by reference and amends the "ECOP" previously described in and made a part of the original transfer of April 26, 2004, and subsequent transfers, and the "ECOP II" dated October 2004, "ECOP III" dated August 2005, and "ECOP IV" dated March 2007 to the extent and only to the extent the same are valid and affect the Property conveyed herein. FWS covenants and agrees that the Property is hereby transferred subject to the use restrictions and covenants which run with the land as identified in Attachment 2 of the ECOP V previously described. FWS further covenants and agrees that in the event that the Property, or any part thereof, is sold, conveyed, transferred, leased, or otherwise disposed of, the following notices, covenants, and restrictions shall be inserted in any instrument of conveyance.

Upon finalization of transfer of the total land requested by FWS, a complete boundary legal description will be provided by FWS identifying all former Army land that had been transferred. Any map overlays used in the interim to identify previously transferred land will be voided for use to identify former Army land at LHAAP subsequently controlled by FWS.

The property transferred is subject to compliance by the FWS with the provisions of the National Environmental Policy Act of 1969, as amended, including the preparation of an environmental impact statement if required. The Property is transferred subject to compliance by the FWS with Section 106 of the National Historic Preservation Act of 1966, and Executive Order 11593.

Mr. Thomas E. Lederle, Chief, ACSIM BRAC Division, U.S. Army, 600 Army Pentagon, Washington D.C. 20310 will act for the U.S. Army in arranging for the transfer of custody and accountability of the Property and in other matters related to the transfer.

A copy of our letter of same date to the U.S. Army is enclosed for your information. It is requested that you acknowledge receipt of this communication on the enclosed copy of this letter in the space provided, return it to this office, and that such steps as necessary be taken by your Agency to consummate the transaction.

Sincerely,

Melvin E. Freeman

Melvin E. Freeman, Director
Real Property Utilization and Disposal
Division (7PZ)

Enclosures

Receipt acknowledged:

Name Robert R. Brubaker

Title Realty Officer

Date 3-3-2014

cc: Mr. Thomas E. Lederle
Chief, ACSIM BRAC Division
600 Army Pentagon
Washington D.C. 20310-0600

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
DIVISION OF REALTY

TRACT REPORT

OF THE

UNITED STAES OF AMERICA

TRACT (100q)

CONTAINING 50.54 ACRES

CADDO LAKE NATIONAL WILDLIFE REFUGE

HARRRISON COUNTY, TEXAS

Report Prepared By

Louis J. duBois, Jr.
Land Surveyor

January 2014

Tract Description of the
United States of America Tract (100q)
Caddo Lake National Wildlife Refuge
Harrison County, Texas

The hereinafter described tract of land is located in Harrison County, Texas, near the town of Karnack, tract (100q) being 50.54 acres of land out of the Longhorn Ordnance Works Reservation, also known as the Longhorn Army Ammunition Plant, Karnack, Texas, said 50.54 acres of land being that certain 50.54 acre tract described as Parcel No. 7 – Landfill 12 Area excepted from United States of America tract (100a) as surveyed by Entz Engineering and Associates, Inc. & Huffman Surveying Company, A Joint Venture, of Muskogee, Oklahoma, delineated on a map tracing designated "United States of America Tracts (100a,b)" bearing the date of May, 2004, of record in the files of the United States Department of the Interior, Fish and Wildlife Service, Region 2, Albuquerque, New Mexico, said tract (100q) being more particularly described by metes and bounds as follows:

SURVEYOR'S NOTE:

All bearings and distances are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92), Survey Feet. The average Combined Scale Factor applied equals 0.99988410; Convergence equals 02° 21' 53". The computed land area is based on surface distances.

Parcel No. 7 - Landfill 12 Area

BEGINNING at the southwest corner of the Landfill 12 Area, described as Parcel No. 7, said point being described as "Landfill 12 Area Point No. 1" and having a coordinate value of N=6953300.238, E=3311087.540;

THENCE, along the boundary line of said Parcel No. 7,

N. 03°15'36" W., 1741.41 feet

to a point for a corner of this tract, said point being described as "Landfill 12 Area Point No. 2";

THENCE, along the boundary line of said Parcel No. 7,

N. 62°03'32" E., 1151.75 feet

to a point for a corner of this tract, said point being described as "Landfill 12 Area Point No. 3";

THENCE, along the boundary line of said Parcel No. 7,

S. 15°55'59" E., 1311.85 feet

to a point for a corner of this tract, said point being described as "Landfill 12 Area Point No. 4";

THENCE, along the boundary line of said Parcel No. 7,

S. 35°09'33" W., 1306.48 feet

to a point for a corner of this tract, said point being described as "Landfill 12 Area Point No. 5";

THENCE, along the boundary line of said Parcel No. 7,

N. 84°25'54" W., 528.74 feet

to the **POINT OF BEGINNING**, and containing 50.54 acres, more or less.

Bounded on the north, east, south and west by USA tract (100a).

The hereinbefore-described tract of land is delineated on a plat designated "United States of America Tract (100q)" bearing the date of January 15, 2014, of record in the files of the United States Department of the Interior, Fish and Wildlife Service.

GSA Public Buildings Service
Tel: (817) 978-3856
Fax: (817) 978-2063
melvin.freeman@gsa.gov

January 29, 2015

Mr. Thomas E. Lederle
Chief, ACSIM BRAC Division
600 Army Pentagon
Washington D.C. 20310-0600

Dear Mr. Lederle:

Your report of excess dated July 29, 2002, covered 8,492.02 acres of land (later corrected to 8,416 acres), more or less, and improvements at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. GSA Control No. 7-D-TX-0692.

As set forth in the enclosed letter, an additional 109.91 acres of land, more or less, in five parcels of the LHAAP property, described in Attachment 1 and Attachment 2 of the transfer letter, including: three portions of the "Production Area Parcel," consisting of Tract 100r, containing 31.73 acres in and around the Former Acid Storage Area, Tract 100s, containing 18.80 acres in and around the Former TNT Waste Disposal Plant, and Tract 100t, containing 3.82 acres in and around the Former Sewage Treatment Plant; the "Y-Area Parcel," Tract 100u, containing 17.24 acres; and a portion of the 40.37 acre "Static Test Area Parcel," Tract 100v, containing 38.32 acres, have been transferred without reimbursement to the U.S. Department of the Interior, Fish and Wildlife Service (FWS) under the authority of 16 U.S.C. 667b. Additional transfers will be made when approvals are obtained from the Army on lands currently not suitable for transfer. Future requests for transfers will identify requested land by legal description or map overlay.

Upon finalization of transfer of the total land requested by FWS, a complete boundary legal description will be provided by FWS identifying all former Army land that had been transferred. Any map overlays used in the interim to identify previously transferred land will be voided for use to identify former Army land at LHAAP subsequently controlled by FWS.

Custody and accountability of the property identified by legal description in Attachment 1 and Attachment 2 to the transfer letter, together with any necessary documentation, should be transferred to FWS by your agency as soon as practicable. We will appreciate your prompt advice as to the date such action is accomplished. We understand that the FWS, Region 2 Acting Regional Director, Ms. Joy Nicholopoulos, P.O. Box 1306, Albuquerque, NM 87103 will represent the FWS in this matter.

U.S. General Services Administration
Real Property Utilization and Disposal Division (7PZ)
819 Taylor Street, Room 11A30
Fort Worth, TX 76102-6112

Please acknowledge receipt of this communication in the space provided on the enclosed copy of this letter and return it to this office. You may contact Veronica Vorva, Realty Specialist, at telephone 817-978-4246 if there are questions.

Sincerely,

Melvin E. Freeman

Melvin E. Freeman, Director
Real Property Utilization and Disposal
Division (7PZ)

Enclosures

Receipt acknowledged:

Name THOMAS E LEDERLE

Title Chief, ACSIM BRAC DIV

Date 20 APR 2015

cc: Ms. Joy Nicholopoulos, Acting Regional Director
U.S. Fish and Wildlife Service, Region 2
Division of Realty
P.O. Box 1306
Albuquerque, NM 87103-1306

00216809

GSA Public Buildings Service
Tel: (817) 978-3856
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melvin.freeman@gsa.gov

January 29, 2015

Joy Nicholopoulos, Acting Regional Director
U.S. Fish and Wildlife Service, Region 2
Division of Realty
P.O. Box 1306
Albuquerque, NM 87103-1306

RE: Transfer of 109.91 acres of land at the Longhorn Army Ammunition Plant, Karnack, Harrison County, Texas

Dear Ms. Nicholopoulos:

Your letter of April 27, 2004, requested transfer to the U.S. Department of the Interior, Fish and Wildlife Service (FWS), under the authority of P.L. 80-537, 16 U.S.C. 667b, a total of 8,404 acres of land (later corrected to 8,416 acres, more or less), at the Longhorn Army Ammunition Plant (LHAAP), City of Karnack, Harrison County, State of Texas, together with all the improvements found on the real estate, and all related personal property located thereon (hereinafter referred to as the "Property"), reported July 29, 2002, as excess to the needs of the U.S. Army. The first transfer of 5,031.75 acres was accepted into primary jurisdiction by FWS on April 30, 2004. It was agreed that as parcels met the specifications of transfer, additional parcels would be transferred by means of a letter request, a map, and a legal description to GSA.

All the rights to be transferred herein have heretofore been declared excess to the needs of the United States Department of the Army. The respective interests to be transferred hereby have been reported to the General Services Administration (GSA) and have been determined to be excess for disposal pursuant to P.L. 107-217, (40 U.S.C. §§550, et. seq.) as amended.

In accordance with your subsequent letter of December 2, 2014, an additional 109.91 acres, more or less, in five parcels of the LHAAP property including: three portions of the "Production Area Parcel," consisting of Tract 100r, containing 31.73 acres in and around the Former Acid Storage Area, Tract 100s, containing 18.80 acres in and around the Former TNT Waste Disposal Plant, and Tract 100t, containing 3.82 acres in and around the Former Sewage Treatment Plant; the "Y-Area Parcel," Tract 100u, containing 17.24 acres; and a portion of the 40.37 acre "Static Test Area Parcel," Tract 100v, containing 38.32 acres (hereinafter referred to as the "Properties") is now suitable

U.S. General Services Administration
Real Property Utilization and Disposal
Division (7PZ)
819 Taylor Street, Room 11A30
Fort Worth, TX 76102-6112

for transfer to add to the 6,414.89 acres, more or less, previously transferred on ten separate occasions. True and complete legal descriptions of the Properties are included in **Attachment 1** and **Attachment 2**.

Accordingly, pursuant to 40 U.S.C. 501, et seq. and Public Law 80-537, 16 U.S.C. 667b, and acting under authority delegated to me, I hereby transfer 109.91 acres, more or less, as described in **Attachment 1** and **Attachment 2** to the custody and accountability of the U.S. Department of Interior, Fish and Wildlife Service.

Additional transfers covering the remainder of the real estate comprising the LHAAP will be made when approvals are obtained from the Army on lands currently not suitable for transfer. Future requests for other transfers will specifically identify such requested land by legal description and/or map overlay.

This transfer is expressly made subject to all environmental notices, exceptions, restrictions, agreements, and covenants affecting the Property identified in the Environmental Condition of Property VI, Longhorn Army Ammunition Plant, Karnack, Texas, dated January 2014, (hereinafter referred to as the "ECOP VI") which is incorporated herein by reference and amends the "ECOP" previously described in and made a part of the original transfer of April 26, 2004, and subsequent transfers, and the "ECOP II" dated October 2004, "ECOP III" dated August 2005, "ECOP IV" dated March 2007, and "ECOP V" dated September 2007 and revised December 6, 2013 to the extent and only to the extent the same are valid and affect the Property conveyed herein. FWS covenants and agrees that the Property is hereby transferred subject to the use restrictions and covenants which run with the land as identified in Attachment 3 of the ECOP VI previously described. FWS further covenants and agrees that in the event that the Property, or any part thereof, is sold, conveyed, transferred, leased, or otherwise disposed of, the following notices, covenants, and restrictions shall be inserted in any instrument of conveyance.

Upon finalization of transfer of the total land requested by FWS, a complete boundary legal description will be provided by FWS identifying all former Army land that had been transferred. Any map overlays used in the interim to identify previously transferred land will be voided for use to identify former Army land at LHAAP subsequently controlled by FWS.

The property transferred is subject to compliance by the FWS with the provisions of the National Environmental Policy Act of 1969, as amended, including the preparation of an environmental impact statement if required. The Property is transferred subject to compliance by the FWS with Section 106 of the National Historic Preservation Act of 1966, and Executive Order 11593.

Mr. Thomas E. Lederle, Chief, ACSIM BRAC Division, U.S. Army, 600 Army Pentagon, Washington D.C. 20310 will act for the U.S. Army in arranging for the transfer of custody and accountability of the Property and in other matters related to the transfer.

A copy of our letter of same date to the U.S. Army is enclosed for your information. It is requested that you acknowledge receipt of this communication on the enclosed copy of this letter in the space provided, return it to this office, and that such steps as necessary be taken by your Agency to consummate the transaction.

Sincerely,

Melvin E. Freeman, Director
Real Property Utilization and Disposal
Division (7PZ)

Enclosures

Receipt acknowledged:

Name David Allard

Title Realty Specialist

Date 2/2/2015

cc: Mr. Thomas E. Lederle
Chief, ACSIM BRAC Division
600 Army Pentagon
Washington D.C. 20310-0600