

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

CHRONOLOGICAL INDEX

Volume 4 of 25

2007

Bate Stamp Numbers

00044794 - 00045726

Prepared for

**Department of the Army
Longhorn Army Ammunition Plant**

1976 – 2007

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

VOLUME 4 of 25

2007

- A. Title: Report - Final Data Gaps Investigation Report
Author(s): Shaw
Recipient: All Stakeholders
Date: April 26, 2007
Bate Stamp: 00044794 - 00045626

- B. Title: Report - Final Addendum 11 Monitored Natural Attenuation Sampling
LHAAP-16, -17, -29, -46, -47, -50, 35A(58), Final Installation-Wide Work Plan
Author(s): Shaw
Recipient: All Stakeholders
Date: May 14, 2007
Bate Stamp: 00045627 - 00045715

- C. Title: Letter - Final LHAAP-12 Well Abandonment and Installation Report,
Groundwater Data Gaps Investigation, Groups 2 and 4
Author(s): Fay Duke, TCEQ
Recipient: Rose Zeiler, Site Manager LHAAP
Date: May 14, 2007
Bate Stamp: 00045716

- D. Title: Minutes - Draft Final Minutes, Monthly Managers Meeting
Author(s): Shaw
Recipient: All Stakeholders
Date: May 15, 2007
Bate Stamp: 00045717 - 00045726



A World of **Solutions**™

April 26, 2007

Shaw/TERC 07-029

Mr. Cliff Murray
U.S. Army Corps of Engineers – Tulsa District
1645 South 101st - East Avenue
Tulsa, Oklahoma 74128-4629

RE: **Task Order No. 109**
Total Environmental Restoration Contract (TERC)
Contract No. DACA56-94-D-0020
Environmental Investigation and Remediation at
Longhorn Army Ammunition Plant, Karnack, Texas
Final Data Gaps Investigation Report,
Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Murray:

Shaw Environmental, Inc. is pleased to submit the attached *Final Data Gaps Investigation Report*. We are also sending copies of the document directly to individuals on the attached project document distribution list.

Please contact me if you have any questions or require additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read "Praveen", with a long, sweeping horizontal line extending to the right.

Praveen Srivastav, Ph.D., P.G.
Project Manager

Longhorn Distribution List

Member	Agency	Address	Phone No. e-mail address	No. of Copies
Cliff Murray Tulsa District	U.S. Army Corp of Engineers	US Army Corp of Engineers 1645 South 101 st – East Avenue Tulsa, Oklahoma 74128-4529	Office: 918-669-7573 Cliff.Murray@SWT03.usace.army.mil	2
Dr. Rose Zeiler	BRAC; Longhorn Site Manager	P.O. Box 220 Ratcliff, AR 72951 727 South Brooklyn Rd Ratcliff, AR 72951	Office: 479-635-0110 rose.zeiler@us.army.mil	1
Jeff Armstrong	Army Environmental Center	Commander USAEC SFIM-AEC-ERA (Attn: Jeff Armstrong) Beal Road Bldg E-4880 APG, MD 21010-5401	Office: 410-436-1516 jeffrey.armstrong@us.army.mil	1
Stephen Tzhone	US Environmental Protection Agency	US Environmental Protection Agency Superfund Division (6SF-AT) 1445 Ross Avenue Dallas, TX 75202-2733	Office: 214-665-8409 tzhone.stephen@epamail.epa.gov	2
Fay Duke	Texas Commission of Environmental Quality	Texas Commission on Environmental Quality TCEQ Environmental Cleanup Section II, Team 2 (MC-221) 12100 Park 35 Circle, Bldg D Austin, TX 78753	Office: 512-239-2443 fduke@tceq.state.tx.us	2 - most 4-eco
Dale Vodak	Texas Commission of Environmental Quality	Texas Commission on Environmental Quality 2916 Teague Drive Tyler, TX 75701	Office: 903-535-5147 dvodak@tceq.state.tx.us	1
Paul Bruckwicki	US Fish and Wildlife Service	US Fish and Wildlife Service PO Box 230 Karnack, TX 75661 (<i>mailing only</i>) Caddo Lake NWR Hwy 134 & Spur 449 Karnack, TX 75661	Office: 903-679-4536 Cell: 903-407-0852 paul_bruckwicki@fws.gov	1
Barry Forsythe	US Fish & Wildlife Service EPA Liaison (6SF-LT)	US Fish & Wildlife Service EPA Liaison (6SF-LT) 1445 Ross Avenue, Suite 1200 Dallas, TX 75202	Office: 214-665-8467 forsythe.barry@epa.gov	1-eco

Total external distribution for routine final (non eco) reports = 10



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

April 26, 2007

DAIM-BD-LO

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

Re: Final Data Gaps Investigation Report, Longhorn Army Ammunition Plant, Karnack,
Texas, April 2007

Dear Mr. Tzhone,

The above-referenced document is transmitted to you for your files.

Point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

A handwritten signature in black ink, reading "Rose M. Zeiler", is positioned above the typed name.

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

Copies furnished:

Fay Duke, TCEQ, Austin, TX
Paul Bruckwicki, Caddo Lake NWR, TX
Cliff Murray, COE – Tulsa District, OK
John R. Lambert, COE – Tulsa District, OK
P. Srivastav, Shaw, Houston, TX (for project file)



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

April 26, 2007

DAIM-BD-LO

Ms. Fay Duke
Texas Commission on Environmental Quality
Environmental Cleanup Section II (MC-221)
12100 Park 35 Circle
Austin, TX 78753

Re: Final Data Gaps Investigation Report, Longhorn Army Ammunition Plant, Karnack,
Texas, April 2007

Dear Ms. Duke,

The above-referenced document is transmitted to you for your files.

Point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

A handwritten signature in black ink, reading "Rose M. Zeiler".

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

Copies furnished:

Stephen Tzhone, USEPA Region 6, Dallas, TX
Paul Bruckwicki, Caddo Lake NWR, TX
Cliff Murray, COE – Tulsa District, OK
John R. Lambert, COE – Tulsa District, OK
P. Srivastav, Shaw, Houston, TX (for project file)

**Comments on Draft Final Data Gaps Investigation Report – May 2005
Longhorn Army Ammunition Plant**

October 12, 2006

Reviewer: Fay Duke, Project Manager, Team 2, Environmental Cleanup Section II, Remediation Division
Scott Harris and Stephen Tzhone, Region 6, U.S. Environmental Protection Agency

Respondents: Shaw Environmental, Inc.

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commenter Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Page	Section/ Paragraph	Comment	C, D, E or X	Response	A or D ²
Fay Duke, TCEQ						
1		General	<p>This report summarizes the data gap investigations at the following sites: LHAAP-04, LHAAP-17, LHAAP-18/24, LHAAP-29, LHAAP-32, LHAAP-35A(58), LHAAP-35B(37), LHAAP-35C(53), LHAAP-47, LHAAP-48, LHAAP-50, and LHAAP-67. Because the data gaps at each LHAAP site are unique, it is recommended that the objectives or the data gaps at each site be specified and conclusions as to whether the sampling and analysis conducted accomplished the objectives be specified.</p> <p>The report identified numerous data gaps at the various sites. We acknowledge that since the publication of this report, additional investigations have been or are currently being conducted to address some of the data gaps. Furthermore, we have previously provided comments on several of these sites in the review of other work plans and reports. Those comments will not be repeated here. We have listed our additional comments and concerns below segregated by sites.</p> <p><i>TCEQ Comment: (Fay Duke, from email dated December 6, 2006): We generally agree with the responses. However, we have the following concerns: We were unable to locate the site-specific objectives for the investigation in Section 2.0.</i></p>	C	<p>Objectives of the investigation for each site are stated in Section 2.0. Conclusions based on the investigation are summarized for each site in Section 4.0.</p> <p>Text will be added to Section 4 to indicate whether the specified objectives were met and if not, will be explained in the individual site summaries.</p> <p>Shaw's Revised Response: The overall objectives for the data gaps investigation are mentioned in Section 1.1. The following text will be inserted after the first sentence of Section 1.1: "The Data Gaps Work Plan was the result of data gaps identified during the Data Quality Objective Workshop, Group 2, held in Dallas, Texas, on June 12-13, 2002, and the Data Quality Objective Workshop, Group 4, held in Austin, Texas, on April 29-30, 2003. The objectives selected to remove the data gaps were identified and approved by the Army and the regulators." The text in Section 2.1.1, first paragraph will be modified as follows: "Twelve (12) monitoring wells were installed to acquire a better understanding of the lateral and vertical extent of groundwater contamination at</p>	

**Comments on Draft Final Data Gaps Investigation Report – May 2005
Longhorn Army Ammunition Plant**

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Scott Harris and Stephen Tzhone, Region 6, U.S. Environmental Protection Agency

Respondents: Shaw Environmental, Inc.

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Comment #	Page	Section/ Paragraph	Comment	C, D, E or X	Response	A or D ²
			<i>In responding to TCEQ comments regarding the incomplete delineation of the groundwater contamination plume at several LHAAP sites, it is stated that identifying data gaps and providing recommendation for future action were not objectives of this project and that data for the site will be evaluated during site specific response and appropriate action will be taken. However, we believe that reference should be made to indicate that additional investigations may be required to fully delineate the contamination at each of the site with data gaps.</i>		several sites. These included two shallow.....” Section 2.3 and 2.4 outline the objectives of the soil, surface water, and sediment sampling effort. Site-specific objectives identified in Section 2.0 of the February 2004 Final Data Gaps Work Plan will be added to the appropriate Section 2.0 subsections of the Final Report. The need for additional investigation will be determined based on an evaluation of the data during site specific responses and to support the proposed remedy for the site.	
2		Figure 1-2	The title of the drawing, Installation-Wide Site and Monitoring Well Location Map, is misleading. The map does not reflect all the sites in the installation nor does it include all the monitoring wells in the facility. Please revise.	C	The title of Figure 1-2 will be revised to “Site and Monitoring Well Location Map.”	
3		LHAAP-04	No Comments.			
4		LHAAP-17	The extent of the perchlorate and VOC contaminations in the shallow zones and deep zones are not well defined. Please provide recommendation for a course of action(s) to address the data gap(s).	C	Identifying data gaps and providing recommendations for future action were not objectives of this project. The groundwater data for the site will be evaluated during the site specific response to LHAAP-17 and appropriate action will be taken.	
5		LHAPP-18/24	No Comments.			
6		LHAAP-29	No Comments.			
7		LHAAP-32	No Comments.			

**Comments on Draft Final Data Gaps Investigation Report – May 2005
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Respondents: Shaw Environmental, Inc.

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Comment #	Page	Section/ Paragraph	Comment	C, D, E or X	Response	A or D ²
8		LHAAP 35A (58)	<p><u>Figure 3-6:</u> The location and boundary for Site 35A is different from those shown in the work plans and previous reports (see attached). Although there are differences in the site boundary of previous drawings, none of the previous drawings included the 200 Area. The TCEQ does not object the inclusion of the 200 Area. However, clarifications should be provided for the inclusion of this area. Furthermore, data and risk assessment and evaluations for LHAAP- 35A must include the data collected for the 200 Area in future reports.</p> <p><u>Section 3.1.5:</u> It is stated that groundwater flow within the shallow groundwater-bearing zone is to the southeast. However, we note that Figure 3-6 depicts groundwater flow to the north east and to the southwest. Please explain.</p> <p><u>Section 3.2.6:</u> It is stated that methylene chloride detected in the deep groundwater zone is a common laboratory contaminants. These statements which imply that methylene chloride is not a site related contaminant cannot be substantiated. Please revise the sentence to state that methylene chloride was detected, but at low concentration.</p> <p><u>Section 4.2.5:</u> It is stated that a contaminated plume for TCE could not be adequately defined because there are only two wells. We noted that a total of seven shallow zone monitoring wells were sampled, please clarify.</p>	<p>C</p> <p>C</p> <p>C</p> <p>C</p>	<p>Please see the attached memorandum from Cliff Murray regarding site boundaries. In the final document, the 200 Area will not be included within the site boundary.</p> <p>The first sentence of the second paragraph will be changed to “Based on the acquired data, the local groundwater flow within the shallow groundwater-bearing zone at LHAAP-35A(58) is to the northeast and southwest (Figure 3-6). In the installation-wide groundwater elevation map (Figure 3-13), the regional groundwater flow at LHAAP-35A(58) is shown to the southeast.”</p> <p>The sentence will be revised to state that methylene chloride was detected, but at low concentration.</p> <p>The sentence that begins, “Since there are only two wells...” will be deleted.</p>	

**Comments on Draft Final Data Gaps Investigation Report – May 2005
Longhorn Army Ammunition Plant**

October 12, 2006

Reviewer: Fay Duke, Project Manager, Team 2, Environmental Cleanup Section II, Remediation Division
Scott Harris and Stephen Tzhone, Region 6, U.S. Environmental Protection Agency

Respondents: Shaw Environmental, Inc.

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Comment #	Page	Section/ Paragraph	Comment	C, D, E or X	Response	A or D ²
			Finally, based on the groundwater gradient depicted in Figure 3-6, the extent of groundwater contamination is not defined down gradient of LHSMW05 and LHSMW07. Please provide a recommendation for a course of action(s) to address the data gap(s).	C	The groundwater data for the site will be evaluated during the site specific response and appropriate action will be taken.	
9		LHAAP-35B (37)	The extent of groundwater contamination is not defined in the intermediate zone. Please provide a recommendation for a course of action(s) to address the data gap(s).	C	The groundwater data for the site will be evaluated during the site specific response and appropriate action will be taken.	
10		LHAPP-35C (58)	No Comments.			
11		LHAAP-47	<u>Section 3.2.9</u> and <u>Section 4.2.8</u> : It is stated that “No perchlorate was detected at LHAAP-47.” We believe the statement is misleading since not all wells were sampled during the data gap investigation. Please revise. The extent of groundwater contamination is not well defined in the shallow zone (downgradient of 47WW31). Please provide a recommendation for a course of action(s) to address the data gap(s).	C	The statement in both sections will be revised to read, “No perchlorate was detected in the wells that were sampled at LHAAP-47”. The groundwater data for the site will be evaluated during the site specific response and appropriate action will be taken.	
12		LHAAP-48	No Comments.			
13		LHAAP-50	The extent of groundwater contamination is not defined in both the shallow and intermediate zones. Please provide a recommendation for a course of action(s) to address the data gap(s).	C	The shallow and intermediate groundwater zones do not appear to be separate zones at LHAAP-50. Although 50WW06 was installed as an intermediate well, there was no clay layer separating the shallow from the intermediate zones so no isolation casing was set. A clay layer of at least 3 feet was encountered at 55 feet below ground surface, the depth at which the screen was set. The groundwater data for this site will be evaluated during the site specific response and appropriate action will be taken.	
14		LHAAP-67	No Comments.			

**Comments on Draft Final Data Gaps Investigation Report – May 2005
Longhorn Army Ammunition Plant**

October 12, 2006

Reviewer: Fay Duke, Project Manager, Team 2, Environmental Cleanup Section II, Remediation Division
Scott Harris and Stephen Tzhone, Region 6, U.S. Environmental Protection Agency

Respondents: Shaw Environmental, Inc.

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Comment #	Page	Section/ Paragraph	Comment	C, D, E or X	Response	A or D ²
15		Surface Water and Sediment at Central Creek, Goose Prairie Creek, Harrison Bayou and Saunders Branch.	According to the work plan for this data gap investigation, samples are to be analyzed for the metals, perchlorate, and explosives. Additionally, ten percent of all samples will be analyzed for semivolatile organic compounds, pesticides, herbicides, dioxins, and polychlorinated biphenyls (PCBs). It is stated in Section 2.4 of this report that all surface water and sediment samples were analyzed for metals, explosives and perchlorate. However, in Section 3.4 of this report, it is stated that samples were analyzed for metals, PCBs, dioxins/furans and pesticides. Additionally, all discussions regarding the sampling results were exclusively concerning metals, PCBs, dioxins/furans and pesticides. Please explain whether sampling included perchlorate and explosive analysis. If so, please include discussion relating to those sampling results.	C	Sampling did include perchlorate and explosive analysis; however, there were no contaminant concentrations observed in any of the samples collected above laboratory detection limits. A sentence will be added to section 3.4, paragraph 5, "No perchlorate or explosives were detected above the laboratory detection limit in the sediment and surface water samples collected."	
Scott Harris and Stephen Tzhone, Region 6, USEPA For comments 16 through 20, please describe how or whether these items will be addressed.						
16	4-1, 4-2	4.2.2 (LHAAP-17)	The perchlorate contaminant plume in the shallow zone is not well defined to the north or south of the site. Offsite migration of perchlorate to the northwest is indicated by the current data. The perchlorate contaminant plume in the deep groundwater zone cannot be adequately established.	C	The groundwater data for the site will be evaluated during the site specific response and appropriate action will be taken.	
17	4-2	4.2.4 (LHAAP-29)	The m-nitrotoluene contaminant plume is not defined to the southeast. The vertical extent [of methylene chloride] is not defined.	C	The groundwater data for the site will be evaluated during the site specific response and appropriate action will be taken.	
18	4-3	4.2.5 (LHAAP-35A/58)	Since there are only two wells, a contaminant plume for TCE is not adequately defined.	C	The groundwater data for the site will be evaluated during the site specific response and appropriate action will be taken.	
19	4-3	4.2.8 (LHAAP-47)	The lateral extent of the plume is not defined to the northeast.	C	The groundwater data for the site will be evaluated during the site specific response and appropriate action will be taken.	

**Comments on Draft Final Data Gaps Investigation Report – May 2005
Longhorn Army Ammunition Plant**

October 12, 2006

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20.	4-4	4.2.9 (LHAAP-48)	However, the effect of slightly elevated turbidity on sample results could not be evaluated because the sample was not analyzed for the full TAL metals suit [sic] and, thus, aluminum and iron results are not available.	C	The cited sentence will be replaced with the following: "Elevated levels of aluminum and iron are typically associated with highly turbid groundwater samples. Since these data are unavailable, the effect of turbidity could not be evaluated."	

To: Longhorn Team Members
From: Cliff Murray, US Army Corps of Engineers, Tulsa District
Subject: LHAAP-58 Boundary

Date: 24 November 2006

I am writing this narrative to document the different boundaries for environmental site LHAAP-58 that have been presented over the last several years and to present a rationale for this last and hopefully final change.

Fay Duke noted in comment number 8 of her comments on the Draft Final Data Gaps Investigation Report (May 2005) that

Figure 3-6: The location and boundary for Site 35A is different from those shown in the work plans and previous reports (see attached). Although, there are differences in the site boundary of previous drawings, none of the previous drawings included the 200 Area. The TCEQ does not object the inclusion of the 200 Area. However, clarifications should be provided for the inclusion of this area. Furthermore, data and risk assessment and evaluations for LHAAP- 35A must include the data collected for the 200 Area in future reports.

This comment pointed out an error that I had made when drawing the boundary for LHAAP-58 in the last couple of years. When assembling installation information for the GIS database I prepared a drawing that provided boundaries for the various environmental sites. Many of these sites which represented more than a building or a distinct facility had not had boundaries assigned to them but had rather been designated, at best, as general areas on a map. In drawing the boundary for LHAAP-58, I had overzealously included buildings in the 200 Area when I believe a more accurate boundary would only include the buildings within the Shops Area, as shown on Figure 1.

As a starting place for this explanation I refer you to Figure 2 which is a portion of a Thiokol Map from the mid-1980's showing the areas that I'm writing about.

Next, please look at Figure 3 which was taken from the Final DERPMIS/RMIS Resolution Document (June 1995) which can be found in the Longhorn AAP (LHAAP) Administrative Record (bates stamp pages 12865-12935). Site 58 is designated the "Maintenance Complex" and is designated on the map with an arrow pointed to the Shops Area. You may want to zoom in on the pdf file to see the area more clearly. From that figure, it appears fairly clear that the site is in the area labeled "Shops Area" in Figure 2.

Figure 4 is from the Final Remedial Investigation (RI) Report, Volume 1: Report, for the Group 4 Sites (January 2002). This map can be found in the LHAAP Administrative Record on page 027337. As shown in the upper left corner of this figure, Site 35A is shown as the area previously referred to as LHAAP-58. In the text of this report, area is referred to synonymously as 35A or "The Shops Area". It appears that for the RI Sverdrup/Jacobs was evaluating this area under the Sumps Investigation (LHAAP-35)

and thus was referring to the site as 35A rather than the established site name, LHAAP-58. At the same time, LHAAP-37 was referred to as Site 35B.

Figure 5 was taken from the Draft Feasibility Study for the Group 4 Sites (August 2002). This appears to be where the confusion of the boundary for LHAAP-58 began. The boundary, for some reason, was expanded to include the boiler house and LHAAP-60 as well as a large chunk of land to the west that did not contain any environmental sites. I'm guessing that the site was expanded to make it easier to group sumps locations together for the discussion in the FS.

Figures 6 and 7 are from the Final Work Plan for the Groundwater Data Gaps Investigation (February 2004). This document was prepared by Shaw and used the same site boundary for Site 35A as the previous Jacobs report (Figure 5). Figure 7 is the map attached to and referenced by Fay in her comments quoted earlier.

Which brings us to the Draft Final Data Gaps Investigation Report (May 2005) in which Shaw used a site boundary for LHAAP-58 that I had prepared for transfer maps. That boundary is shown in Figure 8. As you can see on this figure, the 200 Area is included.

The boundary recommended and shown in Figure 1 may still be a little generous by including LHAAP-03 (Building 722 – Paint Shop), LHAAP-02 (Vacuum Truck Overnight Parking Lot), , LHAAP-56 (Vehicle Wash Rack & Oil/Water Separator), LHAAP-68 (Mobile Storage Tank) and a portion of LHAAP-60 (Former Storage Building 411 and 714) but I believe it more closely represents the intention of the label originally given as the “Maintenance Complex”.

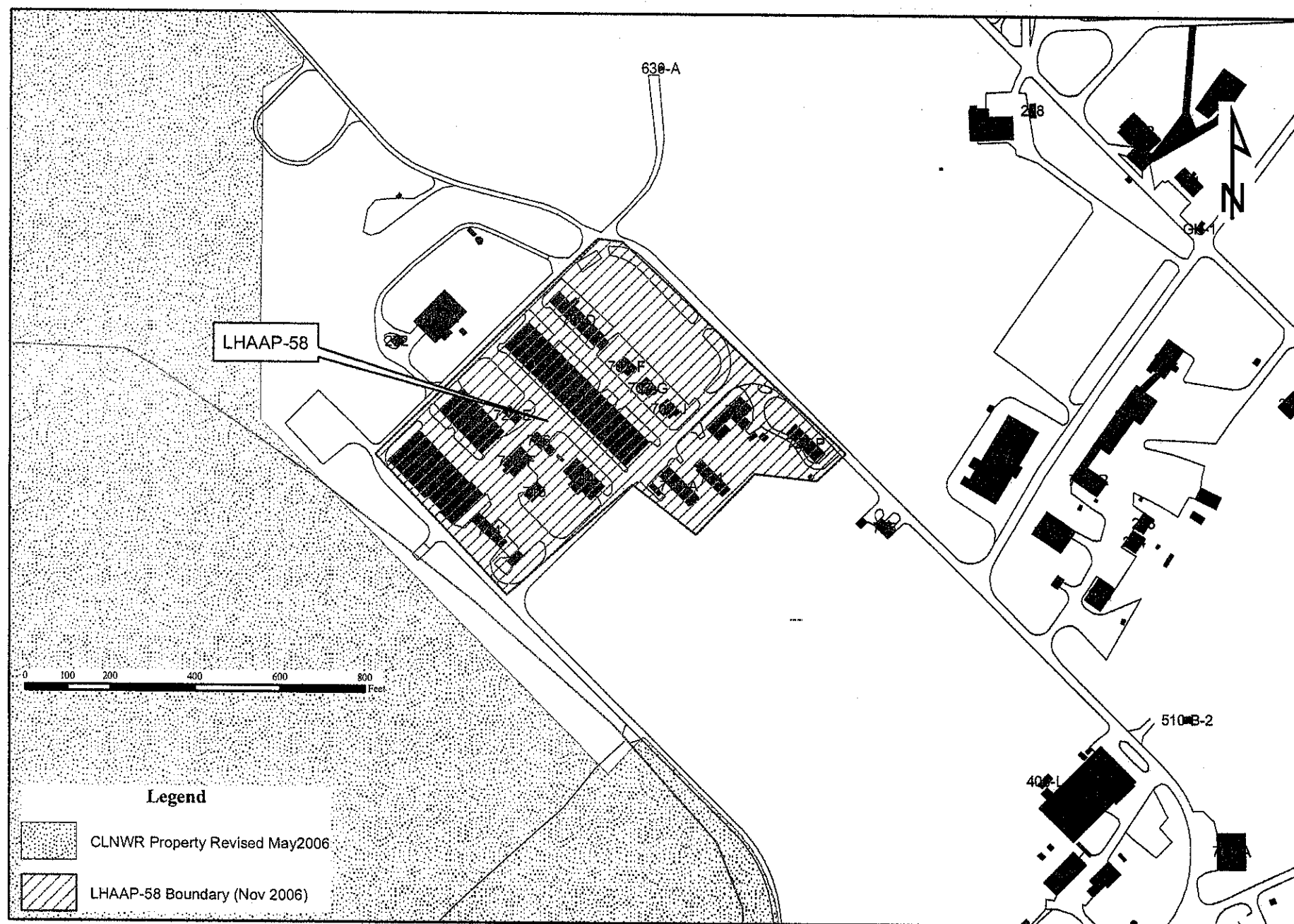


Figure 1

LONGHORN ARMY AMMUNITION PLANT

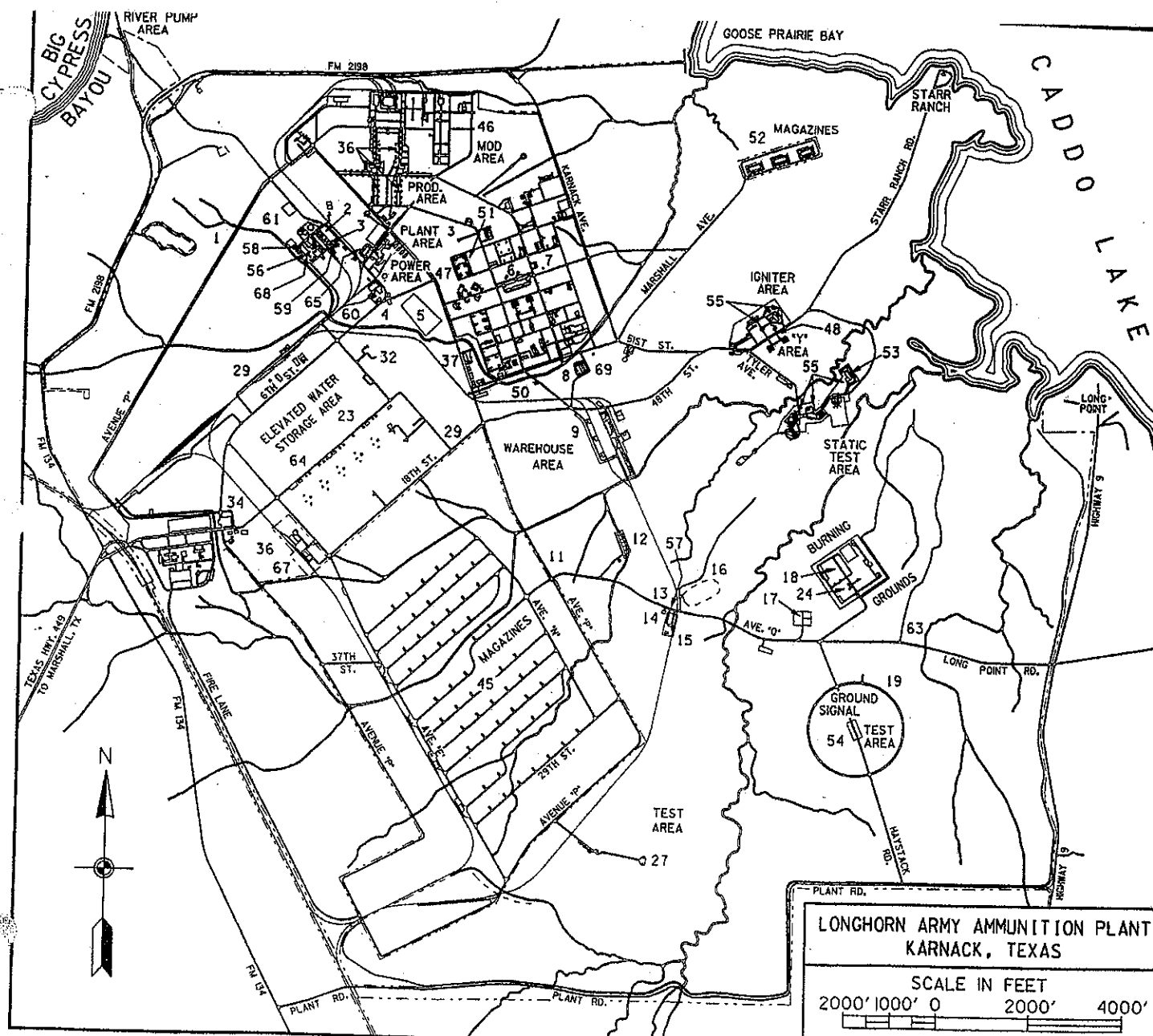
Shops Area/ 200 Area

(1)

SHOPS AREA

200 AREA

~~00044807~~



RMIS LHAAP

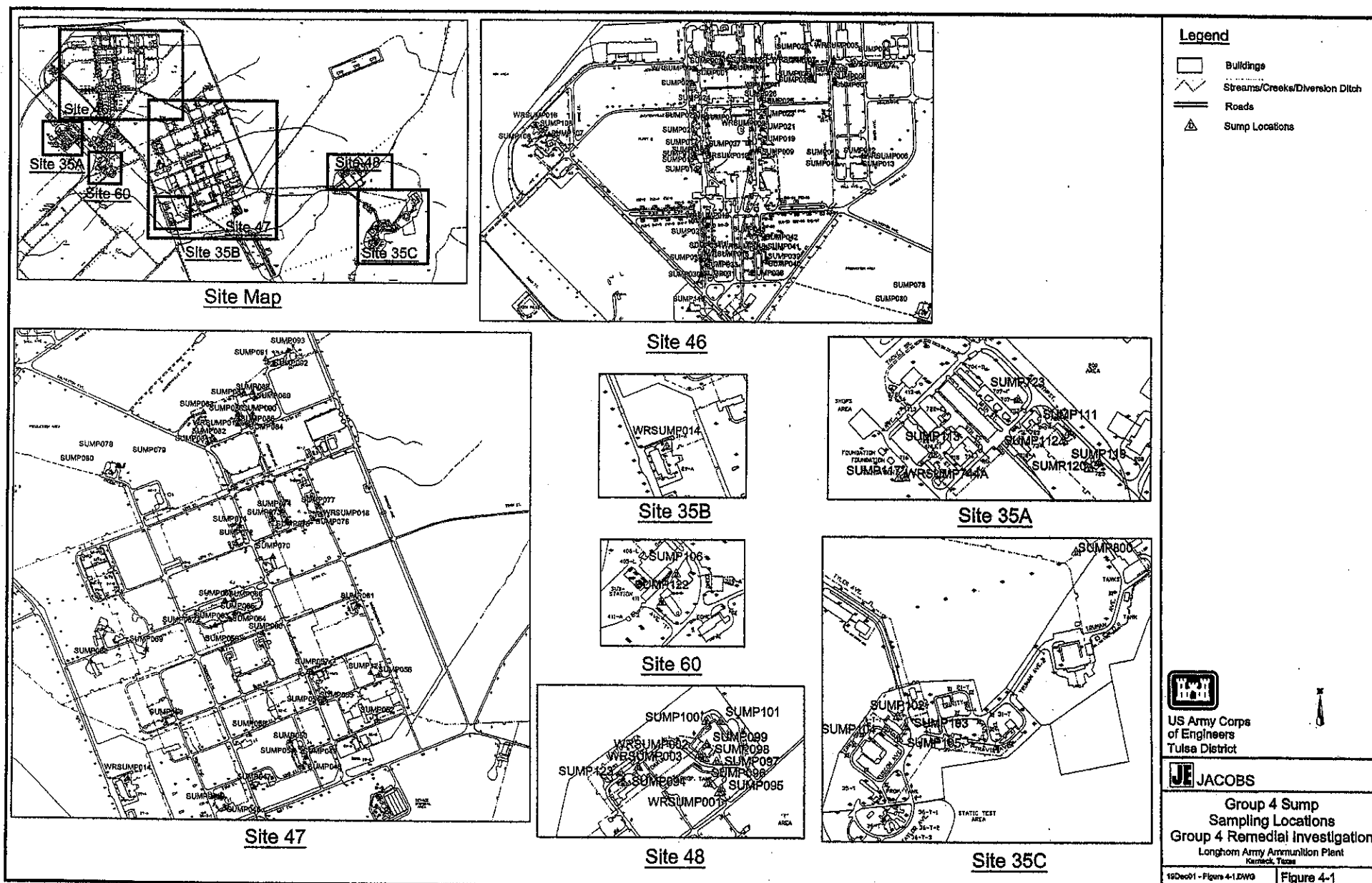
- 1 Inner Burning Ground.
- 2 Vacuum Truck Overnight Parking LBL 2874
- 3 Building 722 - Paint Shop.
- 4 Pilot Waste Water Treatment Plant.
- 5 Power House Boiler Pond.
- 6 Building 54F Solvent.
- 7 Building 50G Drum Processing.
- 8 Sewage Treatment Plant.
- 9 Building 31W Drum Storage.
- 11 Suspected TNT Burial Site at P&Q Ave.
- 12 Active Landfill.
- 13 Suspected TNT Burial Between Active and Old Landfill.
- 14 Area 54W Burial Site.
- 15 Area 49W Drum Storage.
- 16 Old Landfill.
- 17 No. 2 Flashing Area Burning Ground.
- 18 a) Burning Ground #3, b) 24X Holding Area, c) Air Curtain Destructor, d) Building 41X, e) Building 43X, f) 25X Washout Pad, g) Open Burning Cage, h) Open Burning Pan.
- 19 Construction Materials Landfill.
- 23 Building 707 - Storage Area PCB's.
- 24 Former Unlined Evaporation Pond.
- 27 South Test Area / Bomb Test Area.
- 29 a) Former TNT Production Area, b) TNT Red Water Pipeline, c) Former Acid Plant.
- 32 Former TNT Waste Disposal Plant.
- 34 Building 701 - PCP Storage.
- 35 Various Sumps (Located Throughout Facility).
- 36 Explosive Waste Pads.
- 37 Quality Assurance Laboratory Building 29A.
- 45 Magazine Area (Other Than Plant 1).
- 46 Plant 2 / Pyrotechnic Operation.
- 47 Plant 3 / Produces Hand Signal Assemblies.
- 48 Y Area / Produces Hand Signal Assemblies.
- 50 Former Waste Disposal Facility.
- 51 Photographic Laboratory Building 60B.
- 52 Magazine Area (Plant 1).
- 53 Static Test Area.
- 54 Ground Signal Test Area.
- 55 Septic Tank.
- 56 Vehicle Wash Rack & Oil/Water Separator.
- 57 Rubble Burial Site.
- 58 Maintenance Complex.
- 59 Storage Building 725.
- 60 Former Storage Building 411 and 714.
- 61 Water Treatment Plant.
- 63 Burial Pits.
- 64 Transformer Storage.
- 65 Building 209.
- 66 Transformers (Located Throughout Facility).
- 67 Above Ground Storage Tank.
- 68 Mobile Storage Tank.
- 69 Underground Storage Tank.

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

SCALE IN FEET
2000' 1000' 0 2000' 4000'

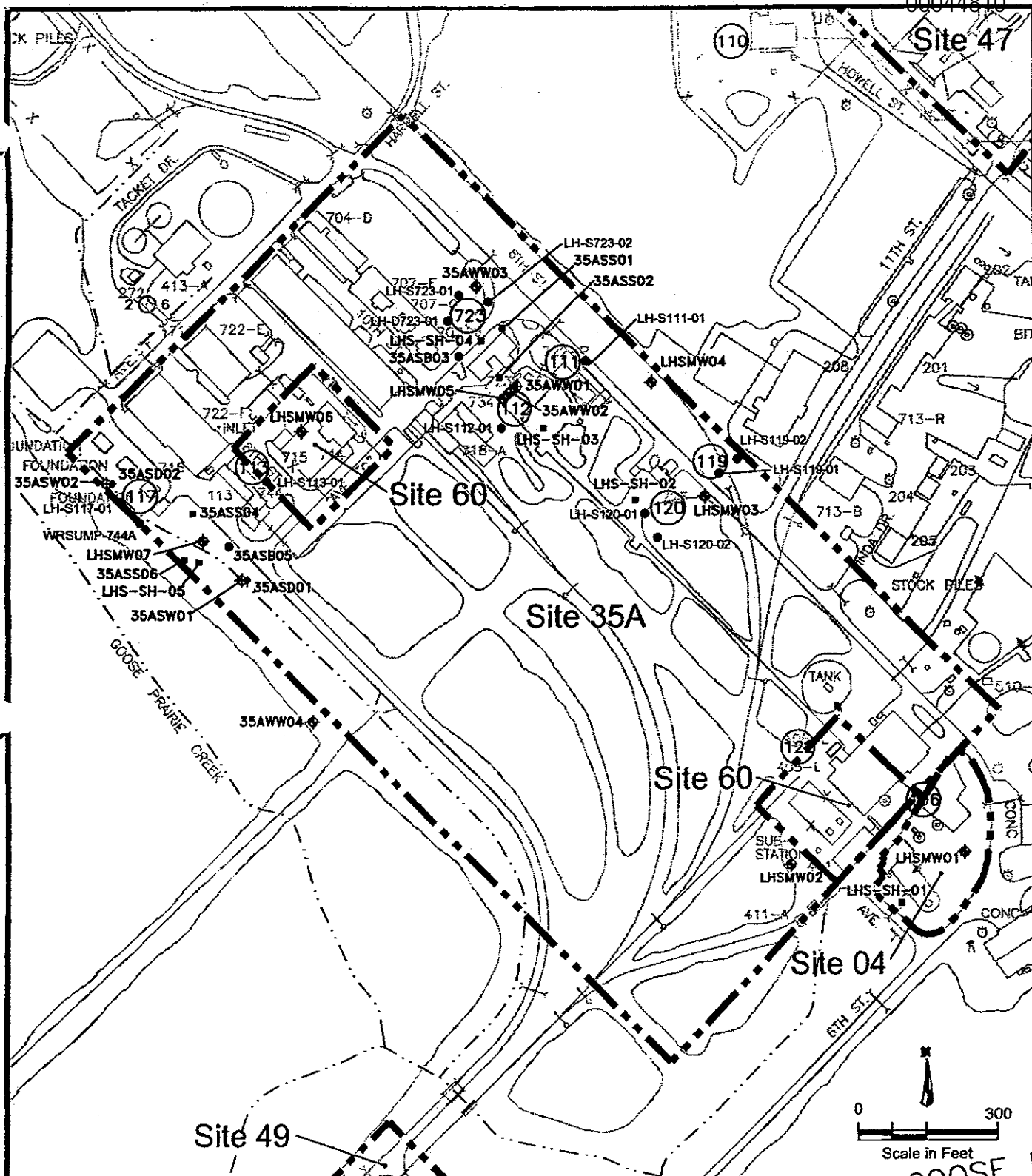
U.S. ARMY CORPS OF ENGINEERS
LHRCNT-1, DGN - 06FEB1995 RDP TULSA DISTRICT

(2)



(4)

Site 47

**Legend**

- Soil Boring Sampling Location
- ◆ Sediment Sampling Location
- ⊕ Shallow Monitoring Well
- ⊕ Shallow Soil Sampling Location
- ⊕ Intermediate Monitoring Well
- ⊕ Sump Location (117)
- ⊕ Deep Monitoring Well
- ⊕ Site Boundary
- ⊕ Surface Water Sampling Location



US Army Corps
of Engineers
Tulsa District

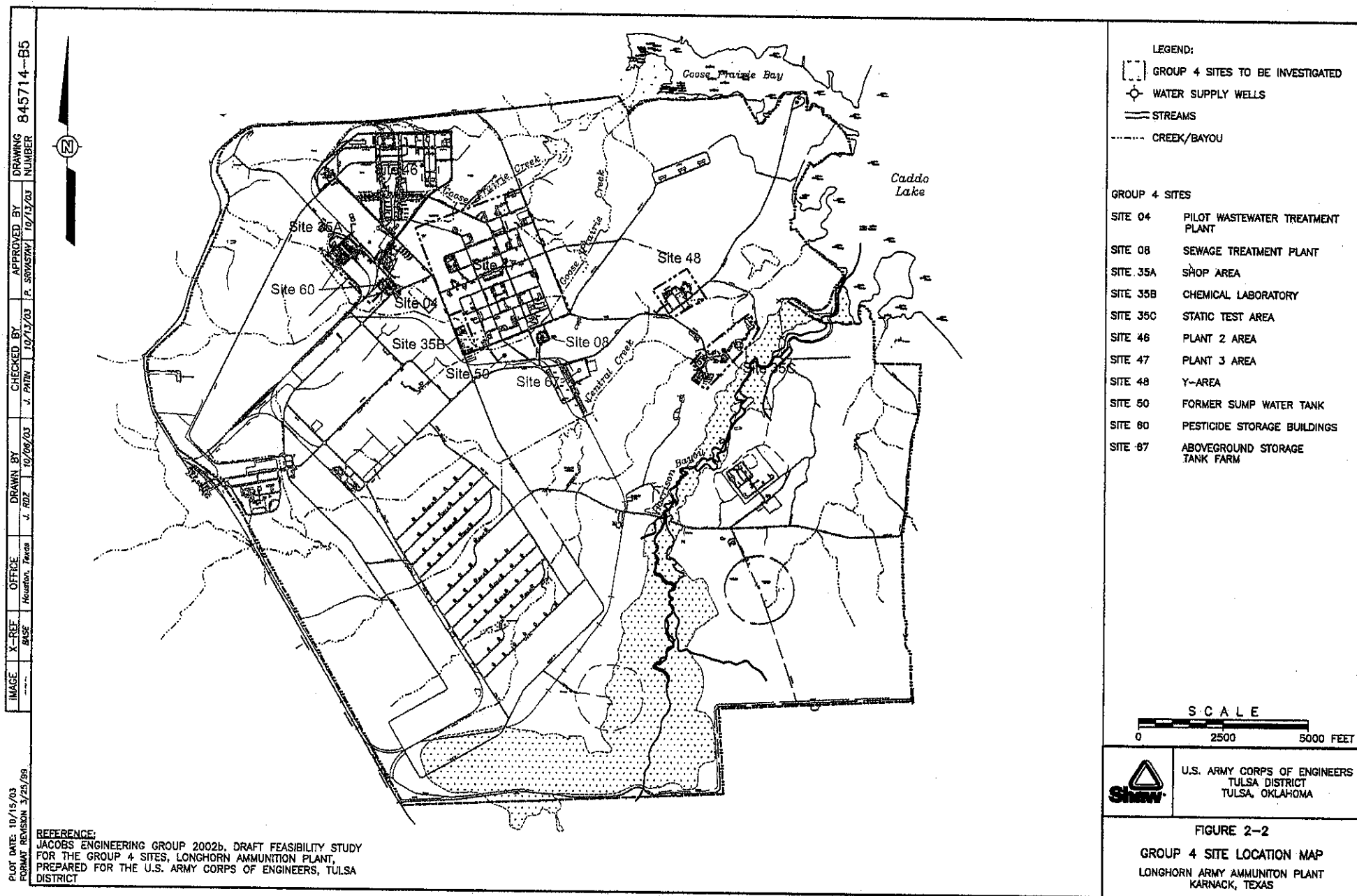
JE JACOBS

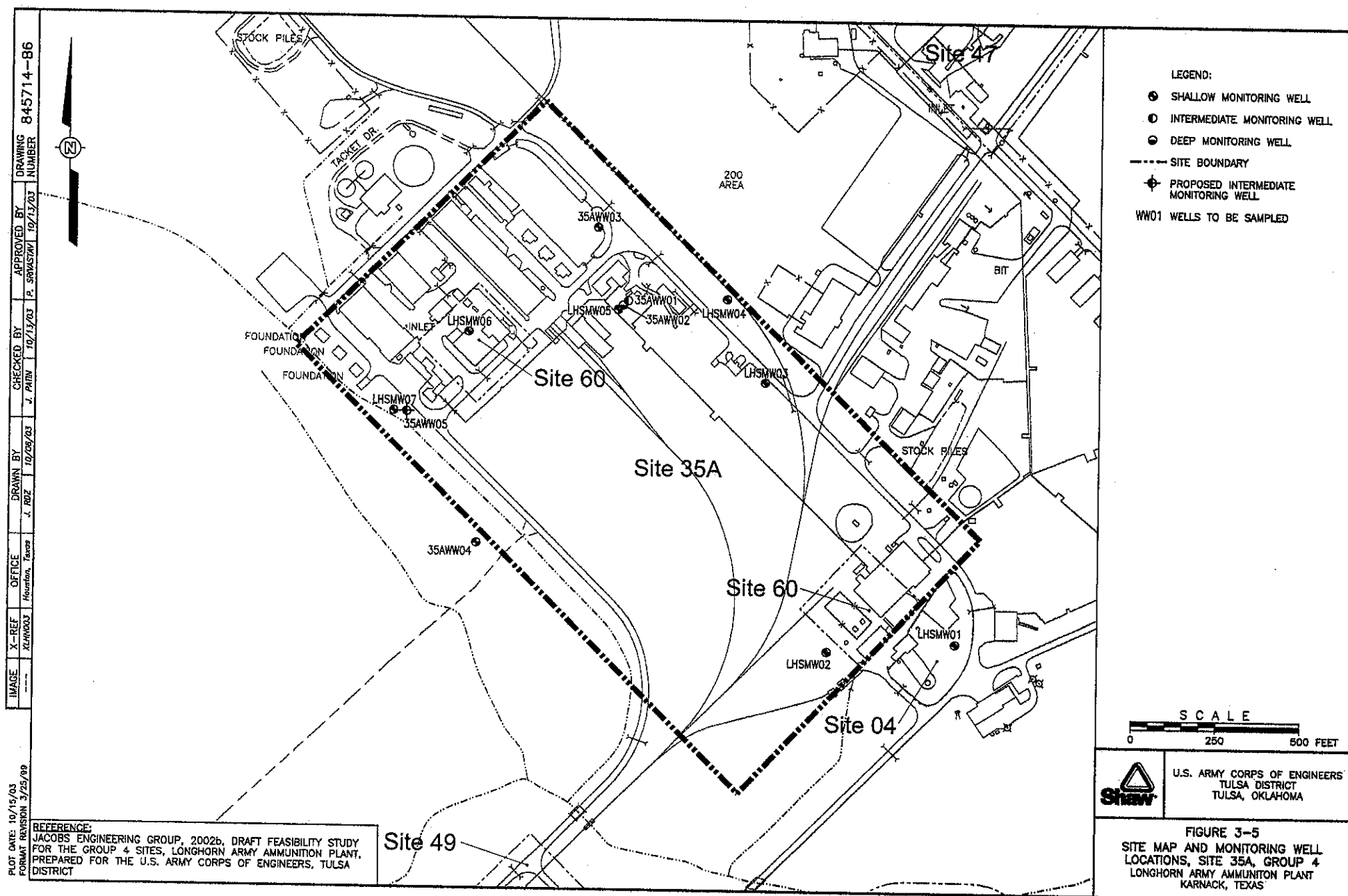
**Site 35A Sampling Locations
Group 4 Sites Feasibility Study**

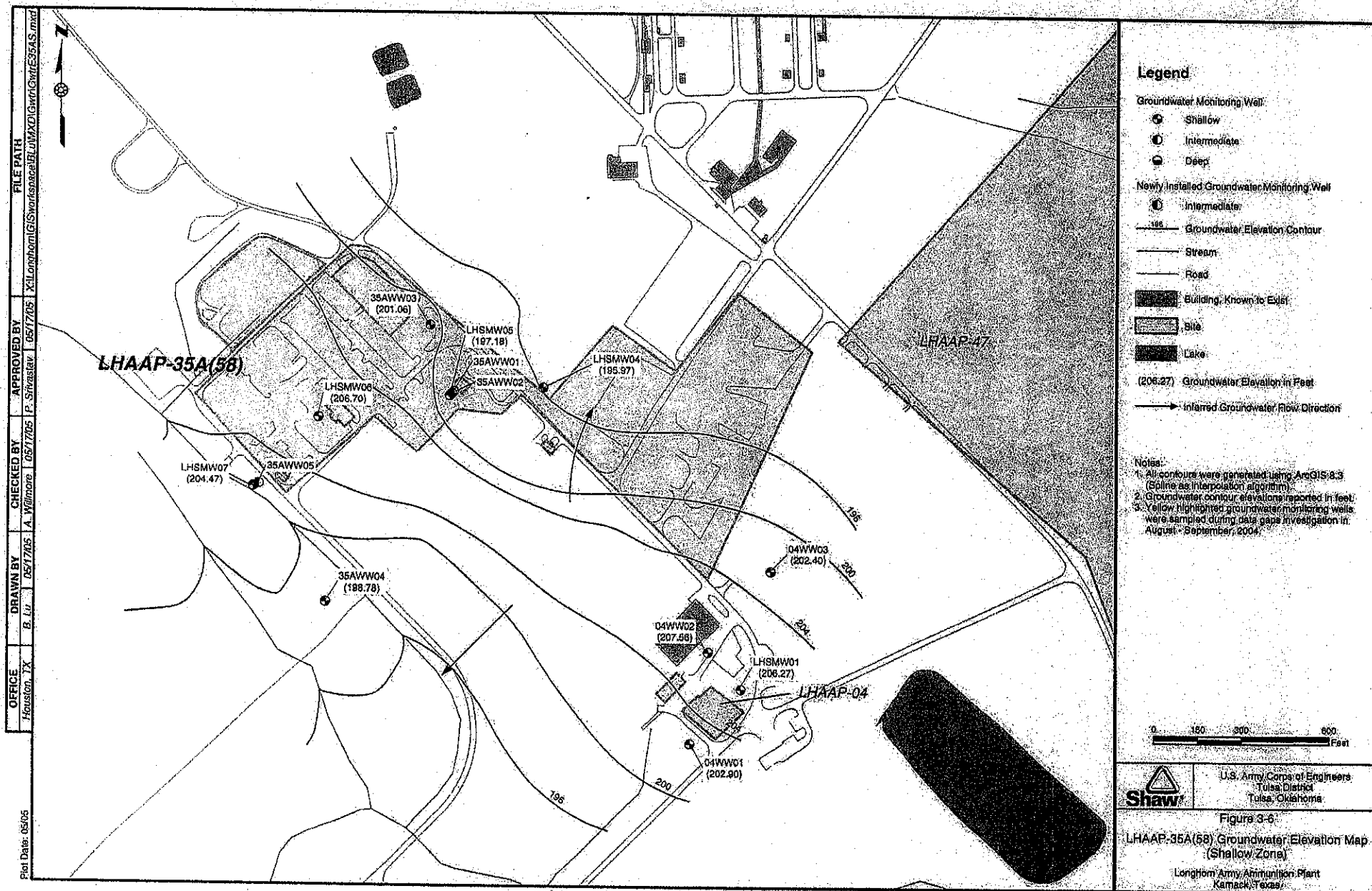
Longhorn Army Ammunition Plant
Karnack, Texas

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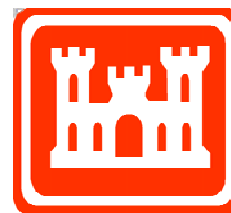
Figure 2-5







FINAL
DATA GAPS INVESTIGATION REPORT
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, Suite 400
Houston, Texas 77042

TERC No. DACA56-94-D-0020, Task Order No. 0109
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April 2007

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Acronyms and Abbreviations

ASTM	ASTM International (formerly American Society for Testing and Materials)
bgs	below ground surface
DCA	dichloroethane
DCE	dichloroethene
DPT	direct push technology
GPS	Global Positioning System
IT/OHM	IT Corporation/OHM Remediation Services Corp.
LHAAP	Longhorn Army Ammunition Plant
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram
NTU	nephelometric turbidity unit
PCB	polychlorinated biphenyl
pg/L	picograms per liter
PVC	polyvinyl chloride
Shaw	Shaw Environmental, Inc.
SOP	standard operating procedure
TAL	target analyte list
TCA	trichloroethane
TCE	trichloroethene
TCL	target compound list
TERC	Total Environmental Restoration Contract
TNT	trinitrotoluene
USACE	U.S. Army Corp of Engineers
VOC	volatile organic compound

1.0 Introduction

The U.S. Army Corps of Engineers (USACE), Tulsa District, contracted Shaw Environmental, Inc. (Shaw), under Total Environmental Restoration Contract (TERC) Number DACA56-94-D-0020, Task Order 0109, to investigate data gaps at 12 sites and four drainage features at Longhorn Army Ammunition Plant (LHAAP) in Karnack, Texas. The 12 sites included LHAAP-04, LHAAP-17, LHAAP-18/24, LHAAP-29, LHAAP-32, LHAAP-35A(58), LHAAP-35B(37), LHAAP-35C(53), LHAAP-47, LHAAP-48, LHAAP-50, and LHAAP-67. The drainage features investigated are Central Creek, Goose Prairie Creek, Harrison Bayou and the Saunders Branch watersheds.

The aforementioned sites have undergone remedial investigations/feasibility studies conducted by other contractors. Subsequent investigations have identified several data gaps that this Data Gaps Investigation Report has been developed to address. The findings of this report are based on field investigations performed by Shaw in April, May, August, and September 2004 in accordance with the *Final Work Plan, Groundwater Data Gaps Investigation, Groups 2 and 4* (Groundwater Data Gaps Work Plan), (Shaw, 2004a) and additional investigations documented in Addendum 1 and Addendum 2 (Shaw, 2004b) to the Groundwater Data Gaps Work Plan.

1.1 Project Objectives

The objective of this project was to collect data that would facilitate a better understanding of the nature and extent of groundwater, soil, surface water, and sediment contamination at LHAAP. The Data Gaps Work Plan was the result of data gaps identified during the Data Quality Objective Workshop, Group 2, held in Dallas, Texas, on June 12-13, 2002, and the Data Quality Objective Workshop, Group 4, held in Austin, Texas, on April 29-30, 2003. The objectives selected to remove the data gaps were identified and approved by the Army and the regulators. The elements of the investigation are as follows:

- Install 12 monitoring wells at locations where groundwater data are lacking.
- Sample newly installed wells and a selected number of existing wells to acquire a better understanding of the lateral and vertical extent of contamination.
- Collect additional data that would delineate the nature and extent of soil contamination at sites LHAAP-32, LHAAP-50, and LHAAP-67.
- Collect additional sediment and surface water samples from several drainage features located at LHAAP from areas where data are lacking.

1.2 LHAAP Location and Background

Longhorn Army Ammunition Plant is located in central-east Texas in the northeastern corner of Harrison County (**Figure 1-1**). The facility occupies 8,493 acres between State Highway 43 in

Karnack, Texas, and the western shore of Caddo Lake. The nearest cities are Marshall, Texas, approximately 14 miles to the southwest, and Shreveport, Louisiana, approximately 40 miles to the east. Caddo Lake is a large freshwater lake that bounds LHAAP to the north and east. The eastern fence of LHAAP is 3.5 miles from the Texas-Louisiana state border.

LHAAP is an inactive army installation which was active from the early 1940s to the late 1990s for the manufacturing of explosives, pyrotechnics, and rocket motors for World War II, the Korean War, and the Cold War. LHAAP consists of a heavily-vegetated landscape with flat to slightly undulating terrain. Aside from the abundant wildlife, the installation is predominantly unoccupied with a number of streets oriented northwest-southeast and northeast-southwest. **Figure 1-2** provides a map of the installation and the 12 sites and four drainage features investigated in this report.

1.3 Report Organization

This report consists of five sections and three appendices. **Section 2.0** explains procedures and rationale for the field investigation activities performed at the sites. **Section 3.0** presents the analytical data. **Section 4.0** summarizes the findings. **Section 5.0** cites the references used in this report. **Appendix A** contains boring logs and well construction diagrams for the monitoring wells installed during the field investigation activities. **Appendix B** contains request for analysis and chain-of-custody reports for the samples. **Appendix C** is a compact disk with groundwater sampling forms and sample collection logs. **Appendix D** is a compact disk with historical groundwater results.

PLOT DATE: 10/11/04
 FORMAT REVISION 5/13/02

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
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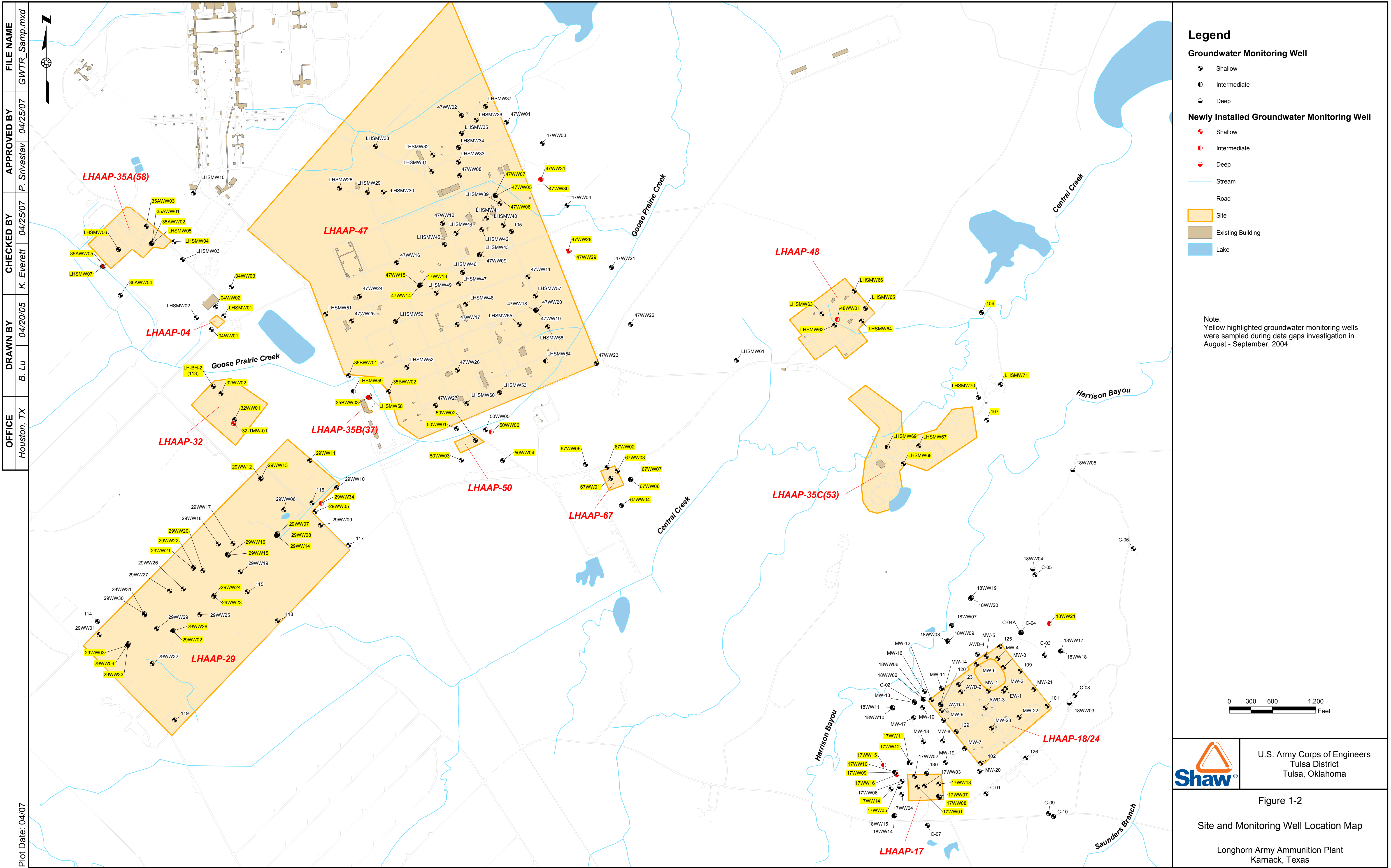


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 U.S.G.S. QUADRANGLE OF
 TYLER, TEXAS; LOUISIANA 1956, REVISED 1977
 SCALE 1:250,000



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

FIGURE 1-1
 LHAAP LOCATION MAP
 DATA GAPS INVESTIGATION REPORT
 LONGHORN ARMY AMMUNITION PLANT
 KARNACK, TEXAS



2.0 *Field Investigation*

In April 2004, Shaw began the installation of 12 groundwater monitoring wells at LHAAP in accordance with the Final Work Plan (Shaw, 2004a). The wells were located at various sites that included LHAAP-17, LHAAP-18/24, LHAAP-29, LHAAP-35A(58), LHAAP-35B(37), LHAAP-47, LHAAP-48, and LHAAP-50. A well installation summary is presented in **Table 2-1**. Eight monitoring wells were installed during April 2004; however, the fieldwork was halted due to flooding caused by heavy rains. The remaining four wells were installed in August 2004.

In August 2004, other tasks were added to the data gaps investigation. The tasks were described in Addenda 1 and 2 to the Final Work Plan, published as one document (Shaw, 2004b). Tasks under Addendum 1 included advancing eight soil borings and installing a shallow, temporary well at LHAAP-32; advancing eight soil borings at LHAAP-50; collecting groundwater samples at LHAAP-32; advancing one boring at LHAAP-67; and collecting groundwater samples at seven wells at LHAAP-67. Tasks under Addendum 2 included collecting 20 collocated sediment and surface water samples at locations along Central Creek, Goose Prairie Creek, Harrison Bayou, and Saunders Branch.

2.1 *Monitoring Well Installation*

2.1.1 *Monitoring Well Installation Activities*

Twelve monitoring wells were installed to acquire a better understanding of the lateral and vertical extent of groundwater contamination at several sites. These included two shallow wells (47WW28 and 47WW30), nine intermediate wells (17WW15, 18WW21, 29WW34, 35AWW05, 35BWW03, 47WW29, 47WW31, 48WW01, and 50WW06), and one deep well (17WW16). Additionally, one piezometer (temporary well), 32TMW01, was installed within the shallow groundwater-bearing zone. Well identifications, zones of installation, and construction details are provided in **Table 2-1**.

Monitoring wells were drilled and installed using a high-torque hollow-stem auger drill rig capable of converting to mud-rotary. Each well was constructed with 4-inch-diameter, flush-joint threaded, schedule 40, polyvinyl chloride (PVC) and installed in accordance with State of Texas rules and regulations. Soil samples were collected continuously during the drilling of each monitoring well borehole to describe the lithology, identify the depths or zones of groundwater saturation, and determine the depths and thickness of semi-confining layers. The soil samples were obtained using a 5-foot-long, 2-inch-diameter, split barrel core sampler advanced ahead of the drill bit. The soil samples were described according to ASTM D2488-00, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)", and logged on USACE

Engineering Form 1836 (Drilling Log) or its equivalent. Additional details regarding the standard practice for logging lithology are provided in TERC Standard Operating Procedure (SOP) No. 1134 (IT Corporation/OHM Remediation Services Corp. [IT/OHM], 2000). Soil boring and drilling logs and well construction diagrams are found in **Appendix A**.

The 4-inch-diameter monitoring wells were installed in the annulus of hollow-stem augers. The PVC well screen was 0.01-inch slotted screen and was 10 feet in length. A threaded PVC bottom cap was secured to the bottom of the screen interval. Solid PVC casing was installed from the top of the screen interval to approximately 3 feet above ground surface. A filter pack consisting of clean silica sand (20-40 size) was placed in the auger-well annulus from approximately 0.5 feet below the well bottom to approximately 2 feet above the screen interval. A 3-foot-thick bentonite seal was placed above the filter pack and hydrated with potable water. The annular space from the top of the bentonite seal to the surface was filled with a bentonite-cement grout.

Wells installed within the intermediate groundwater-bearing zone were isolated from the shallow groundwater-bearing zone using a 12-inch diameter, schedule 40 steel casing. The casing was installed near the ground surface to the top of the first confining layer. Upon grouting and setting the isolation casing, drilling proceeded into the intermediate groundwater-bearing zone. Well 17WW16 was installed within the deep groundwater-bearing zone, isolated from both the shallow and intermediate zones using 16-inch-diameter and 12-inch-diameter steel casings, respectively.

The drilling equipment was decontaminated prior to arrival at the site and prior to drilling at each well location, in accordance with TERC SOP No. 1118 (IT/OHM, 2000). Core samplers were decontaminated between sampling intervals in a detergent/water solution and double rinsed with potable or tap water in clean buckets. The management of decontamination wastewater and drill cuttings is discussed in **Section 2.1.4**.

Aboveground completions were constructed for each monitoring well. The surface completion consisted of a 6-inch by 6-inch by 3-foot-high protective steel casing with a hinged, lockable lid set into a 4-foot by 4-foot by 6-inch-thick concrete pad. Concrete-filled steel bollards were installed at the corners of the concrete pad.

The monitoring wells and surface completions were installed in accordance with USACE and the State of Texas requirements by a drilling subcontractor licensed in the State of Texas. A State of Texas Well Report was submitted to the Texas Department of Licensing and Regulations for construction of each well. Copies of these reports are found in **Appendix A**.

2.1.2 Survey of Monitoring Well Locations

A State of Texas-licensed professional land surveyor, Landmark Consultants of Longview, Texas, surveyed the locations and elevations of the 12 newly installed monitoring wells. Lateral coordinates are referenced to the U. S. State Plane Coordinate System, Texas North Zone, North American Datum of 1983. The vertical elevations of the tops of the wells (top-of-casing) were surveyed to the nearest 0.01 foot. The top of pad elevation at each well location was surveyed to the nearest 0.1 foot. **Table 2-1** provides well coordinates and elevations for the newly-installed monitoring wells.

2.1.3 Well Development Activities

The newly installed wells were developed by removing drilling fines to enhance hydraulic communication between the well and the groundwater zone. Well development was performed by gentle surging of the screened interval using a surge block. Pumping was performed using a down hole pump. A minimum of five well volumes of water was removed from each well. Well volume was calculated based on the diameter of the well and assuming a 30 percent filter pack porosity. The volume of groundwater removed from each well was calculated by subtracting the static water level measurement from the total depth of the well as referenced from the top-of-casing. An electronic probe was used to measure the water levels. As an alternative to pumping, a bottom-filling bailer was used to remove water from low-yielding wells. Water quality measurements (temperature, pH, conductivity, dissolved oxygen, and turbidity) were recorded using a Horiba U-22, Serial No. 0282031-1999.8. Development continued until the water quality parameters stabilized to within 10 percent and the water was visually clear in accordance with guidance on well development provided in TERC SOP No. 1121 (IT/OHM, 2000). Management of the purge water and decontamination wastewater is discussed further in **Section 2.1.4**.

2.1.4 Waste Management for Monitoring Well Installations

Drill cuttings generated during well installation activities were placed in eight polyethylene-lined 20-cubic-yard roll-off containers. A separate roll-off container was used for each site. At some locations, drill cuttings were placed in 55-gallon drums before being transferred to the roll-off. Each roll-off container was sampled and analyzed for volatile organic compounds (VOCs), reactivity, toxicity, flashpoint, and flammability. A grab sample was collected and analyzed for the volatile samples, and a three-point composite was collected and analyzed for the remaining analytical suite. After confirming that the drill cuttings were non-hazardous, the contents of the roll-off containers were disposed within the fenced area at LHAAP-18/24.

During well development activities, wastewater was generated as well development or purge water and decontamination wastewater. This wastewater was placed in 55-gallon drums until transported and emptied into the onsite groundwater treatment plant at LHAAP-18/24.

2.2 *Groundwater Sampling Activities*

In August and September 2004, Shaw conducted groundwater sampling activities at LHAAP. Samples were collected using the low-flow sampling method utilizing a site-specific SOP on low-flow sampling techniques. The objective of this method was to recover representative samples of the groundwater in the formation adjacent to the well screen, eliminating the mixing of any stagnant water above and below the well screen. Ideally, the flow rate of water discharge from the down hole bladder pump was equal to or less than the flow rate of groundwater entering the well from the water-bearing zone.

The wells were purged at low-flow rates until water quality parameters stabilized and were within acceptable ranges. The samples were then collected at the same low flow rate. The low-flow sampling method reduces the turbidity in samples by minimizing the disturbance of sediment at the bottom of the well. That, together with the reduction in the amount of purge water that has to be managed and disposed, makes the low-flow method a more advantageous sampling technique.

2.2.1 *Monitoring Well Sampling Locations*

Shaw conducted groundwater sampling activities at a total of 89 monitoring wells at LHAAP, which included the 12 newly installed monitoring wells. **Figure 1-2** shows the locations of the wells sampled during this activity.

2.2.2 *Analytical Requirements*

Groundwater samples collected from each site were analyzed for specific contaminants of concern based on past activities conducted at each site. Samples collected from LHAAP-17 and LHAAP-29 were analyzed for target compound list (TCL) VOCs, perchlorate, and explosives, and samples collected from LHAAP-18/24, LHAAP-35C(53), LHAAP-47, and LHAAP-50 were analyzed for TCL VOCs and perchlorate. Dioxins/furans and target analyte list (TAL) metals were also analyzed in groundwater samples collected at LHAAP-35C(53). Samples collected from LHAAP-04 were analyzed for perchlorate only. Samples collected from LHAAP-35A(58), LHAAP-35B(37), and LHAAP-67 were analyzed for TCL VOCs only. Samples collected from LHAAP-48 were analyzed for perchlorate, thallium, and dioxins, and samples collected from LHAAP-32 were analyzed for explosives. A summary of the parameters analyzed for each site is shown in **Table 2-2**.

Samples were packaged with completed request for analysis and chain of custody records in each sample cooler and shipped to the appropriate laboratories. Copies of request for analysis and chains of custody records are included in **Appendix B**.

The field samples were collected, documented, handled, analyzed, and reported according to the Final Work Plan (Shaw, 2004a). Chemical data were reported via electronic data packages and

hard copies by the laboratory. Selected results were qualified based on the U.S. Environmental Protection Agency data validation procedures and practices. The analytical data and data validation reports are presented in the Data Quality Summary Report (Shaw, 2004c).

2.2.3 Waste Management for Monitoring Well Sampling

Decontamination wastewater and purge water were generated during the monitoring well sampling activities. The wastewater and purge water were placed in 5-gallon buckets or 55-gallon containers until transported and emptied into the groundwater treatment plant located at LHAAP-18/24.

2.3 Soil Sampling Activities

In August 2004, soil borings were advanced using a direct push technology (DPT) rig (Geoprobe 6610DT). The soil sampling was conducted at sites LHAAP-32, LHAAP-50, and LHAAP-67, in accordance with Addendum 1 to the Final Work Plan (Shaw, 2004b). Three soil samples were collected from each boring location. One sample was from the surface interval, 0 to 1 feet below ground surface (bgs); one sample was collected from a zone with either the most sandy soil content or a zone that revealed variability from the other zones; and one sample was collected immediately above the water table.

The DPT method involved the use of a high-capacity hydraulic ram mounted on a remote-controlled all-terrain vehicle to advance a drive sampler attached to 1-inch inside diameter, steel push rods. Soil samples were collected continuously during drilling using a 1-inch-diameter 36-inch-long sampler with a disposable liner. The total depth of each boring was determined during drilling activities, based on the occurrence of groundwater.

During sampling of each boring, Shaw personnel set up a truck tailgate as a sample area and covered the tailgate with plastic sheeting. Field analytical and health and safety instruments were properly calibrated prior to the commencement of drilling. Between each sampling interval, personnel donned new disposable sample gloves to prevent cross-contamination. Sampling equipment was decontaminated as described in Section 4.5 in the Chemical Data Acquisition Plan, Appendix C of the Final Work Plan (Shaw, 2004a). Drilling operations were observed to verify that all proper safety, sampling, and drilling methods were being instituted. When the soil sample was received from the driller, the soil-filled sampler was opened and the sample liner was removed from the barrel, cut open, and placed on the plastic sheeting. The length of the sample was described according to ASTM D2488-00, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" and recorded on the standard Drilling Log Form based on the USACE Hazardous, Toxic and Radioactive Waste Drilling Log. After determining the appropriate sampling intervals based on the lithology, composite soil samples were collected for laboratory analysis. Each sample container was labeled and enclosed

in a sealable plastic bag and placed in a cooler containing ice, as described in Section 4.6.2 of Appendix C of the Final Work Plan (Shaw, 2004a). This process was repeated for each interval to the total boring depth. Drilling activities and sampling procedures were recorded daily on a Field Sampling Report or logbook. Completed chain-of-custody documentation is provided in **Appendix B**.

The sample field screening was limited to screening of soil samples for total VOCs. Duplicate analyses were performed for volatiles on ten percent of soil samples. The data was used to make decisions regarding sampling intervals. Health and safety screening methods are described in the Site Safety and Health Plan, Appendix A of the Final Work Plan (Shaw, 2004a).

2.3.1 LHAAP-32 Former TNT Treatment Area

Shaw conducted soil sampling at LHAAP-32 to define the extent of trinitrotoluene (TNT)-contaminated soil at the former settling pond and to determine the presence or absence of metal contamination near the former treatment facility building (**Figure 2-1**). The sampling was conducted in two separate events. During the first event, Shaw advanced a total of eight borings at the former settling pond and downgradient from the former treatment building location at LHAAP-32. Three borings (32SB14, 32SB15 and 32SB16) were advanced at the base of the former settling pond bank perimeter to determine the horizontal extent of potential contamination, with one boring (32SB14) located within the deepest part of the settling pond, near its center. Three borings (32SB17 through 32SB19) were located around the settling pond boundaries at the top of the pond bank. During this event, one boring was placed to the southeast of the settling pond and converted to a 1-inch-diameter piezometer (temporary well 32TMW01) in order to confirm any impact to the groundwater. Additionally, two borings (32SB20 and 32SB21) were placed to the north and east of the former treatment facility slab. During the second event, one boring (32SB23) was placed at the location of the former sampling location (32SS03) where TNT was detected at a high concentration of 57,000 milligrams per kilogram (mg/kg) during a previous investigation. The purpose of this boring was to confirm the presence or absence of TNT contamination at 32SS03. A second boring was placed at 32SB22 to define the lateral extent of potential contamination. Soil samples were analyzed for TAL metals and explosives. **Figure 2-1** illustrates sampling locations.

2.3.2 LHAAP-50 Former 47,000-Gallon Aboveground Storage Tank Area

The soil at LHAAP-50 is known to be contaminated with high levels of perchlorate and the groundwater is contaminated with perchlorate and VOCs. Shaw advanced eight soil borings at LHAAP-50 in order to better delineate the area of perchlorate contamination at the site and to determine if a source of VOCs exists in the site soils. Three samples were collected from each boring and analyzed for perchlorate and VOCs. **Figure 2-2** illustrates boring locations at LHAAP-50.

2.3.3 LHAAP-67 Former Aboveground Storage Tank Farm Area

Due to a high concentration (1,800 micrograms per liter [$\mu\text{g/L}$]) of trichloroethane (TCA) detected in a groundwater sample from existing monitoring well 67WW03, soil investigation activities at LHAAP-67 were added to the scope of work (Shaw, 2004b). This included advancing one soil boring (67SB04) approximately 3 feet west of monitoring well 67WW03 to determine whether the soil is a continuing source of contamination. Two samples were collected from this boring and analyzed for VOCs. **Figure 2-3** shows the boring location at LHAAP-67.

2.3.4 Survey of Soil Boring Locations

Sample locations were marked with a stake, and location coordinates were obtained using a Global Positioning System (GPS) device, where practical. Due to heavy vegetation and tree cover, some boring locations were positioned by triangulation using existing site references. Lateral coordinates are referenced to the U. S. State Plane Coordinate System, Texas North Central Zone, North American Datum of 1983.

2.3.5 Waste Management of Soil Sampling Activities

Drill cuttings generated during soil boring activities were either backfilled into the borehole or placed in 20-cubic-yard roll-off containers. A separate roll-off container was used for each site. Each roll-off was sampled for VOCs, toxicity characteristic leaching procedure for metals, reactivity, toxicity, flashpoint, flammability, and pH. A grab sample was collected for the volatile samples; a three-point composite was collected for the remaining analytical suite.

2.4 Surface Water and Sediment Sampling Activities

In August 2004, 20 sediment and 11 surface water samples were collected from four on-site drainage features: Central Creek, Goose Prairie Creek, Harrison Bayou, and Saunders Branch (**Figure 2-4**). These samples were collected in an effort to gain further information where data gaps previously existed.

Surface water samples were collected by gently immersing the appropriate laboratory-supplied sample containers into the surface water of the drainage feature. Samples were taken at depths no greater than 0.5 feet below the water's surface. Once filled, the sample containers were placed into ice-packed coolers for shipping. Samples were evaluated for turbidity, dissolved oxygen, pH, conductivity, and temperature using field instrumentation. This information can be found in **Appendix C** of this report.

Sediment samples were collected from depositional areas of a stream. The samples were collected using a decontaminated stainless steel shovel from a depth no greater than 0.5 feet bgs and placed in clean, laboratory-supplied containers. The samples were then placed into ice-filled coolers for shipping. The stainless steel shovel was decontaminated between sampling locations

by rinsing with detergent solution, potable water, and distilled water. Sample collection documentation was completed for each sample collected.

All samples were analyzed for metals, explosives, and perchlorate. At two locations, IWSD-4 and IWSD-16, samples were analyzed for metals, semivolatile organic compounds, explosives, pesticides, herbicides, and polychlorinated biphenyls (PCBs). Duplicate analyses were performed for metals, explosives, and perchlorate at a separate sampling location, IWSD-3.

2.4.1 Surface Water and Sediment Sampling Activities at Central Creek

Central Creek originates off the western boundary of LHAAP in two separate segments. These two segments combine immediately west of Avenue P in the Magazine Area. Central Creek also remains substantially in its stream channel for the majority of the area in the plant. Approximately 3,000 feet from the facility's fence line near Caddo Lake, Central Creek becomes more sinuous.

Originally, ten surface water and sediment sample locations were planned within Central Creek; however, due to the dry conditions of the creek bed, only five surface water samples were collected: IWSW-8, IWSW-9, IWSW-10, IWSW-15, and IWSW-16. Sediment sampling was performed at ten separate locations (IWSD-7 through IWSD-16) along Central Creek (**Figure 2-4**).

2.4.2 Surface Water and Sediment Sampling Activities at Goose Prairie Creek

Originating immediately off the northwest corner of LHAAP, the flow of Goose Prairie Creek is confined within its embankment for the majority of its traverse across LHAAP. Goose Prairie Creek has two separate channels that flow into Caddo Lake. One channel proceeds generally east-west and the other channel flows generally east-west and then north into Goose Prairie Cove.

Although six surface water and sediment samples were proposed to be obtained from Goose Prairie Creek, dry creek bed conditions allowed for only two surface water samples (IWSW-3 and IWSW-4) to be collected. Sediment sampling was performed at six separate locations (IWSD-1 through IWSD-6) along Goose Prairie Creek (**Figure 2-4**).

2.4.3 Surface Water and Sediment Sampling Activities at Harrison Bayou

Harrison Bayou originates more than 4 miles south of the facility. With the extensive drainage basin south of LHAAP, this stream carries much more water than the other streams on the facility. Approximately 1,400 feet from Caddo Lake, Harrison Bayou maintains a distinct sinuous channel that is not obvious during periods of moderate to high flow rates. Harrison Bayou enters Caddo Lake at a blind inlet. One surface water and sediment sample pair

(IWSW-17/IWSD-17) was collected from the watershed of Harrison Bayou. The sample location is approximately 1,500 feet west of the actual channel (**Figure 2-4**).

2.4.4 Surface Water and Sediment Sampling Activities at Saunders Branch

Saunders Branch begins immediately south of the southeast corner of LHAAP. From the south plant boundary to Long Point Road, Saunders Branch flows within a confined ravine. In the vicinity of Long Point Road, beaver dams inhibit the stream's flow and create extensive wetlands (**Figure 2-4**). From Long Point Road to the north perimeter fence, Saunders Branch flows in a less confined channel resulting in a broad stream profile. Immediately north of the perimeter fence, a pronounced channel is present for the remaining distance prior to reaching Caddo Lake. Surface water and sediment sampling were performed at three separate locations (IWSD-18 through IWSD-20) along Saunders Branch (**Figure 2-4**).

2.4.5 Survey of Surface Water and Sediment Sampling Locations

Upon completion of the surface water and sediment sampling efforts, the actual sampling locations were surveyed using a GPS device. Lateral coordinates are referenced to the U. S. State Plane Coordinate System, Texas North Central Zone, North American Datum of 1983.

Table 2-1
Well Installation Summary

Site	Well	Zone	Northing	Easting	TOC Elevation (feet msl)	Well Depth (feet bgs)	Screen Length (feet)
LHAAP-17	17WW15	Intermediate	6952941.24	3315221.44	182.61	54	10
LHAAP-17	17WW16	Deep	6952809.26	3315406.13	181.13	155	10
LHAAP-18/24	18WW21	Intermediate	6954901.27	3317520.17	195.20	60	10
LHAAP-29	29WW34	Intermediate	6956567.58	3307436.94	214.54	87	10
LHAAP-32	32TMW01	Shallow	6957667.19	3306222.41	NA	25	10
LHAAP-35A(58)	35AWW05	Intermediate	6959849.64	3304426.14	221.41	75.5	10
LHAAP-35B(37)	35BWW03	Intermediate	6958034.06	3308089.22	203.56	81	10
LHAAP-47	47WW28	Shallow	6960058.22	3310852.66	194.43	23	10
LHAAP-47	47WW29	Intermediate	6960059.44	3310868.57	194.08	63	10
LHAAP-47	47WW30	Shallow	6961047.19	3310472.4	197.12	23	10
LHAAP-47	47WW31	Intermediate	6961056.05	3310483.73	196.94	55	10
LHAAP-48	48WW01	Intermediate	6959110.51	3314579.82	193.24	55	10
LHAAP-50	50WW06	Intermediate	6957553.93	3309790.22	195.35	58	10

Notes:

bgs below ground surface

msl mean sea level

NA not available

TOC top of casing

Table 2-2
Groundwater and Soil Analytical Parameter Summary Table

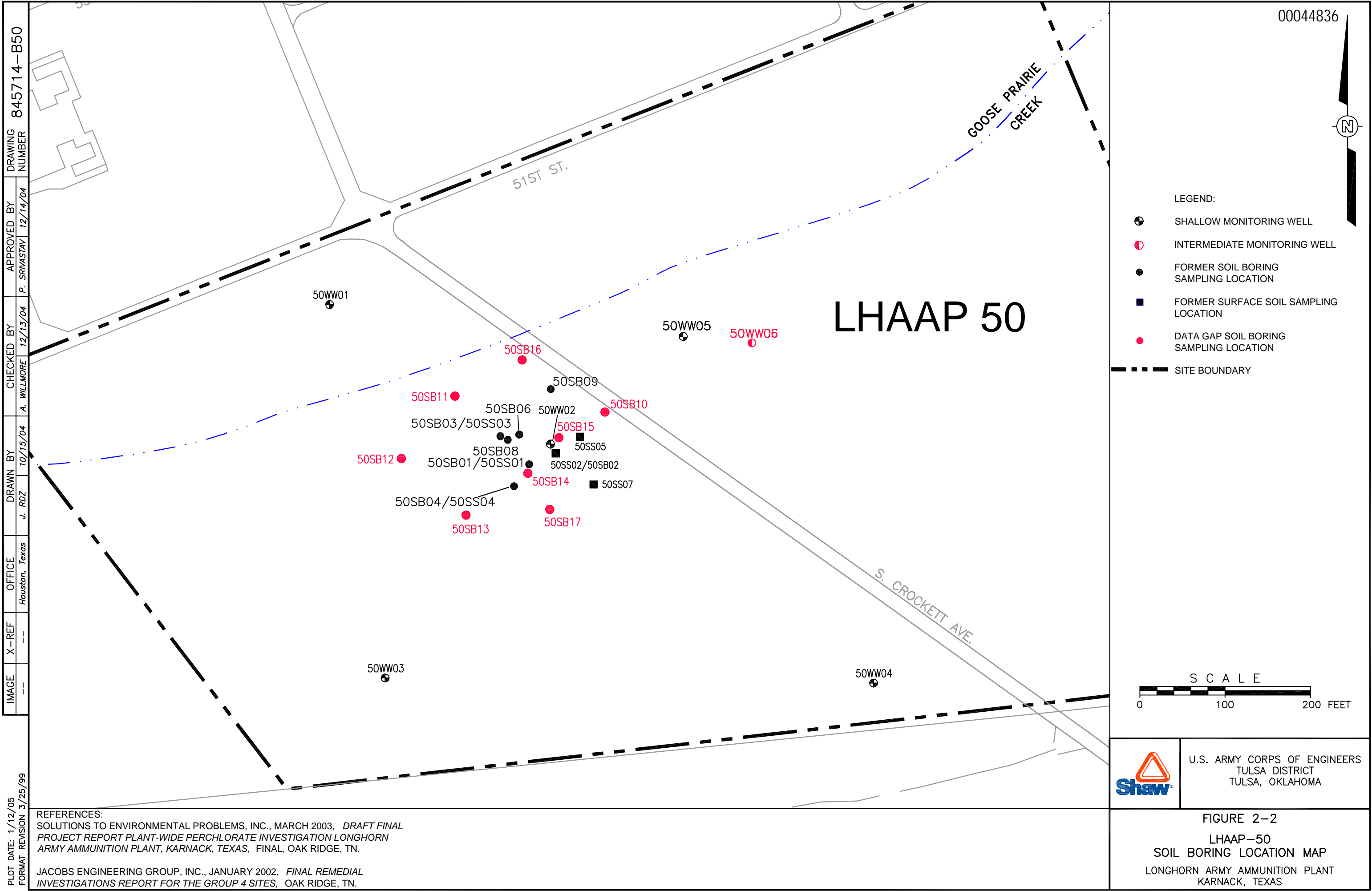
Site	Groundwater Analyses	Soil Analyses
LHAAP-04	Perchlorate	No soil samples were collected
LHAAP-17	Explosives, perchlorate, and TCL VOCs	No soil samples were collected
LHAAP-18/24	Perchlorate and TCL VOCs	No soil samples were collected
LHAAP-29	Explosives, perchlorate, and TCL VOCs	No soil samples were collected
LHAAP-32	Explosives	Explosives and TAL metals
LHAAP-35A (58)	TCL VOCs	No soil samples were collected
LHAAP-35B (37)	TCL VOCs	No soil samples were collected
LHAAP-35C (53)	Dioxins/ furans, TAL metals, perchlorate, and TCL VOCs	No soil samples were collected
LHAAP-47	Perchlorate and TCL VOCs	No soil samples were collected
LHAAP-48	Dioxins/ furans, perchlorate, and thallium	No soil samples were collected
LHAAP-50	Perchlorate and TCL VOCs	Perchlorate and TCL VOCs
LHAAP-67	TCL VOCs	TCL VOCs

Notes:

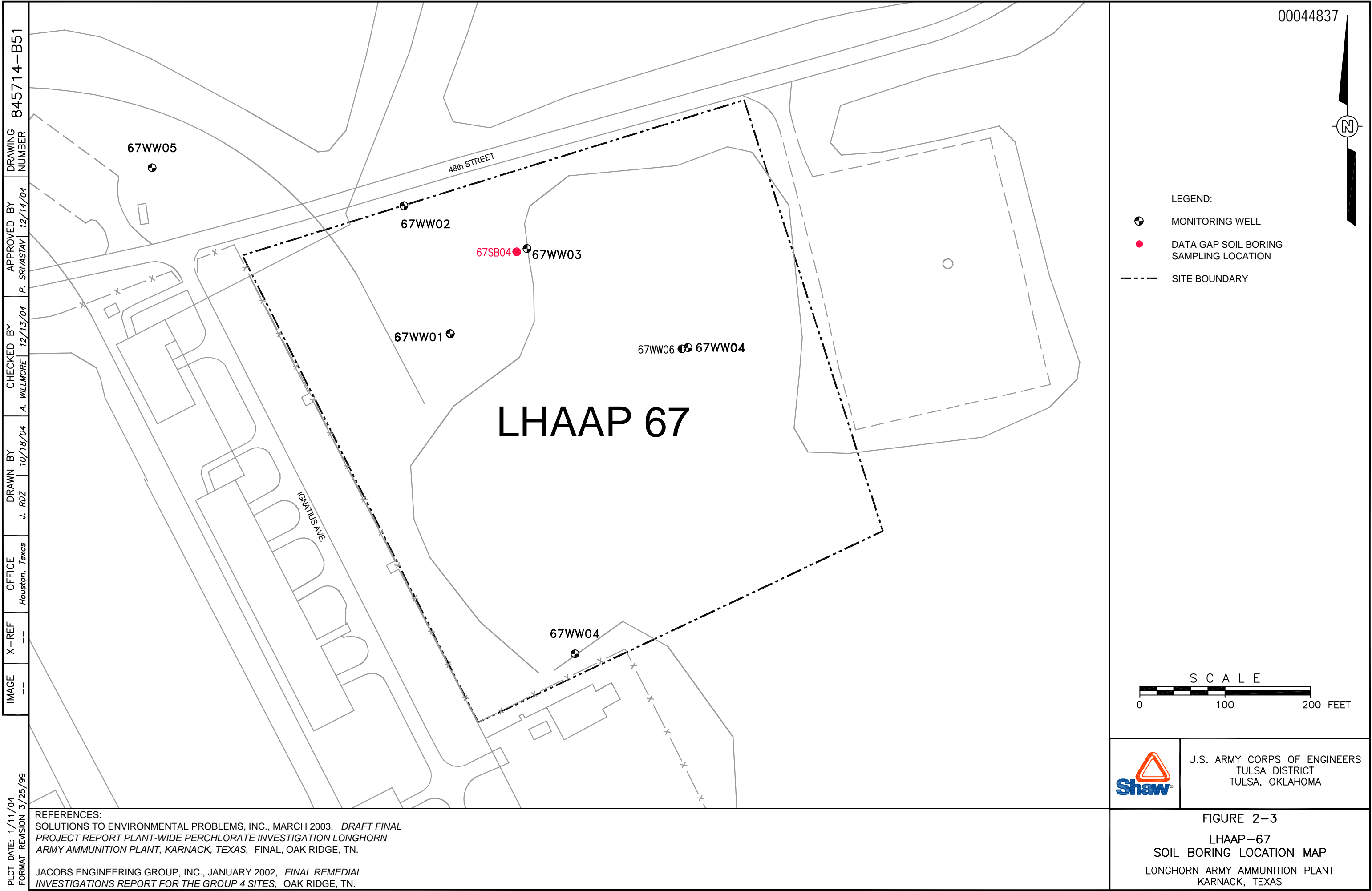
TAL target analyte list

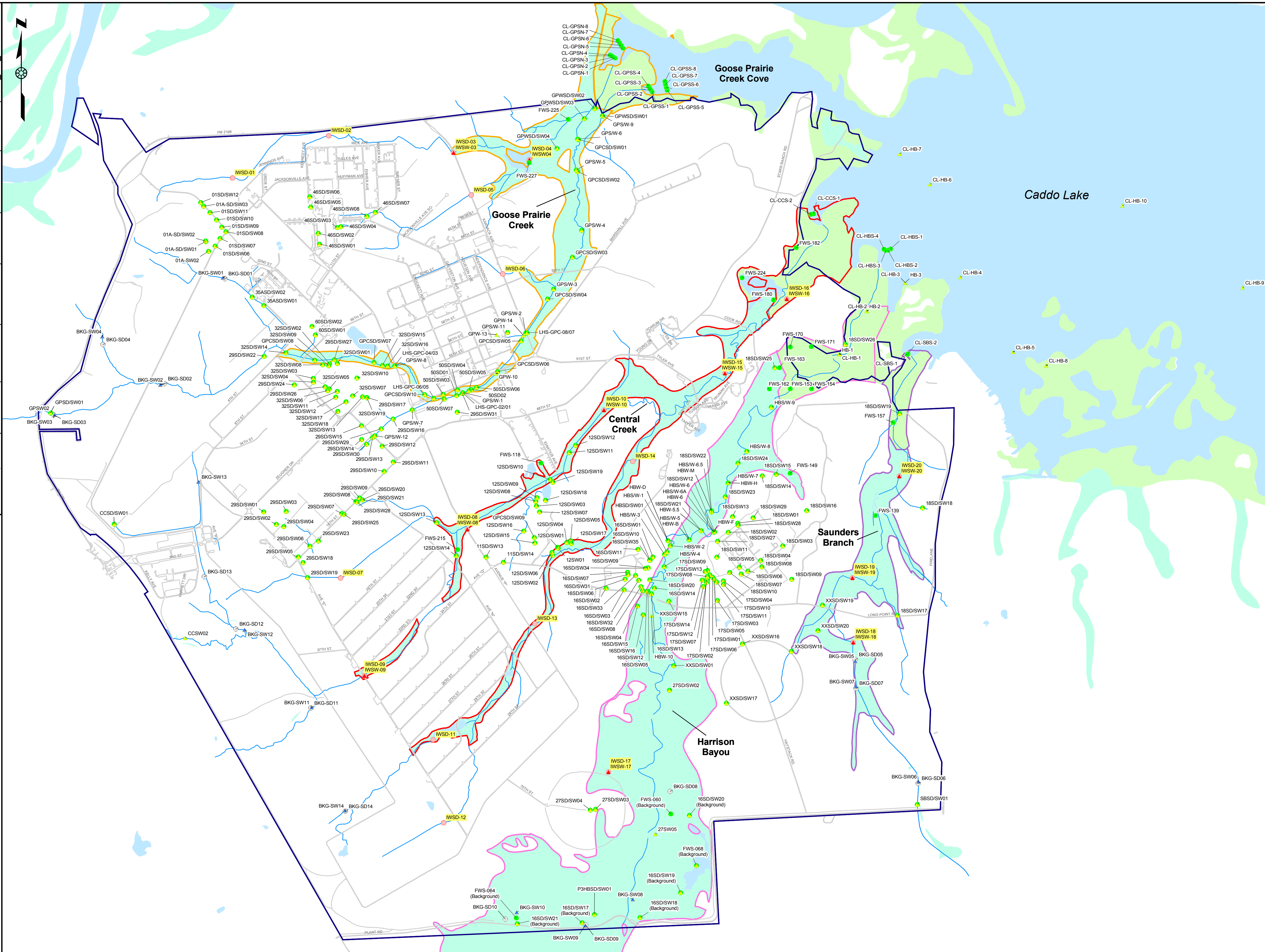
TCL target compound list

VOCs volatile organic compounds



LHAAP 50





Longhorn Army Ammunition Plant
Karnack, Texas

3.0 Investigation Results

3.1 Groundwater Gradient

In August and September 2004, Shaw completed water level measurements at sites LHAAP-04, LHAAP-17, LHAAP-18/24, LHAAP-29, LHAAP-32, LHAAP-35A(58), LHAAP-35B(37), LHAAP-35C(53), LHAAP-47, LHAAP-48, LHAAP-50, LHAAP-67. A total of 89 wells were gauged during this event. The groundwater level measurements were performed in concurrence with the groundwater sampling activities. Wells were gauged using a water level probe. The water level indicator was decontaminated between measurements of each well. Proper personal protective equipment, including hard hat, safety glasses, steel-toe boots, and rubber nitrile gloves, was used during water level measurement.

There are three identified groundwater-bearing zones at the site: shallow zone, intermediate zone, and deep zone. Based on groundwater elevation data collected during the installation-wide groundwater sampling event, the intermediate and shallow groundwater bearing zones may be interconnected. Groundwater elevation was found to be within tenths of a foot at wells that were clustered and were screened in separate groundwater-bearing zones. For example, monitoring well 17WW08, screened within the shallow groundwater-bearing zone, has a groundwater elevation of 170.44 feet bgs. Intermediate monitoring well 17WW07, located in close proximity to 17WW08, has a groundwater elevation of 170.07 feet bgs. Likewise, monitoring wells 47WW30 (shallow) and 47WW31 (intermediate) were measured and have identical groundwater elevations of 178.22 feet bgs. However, these wells were installed within separate groundwater-bearing zones. This trend does not appear to be installation-wide. There is a well-defined groundwater elevation difference between the shallow and intermediate groundwater-bearing zones at LHAAP-29.

The following sections discuss groundwater gradients and flow for each site based on the measured water levels. A list of the wells gauged and corresponding water elevations are provided in **Table 3-1**.

3.1.1 Groundwater Gradient at LHAAP-04

Water level measurements were taken from three monitoring wells (04WW01, 04WW02, and 04WW03) at LHAAP-04. All three monitoring wells were installed within the shallow groundwater-bearing zone. Based on the acquired data, groundwater flow within the shallow groundwater-bearing zone in the immediate vicinity of LHAAP-04 is to the southwest (**Figure 3-1**). There are no intermediate or deep zone wells at the site and thus the groundwater gradients for these groundwater-bearing zones at LHAAP-04 have not been established.

3.1.2 Groundwater Gradient at LHAAP-17

Water level measurements were taken from 12 monitoring wells at LHAAP-17. Six monitoring wells (17WW01, 17WW08, 17WW10, 17WW12, 17WW13, and 17WW14) are installed within the shallow groundwater-bearing zone. Four monitoring wells (17WW07, 17WW09, 17WW11, and 17WW15) are installed within the intermediate groundwater-bearing zone. Monitoring wells 17WW05 and 17WW16 are installed within the deep groundwater-bearing zone.

Based on the acquired data, groundwater flow within the shallow groundwater-bearing zone at LHAAP-17 is to the northwest and northeast toward Caddo Lake (**Figure 3-2**). Previous reports (Jacobs, 2001) also indicated that the shallow groundwater flows to the northwest. Groundwater flow within the intermediate groundwater-bearing zone is to the north and northwest (**Figure 3-3**). The groundwater elevation differences between the shallow and intermediate zones vary from 0.23 feet to 0.38 feet, indicating a slight downward vertical gradient. Due to insufficient data, a potentiometric surface map for the deep groundwater-bearing zone was not generated for LHAAP-17. However, an installation-wide potentiometric map for the deep groundwater-bearing zone has been generated, as discussed in **Section 3.1.13**.

3.1.3 Groundwater Gradient at LHAAP-18/24

A water level measurement was taken from one well, 18WW01, installed within the shallow groundwater-bearing zone at LHAAP-18/24, because this was the only well sampled during the current investigation. The groundwater elevation within this well is 169.14 feet above mean sea level. No groundwater gradients maps were generated for LHAAP-18/24.

3.1.4 Groundwater Gradient at LHAAP-29

Water level measurements were taken from 20 monitoring wells at LHAAP-29. Thirteen monitoring wells (29WW02, 29WW03, 29WW05, 29WW07, 29WW11, 29WW12, 29WW15, 29WW20, 29WW22, and 29WW23) are installed within the shallow groundwater-bearing zone. Five monitoring wells (29WW13, 29WW14, 29WW16, 29WW21, 29WW24, 29WW28, 29WW33, and 29WW34) are installed within the intermediate groundwater-bearing zone. Monitoring wells 29WW04 and 29WW08 are installed within the deep groundwater-bearing zone.

Based on the acquired data, groundwater flow within the shallow groundwater-bearing zone at LHAAP-29 is to the southeast (**Figure 3-4**). Groundwater flow within the intermediate groundwater-bearing zone is to the north and northeast (**Figure 3-5**). Due to insufficient data, no groundwater gradient map for the deep groundwater-bearing zone was generated for LHAAP-29. An installation-wide groundwater gradient map for the deep groundwater-bearing zone is discussed in **Section 3.1.13**.

3.1.5 *Groundwater Gradient at LHAAP-35A(58)*

Water level measurements were taken from ten monitoring wells at LHAAP-35A(58). Seven monitoring wells (35AWW03, 35AWW04, LHSMW01, and LHSMW04 through LHSMW07) are installed within the shallow groundwater-bearing zone. Two monitoring wells (35AWW01 and 35AWW05) are installed within the intermediate groundwater-bearing zone. Monitoring well 35AWW02 is installed within the deep groundwater-bearing zone.

Based on the acquired data, the local groundwater flow within the shallow groundwater-bearing zone at LHAAP-35A(58) is to the northeast and southwest (**Figure 3-6**). In the installation-wide groundwater elevation map (**Figure 3-13**), the regional groundwater flow at LHAAP-35A(58) is shown to the southeast. Due to insufficient data, no groundwater gradient maps for the intermediate and deep groundwater-bearing zones at LHAAP-35A were generated. An installation-wide groundwater gradient map for the deep groundwater-bearing zone is discussed in **Section 3.1.13**.

3.1.6 *Groundwater Gradient at LHAAP-35B(37)*

Water level measurements were taken from five monitoring wells at LHAAP-35B(37). Three monitoring wells (35BWW01, 35BWW02, and LHSMW58) are installed within the shallow groundwater-bearing zone. Monitoring well 35BWW02 was dry. Two monitoring wells (35BWW03 and LHSMW59) were installed within the intermediate groundwater-bearing zone. No monitoring wells were installed within the deep groundwater-bearing zone. Due to insufficient data, groundwater gradient maps for the shallow, intermediate, and deep groundwater-bearing zones at LHAAP-35B(37) were not generated.

3.1.7 *Groundwater Gradient at LHAAP-35C(53)*

Water level measurements were taken from seven monitoring wells at LHAAP-35C(53). Six monitoring wells (106, 107, LHSMW67, LHSMW68, LHSMW70, and LHSMW71) are installed within the shallow groundwater-bearing zone. Monitoring well LHSMW69 is installed within the intermediate groundwater-bearing zone. No monitoring wells are installed within the deep groundwater-bearing zone at LHAAP-35C(53).

Based on the acquired data, groundwater flow within the shallow groundwater-bearing zone at LHAAP-35C is generally to the southeast (**Figure 3-7**). Due to insufficient data, no groundwater gradient maps have been generated for the intermediate and deep groundwater-bearing zones at LHAAP-35C(53).

3.1.8 *Groundwater Gradient at LHAAP-47*

Water level measurements were taken from ten monitoring wells at LHAAP-47. Four monitoring wells (47WW05, 47WW13, 47WW28, and 47WW30) are installed within the shallow groundwater-bearing zone. Four monitoring wells (47WW06, 47WW14, 47WW29, and

47WW31) are installed within the intermediate groundwater-bearing zone. Monitoring wells 47WW07 and 47WW15 are installed within the deep groundwater-bearing zone.

Based on the acquired data, groundwater flow within the shallow and intermediate groundwater-bearing zones at LHAAP-47 is to the northeast (**Figures 3-8 and 3-9**). Near the center of the site, the elevation difference between wells 47WW13 (shallow) and 47WW14 (intermediate) is approximately 3 feet, indicating a strong downward vertical gradient. The vertical gradient, however, is not observed in other areas of the site. Due to insufficient data, a groundwater potentiometric map for the deep groundwater-bearing zone was not generated. An installation-wide groundwater gradient map for the deep groundwater-bearing zone is discussed in **Section 3.1.13**.

3.1.9 Groundwater Gradient at LHAAP-48

Water level measurements were taken from six monitoring wells at LHAAP-48. Five monitoring wells (LHSMW62, LHSMW63, LHSMW64, LHSMW65, and LHSMW66) are installed within the shallow groundwater-bearing zone. Well 48WW01 is installed within the intermediate groundwater-bearing zone. No wells have been installed within the deep groundwater-bearing zone.

Based on the acquired data, groundwater flow within the shallow groundwater-bearing zone at LHAAP-48 is to the south and southeast (**Figure 3-10**). Due to insufficient data, no groundwater gradient maps for the intermediate and deep groundwater-bearing zones were generated.

3.1.10 Groundwater Gradient at LHAAP-50

Water level measurements were taken from five monitoring wells at LHAAP-50. Four monitoring wells (50WW01 through 50WW04) are installed within the shallow groundwater-bearing zone. Well 50WW06 is installed within the intermediate groundwater-bearing zone. No wells installed within the deep groundwater-bearing zone were gauged.

Based on the acquired data, groundwater flow within the shallow groundwater-bearing zone at LHAAP-50 is to the north and northeast (**Figure 3-11**). Due to insufficient data, no groundwater gradient maps for the intermediate and deep groundwater-bearing zones were generated.

3.1.11 Groundwater Gradient at LHAAP-67

Water level measurements were taken from seven monitoring wells at LHAAP-67. Six monitoring wells (67WW01 through 67WW05, and 67WW07) are installed within the shallow groundwater-bearing zone. Well 67WW06 is installed within the intermediate groundwater-bearing zone. Wells installed within the deep groundwater-bearing zone were not gauged.

Based on the acquired data, groundwater flow within the shallow groundwater-bearing zone at LHAAP-67 is to the east-southeast (**Figure 3-12**). Due to insufficient data, no groundwater gradient maps for the intermediate and deep groundwater-bearing zones were generated at LHAAP-67.

3.1.12 Installation-Wide Shallow Zone Groundwater Gradient

Based on the acquired data from the water level measurements taken from the shallow groundwater-bearing zone, groundwater flow within the shallow groundwater-bearing zone at the LHAAP is probably to the east and northeast toward Caddo Lake (**Figure 3-13**). Due to an insufficient number of data points the groundwater gradient for this zone is an approximation.

3.1.13 Installation-Wide Deep Zone Groundwater Gradient

Water level measurements were taken from six monitoring wells within the deep groundwater-bearing zone at the LHAAP. Based on the acquired data, groundwater flow within the deep groundwater-bearing zone at the LHAAP is probably to the east and northeast, toward Caddo Lake (**Figure 3-14**). Due to an insufficient number of few data points, the groundwater gradient for this zone is an approximation.

3.2 Groundwater Sampling Results

This section discusses analytical results from the groundwater sampling activities performed in August and September 2004. Analytical parameters include explosives, perchlorate, metals, dioxins/furans, and VOCs; however, not every sample was analyzed for each analyte. Although 90 wells were planned for this sampling event, only 85 wells were sampled because five wells were either dry or had little water with an extremely low recharge rate. Groundwater sampling procedures are described in **Section 2.2** of this report. Proper personal protective equipment including hard hat, safety glasses, steel-toe boots, and rubber nitrile gloves were worn during sampling activities.

3.2.1 Groundwater Sampling Results at LHAAP-04

Groundwater samples were collected from three monitoring wells at LHAAP-04 and analyzed for perchlorate. No perchlorate was detected in any of the wells.

3.2.2 Groundwater Sampling Results at LHAAP-17

Groundwater samples were collected from 12 monitoring wells at LHAAP-17 and analyzed for explosives, perchlorate, and VOCs. Results are presented in **Table 3-2**. **Figure 3-15** illustrates perchlorate and trichloroethene (TCE) results for the shallow wells.

Perchlorate was detected at concentrations of 840,000J $\mu\text{g/L}$, 1,200 $\mu\text{g/L}$, and 2,000 $\mu\text{g/L}$ in monitoring wells, 17WW01, 17WW05, and 17WW10, respectively. Monitoring well 17WW01 is screened within the shallow groundwater-bearing zone and is located near the central portion

of LHAAP-17. Monitoring well 17WW05 is screened within the deep groundwater-bearing zone and is located west of LHAAP-17 (**Figure 3-15**). Monitoring well 17WW10 is screened within the shallow groundwater-bearing zone and is located northwest of LHAAP-17 (**Figure 3-15**). A perchlorate concentration of 7 µg/L was also detected in shallow monitoring well 17WW12, located north of LHAAP-17.

Nine VOCs, 1,1,2-TCA, 1,1-dichloroethane (DCA), 1,1-dichloroethene (DCE), 1,2-DCA, benzene, chloroform, cis-1,2-DCE, trans-1,2-DCE, and TCE were detected within monitoring well 17WW01. At this well TCE was detected at a concentration of 7,000 µg/L. TCE concentrations in all other shallow wells were non-detect.

Two new wells, 17WW15 (intermediate) and 17WW16 (deep), were installed during the Data Gaps Investigation. One explosive, p-nitrotoluene, was detected at an estimated concentration of 0.25 µg/L at deep monitoring well 17WW16, which is located northwest of LHAAP-17. No contaminants were detected within intermediate monitoring well 17WW15.

3.2.3 *Groundwater Sampling Results at LHAAP-18/24*

A groundwater sample was collected from one monitoring well (18WW21) at LHAAP-18/24 and analyzed for perchlorate and VOCs. Perchlorate was not detected in this sample; however, two VOCs, 2-butanone and carbon disulfide, were detected at concentrations of 8 µg/L and 2J µg/L, respectively (**Table 3-3**). The well 18WW21, installed as part of this investigation, is located northeast of LHAAP-18, and is screened within the intermediate groundwater-bearing zone.

3.2.4 *Groundwater Sampling Results at LHAAP-29*

Groundwater samples were collected from 20 monitoring wells at LHAAP-29 and analyzed for explosives, perchlorate, and VOCs. The results are presented in **Table 3-4**. Perchlorate was detected at an elevated concentration of 24,000 µg/L in monitoring well 29WW15. Monitoring well 29WW15 is screened within the shallow groundwater-bearing zone and is located on the central portion of LHAAP-29. Perchlorate was also detected in shallow monitoring wells 29WW05, 29WW22, and 29WW23 at concentrations of 42 µg/L, 4 µg/L, and 2.6 µg/L, respectively. Perchlorate results for the shallow wells and the extent of the plume are shown in **Figure 3-16**. Additionally, perchlorate was detected in the intermediate well 29WW33 at a concentration of 3.7 µg/L and at deep well 29WW04 at a concentration of 12 µg/L.

Sixteen VOCs were detected within the groundwater at LHAAP-29. 1,2-DCA was detected at an elevated concentration of 6,400 µg/L at shallow monitoring well 29WW15 (**Figure 3-16**). Additionally, methylene chloride was detected at a high concentration of 7,300,000 µg/L at intermediate monitoring well 29WW16, located on the central portion of LHAAP-29. Other VOCs were not detected in the sample from monitoring well 29WW16; however, the laboratory reporting limit was high (200,000 µg/L) due to dilution. Therefore, other VOCs may be present

in the groundwater at 29WW16, but were not detected due to the high reporting limit caused by dilution. **Figure 3-16** illustrates the results and extent of the plume for 1,2-DCA and methylene chloride within the shallow groundwater-bearing zone at LHAAP-29.

One monitoring well, 29WW34, was installed during the Data Gaps Investigation. No contaminants were detected within the monitoring well, which was screened within the intermediate groundwater-bearing zone.

Six explosives, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, m-nitrotoluene, o-nitrotoluene, and p-nitrotoluene were detected at concentrations ranging from 15J µg/L to 400J µg/L in the sample from monitoring well 29WW05, located along the northeast boundary of LHAAP-29 (**Figure 3-17**). Monitoring well 29WW05 is screened within the shallow groundwater-bearing zone. O-Nitrotoluene was detected at a concentration of 3,100 µg/L within this well. Concentrations of explosives ranging from 0.21 µg/L to 290 µg/L were also detected in monitoring wells 29WW03 and 29WW20.

3.2.5 Groundwater Sampling Results at LHAAP-32

Groundwater samples were collected from three monitoring wells at LHAAP-32 and analyzed for explosives. No explosives were detected in any of the samples. The temporary well, 32TMW01 did not generate a sufficient amount of groundwater, therefore samples were not collected from this well.

3.2.6 Groundwater Sampling Results at LHAAP-35A(58)

Groundwater samples were collected and analyzed for VOCs from ten monitoring wells at LHAAP-35A(58). Detected constituents are summarized in **Table 3-5**. Tetrachloroethene and TCE were detected at concentrations of 5,100 µg/L and 230 µg/L, respectively in shallow monitoring well LHSMW-05, located in the central portion of LHAAP-35A(58). Methylene chloride was detected at a low concentration at deep monitoring well 35AWW02, located in the central portion of LHAAP-35A(58). Methylene chloride is a common laboratory contaminant.

One monitoring well, 35AWW05, was installed within the intermediate groundwater-bearing zone during the current investigation. No contaminants were detected in the sample from this monitoring well.

No contaminant concentration maps were generated for this site because all detections were in a single well (LHSM05). Well locations are shown on **Figure 3-6**.

3.2.7 Groundwater Sampling Results at LHAAP-35B(37)

Groundwater samples were collected from four monitoring wells at LHAAP-35B(37). Detected constituents are summarized in **Table 3-6**. Five VOCs were detected within the groundwater at

the site. TCE was detected at a concentration of 33 µg/L in the sample from shallow monitoring well LHSMW58, located northeast of the site. Estimated concentrations of 1,1-DCE and chlorobenzene were also detected. Additionally, TCE was detected at a concentration of 180 µg/L in the sample from intermediate monitoring well LHSMW59, located northwest of the site. Tetrachloroethene was detected from wells LHSMW-58 and LHSMW-59 at concentrations of 20 µg/L and 3J µg/L, respectively.

One monitoring well, 35BWW03, was installed within the intermediate groundwater-bearing zone during the current investigation. No contaminants except for carbon disulfide at 8 µg/L were detected within the monitoring well.

3.2.8 Groundwater Sampling Results at LHAAP-35C(53)

Groundwater samples were collected from all seven monitoring wells at LHAAP-35C(53) and analyzed for dioxins/furans, perchlorate, VOCs, and metals. No VOCs or perchlorate were detected at LHAAP-35C(53). Detected constituents are summarized in **Table 3-7**. Six dioxins/furans were detected at concentrations ranging from 0.934 picograms per liter (pg/L) to 67.19 pg/L at shallow monitoring well LHSMW67, located on the northern portion of LHAAP-35C(53).

Filtered and unfiltered samples for metals were also collected at LHAAP-35C(53). Barium, calcium, chromium, cobalt, iron, magnesium, manganese, mercury, nickel, potassium, sodium, and thallium were detected within both filtered and unfiltered samples from shallow monitoring well LHSMW-71. In addition, aluminum, antimony, copper, and silver were also detected within unfiltered samples from monitoring well LHSMW-71, located northeast of LHAAP-35C(53). Previous samples from well LHSMW-71 showed elevated concentrations of thallium and chromium. Thallium was detected at concentrations of 0.276 µg/L and 0.224 µg/L in unfiltered and filtered samples, respectively. Chromium was detected at a concentration of 83,300 µg/L in the unfiltered sample from LHSMW71. However, the concentration in the filtered sample was much lower at 16J µg/L, indicating that chromium may be attached to particulates.

3.2.9 Groundwater Sampling Results at LHAAP-47

Groundwater samples were collected from 10 monitoring wells at LHAAP-47 and analyzed for perchlorate and VOCs. Detected constituents are summarized in **Table 3-8**. No perchlorate was detected in the wells that were sampled at LHAAP-47. Five VOCs, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, TCE, and vinyl chloride, were detected within the groundwater at LHAAP-47. Monitoring wells 47WW05 (shallow), 47WW13 (shallow), 47WW14 (intermediate), and 47WW30 (shallow) were identified as containing VOCs within the groundwater (**Figure 3-18**). TCE was detected at a concentration of 3,200 µg/L at shallow monitoring well 47WW05. Monitoring wells 47WW13 and 47WW14 are part of a well cluster consisting of three

monitoring wells located in the central portion of LHAAP-47. Monitoring wells 47WW13 and 47WW14 are screened within the shallow and intermediate groundwater-bearing zone, respectively. Samples from these wells contained high concentrations of multiple VOCs. Shallow monitoring well 47WW13 contained TCE and cis-1,2-DCE at concentrations of 720 µg/L and 1,600 µg/L, respectively. The concentrations of these two chemicals in the intermediate well 47WW14 were 280 µg/L and 120 µg/L, respectively.

Four monitoring wells were installed during the current investigation at LHAAP-47. Two monitoring wells, 47WW28 and 47WW30 were installed within the shallow groundwater-bearing zone. In addition, two monitoring wells, 47WW29 and 47WW31 were installed within the intermediate groundwater-bearing zone. TCE was detected at a concentration of 1,100 µg/L within the shallow monitoring well 47WW30. No contaminants were detected within any other monitoring well installed during the Data Gaps Investigation. The extent of contamination for TCE, cis-1,2-DCE and vinyl chloride is shown in **Figure 3-18**.

3.2.10 Groundwater Sampling Results at LHAAP-48

Groundwater samples were collected from three monitoring wells at LHAAP-48 and analyzed for dioxins/furans, perchlorate, and thallium. Detected constituents are summarized in **Table 3-9**. Perchlorate was not detected at LHAAP-48. A total of 13 dioxins/furans were detected in the groundwater at LHAAP-48. Shallow monitoring well LHSMW62, located in the central portion of LHAAP-48, and shallow monitoring well LHSMW64, located in the eastern portion of LHAAP-48, had dioxins/furans concentrations ranging from 0.153JK pg/L to 35.034 pg/L. Thallium was also detected at concentrations ranging between 0.142 µg/L and 0.465 µg/L. Monitoring wells LHSMW63, LHSMW65, and LHSMW66 were not sampled due to dry well conditions.

One monitoring well, 48WW01 was installed during the current investigation at LHAAP-48 and is screened within the intermediate groundwater-bearing zone. Dioxins/furans were detected at estimated concentrations ranging between 2.178J pg/L and 36.101 pg/L.

Although the turbidity of groundwater samples was quite low (10 to 20 nephelometric turbidity units [NTUs]), dioxin and thallium detections may still be related to slightly elevated turbidity of the samples. However, the samples were not analyzed for the TAL metals. Thus, aluminum and iron data are not available for these samples to evaluate the influence of turbidity on the sample results.

3.2.11 Groundwater Sampling Results at LHAAP-50

Groundwater samples were collected from five monitoring wells at LHAAP-50 and analyzed for perchlorate and VOCs. Detected constituents are summarized in **Table 3-10**. Perchlorate was detected at a concentration of 2,500 µg/L in the shallow monitoring well 50WW02, located in

the eastern portion of LHAAP-50. Except for monitoring well 50WW02 and 50WW06, perchlorate was not detected in any other groundwater samples collected from LHAAP-50.

Twelve VOCs were also detected in the groundwater at LHAAP-50. TCE was detected at a concentration of 9,200 µg/L at monitoring well 50WW02. Additionally, cis-1,2-DCE was detected at a concentration of 1,800 µg/L at monitoring well 50WW02.

Monitoring well, 50WW06, was installed during the current investigation at LHAAP-50 and is screened in the intermediate groundwater-bearing zone. Perchlorate and TCE were detected at concentrations of 6.7 µg/L and 15 µg/L, respectively.

3.2.12 Groundwater Sampling Results at LHAAP-67

Groundwater samples were collected from seven monitoring wells at LHAAP-67 and analyzed for VOCs. Detected constituents are summarized in **Table 3-11**. 1,1-DCE was detected at a concentration of 280 µg/L in monitoring well 67WW01, located in the central portion of LHAAP-67. Monitoring well 67WW01 is screened within the shallow groundwater-bearing zone. Low estimated concentrations, in the range 1J-2J µg/L, of other VOCs were detected at 67WW04, 67WW05, and 67WW07 (**Table 3-11**).

3.3 Soil Sampling Results

This section discusses analytical results from the soil sampling activities performed in August and September 2004. Explosives, perchlorate, metals, and VOCs were all analyzed during the soil sampling event. A total of 19 borings were advanced using direct-push techniques.

3.3.1 Soil Sampling Results at LHAAP-32

Soil samples were collected from ten soil borings at LHAAP-32 and analyzed for explosives and metals. Detected constituents are summarized in **Table 3-12**. Three explosives, 2,4,6-TNT, 2,4-dinitrotoluene, and 2-amino-2,6-dinitrotoluene were detected in the soil at LHAAP-32. 2,4,6-TNT was detected at an estimated concentration of 46J mg/kg at the surface soil sample (0-1 feet bgs) at 32SB22. A concentration of 2.6 µg/L of 2-amino-2,6-dinitrotoluene was also detected at the surface of 32SB22. Additionally, a concentration of 0.2 mg/kg of 2,4-dinitrotoluene was detected within the subsurface, 5 to 6 feet bgs, at 32SB22. No other explosives were detected in the soil at LHAAP-32.

Several metals were detected in soil samples from LHAAP-32; however, the most notable is detection of lead at a concentration of 1,630 mg/kg in the 3 to 6 foot bgs sample from boring 32SB20. This boring is located near the southeast corner of the former treatment building. **Figure 3-19** shows boring locations and the associated detected concentrations of TNT.

3.3.2 Soil Sampling Results at LHAAP-50

Soil samples were collected from eight soil borings at LHAAP-50. Soil was analyzed for perchlorate and VOCs. Detected constituents are summarized in **Table 3-13**. Perchlorate was detected at a concentration of 25 µg/kg in the surface soil sample from 50SB10. Additionally, concentrations of 740 mg/kg and 2,600 mg/kg at depths of 6 to 9 feet bgs and 9 to 11 feet bgs (just above the water table), respectively, were detected in soil collected from 50SB17. Three VOCs, acetone, methylene chloride, and naphthalene were also detected within the soil at LHAAP-50. Of these, acetone and methylene chloride are known to be a laboratory contaminants. **Figure 3-20** shows boring locations and the associated detected concentrations of perchlorate and TCE.

3.3.3 Soil Sampling Results at LHAAP-67

Soil samples were collected from one soil boring at LHAAP-67 and were analyzed for VOCs only. Detected constituents are summarized in **Table 3-14**. Methylene chloride at a concentration of 0.002 BJ mg/kg was the only contaminant detected at the 2 to 3 foot interval and 5 to 6 foot interval. This constituent is known to be a laboratory contaminant.

3.4 Sediment and Surface Water Sampling Results

This section discusses analytical results from the sediment and surface water sampling activities performed in September 2004. The samples were analyzed for metals, PCBs, dioxins/furans, and pesticides. A total of 20 sediment and 11 surface water samples were collected during this event. Detected chemicals and corresponding concentrations are presented in **Tables 3-15** and **3-16**. Sample locations are shown in **Figure 2-4**.

Sediment and surface water samples for PCBs were collected from two locations: IWSD/SW-04 and IWSD/SW-15. Aroclor 1260 was detected at a concentration of 0.062 mg/kg in the sediment sample from IWSD-04, located within the northern portion of the Goose Prairie Creek watershed. There were no PCBs detected in the other sediment or surface water samples collected during these activities.

Twenty-two different metals were detected within the sediment samples collected during this sampling event. Additionally, 18 metals were detected in the surface water samples collected.

Sediment and surface water samples for dioxins/furans were also collected from only two locations, IWSD-04 and IWSD-15. Twenty-three dioxins/furans were detected in sediment samples collected from the four separate watersheds. An estimated concentration of 5,960.13 J nanograms per kilograms (ng/kg) of octachlorodibenzo-p-dioxin was detected at IWSD-04 (**Table 3-15**). An estimated concentration of 2,866.47 J ng/kg of octachlorodibenzo-p-dioxin was also detected at IWSD-15.

Nine dioxins/furans were also detected within surface water samples collected from IWSW-04 and IWSW-15. An estimated concentration of 5,960.13 J ng/kg of octachlorodibenzo-p-dioxin was detected at IWSW-04 (**Table 3-16**). Additionally, an estimated concentration of 1,937.23 J ng/kg of octachlorodibenzo-p-dioxin was detected at IWSW-15. No perchlorate or explosives were detected above the laboratory detection limit in the sediment and surface water samples collected.

Sediment and surface water samples from IWSD/SW-04 and IWSD/SW-15 were analyzed for pesticides. Methoxychlor, detected at a concentration of 0.081 mg/kg, was the only constituent detected within the sediment from either location. No pesticides were detected within the surface water.

Table 3-1
Groundwater Elevations
August - September 2004

Well ID	Zone	TOC Elevation (feet msl)	Top of Pad Elevation (feet msl)	Depth to Water Aug-Sep 2004 (feet)	Groundwater Elevations Aug-Sep 2004 (feet)	Monitoring Well Screen Interval (feet bgs)	Sampling Date
LHAAP-04							
04WW01	shallow	212.51	208.78	9.61	202.90	12-22	9/9/2004
04WW02	shallow	216.70	212.80	9.14	207.56	14-24	9/9/2004
04WW03	shallow	215.93	212.38	13.53	202.40	15-25	9/9/2004
LHAAP-17							
17WW01	shallow	179.01	176.62	9.07	169.94	10.8-30.8	9/7/2004
17WW05	deep	182.73	178.80	11.57	171.16	142-152	9/7/2004
17WW07	intermediate	179.68	176.78	9.61	170.07	42-52	9/3/2004
17WW08	shallow	179.94	176.76	9.50	170.44	21-31	9/3/2004
17WW09	intermediate	181.43	178.40	11.60	169.83	41-51	9/2/2004
17WW10	shallow	181.55	178.38	11.34	170.21	20.5-30.5	9/2/2004
17WW11	intermediate	180.95	177.51	11.30	169.65	36-46	9/3/2004
17WW12	shallow	180.32	177.04	10.44	169.88	5-15	9/3/2004
17WW13	shallow	179.14	175.90	9.10	170.04	21.5-31.5	9/2/2004
17WW14	shallow	181.90	178.83	11.60	170.30	13-23	9/3/2004
17WW15	intermediate	182.61	180.33	13.03	169.58	43-53	9/2/2004
17WW16	deep	181.13	178.99	11.50	169.63	141-151	9/14/2004
LHAAP-18/24							
18WW21	intermediate	195.20	192.60	26.06	169.14	48-58	9/3/2004
LHAAP-29							
29WW02	shallow	235.77	232.58	33.16	202.61	30-40	8/31/2004
29WW03	shallow	237.79	234.83	25.77	212.02	17-27	8/30/2004
29WW04	deep	236.88	234.76	47.23	189.65	145-155	8/29/2004
29WW05	shallow	208.95	206.01	17.45	191.50	12-22	8/26/2004
29WW07	shallow	212.24	209.06	23.60	188.64	27-37	8/25/2004
29WW08	deep	212.32	209.87	33.32	179.00	130-140	8/25/2004
29WW11	shallow	205.68	202.68	22.24	183.44	17-27	8/24/2004
29WW12	shallow	223.27	220.22	26.89	196.38	19-29	8/27/2004
29WW13	intermediate	222.92	220.28	33.56	189.36	47-57	8/26/2004
29WW14	intermediate	220.31	217.23	29.69	190.62	75-85	8/24/2004
29WW15	shallow	232.98	229.69	28.27	204.71	20-30	8/26/2004
29WW16	intermediate	231.53	228.92	41.50	190.03	78-88	8/25/2004
29WW20	shallow	235.70	232.40	27.28	208.42	19.6-29.6	8/27/2004
29WW21	intermediate	235.17	232.73	45.20	189.97	65-75	8/30/2004
29WW22	shallow	236.10	233.04	27.05	209.05	22.6-32.6	8/27/2004
29WW23	shallow	226.63	223.29	25.43	201.20	25-35	8/26/2004
29WW24	intermediate	226.14	223.18	32.55	193.59	60-70	8/29/2004
29WW28	intermediate	235.38	232.36	41.75	193.63	66-76	8/26/2004
29WW33	intermediate	237.67	234.30	25.92	211.75	30-40	8/29/2004
29WW34	intermediate	214.54	211.87	24.98	189.56	73.6-83.6	8/26/2004
LHAAP-32							
32WW01	shallow	219.84	216.46	35.66	184.18	37-47	8/31/2004
32WW02	shallow	216.31	213.19	33.38	182.93	35-45	9/1/2004
113	shallow	215.03	212.47	22.04	192.99	-- ^a	9/1/2004

Notes provided on last page

Table 3-1
Groundwater Elevations
August - September 2004

Well ID	Zone	TOC Elevation (feet msl)	Top of Pad Elevation (feet msl)	Depth to Water Aug-Sep 2004 (feet)	Groundwater Elevations Aug-Sep 2004 (feet)	Monitoring Well Screen Interval (feet bgs)	Sampling Date
LHAAP-35A (58)							
35AWW01	intermediate	218.03	214.96	34.90	183.13	60-70	9/9/2004
35AWW02	deep	218.05	215.06	42.07	175.98	126-136	9/10/2004
35AWW03	shallow	219.66	216.73	18.60	201.06	9-19	9/8/2004
35AWW04	shallow	220.66	217.15	21.88	198.78	13-23	9/8/2004
35AWW05	shallow	221.41	219.01	38.15	183.26	60-70	9/8/2004
LHSMW01	shallow	214.43	211.19	8.16	206.27	4.5-14.5	9/9/2004
LHSMW04	shallow	216.95	214.04	20.98	195.97	18.2-28.2	9/9/2004
LHSMW05	shallow	217.59	215.17	20.41	197.18	11.9-21.9	9/9/2004
LHSMW06	shallow	223.18	219.86	16.48	206.70	10-20	9/8/2004
LHSMW07	shallow	221.27	218.54	16.80	204.47	17-27	9/8/2004
LHAAP-35B (37)							
35BWW01	shallow	202.88	200.24	12.90	189.98	9-19	NSC
35BWW02	shallow	203.95	201.06	Dry	Dry	9-14	no sample
35BWW03	intermediate	203.56	201.34	21.68	181.88	70-80	9/10/2004
LHSMW58	shallow	203.56	200.20	17.25	186.31	21.4-31.4	9/10/2004
LHSMW59	intermediate	204.18	201.07	17.89	186.29	27.5-47.5	9/10/2004
LHAAP-35C (53)							
106	shallow	179.05	175.65	12.82	166.23	13-23	9/14/2004
107	shallow	178.32	175.73	10.22	168.10	4.5-19.5	9/15/2004
LHSMW67	shallow	185.57	182.64	17.11	168.46	9.4-19.4	9/15/2004
LHSMW68	shallow	189.65	186.69	20.71	168.94	11-21	9/14/2004
LHSMW69	intermediate	183.27	180.16	15.22	168.05	27.9-47.9	9/15/2004
LHSMW70	shallow	183.62	180.54	14.79	168.83	11-21	9/14/2004
LHSMW71	shallow	183.73	181.00	16.23	167.50	5.9-15.9	9/14/2004
LHAAP-47							
47WW05	shallow	198.55	195.79	18.22	180.33	9-19	9/1/2004
47WW06	intermediate	199.02	195.79	18.70	180.32	30-40	9/1/2004
47WW07	deep	199.24	195.94	19.30	179.94	73-83	9/1/2004
47WW13	shallow	204.97	202.02	16.91	188.06	8-18	9/2/2004
47WW14	intermediate	205.00	202.22	19.98	185.02	39-49	9/2/2004
47WW15	deep	205.17	202.28	23.63	181.54	78-88	9/2/2004
47WW28	shallow	194.43	191.98	15.87	178.56	12-22	9/1/2004
47WW29	intermediate	194.08	191.56	14.53	179.55	52.5-62.5	9/1/2004
47WW30	shallow	197.12	194.61	18.90	178.22	12.5-22.5	9/1/2004
47WW31	intermediate	196.94	194.57	18.72	178.22	42.5	9/2/2004
LHAAP-48							
48WW01	intermediate	193.24	190.81	22.32	170.92	42.5-52.5	9/13/2004
LHSMW62	shallow	192.20	189.06	20.91	171.29	15.7-25.7	9/13/2004
LHSMW63	shallow	194.06	191.01	21.60	172.46	8.5-18.5	NSC
LHSMW64	shallow	191.42	188.23	21.33	170.09	14.1-24.1	9/13/2004
LHSMW65	shallow	194.31	191.80	19.93	174.38	6.8-16.8	NSC
LHSMW66	shallow	195.11	192.23	19.97	175.14	6.9-16.9	NSC

Notes provided on last page

Table 3-1
Groundwater Elevations
August - September 2004

Well ID	Zone	TOC Elevation (feet msl)	Top of Pad Elevation (feet msl)	Depth to Water Aug-Sep 2004 (feet)	Groundwater Elevations Aug-Sep 2004 (feet)	Monitoring Well Screen Interval (feet bgs)	Sampling Date
LHAAP-50							
50WW01	shallow	198.50	195.29	14.31	184.19	10-20	8/31/2004
50WW02	shallow	200.74	197.40	16.80	183.94	9-19	8/30/2004
50WW03	shallow	202.94	199.88	17.74	185.20	10-20	8/30/2004
50WW04	shallow	204.51	201.64	20.25	184.26	10-20	8/31/2004
50WW06	intermediate	195.35	192.99	11.88	183.47	45.4-55.4	8/30/2004
LHAAP-67							
67WW01	shallow	200.89	198.21	21.16	179.73	14-24	9/12/2004
67WW02	shallow	199.79	196.73	19.71	180.08	13-23	9/12/2004
67WW03	shallow	200.19	197.30	20.42	179.77	14-24	9/12/2004
67WW04	shallow	203.76	200.05	24.09	179.67	11-21	9/12/2004
67WW05	shallow	201.00	197.48	20.24	180.76	16-26	9/12/2004
67WW06	intermediate	200.81	196.95	21.21	179.60	38-48	9/12/2004
67WW07	shallow	200.84	197.04	21.21	179.63	14-24	9/12/2004

Notes:

Elevations are reported as above mean sea level

Depth-to-water is measured from TOC

^a Screen information not available for this well

bgs below ground surface

btoc below top of casing

NSC no sample collected

TOC top of casing

Table 3-2
Groundwater Sampling Results for LHAAP-17

Parameter	Associated Site: Location Code: Sample Number: Sample Date: Zone: Units	Area 17 17WW01 L0001- 17WW01 9/7/2004 Shallow Result	Area 17 17WW05 L0001- 17WW05 9/7/2004 Deep Result	Area 17 17WW07 L0001-17WW07 9/3/2004 Intermediate Result	Area 17 17WW08 L0001- 17WW08 9/3/2004 Shallow Result	Area 17 17WW09 L0001-17WW09 9/2/2004 Intermediate Result	Area 17 17WW10 L0001-17WW10 9/2/2004 Shallow Result	Area 17 17WW11 L0001-17WW11 9/3/2004 Intermediate Result	Area 17 17WW12 L0001- 17WW12 9/3/2004 Shallow Result
EXPLOSIVES									
p-Nitrotoluene	µg/L	<0.2	<0.2	<0.26	<0.26	0.2 UJ	0.2 UJ	0.2 UJ	0.2 UJ
PERCHLORATE									
Perchlorate	µg/L	840,000 J	1,200	<1	<1	<1	2,000	<1	7
VOLATILES									
1,1,2-Trichloroethane	µg/L	2 J	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	µg/L	10	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	µg/L	38	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	µg/L	89 JH	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
Benzene	µg/L	2 J	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L	1 J	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	µg/L	27	<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	µg/L	7	<5	<5	<5	<5	<5	<5	<5
Trichloroethene (TCE)	µg/L	7,000	<5	<5	<5	<5	<5	1 J	<5

Notes provided on last page.

Table 3-2
Groundwater Sampling Results for LHAAP-17

Parameter	Associated Site: Location Code: Sample Number: Sample Date: Zone: Units	Area 17 17WW13 L0001- 17WW13 9/2/2004 Shallow Result	Area 17 17WW14 L0001-17WW14 9/3/2004 Shallow Result	Area 17 17WW15 L0001-17WW15 9/2/2004 Intermediate Result	Area 17 17WW16 L0001-17WW16 9/14/2004 Deep Result
EXPLOSIVES					
p-Nitrotoluene	µg/L	0.2 UJ	0.2 UJ	0.2 UJ	0.25 J
PERCHLORATE					
Perchlorate	µg/L	<1	<1	<1	1.0 UJ
VOLATILES					
1,1,2-Trichloroethane	µg/L	<5	<5	<5	<5
1,1-Dichloroethane	µg/L	<5	<5	<5	<5
1,1-Dichloroethene	µg/L	<5	<5	<5	<5
1,2-Dichloroethane	µg/L	5 UJ	5 UJ	5 UJ	<5
Benzene	µg/L	<5	<5	<5	<5
Chloroform	µg/L	<5	<5	<5	<5
cis-1,2-Dichloroethene	µg/L	<5	<5	<5	<5
trans-1,2-Dichloroethene	µg/L	<5	<5	<5	<5
Trichloroethene	µg/L	<5	<5	<5	<5

Notes:

H Result may be biased high
 U Not detected
 J Reported value is an estimated concentration of the constituent
 µg/L micrograms per liter

Table 3-3
Groundwater Sample Results for LHAAP-18/24

Parameter	Associated Site:	
	Location Code:	
	Sample Number:	
	Sample Date:	
	Area 18/24	
	18WW21	
	L0001-18WW21	
	9/3/2004	
Volatiles		
2-Butanone	µg/L	8
Carbon disulfide	µg/L	2 J

Notes:

J Reported value is an estimated concentration of the constituent

µg/L micrograms per liter

Table 3-4
Groundwater Samples Results for LHAAP-29

Parameter	Associated Site:	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29
	Location Code:	29WW02	29WW03	29WW04	29WW05	29WW07	29WW08	29WW11
	Sample Number:	L0001-29WW02	L0001-29WW03	L0001-29WW04	L0001-29WW05	L0001-29WW07	L0001-29WW08	L0001-29WW11
	Sample Date:	8/31/2004	8/30/2004	8/29/2004	8/26/2004	8/25/2004	8/25/2004	8/27/2004
	Zone:	SHALLOW	SHALLOW	DEEP	SHALLOW	SHALLOW	DEEP	SHALLOW
	UNITS	Result	Result	Result	Result	Result	Result	Result
EXPLOSIVES								
2,4-Dinitrotoluene	µg/L	0.2 UJ	<0.2	<0.2	160 J	<0.2	<0.2	<0.2
2,6-Dinitrotoluene	µg/L	0.2 UJ	17	<0.2	280 J	<0.2	<0.2	<0.2
4-Amino-2,6-dinitrotoluene	µg/L	0.2 UJ	0.21 J	<0.2	15 J	<0.2	<0.2	<0.2
m-Nitrotoluene	µg/L	0.2 UJ	12 J	<0.2	400 J	<0.2	<0.2	<0.2
o-Nitrotoluene	µg/L	0.2 UJ	120	<0.2	3,100	<0.2	<0.2	<0.2
p-Nitrotoluene	µg/L	0.2 UJ	<0.2	<0.2	16 J	<0.2	<0.2	<0.2
PERCHLORATE								
Perchlorate	µg/L	<1.0	<1.0	12	42	<1.0	<1.0	<1.0
VOLATILES								
1,1,2-Trichloroethane	µg/L	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	µg/L	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5
1,2,3-Trichlorobenzene	µg/L	<5	<5	<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	µg/L	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	µg/L	<5	5 UJ	<5	<5	<5	<5	<5
Bromodichloromethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Bromoform	µg/L	5 UJL	<5	<5	<5	<5	<5	<5
Chloroform	µg/L	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	µg/L	5 UJL	<5	<5	<5	<5	<5	<5
Dibromochloromethane	µg/L	<5	<5	<5	<5	<5	<5	<5
Hexachlorobutadiene	µg/L	<5	<5	<5	<5	<5	<5	<5
Methylene chloride	µg/L	<5	<5	<5	<5	<5	<5	5 UJ
Naphthalene	µg/L	<5	<5	<5	<5	<5	<5	5 UJ
trans-1,2-Dichloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	µg/L	5 UJ	<5	<5	<5	<5	2 J	<5

Notes provided on last page.

Table 3-4
Groundwater Samples Results for LHAAP-29

Parameter	Associated Site:	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29
	Location Code:	29WW12	29WW13	29WW14	29WW15	29WW16	29WW20	29WW21
	Sample Number:	L0001-29WW12	L0001-29WW13	L0001-29WW14	L0001-29WW15	L0001-29WW16	L0001-29WW20	L0001-29WW21
	Sample Date:	8/27/2004	8/26/2004	8/24/2004	8/25/2004	8/24/2004	8/26/2004	8/25/2004
	Zone:	SHALLOW	INTERMEDIATE	INTERMEDIATE	SHALLOW	INTERMEDIATE	SHALLOW	INTERMEDIATE
	UNITS	Result	Result	Result	Result	Result	Result	Result
EXPLOSIVES								
2,4-Dinitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	13	<0.2
2,6-Dinitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	45	<0.2
4-Amino-2,6-dinitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<4	<0.2
m-Nitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	27 J	<0.2
o-Nitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	290	<0.2
p-Nitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<4	<0.2
PERCHLORATE								
Perchlorate	µg/L	<1.0	<1.0	<1.0	24,000	<1.0	<1.0	<1.0
VOLATILES								
1,1,2-Trichloroethane	µg/L	<5	<5	<5	4 J	<200,000	<5	<5
1,1-Dichloroethane	µg/L	<5	<5	<5	3 J	<200,000	<5	<5
1,1-Dichloroethene	µg/L	<5	<5	<5	4 J	<200,000	<5	<5
1,2,3-Trichlorobenzene	µg/L	<5	<5	5 UJ	<5	<200,000	<5	4 BJ
1,2,4-Trichlorobenzene	µg/L	<5	<5	<5	<5	<200,000	<5	2 BJ
1,2-Dichloroethane	µg/L	<5	<5	<5	6,400	<200,000	<5	<5
Bromodichloromethane	µg/L	<5	<5	<5	<5	<200,000	<5	<5
Bromoform	µg/L	<5	<5	<5	<5	<200,000	<5	<5
Chloroform	µg/L	<5	<5	<5	6	<200,000	<5	<5
cis-1,2-Dichloroethene	µg/L	<5	<5	<5	3 J	<200,000	<5	<5
Dibromochloromethane	µg/L	<5	<5	<5	<5	<200,000	<5	<5
Hexachlorobutadiene	µg/L	<5	<5	<5	<5	<200,000	<5	1 BJ
Methylene chloride	µg/L	5 UJ	<5	<5	100	7,300,000	4 BJ	120
Naphthalene	µg/L	5 UJ	<5	5 UJ	<5	200,000 UJ	<5	3 BJ
trans-1,2-Dichloroethene	µg/L	<5	<5	<5	12	<200,000	<5	<5
Trichloroethene	µg/L	<5	<5	<5	160 J	<200,000	<5	8

Notes provided on last page.

Table 3-4
Groundwater Samples Results for LHAAP-29

Parameter	Associated Site:	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29	AREA 29
	Location Code:	29WW21	29WW22	29WW23	29WW24	29WW28	29WW33	29WW34
	Sample Number:	L0001-29WW21	L0001-29WW22	L0001-29WW23	L0001-29WW24	L0001-29WW28	L0001-29WW33	L0001-29WW34
	Sample Date:	8/25/2004	8/27/2004	8/30/2004	8/27/2004	8/26/2004	8/29/2004	8/26/2004
	Zone:	INTERMEDIATE	SHALLOW	SHALLOW	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE
	UNITS	Result	Result	Result	Result	Result	Result	Result
EXPLOSIVES								
2,4-Dinitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
2,6-Dinitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
4-Amino-2,6-dinitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m-Nitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-Nitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p-Nitrotoluene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
PERCHLORATE								
Perchlorate	µg/L	<1.0	4	2.6	<1.0	<1.0	3.7	<1.0
VOLATILES								
1,1,2-Trichloroethane	µg/L	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	µg/L	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5
1,2,3-Trichlorobenzene	µg/L	4 BJ	<5	<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	µg/L	2 BJ	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	µg/L	<5	<5	5 UJ	<5	<5	<5	<5
Bromodichloromethane	µg/L	<5	<5	<5	<5	<5	<5	2 J
Bromoform	µg/L	<5	<5	<5	<5	<5	<5	12
Chloroform	µg/L	<5	<5	<5	<5	<5	<5	2 J
cis-1,2-Dichloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	µg/L	<5	<5	<5	<5	<5	<5	9
Hexachlorobutadiene	µg/L	1 BJ	<5	<5	<5	<5	<5	<5
Methylene chloride	µg/L	120	2 BJ	<5	26 J	36	<5	<5
Naphthalene	µg/L	3 BJ	5 UJ	<5	5 UJ	<5	<5	<5
trans-1,2-Dichloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	µg/L	8	<5	<5	<5	3 J	<5	<5

Notes:

- H Result may be biased high
 J Reported value is an estimated concentration of the constituent
 B Concentration reported in equipment rinse samples
 U Non-detected
 L Result may be biased low
 µg/L micrograms per liter

Table 3-5
Groundwater Samples Results for LHAAP-35A(58)

PARAMETER	Associated Site:	AREA 35A	AREA 35A	AREA 35A	AREA 35A	AREA 35A	AREA 35A	AREA 35A	AREA 35A	AREA 35A	AREA 35A
	Location Code:	35AWW01	35AWW02	35AWW03	35AWW04	35AWW05	LHSMW01	LHSMW04	LHSMW05	LHSMW06	LHSMW07
	Sample Number:	L0001-35AWW01	L0001-35AWW02	L0001-35AWW03	L0001-35AWW04	L0001-35AWW05	L0001-LHSMW01	L0001-LHSMW04	L0001-LHSMW05	L0001-LHSMW06	L0001-LHSMW07
	Sample Date:	9/9/2004	9/10/2004	9/8/2004	9/8/2004	9/8/2004	9/9/2004	9/9/2004	9/9/2004	9/8/2004	9/8/2004
	Sample Type:	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
	Zone:	INTERMEDIATE	DEEP	SHALLOW	SHALLOW	INTERMEDIATE	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
VOLATILES											
1,1,2-Trichloroethane	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	2 J
1,1-Dichloroethane	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	2 J	51
1,1-Dichloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	590
Chloroform	µg/L	<5	<5	<5	<5	<5	<5	<5	1 J	<5	<5
cis-1,2-Dichloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	6
Methylene chloride	µg/L	<5	1 BJ	<5	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5	5,100	2 J	<5
Trichloroethene	µg/L	<5	<5	<5	<5	<5	<5	<5	230	<5	24
Vinyl chloride	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	9

Notes:

J Reported value is an estimated concentration of the constituent

B Concentration reported in equipment rinse samples

µg/L micrograms per liter

Table 3-6
Groundwater Sampling Results for LHAAP-35B(37)

PARAMATER	Associated Site: Location Code: Sample Number: Sample Date: Zone: UNITS	Area 35B 35BWW01 L0001-35BWW01 9/10/2004 SHALLOW Result	Area 35B 35BWW03 L0001-35BWW03 9/10/2004 INTERMEDIATE Result	Area 35B LHSMW58 L0001-LHSMW58 9/10/2004 SHALLOW Result	Area 35B LHSMW59 L0001-LHSMW59 9/10/2004 INTERMEDIATE Result
Volatiles					
1,1-Dichloroethene	µg/L	<5	<5	4 J	<5
Carbon disulfide	µg/L	<5	8	<5	<5
Chlorobenzene	µg/L	<5	<5	2 J	<5
Tetrachloroethene	µg/L	<5	<5	20	3 J
Trichloroethene (TCE)	µg/L	<5	<5	33	180

Notes:

J Reported value is an estimated concentration of the constituent

µg/L micrograms per liter

msl mean sea level

Table 3-7
Groundwater Sampling Results for LHAAP-35C(53)

PARAMETER	UNITS	Associated Site: Location Code: Sample Number: Sample Date: Sample Type: Zone:	AREA 35C 106 L0001-106 9/14/2004 SHALLOW REG Result	AREA 35C 107 L0001-107 9/15/2004 SHALLOW REG Result	AREA 35C LHSMW67 L0001-LHSMW67 9/15/2004 SHALLOW REG Result	AREA 35C LHSMW68 L0001-LHSMW68 9/14/2004 SHALLOW REG Result	AREA 35C LHSMW69 L0001-LHSMW69 9/15/2004 INTERMEDIATE REG Result	AREA 35C LHSMW70 L0001-LHSMW70 9/14/2004 SHALLOW REG Result	AREA 35C LHSMW71 L0001-LHSMW71 9/14/2004 SHALLOW REG Result
Dioxins & Furans (pg/L)									
1,2,3,4,6,7,8-HpCDD	pg/L	Unfiltered	NA	NA	5.104 J	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L	Unfiltered	NA	NA	0.934 J	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	Unfiltered	NA	NA	9.668	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L	Unfiltered	NA	NA	0.934	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	Unfiltered	NA	NA	67.19 B	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	Unfiltered	NA	NA	5.005 J	NA	NA	NA	NA
Metals (µg/L)									
Aluminum	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	4220
Aluminum	µg/L	Filtered	NA	NA	NA	NA	NA	NA	<200
Antimony	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	151
Antimony	µg/L	Filtered	NA	NA	NA	NA	NA	NA	<20
Barium	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	202
Barium	µg/L	Filtered	NA	NA	NA	NA	NA	NA	35.6 J
Calcium	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	16600
Calcium	µg/L	Filtered	NA	NA	NA	NA	NA	NA	12900
Chromium	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	83300
Chromium	µg/L	Filtered	NA	NA	NA	NA	NA	NA	16.0 J
Cobalt	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	53.5
Cobalt	µg/L	Filtered	NA	NA	NA	NA	NA	NA	5.5 J
Copper	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	383
Copper	µg/L	Filtered	NA	NA	NA	NA	NA	NA	<30
Iron	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	247000
Iron	µg/L	Filtered	NA	NA	NA	NA	NA	NA	106 J
Magnesium	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	781
Magnesium	µg/L	Filtered	NA	NA	NA	NA	NA	NA	104
Manganese	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	0.21 J
Manganese	µg/L	Filtered	NA	NA	NA	NA	NA	NA	0.09 J
Mercury	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	788
Mercury	µg/L	Filtered	NA	NA	NA	NA	NA	NA	251
Nickel	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	1380
Nickel	µg/L	Filtered	NA	NA	NA	NA	NA	NA	855 J
Potassium	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	<30
Potassium	µg/L	Filtered	NA	NA	NA	NA	NA	NA	<30
Silver	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	12.4 J
Silver	µg/L	Filtered	NA	NA	NA	NA	NA	NA	<30
Sodium	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	390000
Sodium	µg/L	Filtered	NA	NA	NA	NA	NA	NA	390000
Thallium	µg/L	Unfiltered	NA	NA	NA	NA	NA	NA	0.276
Thallium	µg/L	Filtered	NA	NA	NA	NA	NA	NA	0.224

Notes:

B Concentration reported was detected above the levels reported in the associated equipment rinse sample and/or laboratory method and trip blanks

J Reported value is an estimated concentration of the constituent

NA not analyzed

pg/L picograms per liter

µg/L micrograms per liter

Table 3-8
Groundwater Samples Results for LHAAP-47

Parameter	Associated Site: Location Code: Sample Number: Sample Date: Zone: Units	Area 47 47WW05 L0001-47WW05 9/1/2004 Shallow Result	Area 47 47WW06 L0001-47WW06 9/1/2004 Intermediate Result	Area 47 47WW07 L0001-47WW07 9/1/2004 Deep Result	Area 47 47WW13 L0001-47WW013 9/2/2004 Shallow Result	Area 47 47WW14 L0001-47WW014 9/2/2004 Intermediate Result
Volatiles						
1,1-Dichloroethane	µg/L	<5	<5	<5	2 J	3 J
cis-1,2-Dichloroethene	µg/L	15 JL	5 UJL	5 UJL	1,600	120
trans-1,2-Dichloroethene	µg/L	<5	<5	<5	18	<5
Trichloroethene (TCE)	µg/L	3,200	5 UJ	5 UJ	720	280
Vinyl chloride	µg/L	<5	<5	<5	6	18

Notes provided on last page.

Table 3-8
Groundwater Sampling Results for LHAAP-47

	Associated Site: Location Code: Sample Number: Sample Date: Zone:	Area 47 47WW15 L0001-47WW15 9/2/2004 Deep	Area 47 47WW28 L0001-47WW28 9/1/2004 Shallow	Area 47 47WW29 L0001-47WW29 9/1/2004 Intermediate	Area 47 47WW30 L0001-47WW30 9/1/2004 Shallow	Area 47 47WW31 L0001-47WW31 9/2/2004 Intermediate
Parameter	Units	Result	Result	Result	Result	Result
<i>Volatiles</i>						
1,1-Dichloroethane	µg/L	<5	<5	<5	2 J	<5
cis-1,2-Dichloroethene	µg/L	<5	5 UJL	5 UJL	9	<5
trans-1,2-Dichloroethene	µg/L	<5	<5	<5	<5	<5
Trichloroethene	µg/L	<5	5 UJ	5 UJ	1100	<5
Vinyl chloride	µg/L	<5	<5	<5	<5	<5

Notes:

J Reported value is an estimated concentration of the constituent

L Result may be biased low

U Not detected

µg/L micrograms per liter

Table 3-9
Groundwater Sampling Results for LHAAP-48

	Associated Site: Location Code: Sample Number: Sample Date: Zone:	Area 48 48WW01 L0001-48WW01 9/13/2004 INTERMEDIATE	Area 48 LHSMW62 L0001-LHSMW62 9/13/2004 SHALLOW	Area 48 LHSMW64 L0001-LHSMW64 9/13/2004 SHALLOW
Parameter	Units	Result	Result	Result
<i>Dioxins & Furans</i>				
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	<10	<26.315	0.297 BJ
1,2,3,4,6,7,8-HpCDD	pg/L	2.178 J	2.59 J	1.547 BJ
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L	<10	0.82 JK	0.618 J
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/L	<10	<26.315	0.173 JK
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L	<10	<26.315	0.258 J
2,3,4,7,8-Pentachlorodibenzofuran	pg/L	<10	<26.315	0.153 JK
Heptachlorodibenzo-p-dioxin	pg/L	2.178	4.902	3.769
Hexachloridibenzo-p-dioxin	pg/L	<25	<26.315	1.876
Hexachlorodibenzofuran	pg/L	<25	<26.315	0.876
Octachlorodibenzofuran	pg/L	<50	3.211 J	1.783 BJ
Octachlorodibenzo-p-dioxin	pg/L	36.101 BJ	35.034 B	26.257 BJ
Pentachlorodibenzo-p-dioxin	pg/L	<25	<26.315	0.33
Tetrachlorodibenzo-p-dioxin	pg/L	<10	<10.526	3.374
<i>Metals</i>				
Thallium	µg/L	0.246	0.465	0.142 J

Notes:

J Reported value is an estimated concentration of the constituent

B Concentration reported in equipment rinse samples

K Maximum estimated concentration

pg/L picograms per liter

µg/L micrograms per liter

Table 3-10
Groundwater Sampling Results for LHAAP-50

Parameter	Associated Site: Location Code: Sample Number: Sample Date: Zone: Units	Area 50 50WW01 L0001-50WW01 8/31/2004 SHALLOW Result	Area 50 50WW02 L0001-50WW02 8/30/2004 SHALLOW Result	Area 50 50WW03 L0001-50WW03 8/30/2004 SHALLOW Result	Area 50 50WW04 L0001-50WW04 8/31/2004 SHALLOW Result	Area 50 50WW06 L0001-50WW06 9/1/2004 INTERMEDIATE Result
Perchlorate						
Perchlorate	µg/L	<1.0	2,500	<1.0	<1.0	6.7
Volatiles						
1,1,2-Trichloroethane	µg/L	<5	3 J	<5	<5	<5
1,1-Dichloroethane	µg/L	<5	16	<5	<5	<5
1,1-Dichloroethene	µg/L	<5	20	<5	<5	<5
1,2-Dichlorobenzene	µg/L	<5	6 UJ	<5	<5	<5
1,2-Dichloroethane	µg/L	<5	58	5 UJ	5 UJ	5 UJ
Benzene	µg/L	<5	1 J	<5	<5	<5
Chloroform	µg/L	<5	13	<5	<5	<5
cis-1,2-Dichloroethene	µg/L	<5	1800	<5	<5	<5
Tetrachloroethene	µg/L	<5	28	<5	<5	<5
trans-1,2-Dichloroethene	µg/L	<5	8	<5	<5	<5
Trichloroethene	µg/L	5 UJ	9,200	8	2 J	15
Vinyl chloride	µg/L	<5	36	<5	<5	<5

Notes:

J Reported value is an estimated concentration of the constituent

UJ Not detected

µg/L micrograms per liter

Table 3-11
Groundwater Sampling Results for LHAAP-67

Parameter	Associated Site: Location Code: Sample Number: Sample Date: Zone: UNITS	LHAAP 67 67WW01 L0001-G4WW01 9/12/2004 SHALLOW Result	LHAAP 67 67WW02 L0001-G4WW02 9/12/2004 SHALLOW Result	LHAAP 67 67WW03 L0001-G4WW03 9/12/2004 SHALLOW Result	LHAAP 67 67WW04 L0001-67WW04 9/12/2004 SHALLOW Result	LHAAP 67 67WW05 L0001-67WW05 9/12/2004 SHALLOW Result	LHAAP 67 67WW06 L0001-67WW06 9/12/2004 INTERMEDIATE Result	LHAAP 67 67WW07 L0001-67WW07 9/12/2004 SHALLOW Result
<i>VOCs</i>								
1,1,2-Trichloroethane	µg/L	1 J	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	µg/L	12	<5	<5	<5	<5	<5	<5
1,1-Dichloroethene	µg/L	280 D	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	µg/L	13	<5	<5	<5	<5	<5	<5
Chloromethane	µg/L	<5	<5	<5	<5	1 J	<5	<5
cis-1,2-Dichloroethene	µg/L	1 J	<5	<5	<5	<5	<5	<5
Hexachlorobutadiene	µg/L	<5	<5	<5	<5	<5	<5	2 J
Methylene chloride	µg/L	<5	<5	<5	<5	1 JB	<5	<5
Trichloroethene	µg/L	6	<5	<5	1 J	<5	<5	<5
Vinyl chloride	µg/L	1 J	<5	<5	<5	<5	<5	<5

Notes:

- D Dilution applied
J Reported value is an estimated concentration of the constituent
B Concentration reported in equipment rinse samples
µg/L micrograms per liter

Table 3-12
Soil Sampling Results for LHAAP-32

Parameter	Associated Site:	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32
	Location Code:	32SB14	32SB14	32SB14	32SB15	32SB15	32SB15	32SB16
	Sample Number:	L0001-32SB14	L0002-32SB14	L0003-32SB14	L0001-32SB15	L0002-32SB15	L0003-32SB15	L0001-32SB16
	Sample Date:	8/16/2004	8/16/2004	8/16/2004	8/16/2004	8/16/2004	8/16/2004	8/16/2004
	Start Depth:	0	12	27	0	9	15	0
	End Depth:	1	15	28	1	12	17	1
	Sample Type:	REG	REG	REG	REG	REG	REG	REG
	Units	Result	Result	Result	Result	Result	Result	Result
EXPLOSIVES								
2,4,6-Trinitrotoluene	mg/kg	<.24 U	<.22 U	<.24 U	<.23 U	<.22 U	<.25 U	<.25 U
2,4-Dinitrotoluene	mg/kg	<.24 U	<.22 U	<.24 U	<.23 U	<.22 U	<.25 U	<.25 U
2-Amino-4,6-dinitrotoluene	mg/kg	<.24 U	<.22 U	<.24 U	<.23 U	<.22 U	<.25 U	<.25 U
METALS								
Aluminum	mg/kg	10,700	7,750	8,260	6,620 J	8,540 J	8,420 J	9,210 J
Antimony	mg/kg	<1.1 U	<1.0 U	<1.1 U	0.32 BJ	0.25 BJ	0.47 BJ	<1.2 UJL
Arsenic	mg/kg	4.3	3.7	3.6	1.5 J	2.1 J	2.6 J	3.6 J
Barium	mg/kg	84.5 J	130 J	59.5 J	115 J	55.8 J	132 J	52.8 J
Beryllium	mg/kg	0.56	0.65	0.54	0.6 J	0.7 J	0.73 J	0.65 J
Cadmium	mg/kg	0.023 J	0.13 J	0.25 J	<0.36 U	0.034 J	0.59	0.04 J
Calcium	mg/kg	750	3,580	5,160	1,240	3,300	3,450	3,940
Chromium	mg/kg	16.3	12.2	15.4	11 J	15.5 J	17.5 J	19.8 J
Cobalt	mg/kg	4.7 J	17.7 J	7.7 J	7.3 J	7.9 J	7.1 J	11.9 J
Copper	mg/kg	7.9	16	15.5	8.8	14.9	19.8	21.3
Iron	mg/kg	13,300 J	19,000 J	15,100 J	10,700 J	22,000 J	22,600 J	14,800 J
Lead	mg/kg	11.9	12.5	8.9	9.8 J	13.2 J	8.8 J	13 J
Magnesium	mg/kg	803	4,560	6,110	988 J	4,860 J	4,550 J	4,970 J
Manganese	mg/kg	174 J	1010 J	435 J	168 J	217 J	119 J	253 J
Mercury	mg/kg	0.058 B	0.065 B	0.051 B	0.013 J	0.023 J	0.068	0.066
Nickel	mg/kg	4.7	14.3	17.6	8.4 J	23.9 J	27.2 J	34.8 J
Potassium	mg/kg	325	1110	1100	328	1150	756	854
Selenium	mg/kg	1.4 J	0.76 J	1 J	0.27 BJ	<1.5 U	<1.5 U	0.22 BJ
Silver	mg/kg	<1.7 U	<1.5 U	<1.7 U	0.9 J	1.2 J	1.1 J	0.96 J
Sodium	mg/kg	97.1	388	209	139	532	628	599
Thallium	mg/kg	0.0791 J	0.118 J	0.171	0.159	0.16	0.212	0.114 J
Vanadium	mg/kg	31.2	15.2	18.2	24.7 J	19.1 J	25.3 J	21.2 J
Zinc	mg/kg	13.9	48.7	57.2	15.9 J	77.1 J	80.6 J	84.6 J

Notes provided on last page.

Table 3-12
Soil Sampling Results for LHAAP-32

Parameter	Associated Site:	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32
	Location Code:	32SB16	32SB16	32SB17	32SB17	32SB17	32SB18
	Sample Number:	L0002-32SB16	L0003-32SB16	L0001-32SB17	L0002-32SB17	L0003-32SB17	L0001-32SB18
	Sample Date:	8/16/2004	8/16/2004	8/17/2004	8/17/2004	8/17/2004	8/17/2004
	Start Depth:	3	12	0	9	15	0
	End Depth:	6	13	1	12	16	1
	Sample Type:	REG	REG	REG	REG	REG	REG
	Units	Result	Result	Result	Result	Result	Result
EXPLOSIVES							
2,4,6-Trinitrotoluene	mg/kg	<.25 U	<.28 U	<.24 U	<.25 U	<.24 U	<.23 U
2,4-Dinitrotoluene	mg/kg	<.25 U	<.28 U	<.24 U	<.25 U	<.24 U	<.23 U
2-Amino-4,6-dinitrotoluene	mg/kg	<.25 U	<.28 U	<.24 U	<.25 U	<.24 U	<.23 U
METALS							
Aluminum	mg/kg	7,780 J	7,110 J	16,000 J	3,050 J	7,680 J	7,630 J
Antimony	mg/kg	0.35 BJ	0.16 BJ	<1.2 UJL	<1.2 UJL	<1.2 UJL	0.13 BJ
Arsenic	mg/kg	3 J	2.6 J	2.7 J	0.87 J	2.7 J	1.7 J
Barium	mg/kg	108 J	228 J	117 J	9.2 J	314 J	67.5 J
Beryllium	mg/kg	0.73 J	0.85 J	0.54 J	0.92 J	0.61 J	0.45 J
Cadmium	mg/kg	<0.37 U	<0.36 U	<0.36 U	0.054 J	0.52	<0.29 U
Calcium	mg/kg	2,740	2290	1530	2750	2,730	1,050
Chromium	mg/kg	16.8 J	16.6 J	15.9 J	5 J	25.8 J	8.7 J
Cobalt	mg/kg	12.9 J	10.4 J	2.8 J	1.1 J	21.5 J	1.5 J
Copper	mg/kg	15.2	9.5	9.1	4.5	13.2	6.1
Iron	mg/kg	13,900 J	14,800 J	26,200 J	1,760 J	11,300 J	7,610 J
Lead	mg/kg	11.4 J	9.3 J	11 J	4.8 J	6.1 J	7.9 J
Magnesium	mg/kg	4,290 J	3,320 J	1,430 J	2,100 J	4,030 J	745 J
Manganese	mg/kg	326 J	241 J	34.9 J	39.6 J	995 J	34.2 J
Mercury	mg/kg	0.033 J	0.059	0.062	0.027 J	0.029 J	0.052
Nickel	mg/kg	31.4 J	27.2 J	9.1 J	3.3 J	36 J	3.8 J
Potassium	mg/kg	826	655	395	374	863	228
Selenium	mg/kg	0.14 BJ	0.52 BJ	<1.8 U	<1.8 U	0.27 BJ	0.34 BJ
Silver	mg/kg	0.92 J	1 J	1.3 J	<1.8 U	0.45 J	0.47 J
Sodium	mg/kg	581	521	362	588	652	442
Thallium	mg/kg	0.214	0.186	0.0922 J	<0.129 U	0.261	0.0623 J
Vanadium	mg/kg	20.6 J	16.5 J	29.7 J	4.5 J	20.4 J	15.9 J
Zinc	mg/kg	78.2 J	53.7 J	23.2 J	8.5 J	78.1 J	8.3 J

Notes provided on last page.

Table 3-12
Soil Sampling Results for LHAAP-32

Parameter	Associated Site:	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32
	Location Code:	32SB18	32SB18	32SB19	32SB19	32SB19	32SB20	32SB20
	Sample Number:	L0002-32SB18	L0003-32SB18	L0001-32SB19	L0002-32SB19	L0003-32SB19	L0001-32SB20	L0002-32SB20
	Sample Date:	8/17/2004	8/17/2004	8/17/2004	8/17/2004	8/17/2004	8/17/2004	8/17/2004
	Start Depth:	9	12	0	6	12	0	3
	End Depth:	12	15	1	9	15	1	6
	Sample Type:	REG	REG	REG	REG	REG	REG	REG
	Units	Result	Result	Result	Result	Result	Result	Result
EXPLOSIVES								
2,4,6-Trinitrotoluene	mg/kg	<.25 U	<.24 U	<.21 U	<.24 U	<.24 U	<.22 U	<.23 U
2,4-Dinitrotoluene	mg/kg	<.25 U	<.24 U	<.21 U	<.24 U	<.24 U	<.22 U	<.23 U
2-Amino-4,6-dinitrotoluene	mg/kg	<.25 U	<.24 U	<.21 U	<.24 U	<.24 U	<.22 U	<.23 U
METALS								
Aluminum	mg/kg	8,830 J	7,010 J	3,200 J	10,200 J	9,970	9,370 J	4,960 J
Antimony	mg/kg	0.19 BJ	0.21 BJ	0.21 BJ	<1.2 UJL	0.55 BJ	0.2 BJ	0.6 BJ
Arsenic	mg/kg	2.4 J	2.4 J	1.1 J	3.9 J	4.3	2.6 J	4.6 J
Barium	mg/kg	66.1 J	40.7 J	28 J	235 J	148 J	95.6 J	147 J
Beryllium	mg/kg	0.66	0.51 J	0.18 J	2.2 J	0.7	0.49 J	0.71 J
Cadmium	mg/kg	<0.38 U	0.02 J	<0.30 U	<0.35 U	<0.34 U	<0.30 U	0.071 J
Calcium	mg/kg	3270	2730	168	2,700	1,320	2,450	1770
Chromium	mg/kg	16.9 J	15.5 J	8.8 J	15.5 J	18.6	13.2 J	23.3 J
Cobalt	mg/kg	5.5 J	11.9 J	1.4 J	5.5 J	13.7	4 J	5.6 J
Copper	mg/kg	12.8	12.7	2.6	14.9	6	9.5	10.3
Iron	mg/kg	12,200 J	13,900 J	6,080 J	15,200 J	20,400	22,700 J	34,900 J
Lead	mg/kg	6.1 J	5.7 J	4.3 J	6.8 J	13.5	12.9 J	1,630 J
Magnesium	mg/kg	4,630 J	3,860 J	193 J	4,380 J	1,190	1,330 J	970 J
Manganese	mg/kg	124 J	219 J	95.6 J	406 J	373	56 J	276 J
Mercury	mg/kg	0.027 J	0.14	0.017 J	0.026 J	0.12 J	0.041	0.0088 J
Nickel	mg/kg	26.7 J	28.9 J	1.9 J	40.5 J	8.4	13.6 J	11.8 J
Potassium	mg/kg	754	819	194	595	310	323	280
Selenium	mg/kg	<1.9 U	0.22 BJ	0.43 BJ	0.22 BJ	2.2	0.28 BJ	0.23 BJ
Silver	mg/kg	0.72 J	0.96 J	0.59 J	0.77 J	0.25 J	1.2 J	1.9
Sodium	mg/kg	1170	546	83.3	1,640	133	64.1	156
Thallium	mg/kg	0.14	0.176	<0.102 U	0.169	0.12	<0.105 U	0.0874 J
Vanadium	mg/kg	17.2 J	17.9 J	13.9 J	25.6 J	38.4	21.4 J	35.3 J
Zinc	mg/kg	72.2 J	68.5 J	3.8 J	68.6 J	18.2	29.3 J	188 J

Notes provided on last page.

Table 3-12
Soil Sampling Results for LHAAP-32

Parameter	Associated Site:	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32
	Location Code:	32SB20	32SB21	32SB21	32SB21	32SB22
	Sample Number:	L0003-32SB20	L0001-32SB21	L0002-32SB21	L0003-32SB21	L0001-32SB22
	Sample Date:	8/17/2004	8/17/2004	8/17/2004	8/17/2004	9/8/2004
	Start Depth:	12	0	9	12	0
	End Depth:	15	1	12	15	1
	Sample Type:	REG	REG	REG	REG	REG
	Units	Result	Result	Result	Result	Result
EXPLOSIVES						
2,4,6-Trinitrotoluene	mg/kg	<.24 U	<.21 U	<.22 U	<.24 U	46 J
2,4-Dinitrotoluene	mg/kg	<.24 U	<.21 U	<.22 U	<.24 U	<.19 U
2-Amino-4,6-dinitrotoluene	mg/kg	<.24 U	<.21 U	<.22 U	<.24 U	2.6 J
METALS						
Aluminum	mg/kg	11,300	7,050 J	8,930 J	12,300	10,900
Antimony	mg/kg	<1.0 UJL	0.24 BJ	0.78 BJ	0.16 BJ	<1 U
Arsenic	mg/kg	4	2 J	2.4 J	2.8	4.3
Barium	mg/kg	38.9 J	57.3 J	55 J	42.3 J	83.7
Beryllium	mg/kg	0.72	0.36 J	0.89 J	0.82	0.52
Cadmium	mg/kg	0.17 J	<0.32 U	0.26 J	0.21 J	<0.31 U
Calcium	mg/kg	4,570	1,470	4,080	5,500	956
Chromium	mg/kg	23.5	10.2 J	18.6 J	23.6	15.6
Cobalt	mg/kg	13.1	2.1 J	12.8 J	11.3	3.8
Copper	mg/kg	23.2	4.6	23.1	32.4	7.2
Iron	mg/kg	19,000	8,930 J	38,100 J	21,400	15,600
Lead	mg/kg	12.1	7.4 J	8.5 J	14.4	11.1
Magnesium	mg/kg	6,060	440 J	4,740 J	6,590	648
Manganese	mg/kg	236	74.8 J	491 J	217	187
Mercury	mg/kg	0.084 BJ	0.014 J	0.039	0.18 J	0.045 B
Nickel	mg/kg	37.2	4.4 J	41.7 J	37.3	4
Potassium	mg/kg	864	305	903	1,120	333
Selenium	mg/kg	2	0.46 BJ	<1.8 U	2	<1.6 U
Silver	mg/kg	<1.5 U	0.74 J	1.9	0.027 J	<1.6 U
Sodium	mg/kg	743	27.6 J	1010	634	110
Thallium	mg/kg	0.19	0.0694 J	0.205	0.204	0.0682 J
Vanadium	mg/kg	22.9	20.5 J	25.5 J	30.7	29
Zinc	mg/kg	98.7	10.1 J	90.6 J	108	13.6

Notes provided on last page.

Table 3-12
Soil Sampling Results for LHAAP-32

Parameter	Associated Site:	AREA 32	AREA 32	AREA 32	AREA 32	AREA 32
	Location Code:	32SB22	32SB22	32SB23	32SB23	32SB23
	Sample Number:	L0002-32SB22	L0003-32SB22	L0001-32SB23	L0002-32SB23	L0003-32SB23
	Sample Date:	9/8/2004	9/8/2004	9/8/2004	9/8/2004	9/8/2004
	Start Depth:	5	10	0	5	10
	End Depth:	6	12	1	6	12
	Sample Type:	REG	REG	REG	REG	REG
	Units	Result	Result	Result	Result	Result
EXPLOSIVES						
2,4,6-Trinitrotoluene	mg/kg	<.2 U	<.18 U	<.2 U	<.19 U	<.19 U
2,4-Dinitrotoluene	mg/kg	<.2 U	<.18 U	<.2 U	<.19 U	<.19 U
2-Amino-4,6-dinitrotoluene	mg/kg	<.2 U	<.18 U	<.2 U	<.19 U	<.19 U
METALS						
Aluminum	mg/kg	9,670	4,010	11,300	8,220	9,620
Antimony	mg/kg	0.087 J	0.11 J	<1.1 U	0.08 J	0.13 J
Arsenic	mg/kg	1.5	0.67 J	2.7	1.4	3.8
Barium	mg/kg	1,950	19.1	116	747	118
Beryllium	mg/kg	0.72	0.62	0.59	0.71	0.65
Cadmium	mg/kg	<0.35 U	<0.3 U	<0.33 U	<0.31 U	<0.35 U
Calcium	mg/kg	3,180	2,520	1,150	2,760	3,230
Chromium	mg/kg	19.9	5.2	12.3	15.2	25
Cobalt	mg/kg	4.9	1.1 J	5	3.4	12.4
Copper	mg/kg	12.5	6.2	6.4	12.4	17
Iron	mg/kg	10,200	2,480	7,990	7,660	14,700
Lead	mg/kg	5.5	6.7	8.4	6.1	9.8
Magnesium	mg/kg	3,900	2,010	1,240	3,280	4,380
Manganese	mg/kg	85.9	48.2	108	61.3	266
Mercury	mg/kg	0.059	0.059	0.053 B	0.1	0.074
Nickel	mg/kg	19.5	3.2	7.6	12.9	26.1
Potassium	mg/kg	686	544	312	593	976
Selenium	mg/kg	<1.7 U	<1.5 U	0.27 J	<1.5 U	<1.8 U
Silver	mg/kg	<1.7 U	<1.5 U	<1.7 U	<1.5 U	<1.8 U
Sodium	mg/kg	685	491	130	608	523
Thallium	mg/kg	0.106 J	<0.109 U	0.0863 J	0.132	0.12 J
Vanadium	mg/kg	13.3	5.5	26.3	9.3	22.7
Zinc	mg/kg	62.8	10.6	16.8	65.6	81.1

Notes:

- B Concentration reported in equipment rinsate samples
 J Reported value is an estimated concentration of the constituent
 U Not detected
 L Result may be biased low
 mg/kg milligrams per kilograms

Table 3-13
Soil Sampling Results for LHAAP-50

Parameter	Associated Site:	Area 50	Area 50	Area 50	Area 50	Area 50	Area 50	Area 50	Area 50
	Location Code:	50SB10	50SB10	50SB10	50SB11	50SB11	50SB11	50SB12	50SB12
	Sample Number:	L0001-50SB10	L0002-50SB10	L0003-50SB10	L0001-50SB11	L0002-50SB11	L0003-50SB11	L0001-50SB12	L0002-50SB12
	Sample Date:	8/18/2004	8/18/2004	8/18/2004	9/8/2004	9/8/2004	9/8/2004	9/8/2004	9/8/2004
	Start Depth:	0	1	6	0	3	9	0	3
	End Depth:	1	3	7	1	6	10	1	6
	UNITS	Result	Result	Result	Result	Result	Result	Result	Result
Perchlorate									
Perchlorate	µg/kg	25 BJ	13 UJL	12 UJL	<11	<11	<12	<11	<11
Volatiles									
Acetone	mg/kg	0.005 J	0.005 J	0.045	<.005	0.006	<.006	<.005	0.006
Methylene chloride	mg/kg	0.003 J	0.007	0.006	0.001 B	0.002 B	0.002 B	0.002 B	0.002 B
Naphthalene	mg/kg	0.006 UJ	0.006 UJ	0.006 UJ	0.005 UJ	0.006 UJ	0.006 UJ	0.005 UJ	0.006 UJ

Notes provided on last page.

Table 3-13
Soil Sampling Results for LHAAP-50

Parameter	Associated Site:	Area 50	Area 50	Area 50	Area 50	Area 50	Area 50	Area 50
	Location Code:	50SB12	50SB13	50SB13	50SB13	50SB14	50SB14	50SB14
	Sample Number:	L0003-50SB12	L0001-50SB13	L0002-50SB13	L0003-50SB13	L0001-50SB14	L0002-50SB14	L0003-50SB14
	Sample Date:	9/8/2004	8/18/2004	8/18/2004	8/18/2004	8/18/2004	8/18/2004	8/18/2004
	Start Depth:	9	0	3	9	0	6	9
	End Depth:	10	1	6	10	1	9	11
	UNITS	Result	Result	Result	Result	Result	Result	Result
Perchlorate								
Perchlorate	µg/kg	<12	10 UJL	11 UJL	11 UJL	11 UJL	11 UJL	11 UJL
Volatiles								
Acetone	mg/kg	0.01	<.005	<.005	0.006	0.004 J	<.006	0.054
Methylene chloride	mg/kg	0.002 B	0.003 J	0.004 J	0.005 J	0.004 J	0.004 J	0.005 J
Naphthalene	mg/kg	0.006 UJ	0.005 UJ	0.005 UJ	0.006 UJ	0.006 UJ	0.006 UJ	0.006 UJ

Notes provided on last page.

Table 3-13
Soil Sampling Results for LHAAP-50

Parameter	Associated Site:	Area 50	Area 50	Area 50	Area 50	Area 50
	Location Code:	50SB15	50SB15	50SB15	50SB16	50SB16
	Sample Number:	L0001-50SB15	L0002-50SB15	L0003-50SB15	L0001-50SB16	L0002-50SB16
	Sample Date:	8/18/2004	8/18/2004	8/18/2004	8/18/2004	8/18/2004
	Start Depth:	0	3	6	0	1
	End Depth:	1	6	7	1	3
	UNITS	Result	Result	Result	Result	Result
Perchlorate						
Perchlorate	µg/kg	12 UJL	12 UJL	12 UJL	12 UJL	11 UJL
Volatiles						
Acetone	mg/kg	0.008	0.009	0.007	<.006	<.006
Methylene chloride	mg/kg	0.005 J	0.006	0.002 J	0.006	0.005 J
Naphthalene	mg/kg	0.006 UJ	0.003 UJ	0.005 BJ	0.006 UJ	0.006 UJ

Notes provided on last page.

Table 3-13
Soil Sampling Results for LHAAP-50

Parameter	Associated Site:	Area 50	Area 50	Area 50	Area 50
	Location Code:	50SB16	50SB17	50SB17	50SB17
	Sample Number:	L0003-50SB16	L0001-50SB17	L0002-50SB17	L0003-50SB17
	Sample Date:	8/18/2004	9/8/2004	9/8/2004	9/8/2004
	Start Depth:	6	0	6	9
	End Depth:	7	1	9	11
	UNITS	Result	Result	Result	Result
Perchlorate					
Perchlorate	µg/kg	12 UJL	<11	740	2,600
Volatiles					
Acetone	mg/kg	0.011	<.005	0.008	0.007
Methylene chloride	mg/kg	0.005 J	0.001 B	0.002 B	0.002 B
Naphthalene	mg/kg	0.006 UJ	0.005 UJ	0.005 UJ	0.006 UJ

Notes:

J Reported value is an estimated concentration of the constituent
 B Concentration reported in equipment rinse samples
 U Not detected
 L Result may be biased low
 mg/kg milligrams per kilograms
 µg/L micrograms per liter

Table 3-14
Soil Sampling Results for LHAAP-67

Parameter	Associated Site:	Area 67	Area 67
	Location Code:	67SB04	67SB04
	Sample Number:	9/8/2004	9/8/2004
	Sample Date:	2	5
	Start Depth:	3	6
	End Depth:	L0001-67SB04	L0002-67SB04
	UNITS	Result	Result
<i>Volatile</i>			
Methylene chloride	mg/kg	0.002 BJ	0.002 BJ

Notes:

BJ Value is estimated-concentration reported in equipment rinse samples
mg/kg milligrams per kilograms

Table 3-15
Installation-Wide Sediment Sampling Results

PARAMETER	Associated Site: Location Code: Sample Number: Sample Date: Start Depth: End Depth:	Goose Prairie Creek IWS001 IWS001 9/16/2004 0 0.5	Goose Prairie Creek IWS002 IWS002 9/17/2004 0 0.5	Goose Prairie Creek IWS003 IWS003 9/16/2004 0 0.5	Goose Prairie Creek IWS004 IWS004 9/16/2004 0 0.5	Goose Prairie Creek IWS005 IWS005 9/16/2004 0 0.5	Goose Prairie Creek IWS006 IWS006 9/16/2004 0 0.5	Central Creek IWS007 IWS007 9/17/2004 0 0.5	Central Creek IWS008 IWS008 9/17/2004 0 0.5	Central Creek IWS009 IWS009 9/17/2004 0 0.5
	UNITS	REG	REG	REG	REG	REG	REG	REG	REG	REG
DIOXINS & FURANS										
1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	NA	NA	NA	9.011	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	ng/kg	NA	NA	NA	124.036	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	NA	NA	NA	0.813 J	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	1.133 J	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	0.851 J	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	2.295 J	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	0.621 J	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	3.122	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	0.444 J	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	NA	NA	NA	0.236 J	NA	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	1.04 J	NA	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	NA	NA	NA	0.7 J	NA	NA	NA	NA	NA
2,3,7,8-TCDD	ng/kg	NA	NA	NA	0.369 J	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	ng/kg	NA	NA	NA	22.774	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	308.573	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	62.89	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	ng/kg	NA	NA	NA	13.444	NA	NA	NA	NA	NA
Octachlorodibenzofuran	ng/kg	NA	NA	NA	18.962	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	5960.133 J	NA	NA	NA	NA	NA
Pentachlorodibenzofuran	ng/kg	NA	NA	NA	16.063	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	8.493	NA	NA	NA	NA	NA
Tetrachlorodibenzofuran, Total	ng/kg	NA	NA	NA	8.465	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	3.741	NA	NA	NA	NA	NA
METALS										
Aluminum	mg/kg	3470 J	2420	9790	7090	2040 J	10500 J	2920 J	1640 J	6240 J
Antimony	mg/kg	0.75 B	0.3 B	0.22 B	0.23 B	0.36 B	1.0 B	0.31 B	0.43 B	0.96 B
Arsenic	mg/kg	2.4	2	4.6	2.6	1.5	3.6	2.2	1.0 J	4.7
Barium	mg/kg	39.5	69.2	174	105	30.7	161	66.1	28.2	74.4
Beryllium	mg/kg	0.32	0.21 J	0.8	0.69	0.23 J	0.93	0.39	0.25 J	0.83
Cadmium	mg/kg	0.035 J	<0.33	0.22 J	0.078 J	0.028 J	0.53	0.041 J	<0.40	0.11 J
Calcium	mg/kg	540 J	359	1860	659	269 J	2530 J	1060 J	362 J	1560 J
Chromium	mg/kg	10	8	13.2	7.6	5.8	14.4	6.2	4.1	27.9
Cobalt	mg/kg	2.0 J	1.1 J	13.7	9.7	2.4 J	11.6 J	2.9 J	2.7 J	4.1 J
Copper	mg/kg	6.5	2.4 B	11.4	6.3	2.9	60.2	4.1	3	7.5
Iron	mg/kg	11800 J	4790	15900	6510	4080 J	9240 J	5700 J	4310 J	18400 J
Lead	mg/kg	5.3	6.1	17.3	10.7	4.7	16.3	8	3.5	8.8
Magnesium	mg/kg	292 J	145	736	325	97.8 J	677 J	330 J	343 J	1100 J
Manganese	mg/kg	121 J	25	419	250	52.8 J	406 J	99.2 J	73.7 J	154 J
Mercury	mg/kg	0.017 J	0.0079 J	0.064 J	0.063	0.017 J	0.3	0.024 J	0.015 J	0.018 J
Nickel	mg/kg	3.0 J	2 J	9.8	6.5	2 J	11.2 J	4.1 J	3.3 J	7.9 J
Potassium	mg/kg	196 J	198	873	367	71.8 J	325 J	160 J	152 J	372 J
Silver	mg/kg	1.1 B	<1.7	<3.2	<2.3	0.42 B	16.7	0.78 B	0.68 B	1.5 B
Sodium	mg/kg	10.5 J	14.4 B	43.8 B	55 J	8.7 J	25.6 J	15.2 J	53.0 J	38.1 J
Thallium	mg/kg	<0.124	<0.118	<0.294	<0.189	<0.120	0.0943 J	<0.118	<0.124	<0.131
Vanadium	mg/kg	18.9 J	13	30.7	15.4	10.6 J	19.3 J	13.3 J	10.8 J	27.7 J
Zinc	mg/kg	14.8	12.8	108	78.1	40.3	219	16.7	15	27.9
PCBs										
Aroclor 1260	mg/kg	NA	NA	NA	0.062	NA	NA	NA	NA	NA
PESTICIDES										
Methoxychlor	mg/kg	NA	NA	NA	.081 J	NA	NA	NA	NA	NA
Percent Solids	Percent	87.5	89.8	40.5	53.9	92.2	82.7	94.6	77.5	77.8

Notes provided on last page.

Table 3-15
Installation-Wide Sediment Sampling Results

PARAMETER	Associated Site:	Central Creek	Central Creek	Central Creek	Central Creek	Central Creek	Central Creek	Central Creek	Central Creek	Harrison Bayou	Saunders Branch	Saunders Branch	Saunders Branch
	Location Code:	IWSD10	IWSD11	IWSD12	IWSD13	IWSD14	IWSD15	IWSD16	IWSD17	IWSD18	IWSD19	IWSD20	
	Sample Number:	IWSD10	IWSD11	IWSD12	IWSD13	IWSD14	IWSD15	IWSD16	IWSD17	IWSD18	IWSD19	IWSD20	
	Sample Date:	9/17/2004	9/16/2004	9/16/2004	9/16/2004	9/16/2004	9/17/2004	9/17/2004	9/17/2004	9/16/2004	9/15/2004	9/15/2004	
	Start Depth:	0	0	0	0	0	0	0	0	0	0	0	
End Depth:	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
UNITS	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	
DIOXINS & FURANS													
1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	4.77	NA	NA	NA	NA	NA	
1,2,3,4,6,7,8-HpCDD	ng/kg	NA	NA	NA	NA	NA	49.477	NA	NA	NA	NA	NA	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.463 J	NA	NA	NA	NA	NA	
1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.87 J	NA	NA	NA	NA	NA	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	0.307 J	NA	NA	NA	NA	NA	
1,2,3,6,7,8-Hexachloridibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	0.967 J	NA	NA	NA	NA	NA	
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.287 J	NA	NA	NA	NA	NA	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	1.261 J	NA	NA	NA	NA	NA	
1,2,3,7,8-Pentachloridibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	0.137 J	NA	NA	NA	NA	NA	
1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	<2.482	NA	NA	NA	NA	NA	
2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.479 J	NA	NA	NA	NA	NA	
2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.138 J	NA	NA	NA	NA	NA	
2,3,7,8-TCDD	ng/kg	NA	NA	NA	NA	NA	0.319 J	NA	NA	NA	NA	NA	
Heptachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	15.737	NA	NA	NA	NA	NA	
Heptachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	133.532	NA	NA	NA	NA	NA	
Hexachloridibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	22.339	NA	NA	NA	NA	NA	
Hexachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	9.472	NA	NA	NA	NA	NA	
Octachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	7.333	NA	NA	NA	NA	NA	
Octachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	2866.467 J	NA	NA	NA	NA	NA	
Pentachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	4.53	NA	NA	NA	NA	NA	
Pentachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	2.375	NA	NA	NA	NA	NA	
Tetrachlorodibenzofuran, Total	ng/kg	NA	NA	NA	NA	NA	0.42	NA	NA	NA	NA	NA	
Tetrachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	1.464	NA	NA	NA	NA	NA	
METALS													
Aluminum	mg/kg	2940 J	4070 J	6560 J	4810 J	7980 J	2260 J	13900 J	3190	1120	3270	5020	
Antimony	mg/kq	0.26 B	0.35 B	0.44 B	0.48 B	0.5 B	0.40 B	1.0 B	1.4 UJL	0.072 B	1.3 UJL	1.3 UJL	
Arsenic	mg/kg	1.5	1.3	2.2	2.7	3.2	1.1 J	6	2	0.51 J	3.2	2.6	
Barium	mg/kg	65.4	85.2	106	66.3	299	44.5	208	72.3	42.6	131	168	
Beryllium	mg/kg	0.35 J	0.42	0.44	0.4	1.2	0.31 J	1	0.45	0.21 J	0.69	1.1	
Cadmium	mg/kg	<0.35	0.11 J	0.009 J	0.025 J	0.23 J	0.029 J	0.23 J	0.03 J	0.0082 J	0.025 J	0.062 J	
Calcium	mg/kg	337 J	501 J	1410 J	527 J	1920 J	502 J	1960 J	724	168	452	1050	
Chromium	mg/kg	4	6.1	6.8	9.5	8.7	4.7	17.3	4.6	2.5	4.7	10	
Cobalt	mg/kg	3.1 J	2.1 J	3.5 J	2.7 J	10.6 J	5.1 J	17.9 J	8.7	2.9	11.7	10.9	
Copper	mg/kg	3	3.6	3.2	2.5	8.4	2.5	14.1	3.4	1.1 B	1.7 B	4.8	
Iron	mg/kq	2940 J	2970 J	5940 J	6310 J	6110 J	4630 J	13900 J	3810	1850	7780	9430	
Lead	mg/kg	6.8	9.2	10.5	7.4	17.1	5.6	24.5	8.6	4.3	13.2	14.9	
Magnesium	mg/kg	323 J	255 J	687 J	268 J	715 J	390 J	1550 J	414	88.6	207	319	
Manganese	mg/kg	65.0 J	149 J	408 J	134 J	530 J	119 J	280 J	200	68.4	733	309	
Mercury	mg/kg	0.022 J	0.039	0.031 J	0.015 J	0.094	0.012 J	0.12	0.039 J	0.011 J	0.023 J	0.031 J	
Nickel	mg/kq	3.5 J	3.3 J	4.4 J	3.1 J	11.4 J	3.8 J	18.6 J	4.6	1.7 J	4.5	5	
Potassium	mg/kg	194 J	209 J	363 J	297 J	395 J	182 J	888 J	274	142	309	413	
Silver	mg/kg	0.29 B	0.24 B	0.35 B	0.46 B	0.55 B	0.47 B	1.1 B	<2.1	<1.8	<1.9	<1.9	
Sodium	mg/kg	35.7 J	<53.0	21.0 J	12 J	18.8 J	44.1 J	201	139	20.1 B	30.7 B	72.3	
Thallium	mg/kg	<0.143	<0.128	<0.119	<0.122	<0.154	<0.144	<0.260	<0.156	<0.145	0.0684 J	<0.182	
Vanadium	mg/kg	9.3 J	10.3 J	14.3 J	15.2 J	16.5 J	8.8 J	31.1 J	11	4.9	12.4	28.5	
Zinc	mg/kg	9.7	31.6	20	13.6	51.4	17.6	82.6	10.5	5.4	11.5	14.9	
PCBs													
Aroclor 1260	mg/kg	NA	NA	NA	NA	NA	<.047	NA	NA	NA	NA	NA	
PESTICIDES													
Methoxychlor	mg/kg	NA	NA	NA	NA	NA	<.024	NA	NA	NA	NA	NA	
Percent Solids	Percent	74.6	81.5	91.4	79	69.1	70.9	41.8	64.2	65.1	71.9	62.5	

Notes:

J Concentration is estimated
H Result may be biased high
NA Not analyzed
U Undetected
L Result may be biased low
mg/kg milligrams per kilograms
µg/L micrograms per liter

Table 3-16
Installation-Wide Surface Water Sampling Results

PARAMETER	Associated Site:	Goose Prairie Creek	Goose Prairie Creek	Goose Prairie Creek	Goose Prairie Creek	Goose Prairie Creek	Goose Prairie Creek	Central Creek	Central Creek	Central Creek
	Location Code:	IWSD01	IWSD02	IWSD03	IWSD04	IWSD05	IWSD06	IWSD07	IWSD08	IWSD09
	Sample Number:	IWSD01	IWSD02	IWSD03	IWSD04	IWSD05	IWSD06	IWSD07	IWSD08	IWSD09
	Sample Date:	9/16/2004	9/17/2004	9/16/2004	9/16/2004	9/16/2004	9/16/2004	9/17/2004	9/17/2004	9/17/2004
	Start Depth:	0	0	0	0	0	0	0	0	0
DIOXINS & FURANS										
1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	NA	NA	NA	9.011	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	ng/kg	NA	NA	NA	124.036	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	NA	NA	NA	0.813 J	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	1.133 J	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	0.851 J	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	2.295 J	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	0.621 J	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	3.122	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	0.444 J	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	NA	NA	NA	0.236 J	NA	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	1.04 J	NA	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	NA	NA	NA	0.7 J	NA	NA	NA	NA	NA
2,3,7,8-TCDD	ng/kg	NA	NA	NA	0.369 J	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	ng/kg	NA	NA	NA	22.774	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	308.573	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	62.89	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	ng/kg	NA	NA	NA	13.444	NA	NA	NA	NA	NA
Octachlorodibenzofuran	ng/kg	NA	NA	NA	18.962	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	5960.133 J	NA	NA	NA	NA	NA
Pentachlorodibenzofuran	ng/kg	NA	NA	NA	16.063	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	8.493	NA	NA	NA	NA	NA
Tetrachlorodibenzofuran, Total	ng/kg	NA	NA	NA	8.465	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	3.741	NA	NA	NA	NA	NA
METALS										
Aluminum	mg/kg	3470 J	2420	9790	7090	2040 J	10500 J	2920 J	1640 J	6240 J
Antimony	mg/kg	0.75 B	0.3 B	0.22 B	0.23 B	0.36 B	1.0 B	0.31 B	0.43 B	0.96 B
Arsenic	mg/kg	2.4	2	4.6	2.6	1.5	3.6	2.2	1.0 J	4.7
Barium	mg/kg	39.5	69.2	174	105	30.7	161	66.1	28.2	74.4
Beryllium	mg/kg	0.32	0.21 J	0.8	0.69	0.23 J	0.93	0.39	0.25 J	0.83
Cadmium	mg/kg	0.035 J	<0.33	0.22 J	0.078 J	0.028 J	0.53	0.041 J	<0.40	0.11 J
Calcium	mg/kg	540 J	359	1860	659	269 J	2530 J	1060 J	362 J	1560 J
Chromium	mg/kg	10	8	13.2	7.6	5.8	14.4	6.2	4.1	27.9
Cobalt	mg/kg	2.0 J	1.1 J	13.7	9.7	2.4 J	11.6 J	2.9 J	2.7 J	4.1 J
Copper	mg/kg	6.5	2.4 B	11.4	6.3	2.9	60.2	4.1	3	7.5
Iron	mg/kg	11800 J	4790	15900	6510	4080 J	9240 J	5700 J	4310 J	18400 J
Lead	mg/kg	5.3	6.1	17.3	10.7	4.7	16.3	8	3.5	8.8
Magnesium	mg/kg	292 J	145	736	325	97.8 J	677 J	330 J	343 J	1100 J
Manganese	mg/kg	121 J	25	419	250	52.8 J	406 J	99.2 J	73.7 J	154 J
Mercury	mg/kg	0.017 J	0.0079 J	0.054 J	0.063	0.017 J	0.3	0.024 J	0.015 J	0.018 J
Nickel	mg/kg	3.0 J	2 J	9.8	6.5	2 J	11.2 J	4.1 J	3.3 J	7.9 J
Potassium	mg/kg	196 J	198	873	367	71.8 J	325 J	160 J	152 J	372 J
Silver	mg/kg	1.1 B	<1.7	<3.2	<2.3	0.42 B	16.7	0.78 B	0.68 B	1.5 B
Sodium	mg/kg	10.5 J	14.4 B	43.8 B	55 J	8.7 J	25.6 J	15.2 J	53.0 J	38.1 J
Thallium	mg/kg	<0.124	<0.118	<0.294	<0.189	<0.120	0.0943 J	<0.118	<0.124	<0.131
Vanadium	mg/kg	18.9 J	13	30.7	15.4	10.6 J	19.3 J	13.3 J	7.0 J	27.7 J
Zinc	mg/kg	14.8	12.8	108	78.1	40.3	219	16.7	15	27.9
PCBs										
Aroclor 1260	mg/kg	NA	NA	NA	0.062	NA	NA	NA	NA	NA
PESTICIDES										
Methoxychlor	mg/kg	NA	NA	NA	.081 J	NA	NA	NA	NA	NA
Percent Solids	Percent	87.5	89.8	40.5	53.9	92.2	82.7	94.6	77.5	77.8

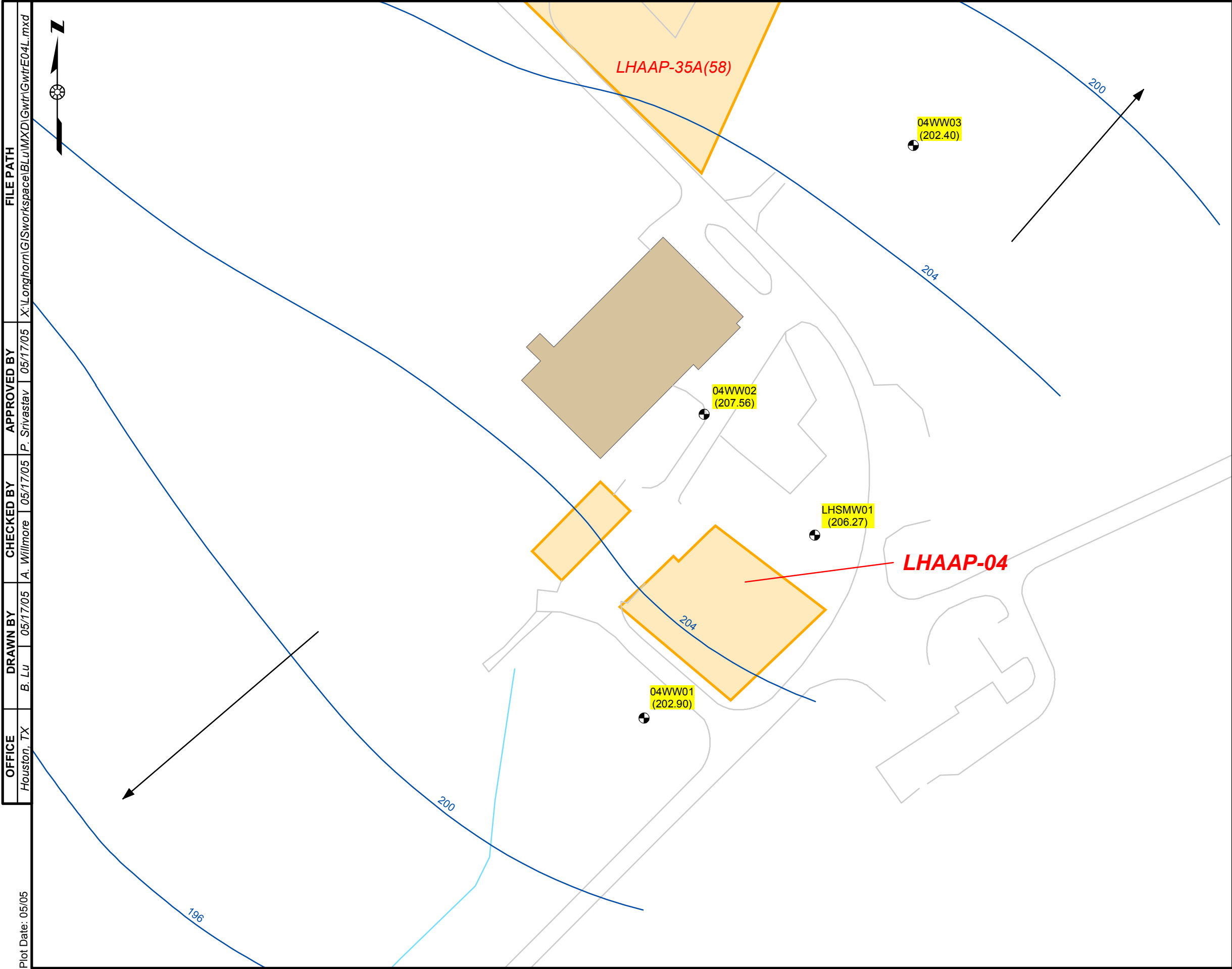
Notes provided on last page

Table 3-16
Installation-Wide Surface Water Sampling Results

PARAMETER	Associated Site:	Central Creek	Central Creek	Central Creek	Central Creek	Central Creek	Central Creek	Central Creek	Harrison Bayou	Saunders Branch	Saunders Branch	Saunders Branch
	Location Code:	IWSD10	IWSD11	IWSD12	IWSD13	IWSD14	IWSD15	IWSD16	IWSD17	IWSD18	IWSD19	IWSD20
	Sample Number:	IWSD10	IWSD11	IWSD12	IWSD13	IWSD14	IWSD15	IWSD16	IWSD17	IWSD18	IWSD19	IWSD20
	Sample Date:	9/17/2004	9/16/2004	9/16/2004	9/16/2004	9/16/2004	9/17/2004	9/17/2004	9/16/2004	9/15/2004	9/15/2004	9/15/2004
	Start Depth:	0	0	0	0	0	0	0	0	0	0	0
DIOXINS & FURANS												
1,2,3,4,6,7,8-Heptachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	4.77	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	ng/kg	NA	NA	NA	NA	NA	49.477	NA	NA	NA	NA	NA
1,2,3,4,7,8,9-Heptachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.463 J	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.87 J	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	0.307 J	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	0.967 J	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.287 J	NA	NA	NA	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	1.261 J	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	0.137 J	NA	NA	NA	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	<2.482	NA	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.479 J	NA	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	0.138 J	NA	NA	NA	NA	NA
2,3,7,8-TCDD	ng/kg	NA	NA	NA	NA	NA	0.319 J	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	15.737	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	133.532	NA	NA	NA	NA	NA
Hexachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	22.339	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	9.472	NA	NA	NA	NA	NA
Octachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	7.333	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	2866.467 J	NA	NA	NA	NA	NA
Pentachlorodibenzofuran	ng/kg	NA	NA	NA	NA	NA	4.53	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	2.375	NA	NA	NA	NA	NA
Tetrachlorodibenzofuran, Total	ng/kg	NA	NA	NA	NA	NA	0.42	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	ng/kg	NA	NA	NA	NA	NA	1.464	NA	NA	NA	NA	NA
METALS												
Aluminum	mg/kg	2940 J	4070 J	6560 J	4810 J	7980 J	2260 J	13900 J	3190	1120	3270	5020
Antimony	mg/kg	0.26 B	0.35 B	0.44 B	0.48 B	0.5 B	0.40 B	1.0 B	1.4 UJL	0.072 B	1.3 UJL	1.3 UJL
Arsenic	mg/kg	1.5	1.3	2.2	2.7	3.2	1.1 J	6	2	0.51 J	3.2	2.6
Barium	mg/kg	65.4	85.2	106	66.3	299	44.5	208	72.3	42.6	131	168
Beryllium	mg/kg	0.35 J	0.42	0.44	0.4	1.2	0.31 J	1	0.45	0.21 J	0.69	1.1
Cadmium	mg/kg	<0.35	0.11 J	0.009 J	0.025 J	0.23 J	0.029 J	0.23 J	0.03 J	0.0082 J	0.025 J	0.062 J
Calcium	mg/kg	337 J	501 J	1410 J	527 J	1920 J	502 J	1960 J	724	168	452	1050
Chromium	mg/kg	4	6.1	6.8	9.5	8.7	4.7	17.3	4.6	2.5	4.7	10
Cobalt	mg/kg	3.1 J	2.1 J	3.5 J	2.7 J	10.6 J	5.1 J	17.9 J	8.7	2.9	11.7	10.9
Copper	mg/kg	3	3.6	3.2	2.5	8.4	2.5	14.1	3.4	1.1 B	1.7 B	4.8
Iron	mg/kg	2940 J	2970 J	5940 J	6310 J	6110 J	4630 J	13900 J	3810	1850	7780	9430
Lead	mg/kg	6.8	9.2	10.5	7.4	17.1	5.6	24.5	8.6	4.3	13.2	14.9
Magnesium	mg/kg	323 J	255 J	687 J	268 J	715 J	390 J	1550 J	414	88.6	207	319
Manganese	mg/kg	65.0 J	149 J	408 J	134 J	530 J	119 J	280 J	200	68.4	733	309
Mercury	mg/kg	0.022 J	0.039	0.031 J	0.015 J	0.094	0.012 J	0.12	0.039 J	0.011 J	0.023 J	0.031 J
Nickel	mg/kg	3.5 J	3.3 J	4.4 J	3.1 J	11.4 J	3.8 J	18.6 J	4.6	1.7 J	4.5	5
Potassium	mg/kg	194 J	209 J	363 J	297 J	395 J	182 J	888 J	274	309	309	413
Silver	mg/kg	0.29 B	0.24 B	0.35 B	0.46 B	0.55 B	0.47 B	1.1 B	<2.1	<1.8	<1.9	<1.9
Sodium	mg/kg	35.7 J	<53.0	21.0 J	12 J	18.8 J	44.1 J	201	139	20.1 B	30.7 B	72.3
Thallium	mg/kg	<0.143	<0.128	<0.119	<0.122	<0.154	<0.144	<0.260	<0.156	<0.145	0.0684 J	<0.182
Vanadium	mg/kg	9.3 J	10.3 J	14.3 J	15.2 J	16.5 J	8.8 J	31.1 J	11	4.9	12.4	28.5
Zinc	mg/kg	9.7	31.6	20	13.6	51.4	17.6	82.6	10.5	5.4	11.5	14.9
PCBs												
Aroclor 1260	mg/kg	NA	NA	NA	NA	NA	<0.047	NA	NA	NA	NA	NA
PESTICIDES												
Methoxychlor	mg/kg	NA	NA	NA	NA	NA	<0.024	NA	NA	NA	NA	NA
Percent Solids	Percent	74.6	81.5	91.4	79	69.1	70.9	41.8	64.2	65.1	71.9	62.5

Notes:

J Concentration is estimated
H Result may be biased high
L Result may be biased low
NA Not analyzed
U Not detected
mg/kg milligrams per kilograms
µg/L micrograms per liter



OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Lu	A. Willmore	P. Srivastav	X:\Longhorn\GIS\workspace\BLU\MXD\Gwtr\GwtrE04L.mxd

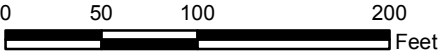
Plot Date: 05/05

Legend

- Shallow Groundwater Monitoring Well
- Groundwater Elevation Countour
- Stream
- Road
- Building, Known to Exist
- Site
- (207.56) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

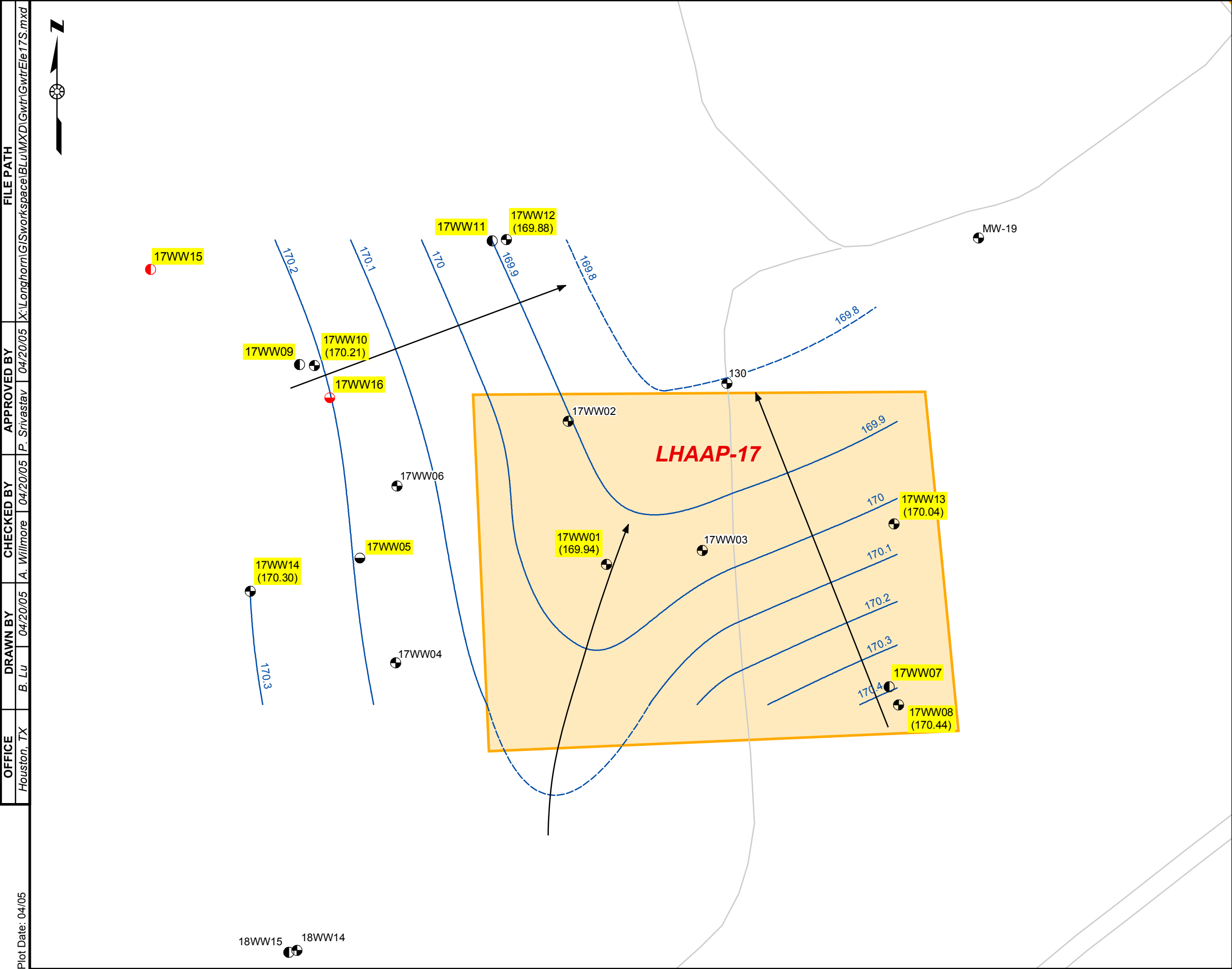
Notes:

1. All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
2. Groundwater contour elevations reported in feet.
3. Yellow highlighted groundwater monitoring wells were sampled during Data Gaps Investigation in August - September, 2004.
4. Groundwater contour elevations are based on data collected from shallow monitoring wells at LHAAP-04 and LHAAP-35A.



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Tulsa, Oklahoma

Figure 3-1
LHAAP-04 Groundwater Elevation Map
(Shallow Zone)
Longhorn Army Ammunition Plant
Karnack, Texas



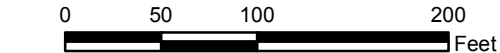
OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Lu	A. Willmore	P. Srivastav	X:\Longhorn\GIS\workspace\BLu\MXD\Gwtr\GwtrEle17S.mxd

Plot Date: 04/05

Legend

- Groundwater Monitoring Well
- Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well
- Intermediate
 - Deep
- 170.1 Groundwater Elevation Contour
- 170.1 Estimated Groundwater Elevation Contour
- Road
- Site
- (169.88) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

- Notes:
- All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
 - Groundwater contour elevations reported in feet.
 - Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.
 - The data indicate that the shallow and intermediate zones may be interconnected with a downward vertical gradient between the two zones.

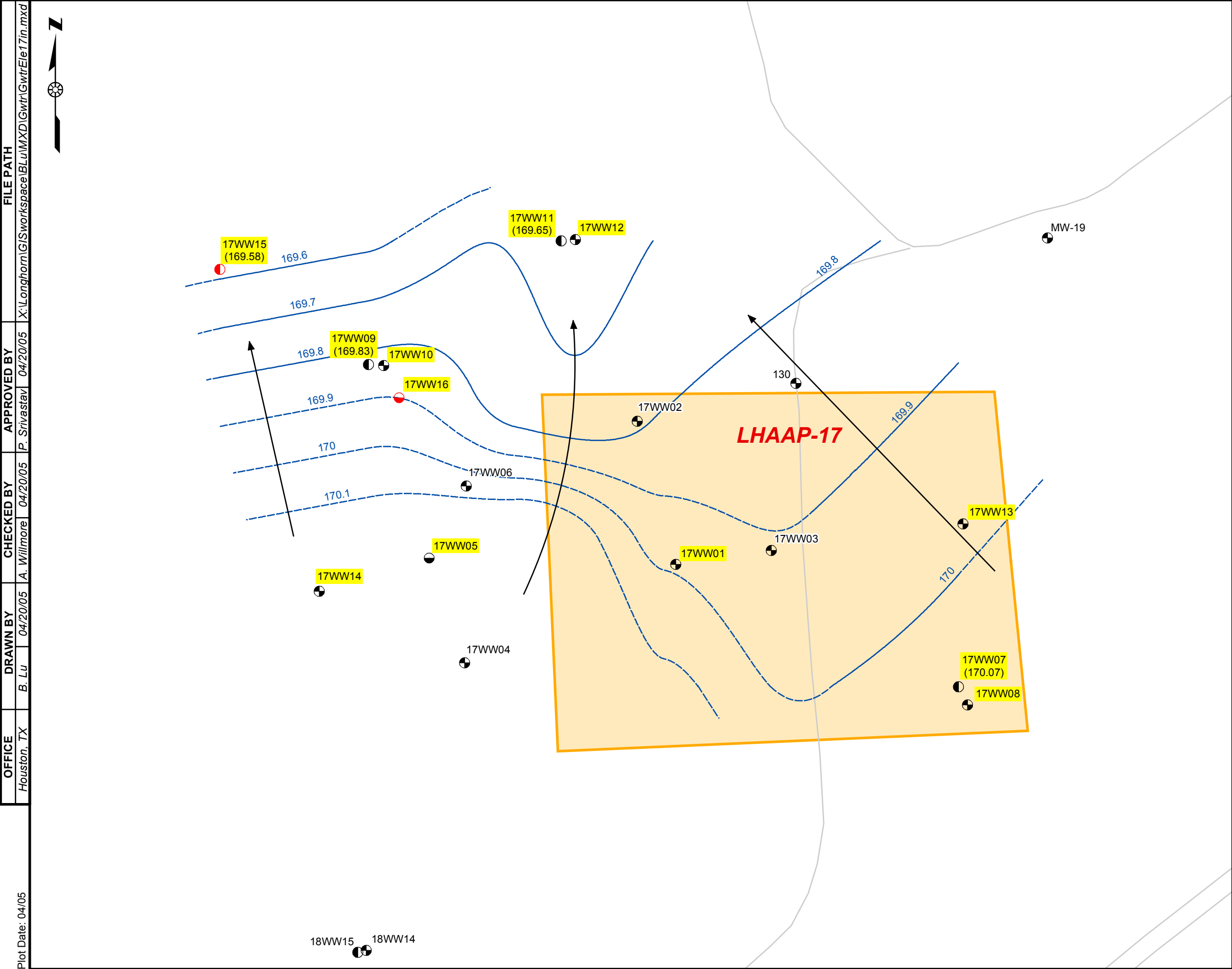


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Tulsa, Oklahoma

Figure 3-2

LHAAP-17 Groundwater Elevation Map
(Shallow Zone)

Longhorn Army Ammunition Plant
Karnack, Texas



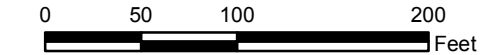
OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Lu	A. Willmore	P. Srivastav	X:\Longhorn\GIS\workspace\BLU\MXD\Gwtr\Ele17in.mxd

Plot Date: 04/05

Legend

- Groundwater Monitoring Well
- Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well
- Intermediate
 - Deep
- 169.8 Groundwater Elevation Contour
- 169.8 Estimated Groundwater Elevation Contour
- Road
- Site
- (169.65) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

- Notes:
- All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
 - Groundwater contour elevations reported in feet.
 - Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.
 - The data indicate that the shallow and intermediate zones may be interconnected with a downward vertical gradient between the two zones.

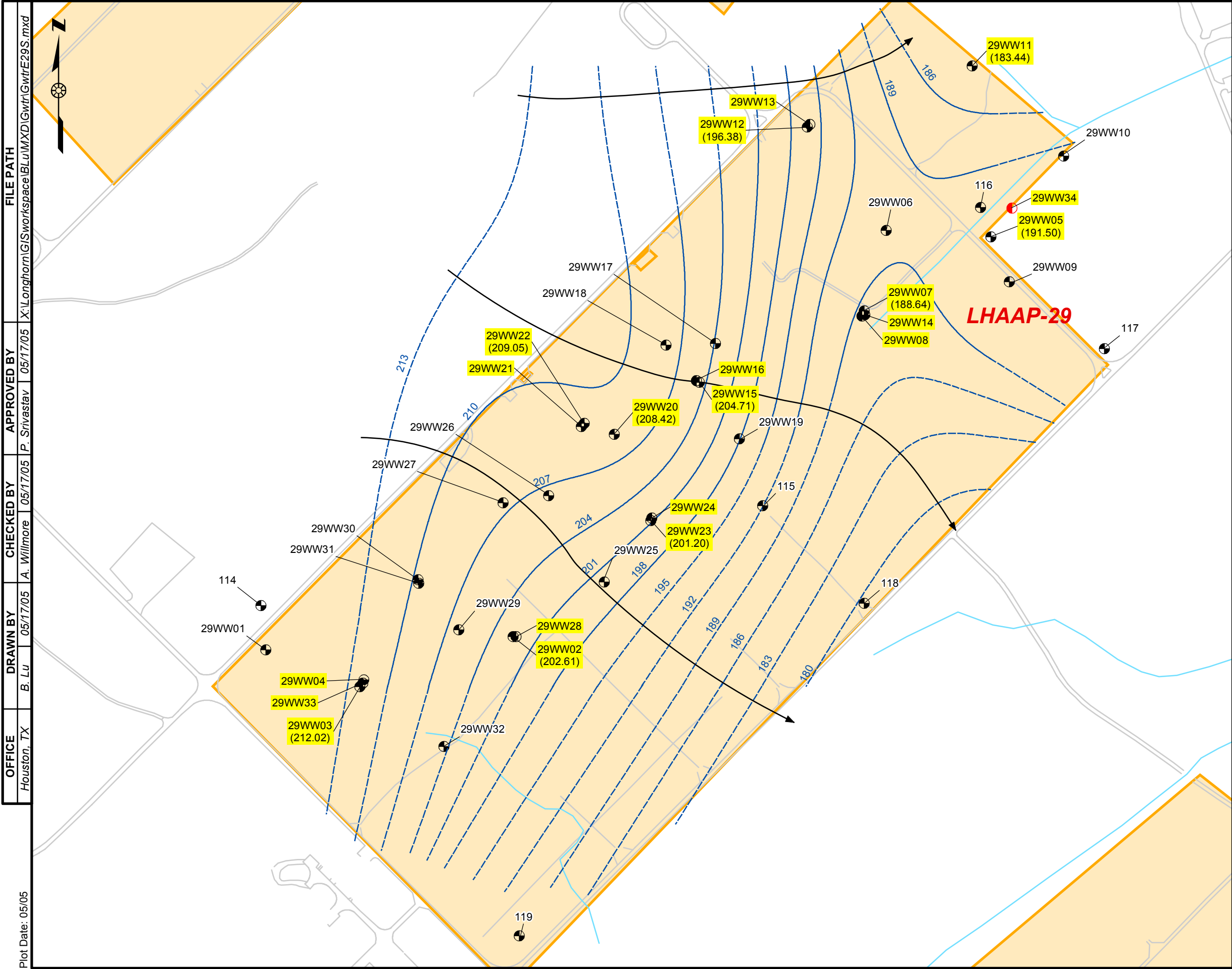


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Tulsa, Oklahoma

Figure 3-3

LHAAP-17 Groundwater Elevation Map
(Intermediate Zone)

Longhorn Army Ammunition Plant
Karnack, Texas

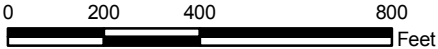


Legend

- Groundwater Monitoring Well
- Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well
- Intermediate
- 186 Groundwater Elevation Contour
- 186 Estimated Groundwater Elevation Contour
- Stream
- Road
- Site
- (183.44) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

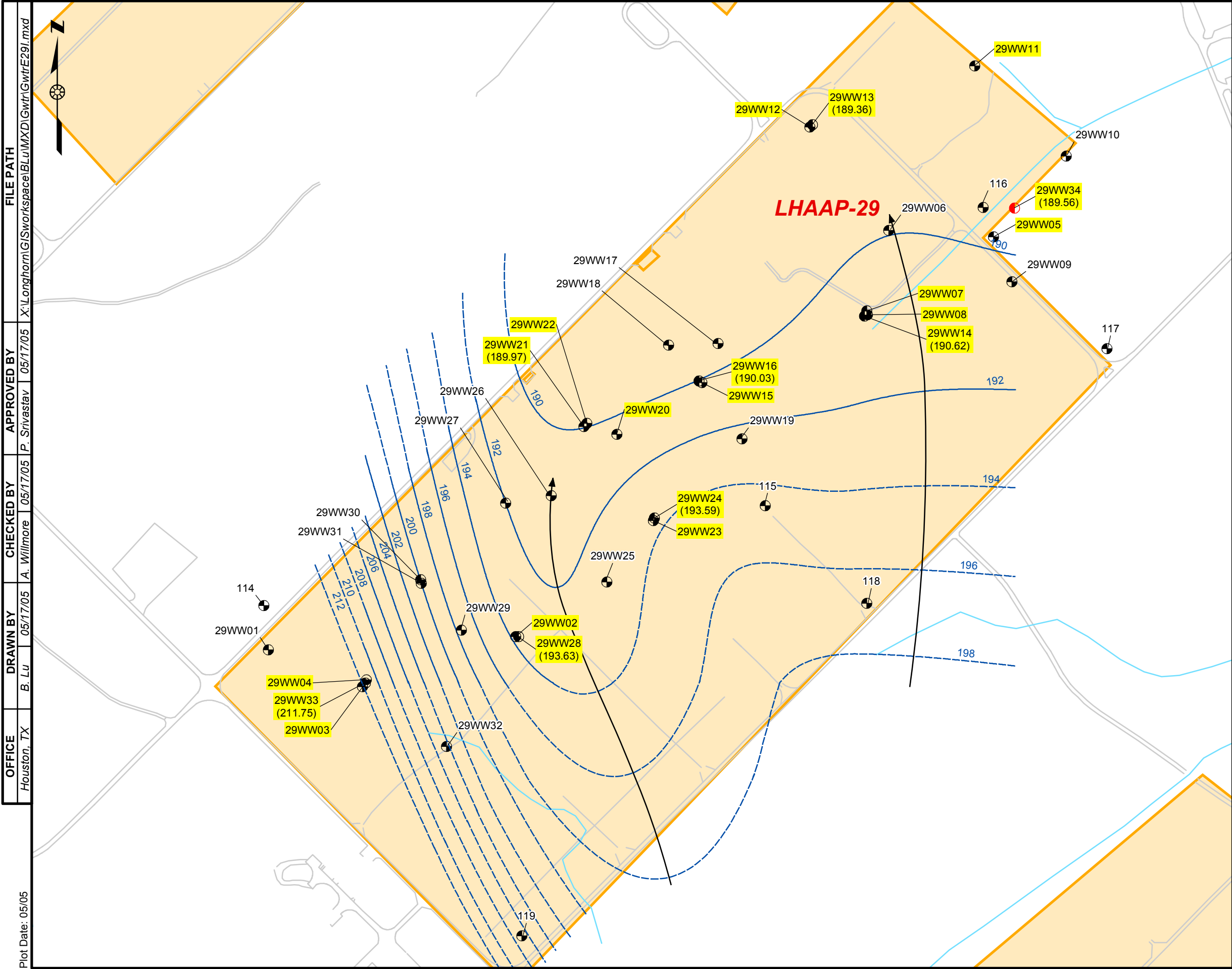
Notes:

1. All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
2. Groundwater contour elevations reported in feet.
3. Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.



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Tulsa District
Tulsa, Oklahoma

Figure 3-4
LHAAP-29 Groundwater Elevation Map
(Shallow Zone)
Longhorn Army Ammunition Plant
Karnack, Texas

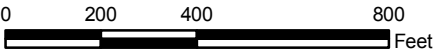


Legend

- Groundwater Monitoring Well
- Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well
- Intermediate
- 190 Groundwater Elevation Contour
- 190 Estimated Groundwater Elevation Contour
- Stream
- Road
- Site
- (189.36) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

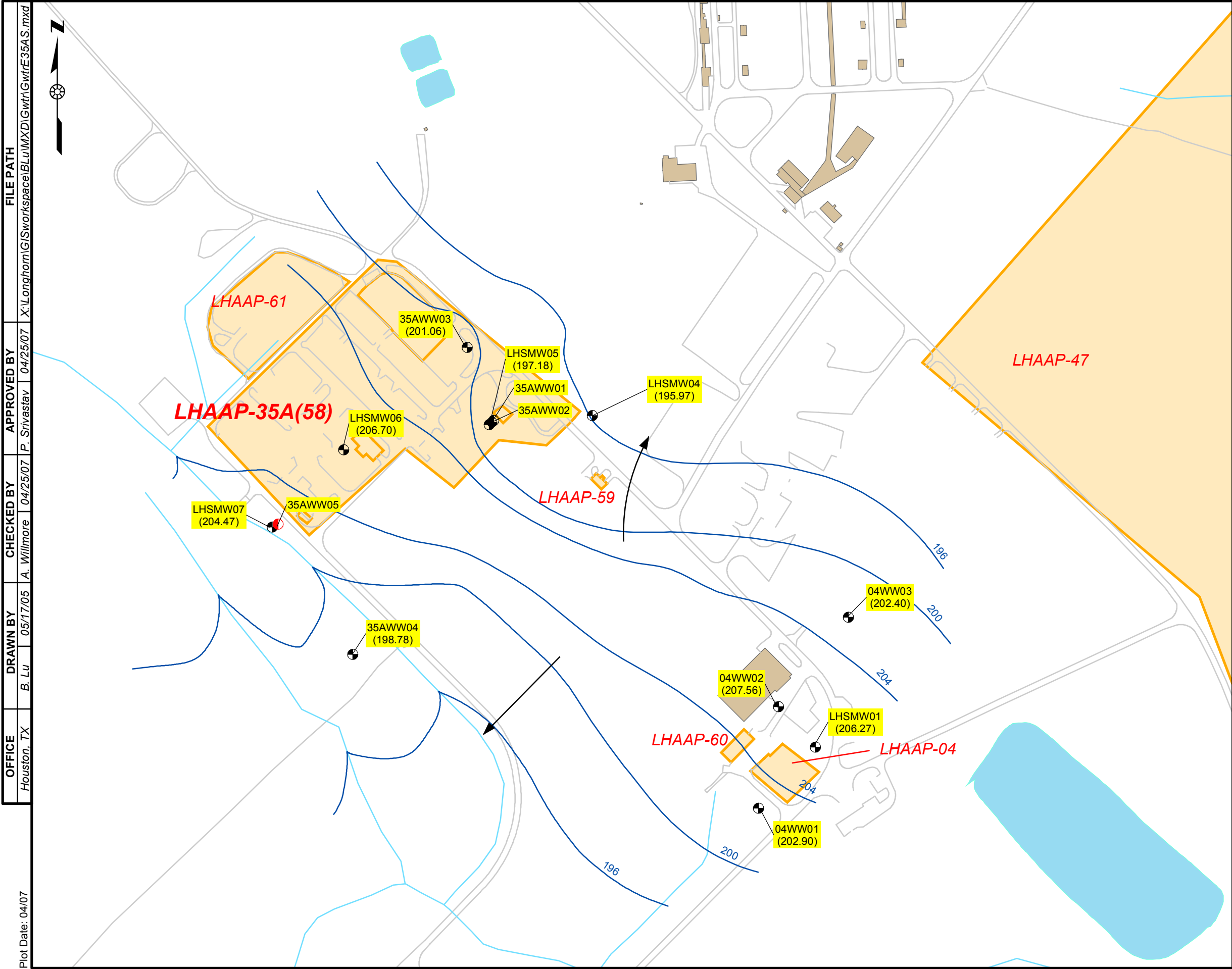
Notes:

1. All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
2. Groundwater contour elevations reported in feet.
3. Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.



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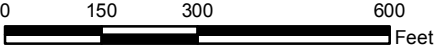
Figure 3-5
LHAAP-29 Groundwater Elevation Map
(Intermediate Zone)
Longhorn Army Ammunition Plant
Karnack, Texas



Legend

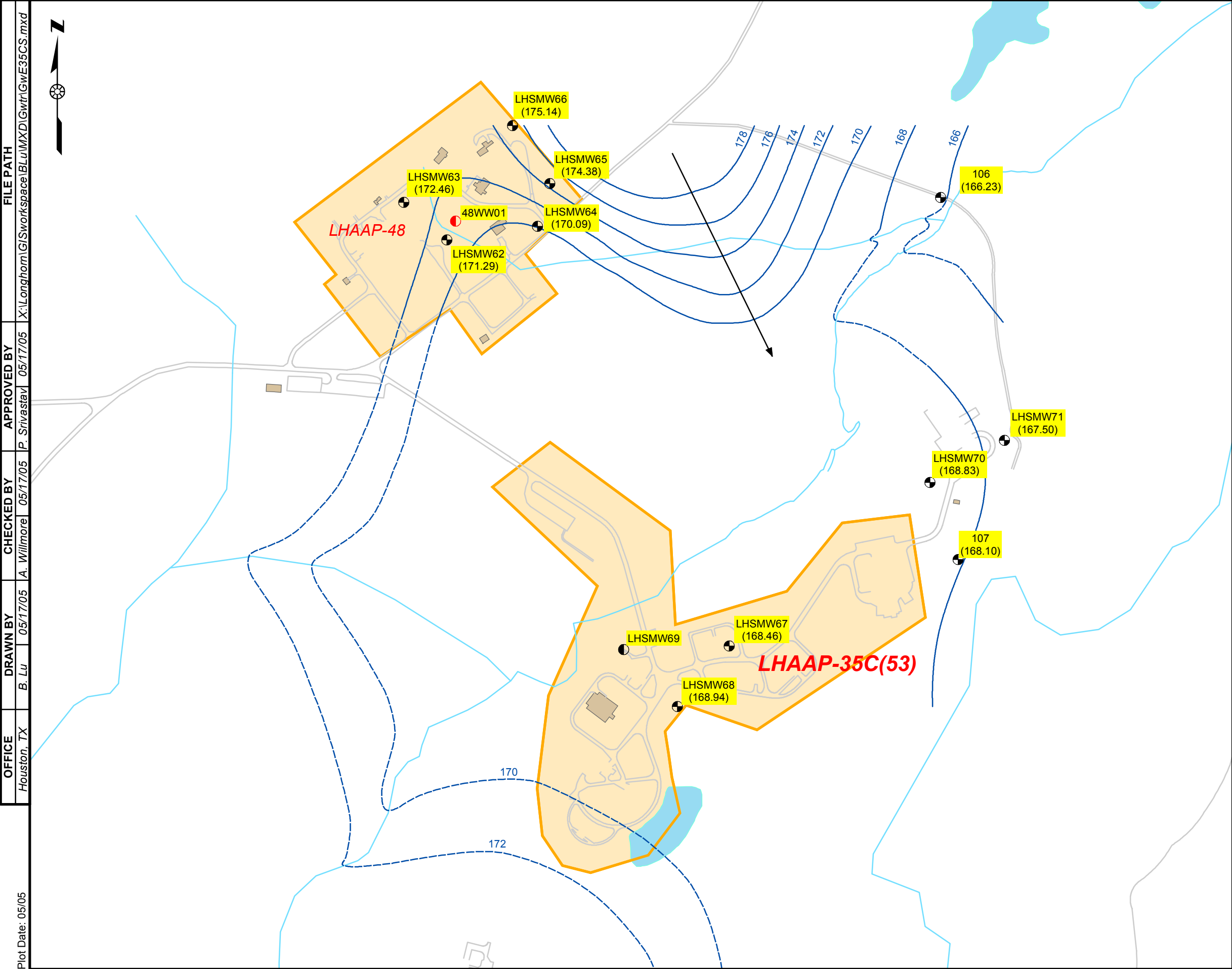
- Groundwater Monitoring Well
- Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well
- Intermediate
- 196 Groundwater Elevation Contour
- Stream
- Road
- Building, Known to Exist
- Site
- Lake
- (206.27) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

- Notes:
- All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
 - Groundwater contour elevations reported in feet.
 - Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.



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Tulsa, Oklahoma

Figure 3-6
LHAAP-35A(58) Groundwater Elevation Map
(Shallow Zone)
Longhorn Army Ammunition Plant
Karnack, Texas

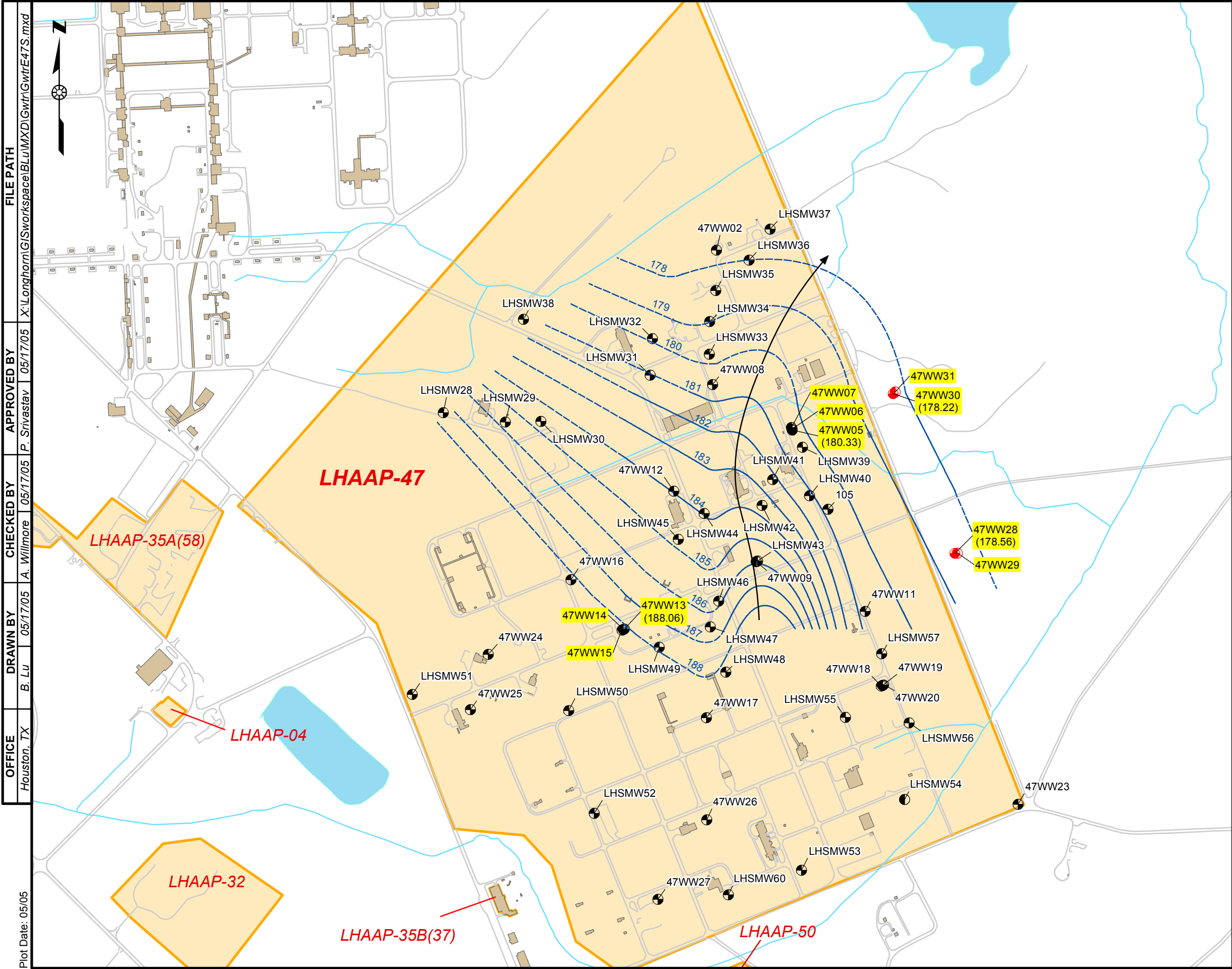


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Tulsa District
Tulsa, Oklahoma

Figure 3-7

LHAAP-35C(53) Groundwater Elevation Map
(Shallow Zone)

Longhorn Army Ammunition Plant
Karnack, Texas

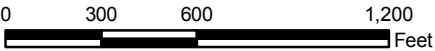


Legend

- Groundwater Monitoring Well
- Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well
- Shallow
 - Intermediate
- 178 Groundwater Elevation Contour
- 178 Estimated Groundwater Elevation Contour
- Stream
- Road
- Building, Known to Exist
- Site
- Lake
- (178.22) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

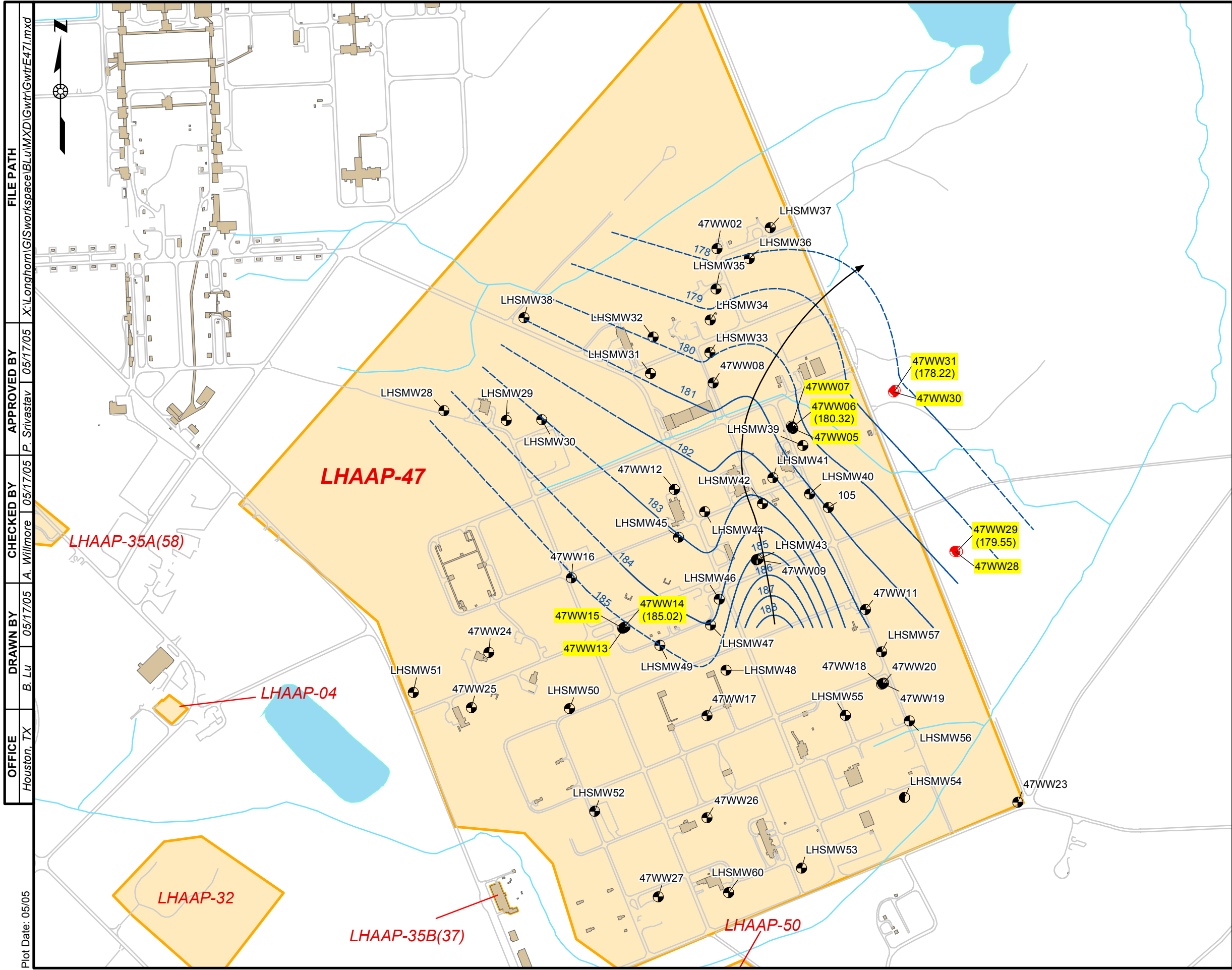
Notes:

- All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
- Groundwater contour elevations reported in feet.
- Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.



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Tulsa, Oklahoma

Figure 3-8
LHAAP-47 Groundwater Elevation Map
(Shallow Zone)
Longhorn Army Ammunition Plant
Karnack, Texas



Legend

- Groundwater Monitoring Well
- Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well
- Shallow
 - Intermediate
- 178 Groundwater Elevation Contour
- 178 Estimated Groundwater Elevation Contour
- Stream
- Road
- Building, Known to Exist
- Site
- Lake
- (178.22) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

Notes:

1. All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
2. Groundwater contour elevations reported in feet.
3. Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.

0 300 600 1,200 Feet



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Tulsa, Oklahoma

Figure 3-9

LHAAP-47 Groundwater Elevation Map
(Intermediate Zone)

Longhorn Army Ammunition Plant
Karnack, Texas

FILE PATH X:\Longhorn\GIS\workspace\BLU\MXD\Gwr\GwrE47L.mxd

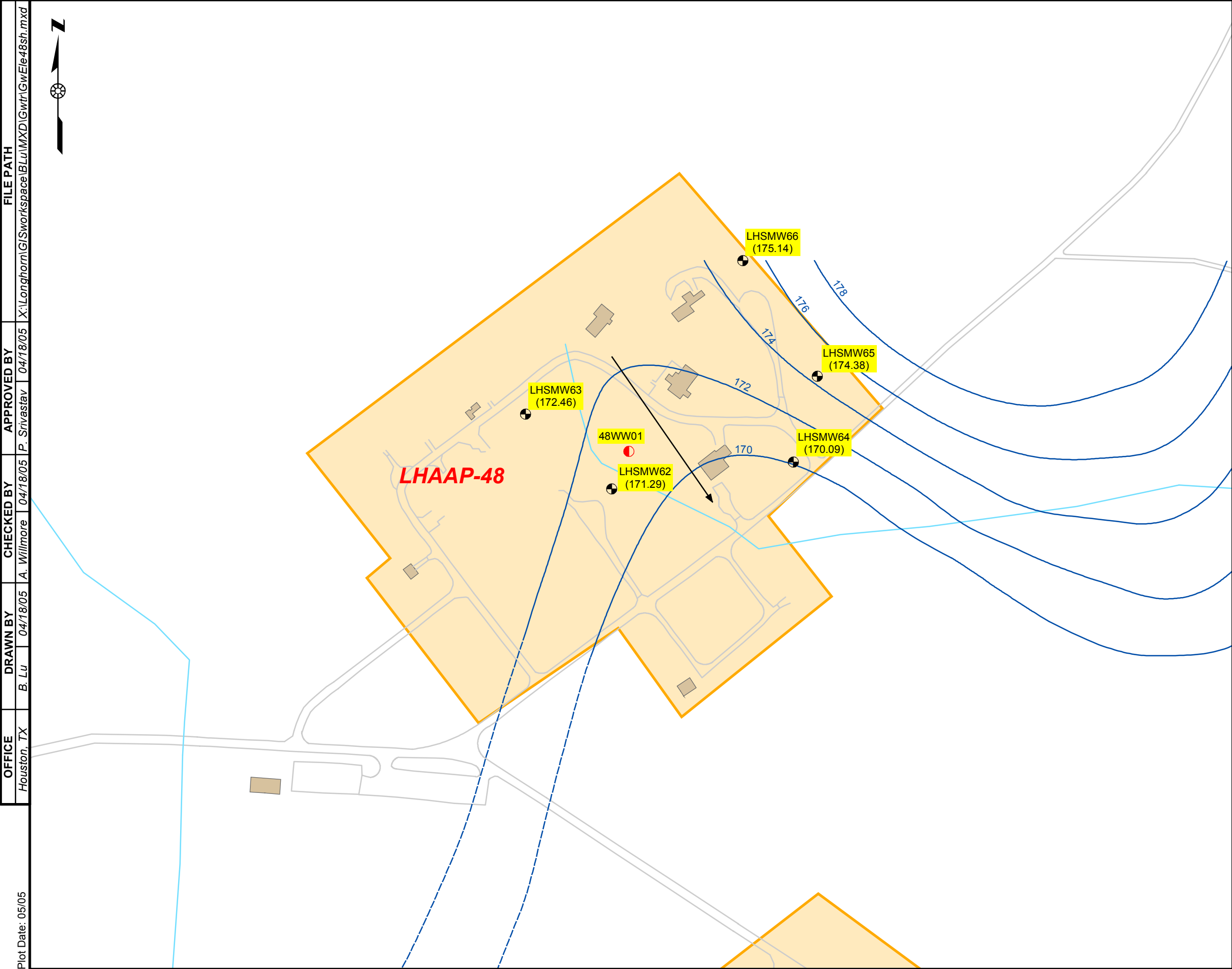
APPROVED BY P. Srivastav 05/17/05

CHECKED BY A. Willmore 05/17/05

DRAWN BY B. Lu 05/17/05

OFFICE Houston, TX

Plot Date: 05/05



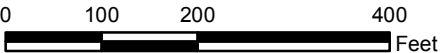
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Plot Date: 05/05

Legend

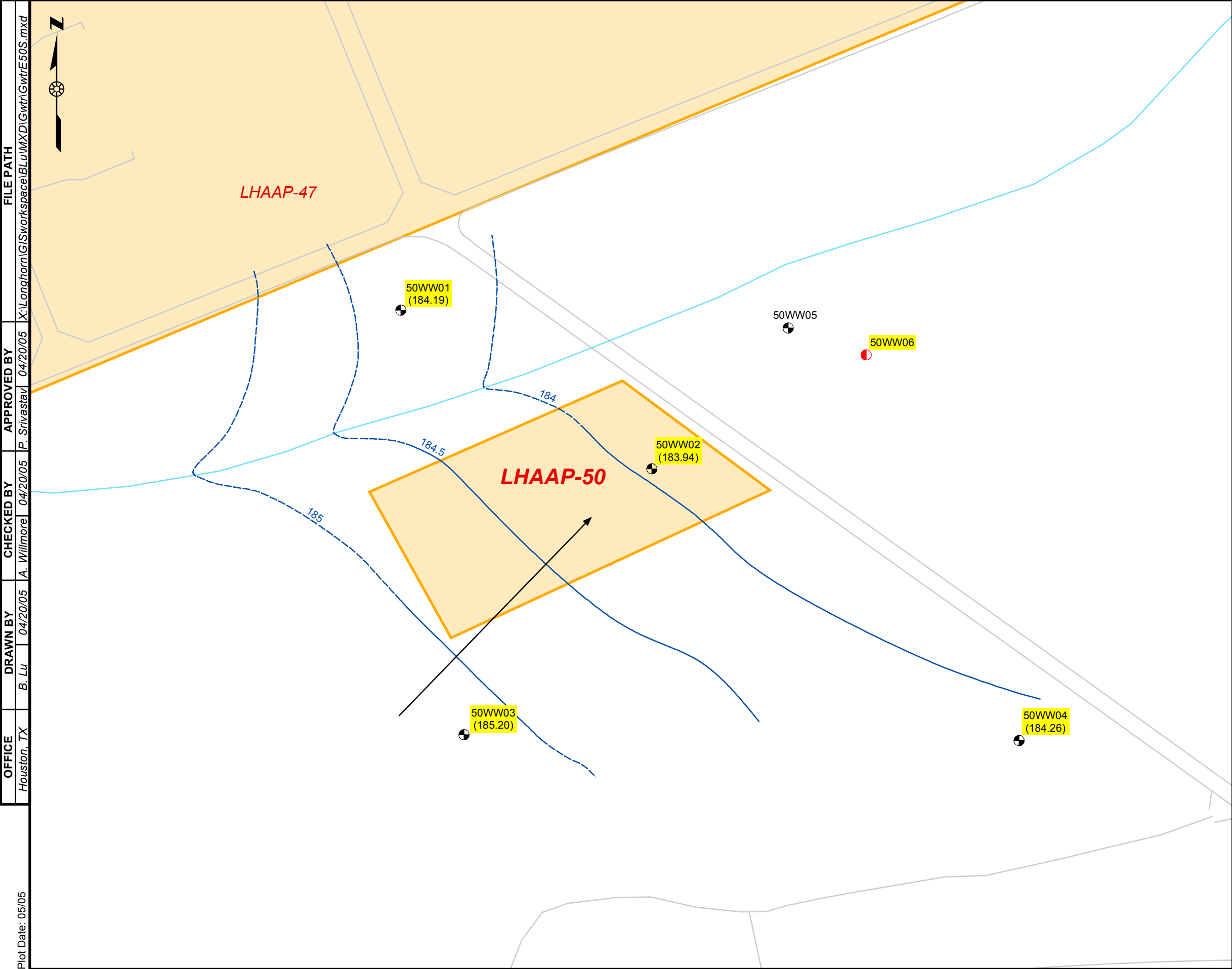
- Groundwater Monitoring Well
- Shallow
- Newly Installed Groundwater Monitoring Well
- Intermediate
- Groundwater Elevation Contour
- Estimated Groundwater Elevation Contour
- Stream
- Road
- Building, Known to Exist
- Site
- Lake
- (166.23) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

- Notes:
- All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
 - Groundwater contour elevations reported in feet.
 - Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.
 - Contours were generated utilizing LHAAP-35C(53) and LHAAP-48 groundwater elevation data (see Figure 3-7 and Figure 3-13).
 - 170-foot groundwater elevation contour was inferred based on Figure 3-13 Installation-Wide Groundwater Elevation Map (Shallow Zone).



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Figure 3-10
LHAAP-48 Groundwater Elevation Map
(Shallow Zone)
Longhorn Army Ammunition Plant
Karnack, Texas



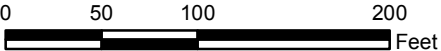
OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Lu	A. Willmore	P. Srivastav	X:\Longhorn\GIS\workspace\BLu\MXD\Gwtr\GwtrE50S.mxd

Plot Date: 05/05

Legend

- Groundwater Monitoring Well
 - Shallow
- Newly Installed Groundwater Monitoring Well
 - Intermediate
- 184 Groundwater Elevation Contour
- 184 Estimated Groundwater Elevation Contour
- Stream
- Road
- Site
- (183.94) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

- Notes:
- All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
 - Groundwater contour elevations reported in feet.
 - Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.

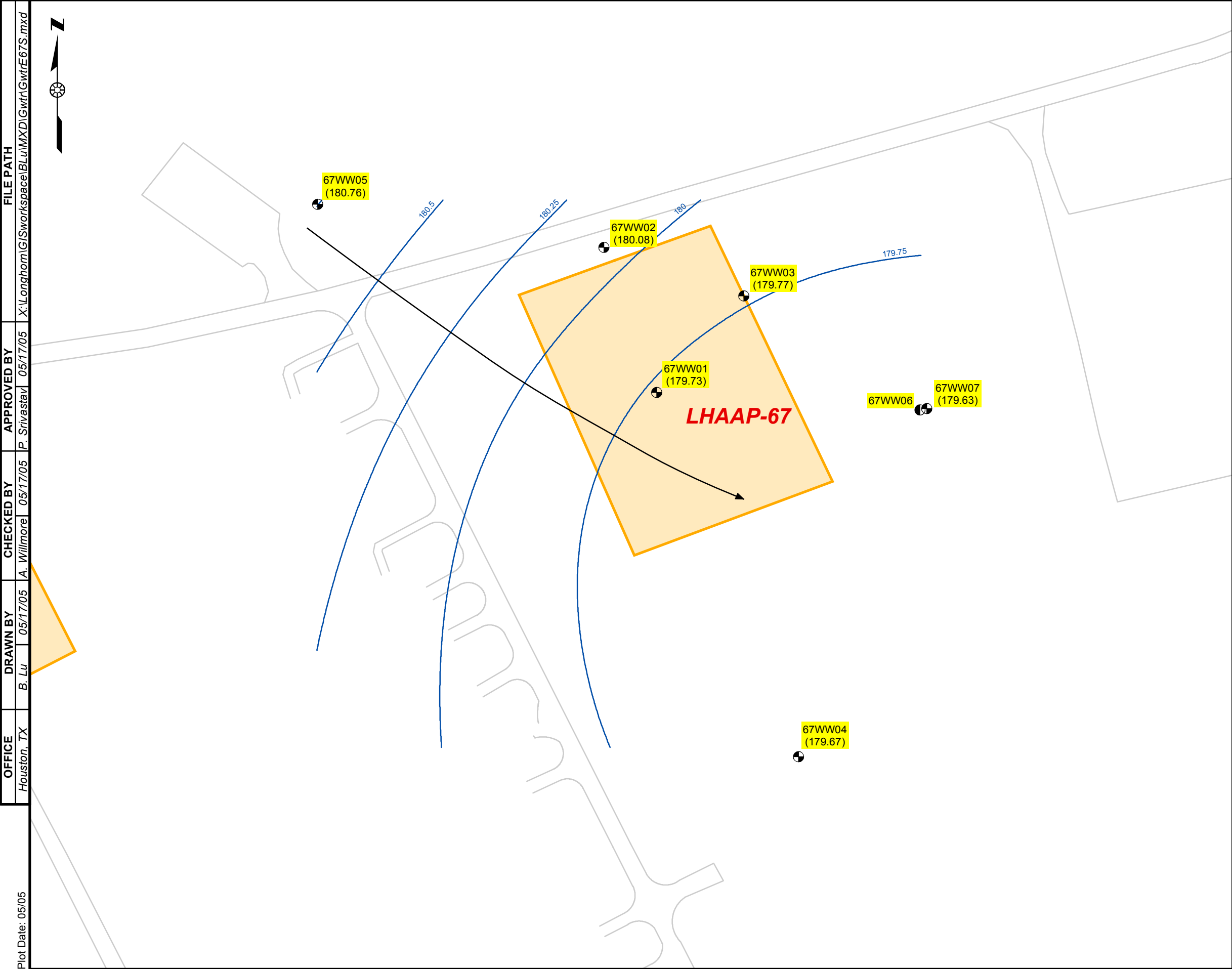


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Tulsa, Oklahoma

Figure 3-11

LHAAP-50 Groundwater Elevation Map
(Shallow Zone)

Longhorn Army Ammunition Plant
Karnack, Texas



OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Lu	A. Willmore	P. Srivastav	X:\Longhorn\GIS\workspace\BLU\MXD\Gwt\GwtE67S.mxd

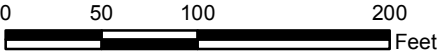
Plot Date: 05/05

Legend

- Groundwater Monitoring Well
- Shallow
 - Intermediate
- Groundwater Elevation Contour
- 180.75
- Road
- Building, Known to Exist
- Site
- (179.63) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

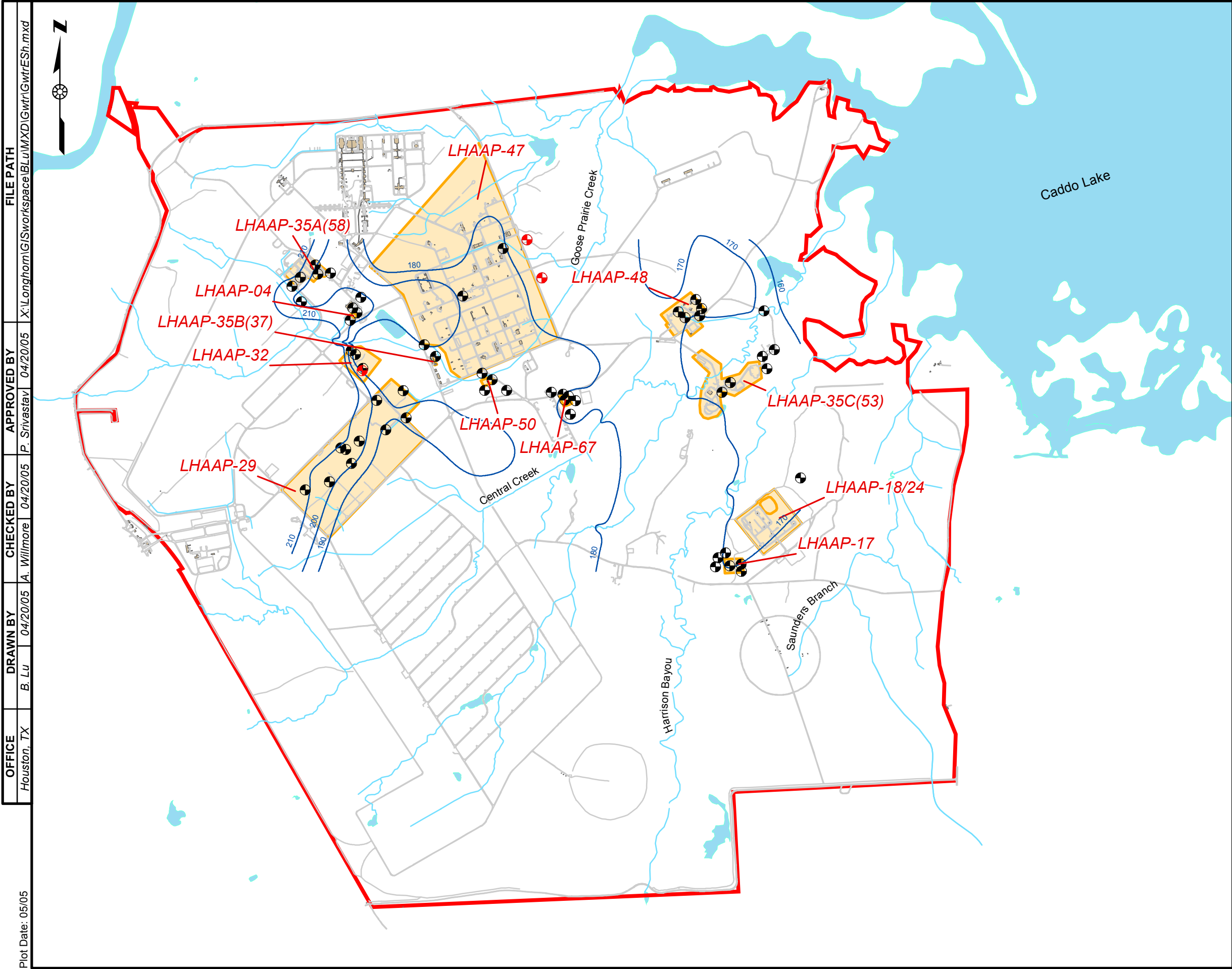
Notes:

- All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
- Groundwater contour elevations reported in feet.
- Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.



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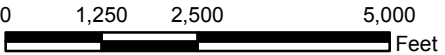
Figure 3-12
LHAAP-67 Groundwater Elevation Map
(Shallow Zone)
Longhorn Army Ammunition Plant
Karnack, Texas



Legend

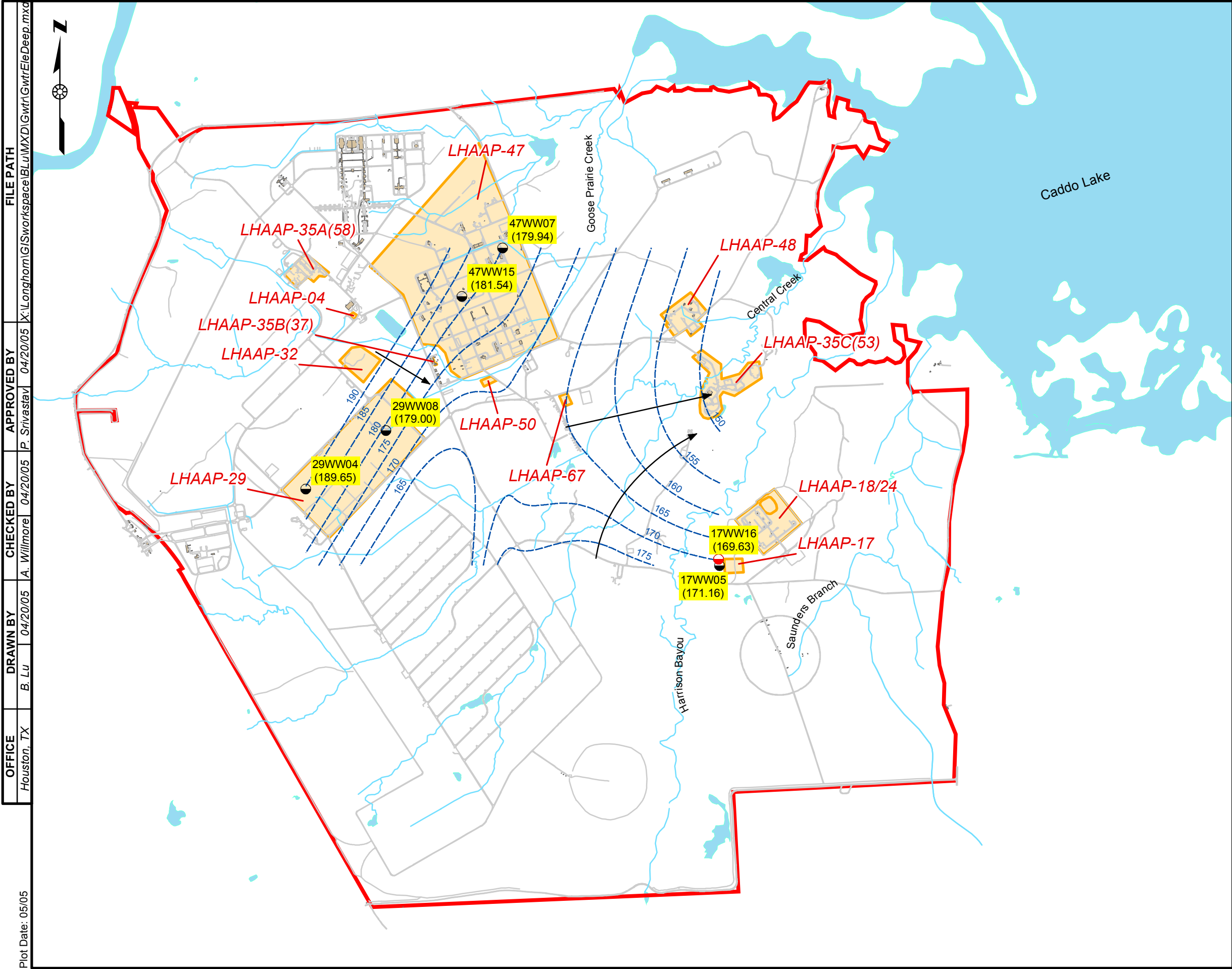
- Shallow Groundwater Monitoring Well
- Newly Installed Shallow Groundwater Monitoring Well
- 180 Approximate Groundwater Elevation Contour
- Stream
- Road
- Building, Known to Exist
- Site
- Lake
- Longhorn Base Boundary

Notes:
1. All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
2. Groundwater contour elevations reported in feet.



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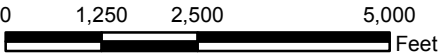
Figure 3-13
Installation-Wide Groundwater Elevation Map
(Shallow Zone)
Longhorn Army Ammunition Plant
Karnack, Texas



Legend

- Deep Groundwater Monitoring Well
- Newly Installed Deep Groundwater Monitoring Well
- 150 Groundwater Elevation Contour
- 150 Estimated Groundwater Elevation Contour
- Stream
- Road
- Building, Known to Exist
- Site
- Lake
- Longhorn Base Boundary
- (171.16) Groundwater Elevation in Feet
- Inferred Groundwater Flow Direction

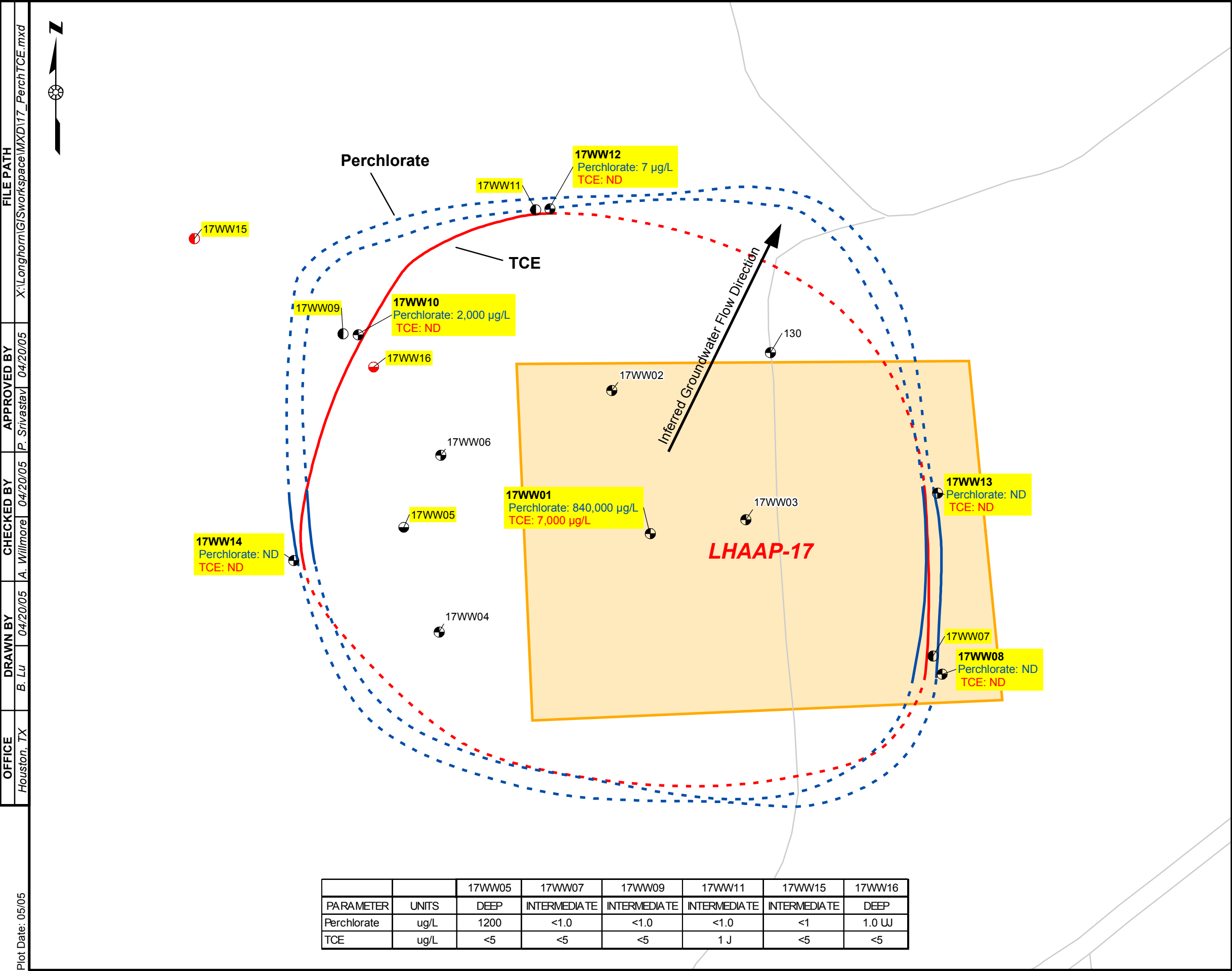
Notes:
1. All contours were generated using ArcGIS 8.3 (Spline as interpolation algorithm).
2. Groundwater contour elevations reported in feet.
3. Yellow highlighted groundwater monitoring wells were sampled during data gaps investigation in August - September, 2004.



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Figure 3-14
Installation-Wide Groundwater Elevation Map
(Deep Zone)
Longhorn Army Ammunition Plant
Karnack, Texas

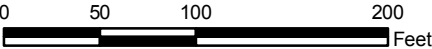
Plot Date: 05/05
OFFICE Houston, TX
DRAWN BY B. Lu
CHECKED BY A. Willmore
APPROVED BY P. Srivastav
FILE PATH X:\Longhorn\GIS\workspace\BLU\MXD\Gwtr\Ele\Deep.mxd



Legend

- Groundwater Monitoring Well
 - Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well
 - Shallow
 - Intermediate
 - ND Not Detected
- Perchlorate Contamination Extent At Concentration =4 µg/L
- Estimated Perchlorate Contamination Extent At Concentration =4 µg/L
- Trichloroethene (TCE) Contamination Extent At Concentration =5 µg/L
- Estimated Trichloroethene (TCE) Contamination Extent At Concentration =5 µg/L
- Road
- Site

- Notes:
- Contamination plume extents are based on TCEQ's Medium Specific Concentrations, updated March 31, 2004 or EPA Maximum Contaminant Levels.
 - Yellow highlighted groundwater monitoring wells were sampled in August - September, 2004 during data gaps investigation.

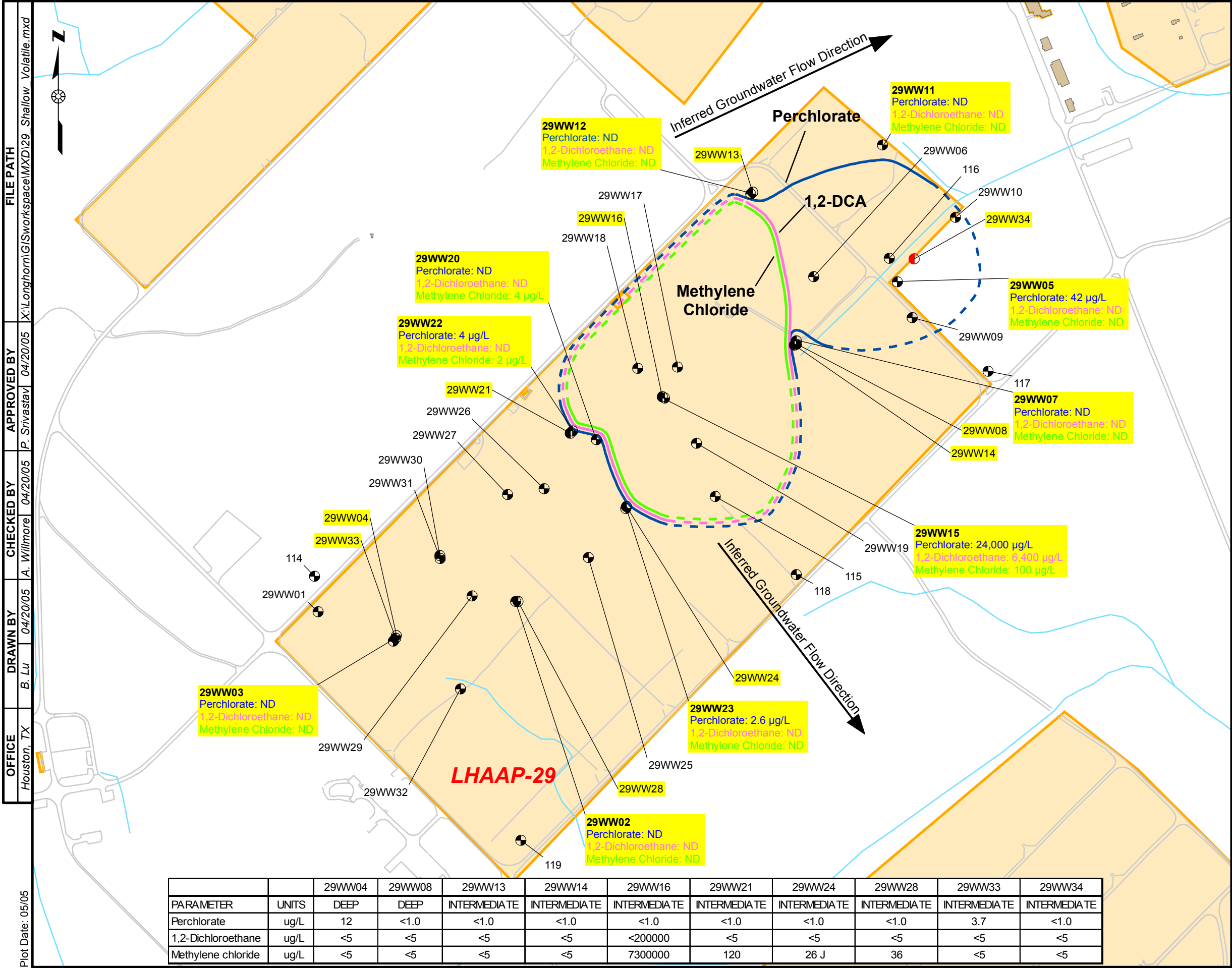


U.S. Army Corps of Engineers
Tulsa District
Tulsa, Oklahoma

Figure 3-15

LHAAP-17 Perchlorate and TCE
Concentration Map (Shallow Zone)

Longhorn Army Ammunition Plant
Karnack, Texas



Legend

Groundwater Monitoring Well

- Shallow
- Intermediate
- Deep

Newly Installed Groundwater Monitoring Well

- Intermediate

ND Not Detected

Contamination Extents:

- 1,2- Dichloroethane Contamination Extent At Concentration = 5 µg/L
- Estimated 1,2- Dichloroethane Contamination Extent At Concentration = 5 µg/L
- Methylene Chloride Contamination Extent At Concentration = 5 µg/L
- Estimated Methylene Chloride Contamination Extent At Concentration = 5 µg/L
- Perchlorate Contamination Extent At Concentration = 4 µg/L
- Estimated Perchlorate Contamination Extent At Concentration = 4 µg/L

Other Features:

- Stream
- Road
- Existing Building
- Site

Notes:

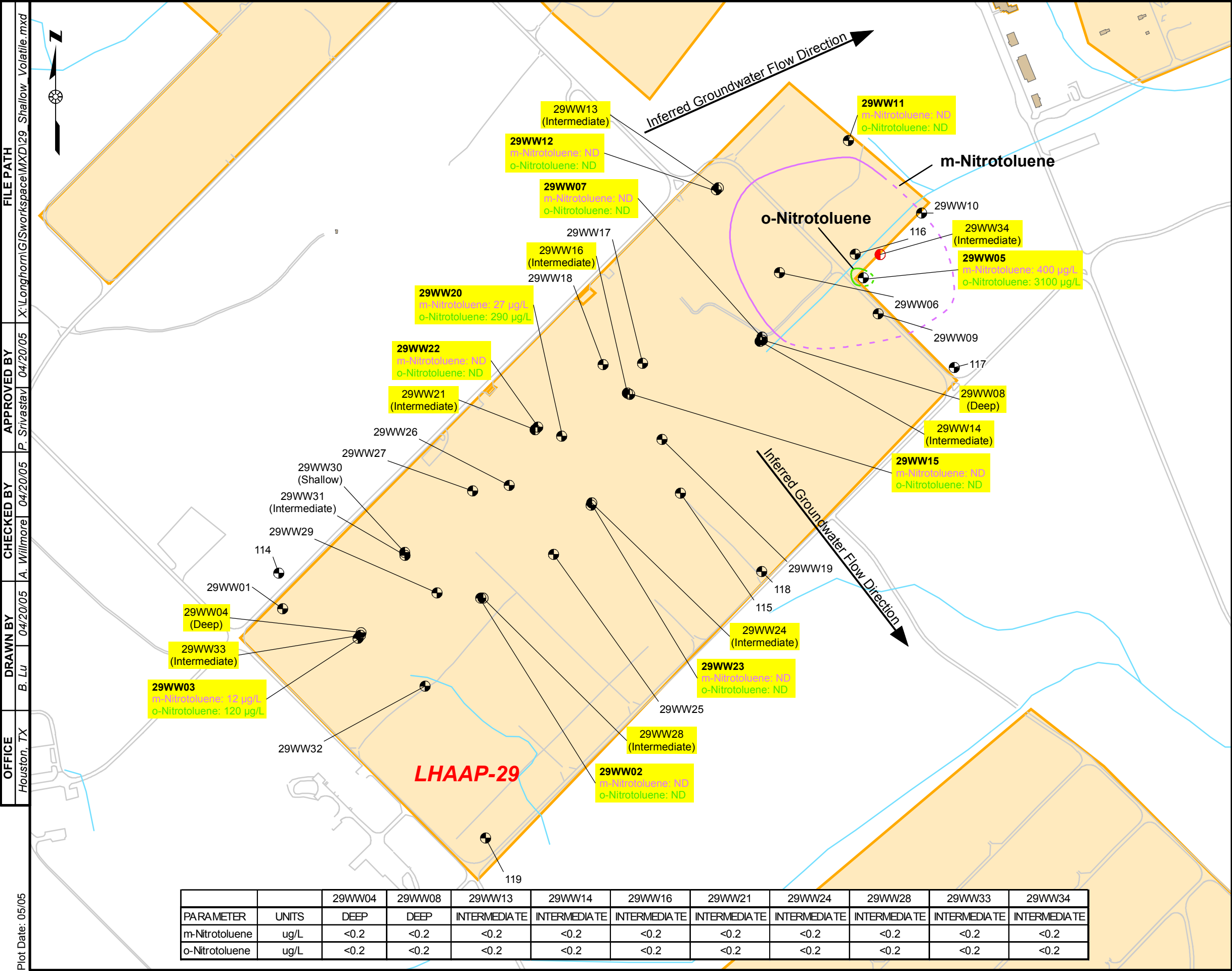
- Contamination plume extents are based on TCEQ's Medium Specific Concentrations, updated March 31, 2004 or EPA Maximum Contaminant Levels.
- Yellow highlighted groundwater monitoring wells were sampled in August - September, 2004 during data gaps investigation.

Scale: 0 250 500 1,000 Feet

U.S. Army Corps of Engineers
Tulsa District
Tulsa, Oklahoma

Figure 3-16
LHAAP-29 Perchlorate, 1,2-DCA, and Methylene Chloride Concentration Map (Shallow Zone)

Longhorn Army Ammunition Plant
Karnack, Texas



Groundwater Monitoring Well

Shallow

Intermediate

Deep

Newly Installed Groundwater Monitoring Well

Intermediate

Not Detected

m- Nitrotoluene Contamination Extent At Concentration = 365 µg/L

Estimated m- Nitrotoluene Contamination Extent At Concentration = 365 µg/L

o- Nitrotoluene Contamination Extent At Concentration = 368 µg/L

Estimated o- Nitrotoluene Contamination Extent At Concentration = 368 µg/L

Stream

Road

Existing Building

Site

Notes:

1. Contamination plume extents are based on TCEQ's Medium Specific Concentrations, updated March 31, 2004 or EPA Maximum Contaminant Levels.

2. Yellow highlighted groundwater monitoring wells were sampled in August - September, 2004 during data gaps investigation.

0 250 500 1,000 Feet

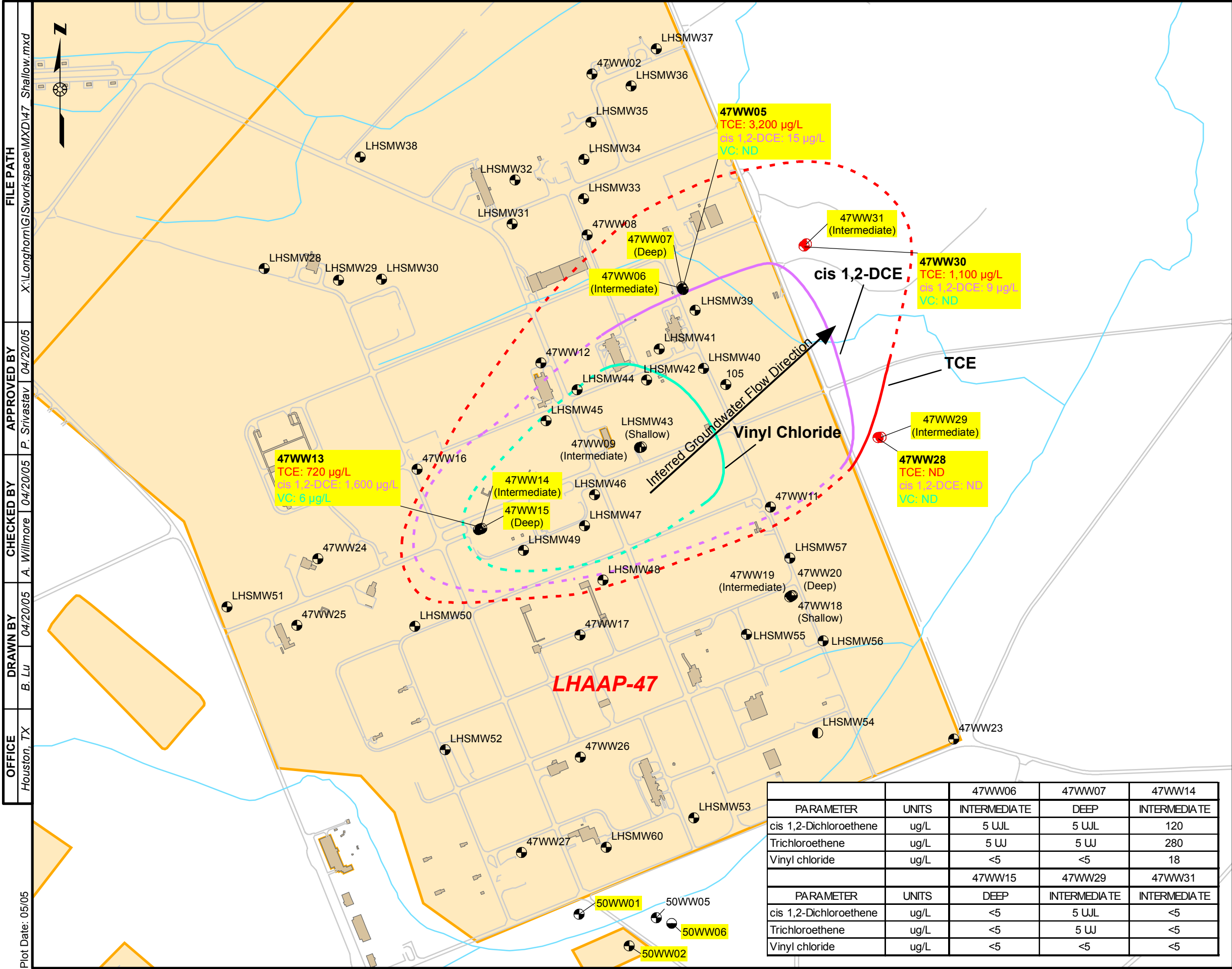
Shaw®

U.S. Army Corps of Engineers
Tulsa District
Tulsa, Oklahoma

Figure 3-17

LHAAP-29 m-Nitrotoluene and o-Nitrotoluene Concentration Map (Shallow Zone)

Longhorn Army Ammunition Plant
Karnack, Texas

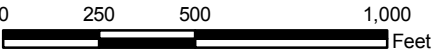


Legend

- Groundwater Monitoring Well**
- Shallow
 - Intermediate
 - Deep
- Newly Installed Groundwater Monitoring Well**
- Shallow
 - Intermediate
 - ND Not Detected
- Trichloroethene (TCE) Contamination Extent At Concentration =5 µg/L
- Estimated Trichloroethene (TCE) Contamination Extent At Concentration =5 µg/L
- cis 1,2-Dichloroethene (DCE) Contamination Extent At Concentration =70 µg/L
- Estimated cis 1,2-Dichloroethene (DCE) Contamination Extent At Concentration =70 µg/L
- Vinyl Chloride (VC) Contamination Extent At Concentration =2 µg/L
- Estimated Vinyl Chloride (VC) Contamination Extent At Concentration =2 µg/L
- Stream
- Road
- Existing Building
- Site

Notes:

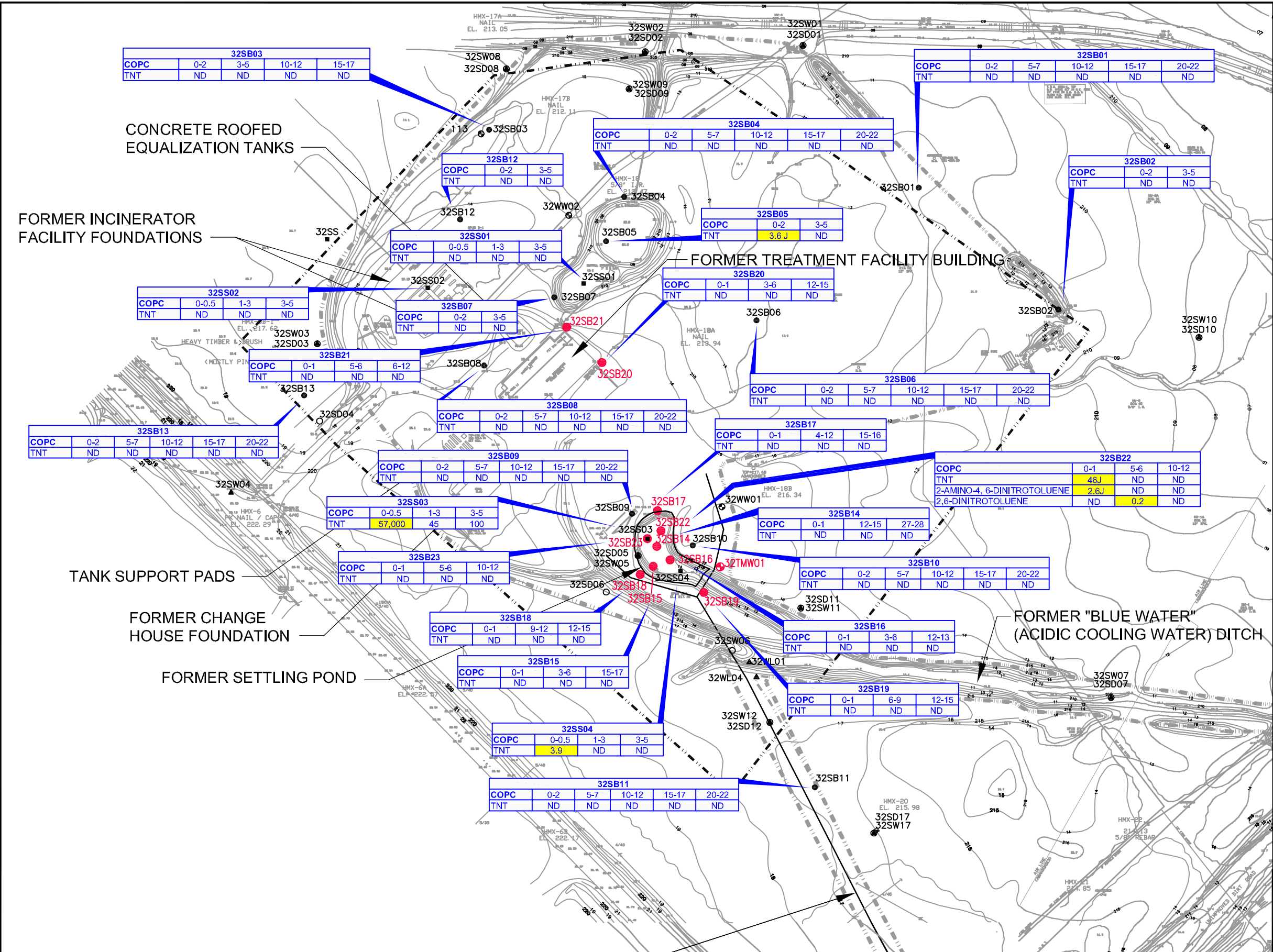
- Contamination plume extents are based on TCEQ's Medium Specific Concentrations, updated March 31, 2004 or EPA Maximum Contaminant Levels.
- Yellow highlighted groundwater monitoring wells were sampled in August - September, 2004 during Data Gaps Investigation.



U.S. Army Corps of Engineers
Tulsa District
Tulsa, Oklahoma

Figure 3-18
LHAAP-47 TCE, cis 1,2-DCE, and Vinyl Chloride
Concentration Map (Shallow Zone)
Longhorn Army Ammunition Plant
Karnack, Texas

		47WW06	47WW07	47WW14
PARAMETER	UNITS	INTERMEDIATE	DEEP	INTERMEDIATE
cis 1,2-Dichloroethene	ug/L	5 UJL	5 UJL	120
Trichloroethene	ug/L	5 UJ	5 UJ	280
Vinyl chloride	ug/L	<5	<5	18
		47WW15	47WW29	47WW31
PARAMETER	UNITS	DEEP	INTERMEDIATE	INTERMEDIATE
cis 1,2-Dichloroethene	ug/L	<5	5 UJL	<5
Trichloroethene	ug/L	<5	5 UJ	<5
Vinyl chloride	ug/L	<5	<5	<5



REFERENCES:

SOLUTIONS TO ENVIRONMENTAL PROBLEMS, INC., MARCH 2003, *DRAFT FINAL PROJECT REPORT PLANT-WIDE PERCHLORATE INVESTIGATION LONGHORN ARMY AMMUNITION PLANT, KARNACK, TEXAS*, FINAL, OAK RIDGE, TN.

JACOBS ENGINEERING GROUP, INC., JANUARY 2002, *FINAL REMEDIAL INVESTIGATIONS REPORT FOR THE GROUP 4 SITES*, OAK RIDGE, TN.

4.0 *Summary and Findings*

This section discusses the findings and summarizes the data collected during the data gaps investigation activities. The objective of the data gaps investigation, to collect data that facilitates a better understanding of the nature and extent of groundwater, soil, surface water, and sediment contamination at LHAAP, has been achieved. For detailed discussions of analytical results and localized groundwater gradients regarding these sites, please refer to **Section 3.0** of this report.

4.1 *Groundwater Elevation*

Groundwater elevation and gradient maps were prepared where sufficient data points were available. Groundwater elevation data indicate that the shallow and intermediate zones are likely interconnected at some sites, such as LHAAP-17 and LHAAP-47. The two zones may be distinct at other sites (e.g., LHAAP-29).

4.2 *Analytical Data Summary*

4.2.1 *LHAAP-04*

Groundwater was collected from three monitoring wells at LHAAP-04 and analyzed for perchlorate. No perchlorate was detected in any of the samples.

4.2.2 *LHAAP-17*

Groundwater was collected from 12 monitoring wells at LHAAP-17 and analyzed for explosives, perchlorate, and VOCs. Contaminant constituents were observed above the laboratory detection limit in 4 of the 12 monitoring wells.

The explosive p-Nitrotoluene was observed in small concentrations in the monitoring wells at LHAAP-17.

Perchlorate was observed in the shallow zone in monitoring wells 17WW01, 17WW10, and 17WW12. The perchlorate contaminant plume in the shallow zone is not well defined to the north or south of the site. As discussed previously, the groundwater flow direction in the shallow zone varies from northwest to northeast. Offsite migration of perchlorate to the northwest is indicated by the current data. LHAAP-18/24 exists to the northeast of LHAAP-17 with elevated concentrations of perchlorate in the groundwater. Perchlorate contamination is thus defined to the northeast. The maximum perchlorate concentration is found in 17WW01, a shallow well installed near the central portion of LHAAP-17.

Perchlorate has migrated to the deeper groundwater-bearing zone, as evidenced by analytical results from 17WW05, which is located to the west of 17WW01. However, this appears to be

localized since perchlorate was not observed in the deep well, 17WW16, located approximately 150 feet north of 17WW05 and near the second highest shallow concentration of perchlorate (from well 17WW10) observed at this site. Since there are only two wells (17WW05 and 17WW16) installed in the deep zone, the perchlorate contaminant plume in the deep groundwater zone can not be adequately established.

VOCs were observed only in monitoring well 17WW01, installed in the shallow zone, with a TCE concentration of 7,000 µg/L. TCE was non-detect in wells located to the north, northwest, and west of the site. LHAAP-18/24 is present to the northeast of LHAAP-17 with elevated concentrations of TCE in the groundwater. The extent of TCE contamination at LHAAP-17 thus appears to be defined.

4.2.3 LHAAP-18/24

One groundwater sample was collected from LHAAP-18/24 and analyzed for perchlorate and VOCs. Perchlorate was not detected and only two VOCs (2-butanone and carbon disulfide) were detected at low concentrations in this well.

4.2.4 LHAAP-29

Groundwater was collected from 20 monitoring wells at LHAAP-29 and analyzed for explosives, perchlorate, and VOCs. Contaminant constituents were observed above the laboratory detection limit in several of the monitoring wells.

Six explosives were detected in shallow monitoring wells 29WW03, 29WW05, and 29WW20. The m-nitrotoluene contaminant plume is not defined to the southeast.

Perchlorate was observed in monitoring wells 29WW05, 29WW15, 29WW22, and 29WW23, which are screened in the shallow groundwater-bearing zone. Perchlorate appears to be migrating to the south-southeast following the groundwater gradient and has migrated to the intermediate and deep groundwater-bearing zones based on analytical results from intermediate well 29WW33 and deep well 29WW04. Both wells are located in close proximity to each other in the southwestern portion of LHAAP-29.

Methylene chloride was detected in intermediate monitoring well 29WW16 at a concentration of 7,300,000 µg/L. This well is more centrally located at LHAAP-29. There are no deep wells installed near 29WW16; therefore, the vertical extent is not defined at LHAAP-29.

4.2.5 LHAAP-35A(58)

Groundwater was collected from ten monitoring wells at LHAAP-35A(58) and analyzed for VOCs. Tetrachloroethene is observed above the laboratory detection limit in monitoring well LHSMW05. TCE is observed above the laboratory detection limit in two shallow monitoring

wells, LHSMW05 and LHSMW07. There is no demonstrated vertical migration of contaminants to the intermediate or deep zones at LHAAP-35A(58).

4.2.6 LHAAP-35B(37)

Groundwater was collected from four monitoring wells at LHAAP-35B(37) and analyzed for VOCs. TCE was detected in shallow monitoring well LHSMW58 and intermediate monitoring well LHSMW59. Other contaminant concentrations were detected in LHSMW58; however, only tetrachloroethene was detected in addition to TCE in LHSMW59 and the value was reported as an estimated concentration of the constituent. No other contaminants were observed in the other intermediate zone well (35BWW03) except for a low concentration of carbon disulfide.

4.2.7 LHAAP-35C(53)

Groundwater was collected from seven monitoring wells at LHAAP-35C(53) and analyzed for perchlorate and VOCs. In addition, monitoring well LHSMW67 was analyzed for dioxins/furans and LHSMW71 was analyzed for metals, filtered and non filtered.

No VOC or perchlorate was detected at LHAAP-35C(53). Dioxins/furans were detected in LHSMW67 and several metals were detected in LHSMW71. The differences in concentration values between the filtered and unfiltered metal samples support the conclusion that some metal constituents may attach to particulates in the sample and misleadingly inflate the concentration value.

4.2.8 LHAAP-47

Groundwater was collected from ten monitoring wells at LHAAP-47 and analyzed for perchlorate and VOCs. No perchlorate was detected in the wells sampled at LHAAP-47. Five VOCs (1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, TCE, and vinyl chloride) were detected in the groundwater at LHAAP-47.

TCE is known to reduce to 1,2-DCE and, likewise, 1,2-DCE reduces to vinyl chloride. All three contaminant plumes exist in the shallow groundwater-bearing zone at LHAAP-47 and appear to follow the northeasterly groundwater gradient. The lateral extent of the plume is not defined to the northeast. VOCs (cis-1,2-dichloroethene, TCE, and vinyl chloride) were observed only in one intermediate monitoring well, 47WW14, near the central portion of LHAAP-47.

4.2.9 LHAAP-48

Groundwater samples were collected from three monitoring wells at LHAAP-48 and analyzed for dioxins/furans, perchlorate, and thallium. Dioxins/furans and thallium were detected in the three wells, representing shallow and intermediate groundwater-bearing zones. Perchlorate was not detected at LHAAP-48. The sample turbidity ranged from 10 to 20 NTUs. Elevated levels

of aluminum and iron are typically associated with highly turbid groundwater samples. Since these data are unavailable, the effect of turbidity could not be evaluated.

4.2.10 LHAAP-50

Groundwater samples were collected from five monitoring wells at LHAAP-50 and analyzed for perchlorate and VOCs. Soil samples were collected from eight borings and analyzed for perchlorate and VOCs.

Perchlorate was detected in the groundwater, which flows towards the northeast. Except for monitoring wells 50WW02 and 50WW06, perchlorate was not detected in any other groundwater sample collected from LHAAP-50.

Perchlorate was also detected in the soil at LHAAP-50. Soil, predominantly sandy clay, is impacted near the central portion of LHAAP-50 near a suspected former storage tank location. South Crocket Avenue, a northwest to southeast oriented road, transects LHAAP-50. The contaminated soil was detected approximately 150 feet southwest of the road.

VOCs were also detected in groundwater and soils from LHAAP-50. VOCs in groundwater were observed in 50WW02 and 50WW03. VOCs at or just above detection limits in soil were observed in soil borings 50SB11, 50SB12, 50SB13, 50SB14, 50SB15, and 50SB16.

4.2.11 LHAAP-67

Groundwater samples were collected from seven monitoring wells at LHAAP-67 and analyzed for VOCs. VOCs were detected in a shallow monitoring well 67WW01, located in the central portion of LHAAP-67. Groundwater flow at LHAAP-67 is to the southeast.

Soil samples were collected from one soil boring at LHAAP-67 and analyzed for VOCs. The only VOC detected, methylene chloride, a common laboratory contaminant, was detected at low concentrations.

4.2.12 LHAAP-32

Soil samples were collected from ten soil borings at LHAAP-32 and analyzed for explosives and metals. Groundwater samples were collected from three monitoring wells and analyzed for explosives. No explosives were detected in any of the groundwater samples.

The only significant detection of explosives (2,4,6-trinitrotoluene) was observed at 0 to 1 foot bgs at 32SB22 with a concentration of 46 J mg/kg. This boring is located within the former settling pond located in the southeast corner of LHAAP-32. The only significant detection of lead was observed at 32SB20 with a concentration of 1,630 mg/kg. This boring is located at the northeastern corner of the former treatment building. Migration of these contaminants would be impeded due to the lithology of the soil (stiff clays) at LHAAP-32.

5.0 References

ASTM International, ASTM D2488-00, “Standard Practice for Description and Identification of Soils,” available online at <www.astm.org> (January 2005), West Conshohocken, Pennsylvania.

IT Corporation/OHM Remediation Services Corp., 2000, *Standard Operating Procedures Manual, USACE – Tulsa District, Total Environmental Restoration Contract, Contract No. DACA56-94-D-0020*, Houston, Texas.

Jacobs Engineering Group, Inc., 2001, *Final Remedial Investigation Report for the Group 2 Site, St. Louis, Missouri*, April.

Jacobs Engineering Group, Inc., 2002, *Final Remedial Investigations Report for the Group 4 Sites, Oak Ridge, TN*, January.

Shaw Environmental, Inc., 2004a, *Final Work Plan, Groundwater Data Gaps Investigation, Groups 2 and 4*, Houston, Texas, February.

Shaw 2004b, *Final Addendum 1, Additional Investigation, LHAAP-32 and LHAAP-50*; and *Final Addendum 2, Additional Investigation, Installation-Wide Sediment and Surface Water Sampling*, Houston, Texas, September.

Shaw, 2004c, *Data Quality Summary Report, Longhorn Army Ammunition Plant, Karnack, Texas*, Houston, Texas, December.

Solutions to Environmental Problems, Inc. (STEP), 2003, *Draft Final Project Report Plant-Wide Perchlorate Investigation Longhorn Army Ammunition Plant, Karnack, Texas*, March.

Appendix A
Boring and Drilling Logs and
Monitoring Well Construction Diagrams

**ETTL ENGINEERS & CONSULTANTS INC.**

GEOTECHNICAL • MATERIALS • ENVIRONMENTAL



October 15, 2004
Tyler, Texas

Shaw Environmental, Inc.
1430 Enclave Parkway
Houston, Texas 77077

Attn: Ms. Kay Everett

Re: Well Reports
LHAAP
Karnack, Texas

Dear M. Everett:

Enclosed is a copy of the State of Texas Well Reports for the twelve (12) monitoring wells that were drilled by our company at the above-mentioned site. Should you have any questions after reviewing the reports please feel free to contact ETTL at your convenience.

It has been our pleasure working with you on this project and we look forward to working with you again in the near future.

Sincerely,

ETTL ENGINEERS & CONSULTANTS INC.

Jeanie M. Odom, P.G.
Project Manager/Geologist

HOME OFFICE:

1717 East Erwin Street
Tyler, Texas 75702-6398
Office: (903) 595-4421
Lab: (903) 595-6402
Fax: (903) 595-6113

TEXARKANA:

210 Beech Street
Texarkana, Arkansas 71854
Office: (870) 772-0013
Fax: (870) 216-2413

LONGVIEW:

707 West Cotton Street
Longview, Texas 75604-5505
Office: (903) 758-0402
Fax: (903) 758-8245

STATE OF TEXAS WELL REPORT for Tracking #46641

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	47WW30
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-23-6
Well Location:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Latitude:	32° 41' 16" N
Well County:	Harrison	Longitude:	094° 08' 11" W
Elevation:	No Data	GPS Brand Used:	Garmin III Plus
Type of Work: New Well		Proposed Use: Monitor	

Drilling Date: Started: 4/21/2004
Completed: 4/21/2004

Diameter of Hole: Diameter: 10 in From Surface To 23 ft

Drilling Method: Hollow Stem Auger

Borehole Completion: Gravel Packed From: 10 ft to 23 ft
Gravel Pack Size: 20/40

Annular Seal Data: 1st Interval: From 8 ft to 10 ft with 2 bentonite (#sacks and material)
2nd Interval: From 0 ft to 8 ft with 2 cement (#sacks and material)
3rd Interval: No Data
Method Used: Gravity
Cemented By: Driller
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: Surface Slab Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: E TTL Engineers & Consultants Inc.
1717 E. Erwin

Tyler, TX 75702

Driller License Number: 2126

Licensed Well Driller Signature: Doug Hinds

Registered Driller Apprentice Signature: No Data

Apprentice Registration Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner of the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #46641) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0-3	Silty clay - bluish green
3-11.5	Clay - bluish green & yellowish brown
11.5-13	Clayey sand - yellow & bluish gray
13-17.5	Sand - yellow & bluish gray
17.5-18	Silty sand - yellow & bluish gray
18-20.8	Clayey sand - yellow & bluish gray
20.8-21.8	Clay
21.8-22.5	Clayey sand - gray
22.5-23	Clay - bluish gray

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
4	New	PVC Sch. 40	0 - 12.6
4	New	PVC Sch. 40 - slotted	12.6 - 22.6 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46643

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	47WW31
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-23-6
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 41' 16" N
Well County:	Harrison	Longitude:	094° 08' 11" W
Elevation:	No Data	GPS Brand Used:	Garmin III Plus
Type of Work:	New Well	Proposed Use:	Monitor

Drilling Date: Started: 4/17/2004
Completed: 4/20/2004

Diameter of Hole: Diameter: 16 in From Surface To 28 ft
Diameter: 9 in From 28 ft To 55 ft

Drilling Method: Mud Rotary Hollow Stem Auger

Borehole Completion: Gravel Packed From: 39 ft to 55 ft
Gravel Pack Size: 20/40

Annular Seal Data: 1st Interval: From 0 ft to 28 ft with 14 cement (#sacks and material)
2nd Interval: From 36 ft to 39 ft with 2 bentonite (#sacks and material)
3rd Interval: From 0 ft to 36 ft with 8 cement (#sacks and material)
Method Used: Tremie pipe
Cemented By: Driller
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: Surface Slab Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company: E TTL Engineers & Consultants Inc.

Information: 1717 E. Erwin
Tyler, TX 75702

Driller License
Number: 2126

Licensed Well
Driller Signature: Doug Hinds

Registered Driller
Apprentice
Signature: No Data

Apprentice
Registration
Number: No Data

Comments: No Data

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Please include the report's Tracking number (Tracking #46643) on your written request.

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(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0-3	Silty clay - bluish green
3-11.5	Clay - bluish green & yellowish brown
11.5-13	Clayey sand - yellow & bluish gray
13-17.5	Sand - yellow & bluish gray
17.5-18	Silty sand - yellow & bluish gray
18-20.8	Clayey sand - yellow & bluish gray
20.8-21.8	Clay
21.8-22.5	Clayey sand - gray
22.5-23	Clay - bluish gray
23-23.5	Clayey sand - yellow
23.5-30	Clay - gray
30-33.5	Clayey silt - yellow & bluish gray
33.5-34	Sand - gray
34-39	Silty clay - yellow
39-40	Sand
40-41.5	Silty clay - gray
41.5-44	Clayey silt/sandy silt - gray
44-55	Sand - gray

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
12	New	Carbon Steel	0 - 28
4	New	PVC Sch. 40	0 - 42.6
4	New	PVC Sch. 40 - slotted	42.6 - 52.6 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46645

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	48WW01
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-24-4
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 40' 55" N
Well County:	Harrison	Longitude:	094° 07' 25" W
Elevation:	No Data	GPS Brand Used:	Garmin III Plus
Type of Work:	New Well	Proposed Use:	Monitor

Drilling Date: Started: 4/16/2004
Completed: 4/20/2004

Diameter of Hole: Diameter: 16 in From Surface To 38 ft
Diameter: 9 in From 38 ft To 55 ft

Drilling Method: Mud Rotary Hollow Stem Auger

Borehole Completion: Gravel Packed From: 39 ft to 55 ft
Gravel Pack Size: 20/40

Annular Seal Data: 1st Interval: From 0 ft to 38 ft with 19 cement (#sacks and material)
2nd Interval: From 36 ft to 39 ft with 2 bentonite (#sacks and material)
3rd Interval: From 0 ft to 36 ft with 8 cement (#sacks and material)
Method Used: Tremie pipe
Cemented By: Driller
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: Surface Slab Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company: Ettl Engineers & Consultants Inc.

Information: 1717 E. Erwin
Tyler, TX 75702

Driller License
Number: 2126

Licensed Well
Driller Signature: Doug Hinds

Registered Driller
Apprentice
Signature: No Data

Apprentice
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Number: No Data

Comments: No Data

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DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0-3	Silty clay - reddish yellow
3-8	Clay - reddish yellow, yellow, gray, & bluish gray
8-12	Silty - yellow & bluish gray
12-13	Clay - yellow, gray, bluish gray
13-14	Sand - brownish yellow
14-16	Clay - bluish gray
16-16.5	Clayey sand - yellow
16.5-23	Clay - yellow & bluish gray
23-24	Clayey sand
24-26	Sandy clay - yellowish brown
26-26.8	Clayey sand
26.8-28	Clay - yellow & bluish gray
28-30	Clayey sand
30-38	Clay - bluish gray & yellow
38-45	Sand
45-47	Silty clay - bluish gray
47-55	Sand

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
12	New	Carbon Steel 0	- 38
4	New	PVC Sch. 40 0	- 42.6
4	New	PVC Sch. 40 - slotted	42.6 - 52.6 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46646

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	47WW28
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-23-6
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 41' 06" N
Well County:	Harrison	Longitude:	094° 08' 06" W
Elevation:	No Data	GPS Brand Used:	Garmin III Plus

Type of Work:	New Well	Proposed Use:	Monitor
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Drilling Date: Started: **4/21/2004**
 Completed: **4/21/2004**

Diameter of Hole: Diameter: **10 in From Surface To 23 ft**

Drilling Method: **Hollow Stem Auger**

Borehole Gravel Packed From: **10.5 ft to 23 ft**
 Completion: Gravel Pack Size: **20/40**

Annular Seal Data: 1st Interval: **From 8 ft to 10.5 ft with 2 bentonite (#sacks and material)**
 2nd Interval: **From 0 ft to 8 ft with 2 cement (#sacks and material)**
 3rd Interval: **No Data**
 Method Used: **Gravity**
 Cemented By: **Driller**
 Distance to Septic Field or other Concentrated Contamination: **No Data**
 Distance to Property Line: **No Data**
 Method of Verification: **No Data**
 Approved by Variance: **No Data**

Surface **Surface Slab Installed**
 Completion:

Water Level: Static level: **No Data**
 Artesian flow: **No Data**

Packers: **No Data**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: Type of Water: **No Data**
 Depth of Strata: **No Data**
 Chemical Analysis Made: **No Data**
 Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company **ETTL Engineers & Consultants Inc.**
 Information: **1717 E. Erwin**

Tyler, TX 75702

Driller License Number: 2126

Licensed Well Driller Signature: Doug Hinds

Registered Driller Apprentice Signature: No Data

Apprentice Registration Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Texas Department of Licensing & Regulation
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Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL**CASING, BLANK PIPE & WELL SCREEN DATA**

From (ft)	To (ft)	Description
0-3		Silty clay
3-12.5		Clay - bluish gray
12.5-16		Sand - yellow & gray
16-18		Clay
18-18.5		Sand - yellow & gray
18.5-22.8		Clay - bluish gray
22.8-23		Clayey sand - bluish gray

Dia.	New/Used	Type	Setting From/To
4	New	PVC Sch. 40	0 - 12
4	New	PVC Sch. 40 - slotted	12 - 22 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46647

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	47WW29
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-23-6
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 41' 06" N
Well County:	Harrison	Longitude:	094° 08' 07" W
Elevation:	No Data	GPS Brand Used:	Garmin III Plus
Type of Work: New Well		Proposed Use: Monitor	

Drilling Date: Started: **4/17/2004**
Completed: **4/21/2004**

Diameter of Hole: Diameter: **16 in From Surface To 22.5 ft**
Diameter: **9 in From 22.5 ft To 63 ft**

Drilling Method: **Mud Rotary Hollow Stem Auger**

Borehole Completion: Gravel Packed From: **49 ft to 63 ft**
Gravel Pack Size: **20/40**

Annular Seal Data: 1st Interval: **From 0 ft to 22.5 ft with 12 cement (#sacks and material)**
2nd Interval: **From 48 ft to 49 ft with 2 bentonite (#sacks and material)**
3rd Interval: **From 0 ft to 46 ft with 10 cement (#sacks and material)**
Method Used: **Tremie pipe**
Cemented By: **Driller**
Distance to Septic Field or other Concentrated Contamination: **No Data**
Distance to Property Line: **No Data**
Method of Verification: **No Data**
Approved by Variance: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: Static level: **No Data**
Artesian flow: **No Data**

Packers: **No Data**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: Type of Water: **No Data**
Depth of Strata: **No Data**
Chemical Analysis Made: **No Data**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company **ETTL Engineers & Consultants Inc.**

Information: 1717 E. Erwin
Tyler, TX 75702

Driller License
Number: 2126

Licensed Well
Driller Signature: Doug Hinds

Registered Driller
Apprentice
Signature: No Data

Apprentice
Registration
Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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DESC. & COLOR OF FORMATION MATERIAL**CASING, BLANK PIPE & WELL SCREEN DATA**

From (ft) To (ft)	Description
0-3	Silty clay
3-12.5	Clay - bluish gray
12.5-16	Sand - yellow & gray
16-18	Clay
18-18.5	Sand - yellow & gray
18.5-22.8	Clay - bluish gray
22.8-25.5	Clayey sand - bluish gray
25.5-29	Clay - bluish gray
29-33	Clayey sand - bluish gray
33-46.5	Sandy clay - yellow & bluish gray
46.5-48	Clayey sand - greenish gray & bluish gray
48-63	Sand

Dia.	New/Used	Type	Setting From/To
12	New	Carbon steel	0 - 22.5
4	New	PVC Sch. 40	0 - 52.6
4	New	PVC Sch. 40 - slotted	52.6 - 62.6 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46649

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	35BWW03
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-23-6
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 40' 47" N
Well County:	Harrison	Longitude:	094° 08' 41" W
Elevation:	No Data	GPS Brand Used:	Garmin III Plus

Type of Work:	New Well	Proposed Use:	Monitor
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Drilling Date: Started: 4/14/2004
Completed: 4/19/2004

Diameter of Hole: Diameter: 16 in From Surface To 23 ft
Diameter: 9 in From 23 ft To 81 ft

Drilling Method: Mud Rotary Hollow Stem Auger

Borehole Completion: Gravel Packed From: 63 ft to 81 ft
Gravel Pack Size: 20/40

Annular Seal Data: 1st Interval: From 0 ft to 23 ft with 10 cement (#sacks and material)
2nd Interval: From 60 ft to 63 ft with 2 bentonite (#sacks and material)
3rd Interval: From 0 ft to 60 ft with 13 cement (#sacks and material)
Method Used: Tremie pipe
Cemented By: Driller
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: Surface Slab Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company: E TTL Engineers & Consultants Inc.

Information: 1717 E. Erwin
Tyler, TX 75702

Driller License Number: 2126

Licensed Well Driller Signature: Doug Hinds

Registered Driller Apprentice Signature: No Data

Apprentice Registration Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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DESC. & COLOR OF FORMATION MATERIAL**CASING, BLANK PIPE & WELL SCREEN DATA**

From (ft) To (ft)	Description
0-3	Silty clay - yellowish red & gray
3-11.7	Clay - yellowish red, bluish gray, & yellowish brown
11.7-15	Clayey sand - reddish yellow & bluish gray
15-16	Sandy clay - bluish gray
16-18	Clayey sand - yellow & bluish gray
18-20.5	Sand - olive gray
20.5-22	Clayey sand
22-23	Sandy clay - yellow & bluish gray
23-25	Sand - yellowish brown
25-26.5	Clayey sand - yellow & bluish gray
26.5-27	Sandy clay
27-28	Clayey sand - yellow & bluish gray
28-33	Sand - yellowish brown
33-41	Clay - bluish gray & yellow
41-43.5	Sand
43.5-57.4	Clay - bluish gray
57.4-57.8	Lignite - black
57.8-63.5	Clay - bluish gray
63.5-65.7	Lignite - black
65.7-69	Clay - bluish gray
69-81	Clayey silt - bluish gray

Dia.	New/Used	Type	Setting From/To
12	New	Carbon steel	0 - 23
4	New	PVC Sch. 40	0 - 70
4	New	PVC Sch. 40 - slotted	70 - 80 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46650

Owner: Longhorn Army Ammunition Plant	Owner Well #: 35AWW05
Address: Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #: 35-23-6
Well Location: Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude: 32° 41' 38" N
Well County: Harrison	Longitude: 094° 09' 23" W
Elevation: No Data	GPS Brand Used: Garmin III Plus

Type of Work: New Well	Proposed Use: Monitor
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Drilling Date: Started: 4/13/2004
Completed: 4/18/2004

Diameter of Hole: Diameter: 16 in From Surface To 38 ft
Diameter: 9 in From 38 ft To 75.5 ft

Drilling Method: Mud Rotary Hollow Stem Auger

Borehole Completion: Gravel Packed From: 58 ft to 75.5 ft
Gravel Pack Size: 20/40

Annular Seal Data: 1st Interval: From 0 ft to 38 ft with 20 cement (#sacks and material)
2nd Interval: From 55 ft to 58 ft with 2 bentonite (#sacks and material)
3rd Interval: From 0 ft to 55 ft with 12 cement (#sacks and material)
Method Used: Tremie pipe
Cemented By: Driller
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: Surface Slab Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company: E TTL Engineers & Consultants Inc.

Information: 1717 E. Erwin
Tyler, TX 75702

Driller License Number: 2126

Licensed Well Driller Signature: Doug Hinds

Registered Driller Apprentice Signature: No Data

Apprentice Registration Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #46650) on your written request.

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P.O. Box 12157
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DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0-2	Silt - yellowish red
2-11.8	Clay - red, gray, bluish gray, & brown
11.8-13	Silty clay - bluish gray
13-23	Clayey silt - bluish gray
23-25.5	Silty clay - greenish gray & bluish gray
25.5-27.7	Silt - greenish gray
27.7-30	Silty clay - bluish green & bluish gray
30-57	Clay - bluish green & bluish gray
57-58	Silty clay - bluish gray
58-58.5	Clay - bluish gray
58.5-60.8	Lignite - black
60.8-75.5	Silty clay - bluish gray

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
12	New	Carbon steel	0 - 38
4	New	PVC Sch. 40	0 - 60
4	New	PVC Sch. 40 - slotted	60 - 70 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46651

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	29WW34
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-23-6
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 40' 33" N
Well County:	Harrison	Longitude:	094° 08' 47" W
Elevation:	No Data	GPS Brand Used:	Garmin III Plus

Type of Work:	New Well	Proposed Use:	Monitor
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Drilling Date: Started: 4/15/2004
Completed: 4/20/2004

Diameter of Hole: Diameter: 16 in From Surface To 44.5 ft
Diameter: 9 in From 44.5 ft To 87 ft

Drilling Method: Mud Rotary Hollow Stem Auger

Borehole Completion: Gravel Packed From: 71 ft to 87 ft
Gravel Pack Size: 20/40

Annular Seal Data: 1st Interval: From 0 ft to 44.5 ft with 22 cement (#sacks and material)
2nd Interval: From 65 ft to 71 ft with 2 bentonite (#sacks and material)
3rd Interval: From 0 ft to 65 ft with 14 cement (#sacks and material)
Method Used: Tremie pipe
Cemented By: Driller
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: Surface Slab Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company: Ettl Engineers & Consultants Inc.

Information: 1717 E. Erwin
Tyler, TX 75702

Driller License Number: 2126

Licensed Well Driller Signature: Doug Hinds

Registered Driller Apprentice Signature: No Data

Apprentice Registration Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0-6	Clay - brown, reddish yellow, & bluish gray
6-8	Sandy clay - reddish yellow & bluish gray
8-10	Clay reddish yellow
10-14	Sandy clay - bluish gray & yellow
14-17	Silt - yellow & bluish gray
17-20	Silty clay - yellow
20-24.5	Silt - yellow
24.5-33	Silty clay - yellow & bluish gray
33-42.5	Silt - bluish gray
42.5-79	Clay - bluish gray, bluish black, & bluish green
79-87	Sand - greenish gray

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
12	New	Carbon steel	0 - 44.5
4	New	PVC Sch. 40	0 - 73.6
4	New	PVC Sch. 40 - slotted	73.6 - 83.6 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46652

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	18WW21
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-24-4
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 40' 12" N
Well County:	Harrison	Longitude:	094° 06' 51" W
Elevation:	No Data	GPS Brand Used:	Garmin 12 GPS

Type of Work:	New Well	Proposed Use:	Monitor
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Drilling Date: Started: 8/5/2004
 Completed: 8/7/2004

Diameter of Hole: Diameter: 16 in From Surface To 28 ft
 Diameter: 9 7/8 in From 28 ft To 60 ft

Drilling Method: **Mud Rotary**

Borehole
Completion: Gravel Packed From: 44 ft to 60 ft
 Gravel Pack Size: 20/40

Annular Seal Data: 1st Interval: From 0 ft to 28 ft with 14 cement (#sacks and material)
 2nd Interval: From 39 ft to 44 ft with 2 bentonite (#sacks and material)
 3rd Interval: From 0 ft to 39 ft with 27 cement (#sacks and material)
 Method Used: Tremie pipe
 Cemented By: Driller
 Distance to Septic Field or other Concentrated Contamination: No Data
 Distance to Property Line: No Data
 Method of Verification: No Data
 Approved by Variance: No Data

Surface
Completion: **Surface Slab Installed**

Water Level: Static level: No Data
 Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
 Depth of Strata: No Data
 Chemical Analysis Made: No Data
 Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company **ETTL Engineers & Consultants Inc.**

Information: 1717 E. Erwin
Tyler, TX 75702

Driller License
Number: 2126

Licensed Well
Driller Signature: Doug Hinds

Registered Driller
Apprentice
Signature: No Data

Apprentice
Registration
Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0-10	Silty clay - red, gray, bluish gray, & brown
10-13	Clay - brown & bluish gray
13-17	Sand - brownish yellow
17-22	Clayey sand - brownish yellow
22-24	Clay - brown, gray, & bluish gray
24-24.5	Sand - yellowish brown
24.5-25	Sandy lean clay - bluish gray
25-25.5	Sand - yellowish brown
25.5-26	Clayey sand - bluish gray
26-28	Clay - brownish yellow, gray, & bluish gray
28-32	Sand
32-34	Clay - bluish gray
34-37	Sand
37-39	Clay - bluish gray
39-47	Sand
47-49	Clay - bluish gray
49-58.5	Sand
58.5-60	Silt - bluish gray

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
12	New	Carbon steel	0 - 28
4	New	PVC Sch. 40	0 - 48
4	New	PVC Sch. 40 - slotted	48 - 58 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46654

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	17WW15
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-24-7
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 39' 54" N
Well County:	Harrison	Longitude:	094° 07' 21" W
Elevation:	No Data	GPS Brand Used:	Garmin 12 GPS
Type of Work:	New Well	Proposed Use:	Monitor

Drilling Date: Started: **8/4/2004**
Completed: **8/8/2004**

Diameter of Hole: Diameter: **16 in From Surface To 28 ft**
Diameter: **9 7/8 in From 28 ft To 54 ft**

Drilling Method: **Mud Rotary**

Borehole Completion: Gravel Packed From: **39 ft to 54 ft**
Gravel Pack Size: **20/40**

Annular Seal Data: 1st Interval: **From 0 ft to 28 ft with 14 cement (#sacks and material)**
2nd Interval: **From 34 ft to 39 ft with 2 bentonite (#sacks and material)**
3rd Interval: **From 0 ft to 34 ft with 24 cement (#sacks and material)**
Method Used: **Tremie pipe**
Cemented By: **Driller**
Distance to Septic Field or other Concentrated Contamination: **No Data**
Distance to Property Line: **No Data**
Method of Verification: **No Data**
Approved by Variance: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: Static level: **No Data**
Artesian flow: **No Data**

Packers: **No Data**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: Type of Water: **No Data**
Depth of Strata: **No Data**
Chemical Analysis Made: **No Data**
Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company **ETTL Engineers & Consultants Inc.**

Information: 1717 E. Erwin
Tyler, TX 75702

Driller License Number: 2126

Licensed Well Driller Signature: Doug Hinds

Registered Driller Apprentice Signature: No Data

Apprentice Registration Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0-6.6	Silty clay - gray, bluish gray, brown, & reddish yellow
6.6-13	Silt - bluish gray, gray, & yellowish red
13-15	Sandy silt - bluish gray
15-16	Silty sand - bluish gray
16-20	Sand - bluish gray
20-27	Silty sand - bluish gray
27-28	Clay - gray & yellowish red
28-33.5	Silty sand - bluish gray
33.5-35	Silty clay - bluish gray
35-35.5	Lignite - black
35.5-39	Silty sand - bluish gray
39-50	Silt - bluish gray
50-54	Silty sand - bluish gray

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
12	New	Carbon steel	0 - 28
4	New	PVC Sch. 40	0 - 43
4	New	PVC Sch. 40 - slotted	43 - 53 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46655

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	50WW06
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-24-4
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 40' 12" N
Well County:	Harrison	Longitude:	094° 06' 52" W
Elevation:	No Data	GPS Brand Used:	Garmin 12 GPS

Type of Work:	New Well	Proposed Use:	Monitor
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Drilling Date: Started: **8/3/2004**
 Completed: **8/3/2004**

Diameter of Hole: Diameter: **9 7/8 in From Surface To 58 ft**

Drilling Method: **Mud Rotary Hollow Stem Auger**

Borehole Completion: Gravel Packed From: **43 ft to 58 ft**
 Gravel Pack Size: **20/40**

Annular Seal Data: 1st Interval: **From 35 ft to 43 ft with 2 bentonite (#sacks and material)**
 2nd Interval: **From 0 ft to 35 ft with 8 cement (#sacks and material)**
 3rd Interval: **No Data**
 Method Used: **Tremie pipe**
 Cemented By: **Driller**
 Distance to Septic Field or other Concentrated Contamination: **No Data**
 Distance to Property Line: **No Data**
 Method of Verification: **No Data**
 Approved by Variance: **No Data**

Surface Completion: **Surface Slab Installed**

Water Level: Static level: **No Data**
 Artesian flow: **No Data**

Packers: **No Data**

Plugging Info: Casing or Cement/Bentonite left in well: **No Data**

Type Of Pump: **No Data**

Well Tests: **No Data**

Water Quality: Type of Water: **No Data**
 Depth of Strata: **No Data**
 Chemical Analysis Made: **No Data**
 Did the driller knowingly penetrate any strata which contained undesirable constituents: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **ETTL Engineers & Consultants Inc.
 1717 E. Erwin**

Tyler, TX 75702

Driller License
Number: 2126

Licensed Well
Driller Signature: Doug Hinds

Registered Driller
Apprentice
Signature: No Data

Apprentice
Registration
Number: No Data

Comments: No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner of the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #46655) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0-7		Silty clay - brown & bluish gray
7-58		Sand - brown, greenish gray, & yellow

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
4	New	PVC Sch. 40	0 - 45
4	New	PVC Sch. 40 - slotted	45 - 55 0.010"

STATE OF TEXAS WELL REPORT for Tracking #46656

Owner:	Longhorn Army Ammunition Plant	Owner Well #:	17WW16
Address:	Hwy 143 @ Spur 449, LHAAP Karnack, TX 75661	Grid #:	35-24-7
Well Location:	Hwy 143 @ Spur 449 LHAAP Karnack, TX 75661	Latitude:	32° 39' 52" N
Well County:	Harrison	Longitude:	094° 07' 17" W ← Should be 94° 7' 18"
Elevation:	No Data	GPS Brand Used:	Garmin 12 GPS

Type of Work:	New Well	Proposed Use:	Monitor
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Drilling Date: Started: 8/3/2004
Completed: 8/8/2004

Diameter of Hole: Diameter: 19 in From Surface To 28 ft
Diameter: 15 in From 28 ft To 54 ft
Diameter: 9 7/8 in From 54 ft To 155 ft

Drilling Method: Mud Rotary

Borehole Completion: Gravel Packed From: 136 ft to 155 ft
Gravel Pack Size: 20/40

Annular Seal Data: 1st Interval: From 0 ft to 28 ft with 16 cement (#sacks and material)
2nd Interval: From 0 ft to 54 ft with 15 cement (#sacks and material)
3rd Interval: From 0 ft to 130 ft with 90 cement (#sacks and material)
Method Used: Tremie pipe
Cemented By: Driller
Distance to Septic Field or other Concentrated Contamination: No Data
Distance to Property Line: No Data
Method of Verification: No Data
Approved by Variance: No Data

Surface Completion: Surface Slab Installed

Water Level: Static level: No Data
Artesian flow: No Data

Packers: No Data

Plugging Info: Casing or Cement/Bentonite left in well: No Data

Type Of Pump: No Data

Well Tests: No Data

Water Quality: Type of Water: No Data
Depth of Strata: No Data
Chemical Analysis Made: No Data
Did the driller knowingly penetrate any strata which contained undesirable constituents: No

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.

Company Information: **ETTL Engineers & Consultants Inc.**
1717 E. Erwin
Tyler, TX 75702

Driller License Number: **2126**

Licensed Well Driller Signature: **Doug Hinds**

Registered Driller Apprentice Signature: **No Data**

Apprentice Registration Number: **No Data**

Comments: **No Data**

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner of the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #46656) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft)	Description
0-8	Silty clay - reddish yellow & gray
8-14	Clay - brownish gray, reddish yellow, & bluish gray
14-14.5	Clayey sand - yellowish red & bluish gray
14.5-17	Sand - bluish gray
17-18	Clayey sand - bluish gray
18-21	Sand - bluish gray
21-23	Clayey sand - bluish gray
23-24	Sand
24-34	Clay - bluish gray & reddish yellow
34-39	Silty clay - bluish gray
39-40	Clayey silt - bluish gray
40-47	Sand
47-49	Silty clay - bluish gray
49-59	Silty sand - bluish gray
59-75	Sand
75-80	Clayey sand - bluish gray
80-155	Sand

CASING, BLANK PIPE & WELL SCREEN DATA

Dia.	New/Used	Type	Setting From/To
16	New	Carbon steel 0	- 28
10	New	Carbon steel 0	- 54
4	New	PVC Sch. 40 0	- 141
4	New	PVC Sch. 40 - slotted 141	- 151 0.010"



Drilling Log

Monitoring Well

17WW15

00044934

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Surface Elev. 180.3 ft.

Total Hole Depth 54.0 ft.

North 6952941.24 ft East 3315221.445 ft.

Top of Casing 182.61 ft.

Water Level Initial 16.0 ft.

Static 13.0 ft. Diameter 10 in.

Screen: Dia 4 in.

Length 10 ft.

Type/Size PVC/0.01 in.

Casing: Dia 4 in.

Length 46.28 ft.

Type Sch. 40 PVC

Fill Material 20/40 Sand, Bentonite Grout

Rig/Core Foremost 5500/5' Core Barrel

Drill Co. ETTL

Method Hollow Stem Auger w/Mud Rotary Capabilities

Driller Doug Hines

Log By Dale Jayne

Date 8/7/04

Driller # NA

Checked By Kay Everett

License No. NA

COMMENTS

12" CARBON STEEL SURFACE CASING SET AT 28' BGS; APPROXIMATE DIAMETER OF SECTION 1 BOREHOLE IS 16" AND SECTION 2 IS 9 7/8"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	180.33
2		0.0	NA 100%			SILTY CLAY, MOIST, STIFF, CLAY,	178
4					CL	-BECOMES REDDISH-YELLOW IN COLOR, MOTTLING PRESENT	176
6		0.0	NA 100%				174
8						SILT, LIGHT BLUISH-GRAY, MOIST TO WET, SOFT	172
10		0.0	NA 100%		ML	-YELLOW-RED MOTTLING BEGINS TO APPEAR	170
12						-BECOMES CLAYEY	168
14					ML	SANDY SILT, LIGHT BLUISH-GRAY, SOFT, MOIST TO WET	166
16		0.0	NA 90%		SP	SILTY SAND, LIGHT BLUISH GRAY, SOFT, WET	164
18						-BECOMES LOOSE, SATURATED	162
20		0.0	NA 80%		SM	-BECOMES FINE-GRAINED	160
22					SP SM	-BECOMES MORE LOOSE	158
24							156
26		0.0	NA 80%				154
28		0.0	NA 0%			SILTY CLAY, YELLOWISH-RED, STIFF, MOIST	152
30		0.0				-NO RECOVERY	

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Drilling Log

Monitoring Well

00044935

17WW15

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						Continued	150
32		0.0	NA 50%		SM CL CL SM	SILTY SAND, LIGHT BLUISH GRAY, WET, SOFT	148
34					CL	SILTY CLAY, DARK BLUISH GRAY, STIFF, MOIST, SOME FINE-GRAINED -BECOMES VERY STIFF	146
36		0.0	NA 70%			LIGNITE, DARK BLACK	144
38					SM	SILTY SAND, LIGHT BLUISH GRAY, MOIST, FIRM, LAMINATED -NO RECOVERY	142
40					ML	SILT, DRY TO MOIST, LIGHT-DARK BLUISH GRAY, STIFF	140
42		0.0	NA 100%		SM	SILTY SAND, BLUISH-GRAY, DRY TO MOIST, STIFF	138
44						SILT, SOFT, LIGHT-DARK BLUISH GRAY, MOIST, STIFF, TRACES OF FINE-GRAINED SAND, FINE-GRAINED SILTY SAND LAYER PRESENT WITH THICKNESSES OF 1/4"-1/2" THROUGHOUT	136
46		0.0	NA 80%		MLS		134
48							132
50						SILTY SAND, LIGHT BLUISH-GRAY, WET, SOFT, LAMINATED	130
52		0.0	NA 70%		SM		128
54						END OF BORING	126
56							124
58							122
60							120
62							118
64							116
66							114
68							112
70							



Drilling Log

00044936

Monitoring Well **17WW16**

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Surface Elev. 179.0 ft.

Total Hole Depth 155.0 ft.

North 6952809.255 ft. East 3315406.13 ft.

Top of Casing 181.13 ft.

Water Level Initial 8.0 ft.

Static 11.5 ft. Diameter 10 in.

Screen: Dia 4 in.

Length 10 ft.

Type/Size PVC/0.01 in.

Casing: Dia 4 in.

Length 147.14 ft.

Type Sch. 40 PVC

Fill Material 20/40 Sand, Bentonite Grout

Rig/Core Foremost 5500/5' Core Barrel

Drill Co. ETTL

Method Hollow Stem Auger w/Mud Rotary Capabilities

Driller Doug Hines

Log By Dale Jayne

Date 8/8/04

Driller # NA

Checked By Kay Everett

License No. NA

COMMENTS

16" SURFACE CASINGS AND 10" TO DEPTHS OF 28 FEET BGS AND 54 FEET BGS, RESPECTIVELY.

APPROXIMATE DIAMETER OF SECTION 1 BOREHOLE IS 19".
APPROXIMATE DIAMETER OF SECTION 2 BOREHOLE IS 15".
APPROXIMATE DIAMETER OF SECTION 3 BOREHOLE IS 9-7/8"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	178.99
2		0.0	NA 100%			SILTY CLAY, REDDISH-YELLOW AND GRAY, DRY, STIFF	178
4						-SOME FINE-GRAINED SAND	176
6		0.0	NA 100%				174
8					CL	-AS ABOVE, SOFT, MOIST -BECOMES LIGHT GREENISH-GRAY, SOFT, WET, SATURATED	172
10		0.0	NA 100%				170
12						-OCCASIONAL REDDISH-YELLOW MOTTLING THROUGHOUT	168
14							166
16		0.0	NA 90%		SC	CLAYEY SAND, REDDISH-YELLOW, LOOSE, SATURATED -BECOMES LIGHT BLUE-GRAY IN COLOR	164
18					SP	SAND, LIGHT BLuish-GRAY, LOOSE, SATURATED	162
20						CLAYEY SAND AS ABOVE -BECOMES LESS CLAYEY, LIGHT BLuish-GRAY, LOOSE, SATURATED	160
22		0.0	NA 80%		SC		158
24					SP	SAND, LOOSE AND SATURATED	156
26		0.0	NA 80%			SANDY CLAY, LIGHT BLuish-GRAY TO REDDISH YELLOW, MEDIUM STIFF, MOIST TO WET	154
28		0.0	NA 0%		CL	-BECOMES DARK BLuish GRAY, VERY STIFF, MOIST	152
30		0.0					150

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Drilling Log

Monitoring Well

00044937

17WW16

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	P/D (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						Continued	
32		0.0	NA 100%			- BECOMES LESS SANDY, VERY STIFF, DARK, MOIST, BLUISH GRAY, SOME SILT	148
34					CL	-TRACES OF FINE-GRAINED SAND	146
36		0.0	NA 70%			-36' to 39' TRACES OF LIGNITE	144
38							142
40		0.0	NA 100%		ML	CLAYEY SILT, BLUISH GRAY, SOFT, MOIST TO WET, SOME SAND	140
42						SAND, FINE-GRAINED, SATURATED, LOOSE	138
44					SP		136
46		0.0	NA 80%				134
48					CL	SILTY CLAY, BLUISH GRAY, STIFF, MOIST, SOME FINE-GRAINED SAND	132
50						NO RECOVERY 49'-51'	130
52		0.0	NA 70%			SILTY SAND, BLUISH-GRAY, WET STIFF, SANDY HORIZONTAL LAMINATIONS IN PART, SOME CLAY	128
54					SM		126
56		0.0	NA 40%			-BECOMES WET, SOFT	124
58						SAND, FINE-GRAINED, WELL-SORTED, LOOSE	122
60					SP		120
62		0.0	NA 100%				118
64						SAND TO SILTY SAND, FINE-GRAINED, LOOSE, SATURATED	116
66					SP SM		114
68		0.0	NA 100%				112
70							110
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Drilling Log

Monitoring Well **17WW16**

00044938

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
70		0.0				<i>Continued</i> SAND, FINE-GRAINED, LOOSE, SATURATED	108
72		0.0	NA 100%		SP		106
74							
76		0.0	NA 100%		SC	CLAYEY SAND, LIGHT BLUISH GRAY, SOFT, SATURATED	104
78							102
80		0.0	NA 100%			SAND, FINE-GRAINED, WELL-SORTED, LOOSE, SATURATED	100
82							98
84		0.0	NA 100%				96
86							94
88		0.0	NA 100%				92
90						AS ABOVE	90
92		0.0	NA 100%				88
94							86
96		0.0	NA 100%		SP		84
98							82
100		0.0	NA 100%				80
102							78
104		0.0	NA 100%				76
106						AS ABOVE	74
108		0.0	NA 100%				72
110							70

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Drilling Log

Monitoring Well

00044939

17WW16

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
110						Continued	
112		0.0	NA 100%				68
114							66
116							64
118		0.0	NA 100%				62
120						-TRACES OF CLAY	60
122		0.0	NA 100%				58
124							56
126							54
128		0.0	NA 100%				52
130					SP		50
132		0.0	NA 100%				48
134							46
136						-TRACES OF CLAY	44
138		0.0	NA 100%				42
140							40
142		0.0	NA 100%				38
144							36
146							34
148		0.0	NA 100%				32
150							30

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Drilling Log

Monitoring Well

00044940
17WW16

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
150						Continued	28
152						END OF BORING	26
154							24
156							22
158							20
160							18
162							16
164							14
166							12
168							10
170							8
172							6
174							4
176							2
178							0
180							-2
182							-4
184							-6
186							-8
188							-10
190							



Drilling Log

Monitoring Well

00044941

18WW21

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Surface Elev. 192.6 ft.

Total Hole Depth 60.0 ft.

North 6954901.272 East 3317520.169

Top of Casing 195.20 ft.

Water Level Initial 15.0 ft.

Static 26.1 ft. Diameter 10 in.

Screen: Dia 4 in.

Length 10 ft.

Type/Size PVC/0.01 in.

Casing: Dia 4 in.

Length 52.60 ft.

Type Sch. 40 PVC

Fill Material 20/40 Sand, Bentonite Grout

Rig/Core Foremost 5500/5' Core Barrel

Drill Co. ETTL

Method Hollow Stem Auger w/Mud Rotary Capabilities

Driller Doug Hines

Log By Dale Jayne

Date 8/6/04

Driller # NA

Checked By Kay Everett

License No. NA

COMMENTS

12" CARBON STEEL SURFACE
CASING SET AT 28' BGS;
APPROXIMATE DIAMETER OF
SECTION 1 BOREHOLE IS 16"
AND SECTION 2 IS 9 7/8"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	192.60
2		2.8	NA 100%			SILTY CLAY, LIGHT RED, LIGHT BLUISH GRAY, DRY, STIFF	192
4					CL		190
6		2.6	NA 100%			-BECOMES LESS SILTY, LIGHT RED, VERY STIFF, MOIST, HORIZONTAL LAMINATIONS	188
8						-BECOMES VERY PALE BROWN AND GRAY IN COLOR	186
10		0.0	NA 80%			-8'-10' NO RECOVERY	184
12					CL	CLAY, VERY PALE BROWN, LIGHT BLUISH GRAY, STIFF TO VERY STIFF, MOIST 1/4"-1/2" HORIZONTAL LAMINATIONS	182
14						-TRACE SAND AT 13' -13'-15.5' NO RECOVERY	180
16		0.0	NA 50%				178
18					SC	SAND, BROWNISH-YELLOW, FINE-GRAINED, LOOSE, WET	176
20		0.0	NA 50%		SP	CLAYEY SAND, BROWNISH YELLOW, SOFT, MOIST TO WET	174
22					SP	-18'-20.5' NO RECOVERY	172
24					SC	SAND, FINE-GRAINED, LOOSE, WET	170
26		0.0	NA 80%		SP	CLAYEY SAND, LIGHT BLUISH GRAY, SOFT, WET	168
28					CL	SAND, LOOSE, WET	166
30		0.0	NA 0%		CL	CLAY, STIFF, VERY PALE BROWN AND LIGHT BLUISH GRAY, SATURATED	164
					SP	-23'-24' NO RECOVERY, PROBABLY SAND	
					SC	SAND, LIGHT YELLOWISH BROWN, LOOSE, SATURATED	
					CL	SANDY CLAY, STIFF, LIGHT BLUISH GRAY, SOFT, SATURATED	
						SAND AS ABOVE, STIFF, WET	
						CLAYEY SAND, LIGHT YELLOWISH BROWN, LOOSE, SATURATED	
						CLAY, BROWNISH YELLOW, LIGHT BLUISH GREEN,	

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Drilling Log

Monitoring Well

00044942

18WW21

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						<i>Continued</i>	
						SOFT SATURATED, -29'-32' NO RECOVERY	162
32		0.0	NA 0%		CL	CLAY, LIGHT BLuish-GRAY, VERY STIFF, WET	160
34						-34'-37' NO RECOVERY	158
36		0.0	NA 0%				156
38					CL	CLAY, LIGHT BLuish-GRAY, SOFT, WET	154
40						SAND, BROWN, LOOSE, SATURATED	152
42		NA	NA 0%		SP		150
44							148
46		0.0	NA 40%				146
48					CL	CLAY, LIGHT BLuish-GRAY, VERY STIFF, WET	144
50						SAND, BROWN, FINE-GRAINED, LOOSE, WET	142
52		ND	NA 0%				140
54					SP		138
56		0.0	NA 10%				136
58					ML	SILT, DARK BLuish GRAY, SOFT, WET	134
60						TOTAL DEPTH OF WELL	132
62							130
64							128
66							126
68							124
70							

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Drilling Log

00044943

Monitoring Well **29WW34**

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Surface Elev. 211.9 ft.

Total Hole Depth 87.0 ft.

North 6956567.583 East 3307436.941

Top of Casing 214.54 ft.

Water Level Initial 13.0 ft.

Static 25.0 ft. Diameter 10 in.

Screen: Dia 4 in.

Length 10 ft.

Type/Size PVC/0.01 in.

Casing: Dia 4 in.

Length 79.67 ft.

Type Sch. 40 PVC

Fill Material 20/40 Sand, Bentonite Grout

Rig/Core Foremost 5500/5' Core Barrel

Drill Co. ETTL

Method Hollow Stem Auger w/Mud Rotary Capabilities

Driller Doug Hines

Log By Dale Jayne

Date 4/28/04

Driller # NA

Checked By Kay Everett

License No. NA

COMMENTS

12" CARBON STEEL CASING
SET AT 44.5';
APPROXIMATE DIAMETER OF
SECTION 2 BOREHOLE IS 9"
APPROXIMATE DIAMETER OF
SECTION 1 BOREHOLE IS 16"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	211.87
2		0.0	NA 75%			CLAY, PALE BROWN, MOIST, SOFT	
4		0.0	NA 100%			REDDISH-YELLOW, STIFF	210
6		0.0	NA 100%				208
8		0.0	NA 100%			-BECOMES LIGHT BLUISH GRAY SANDY CLAY, REDDISH-YELLOW TO LIGHT BLUISH-GRAY	206
10		0.0	NA 80%		CL		204
12		0.0	NA 80%			-BECOMES BLUISH-GRAY AND YELLOW, SOFT, MOIST	202
14		0.0	NA 100%				200
16		0.0	NA 100%		ML	CLAYEY SILT, YELLOW, MOIST SOFT	198
18		0.0	NA 100%		CL	SILTY CLAY, PALE YELLOW, STIFF, MOIST	196
20		0.0	NA 100%				194
22		0.0	NA 100%		ML	CLAYEY SILT, PALE YELLOW, SOFT, LOOSE, MOIST	192
24		0.0	NA 100%				190
26		0.0	NA 100%		CL	SILTY CLAY, PALE YELLOW, LIGHT BLUISH-GRAY, LOW PLASTICITY, STIFF, FISSILE, MOIST	188
28		0.0	NA 100%				186
30		0.0	NA 100%				184
							182

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Drilling Log

Monitoring Well

00044944

29WW34

Page: 2 of 3

Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						Continued	
32		0.0	NA 100%		CL		180
34						CLAYEY SILT, BLUISH-GRAY, FISSILE, LOOSE, DRY	178
36		0.0	NA 100%				176
38					ML		174
40		0.0	NA 100%			-BECOMES SOFT (BREAKS EASILY), DRY	172
42							170
44						CLAY, BLUISH-BLACK, SOFT, SATURATED	168
46		0.0	NA 100%				166
48		0.0	NA 100%				164
50						-BECOMES DARK BLUISH GRAY IN COLOR, STIFF	162
52		0.0	NA 100%				160
54							158
56		0.0	NA 100%		CL		156
58							154
60							152
62		0.0	NA 100%				150
64							148
66		0.0	NA 100%				146
68							144
70		0.0					142

Continued Next Page



Drilling Log

Monitoring Well

00044945

29WW34

Page: 3 of 3

Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
70						Continued	
72		0.0	NA 100%		CL		140
74							138
76		0.0	NA 100%			-NO RECOVERY, MOST LIKELY SAND BASED ON DRILLING RESPONSE SAND, GREENISH-GRAY, LOOSE, SATURATED	136
78					SP		134
80							132
82							130
84						TOTAL DEPTH OF WELL	128
86							126
88							124
90							122
92							120
94							118
96							116
98							114
100							112
102							110
104							108
106							106
108							104
110							102



Drilling Log

Soil Boring **32SB14**
00044946
Page: 1 of 2

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 28.0 ft. North 6957673.63 ft East 3306158.68 ft
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/16/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
11:00-BEGAN DRILLING
11:20-SAMPLED 32SB14-01,
INTERVAL 0'-1' BGS
11:30-STOPPED DRILLING TO
SITUATE SAMPLING
11:35-RESUMED DRILLING
12:20-COLLECTED SAMPLE
32SB14-15, INTERVAL 12'-15'
BGS
13:15-COLLECTED SAMPLE
32SB14-28; COMPLETED
DRILLING, INTERVAL 27'-28'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 60%			SILTY CLAY, REDDISH-BROWN, LOW PLASTICITY, SOFT, IRON STAINING, DRY, NO ODOR
4	0	NA 100%			-BECOMES SLIGHTLY STIFF, STILL HAS HIGH PLASTICITY -1-INCH WET ZONE
6					
8	0	NA 100%		CL ML	-BECOMES GRAY, STIFF, NO IRON STAINING
10	0	NA 100%			
12					
14	0	NA 100%			
16	0	NA 100%		ML	SILT, HARD, IRON STAINING, DRY, WEATHERED, LAMINATED, NO ODOR
18					
20	0	NA 100%		CL ML	SILTY CLAY, BROWN TO DARK GRAY, VERY HARD, ORGANIC, CALCITE DEPOSITS, DRY, NO ODOR
22	0	NA 100%			-BECOMES LIGHT BROWN IN COLOR WITH ORANGE STREAKS, BRITTLE
24				CL	-BECOMES DARK BROWN TO GRAY IN COLOR
					SANDY CLAY, ALTERNATING SEAMS OF HARD CLAY AND THIN SAND LAYERS, SLIGHTLY MOIST WITH SOME QUARTZ, NO ODOR

MANCHACA Rev: 10/25/04 SITES 32 50 87 BORING LOGS.GPJ 12/2/04

Continued Next Page



Drilling Log

00044947
Soil Boring **32SB14**
Page: 2 of 2

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
24					Continued
26	0	NA 100%		CL	
28	0	NA 100%			END OF BORING
30					
32					
34					
36					
38					
40					
42					
44					
46					
48					
50					
52					
54					
56					



Drilling Log

00044948

Soil Boring **32SB15**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Kamack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 17.0 ft. North 6957654.84 ft East 3306150.7 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/16/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS

14:00-BEGAN DRILLING 32
SB15
14:05-SAMPLE 32SB15-01
COLLECTED, INTERVAL 0'-1'
BGS
14:45-SAMPLE 32SB15-06
COLLECTED, INTERVAL 12'-15'
BGS
15:45-SAMPLE 32SB15-17
COLLECTED, INTERVAL 15'-17'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%			SANDY CLAY, BROWN, HIGH PLASTICITY, SOFT, IRON STAINING, SLIGHTLY MOIST, NO ODOR
4	0	NA 100%			-BECOMES DRY -LESS IRON STAINING, BECOMES DARK GRAY
6					-BECOMES MEDIUM STIFF, LAMINATED -1-INCH GRAY SAND SEAM, IRON STAINING APPEARS, BECOMES SLIGHTLY MOIST
8	0	NA 100%		CL	
10	0	NA 100%			-BECOMES GRAY AND HARD
12					
14	0	NA 100%			
16	0	NA 100%			-VERY HARD, SLIGHTLY MOIST
18					END OF BORING
20					
22					
24					



Drilling Log

00044949

Soil Boring **32SB16**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 13.0 ft. North 6957651.9 ft. East 3306174.17 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/16/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
16:00-BEGAN DRILLING
32SB16
16:05-TOOK SAMPLE
32SB16-01, INTERVAL 0'-1'
BGS
16:35-TOOK SAMPLE
32SB16-06, INTERVAL 3'-6'
BGS
16:55-TOOK SAMPLE
32SB16-13, 12'-13' BGS
17:40-DRILL RIG 6610DPT

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%			SANDY CLAY, BROWN, LOW PLASTICITY, SOFT, IRON STAINING, SLIGHTLY MOIST, NO ODOR
4	0	NA 100%			-BECOMES HARDER
6					-BECOMES SOFTER
8	0	NA 100%			-MORE ABUNDANT IRON STAINING
10	0	NA 100%			-BECOMES MORE SANDY
12	0	NA 100%			
14					END OF BORING
16					
18					
20					
22					
24					



Drilling Log

Soil Boring

32SB17

00044950

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Kamack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 16.0 ft. North 6957719.68 ft East 3306159.59 ft
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/17/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
8:12-BEGAN DRILLING 32SB17
8:17-SAMPLE 32SB17-01
COLLECTED, INTERVAL 0'-1'
BGS
8:40-SAMPLE 32SB17-12
COLLECTED, INTERVAL 9'-12'
BGS
8:45-SAMPLE 32SB17-16
COLLECTED, INTERVAL 15'-16'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 60%		CL	SANDY CLAY, LIGHT BROWN, FINE-GRAINED, HARD, IRON STAINING, DRY, NO ODOR
4	0	NA 90%			
6					-BECOMES MORE SANDY
8	0	NA 100%		SC	CLAYEY SAND, BROWN, FINE-GRAINED, SOME IRON CONTENT, SLIGHTLY MOIST, NO ODOR -6-INCH LOOSE SAND SEAM
10	0	NA 100%			SANDY CLAY, BROWN, FINE-GRAINED, SOFT, MOIST, NO ODOR
12				CL	-WOOD CHIPS
14	0	NA 90%			-BECOMES SIGNIFICANTLY LESS SANDY, HARD WITH ORGANIC CONTENT -SOME CALCITE DEPOSITS
16	0	NA 100%		SC	CLAYEY SAND, BROWN, WET, NO ODOR
18					END OF BORING
20					
22					
24					



Drilling Log

00044951

Soil Boring

32SB18

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 15.0 ft. North 6957637.08 ft East 3306139.58 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/17/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS

12:40-BEGAN DRILLING
32SB18
12:55-SAMPLE 32SB18-01
COLLECTED, INTERVAL 0'-1'
BGS
13:10-SAMPLE 32SB18-12
COLLECTED, INTERVAL 9'-12'
BGS
13:20-SAMPLE 32SB18-15
COLLECTED, INTERVAL 12'-15'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%		SC	CLAYEY SAND, GRAY, NO ODOR -BECOMES SLIGHTLY MOIST
4	0	NA 100%			SANDY CLAY, GRAY TO BROWN, LOW PLASTICITY, STIFF, DRY, NO ODOR
6					-HIGHER PLASTICITY
8	0	NA 100%		CL	
10	0	NA 100%			-3-INCH SAND SEAM AT 9' -BECOMES SLIGHTLY MOIST, OLIVE, MORE SANDY, STILL HIGH CLAY CONTENT
12					
14	0	NA 100%			
16					END OF BORING
18					
20					
22					
24					



Drilling Log

00044952
Soil Boring **32SB19**
Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Kamack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 15.0 ft. North 6957620.61 ft East 3306197.24 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/17/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
13:33-BEGAN DRILLING
32SB19
13:50-SAMPLE 32SB19-01
COLLECTED, INTERVAL 0'-1'
BGS
13:55-SAMPLE 32SB19-09
COLLECTED, INTERVAL 6'-9'
BGS
14:00-SAMPLE 32SB19-15
COLLECTED, INTERVAL 12'-15'
BGS
14:10-COMPLETED DRILLING
32SB19 BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%		SC	CLAYEY SAND, TAN, IRON STAINING, SLIGHTLY MOIST, DRY, NO ODOR
4	0	NA 100%			
6					
8	0	NA 100%		CL	SANDY CLAY, BROWN TO TAN, STIFF, IRON STAINING, DRY, NO ODOR
10	0	NA 100%			
12				SC	CLAYEY SAND, TAN, LOOSE, SLIGHTLY MOIST, NO ODOR
14	0	NA 100%		CL	SANDY CLAY, TAN, STIFF, SLIGHTLY MOIST, NO ODOR
16					END OF BORING
18					
20					
22					
24					



Drilling Log

00044953

Soil Boring **32SB20**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 15.0 ft. North 6957903.27 ft East 3306087.65 ft
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/17/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
9:55-BEGAN DRILLING
10:04-SAMPLE 32SB20-01
COLLECTED, INTERVAL 0'-1'
BGS
10:30-SAMPLE 32SB20-06
COLLECTED, INTERVAL 3'-6'
BGS
10:40-SAMPLE 32SB20-15
COLLECTED, INTERVAL 12'-15'
BGS
10:45-DEMobilized FROM
32SB20

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 50%		SC	CLAYEY SAND, BROWN, SLIGHTLY MOIST, NO ODOR
4	0	NA 80%			
6					-WET AT 5'-6'
6					SANDY CLAY, BROWN, VERY STIFF, IRON STAINING, DRY, NO ODOR
8	0	NA 100%			-BECOMES LESS SANDY
10	0	NA 100%		CL	-BECOMES MORE GRAY IN COLOR, SOFTER, MOIST
12					
14	0	NA 50%			
16					END OF BORING
18					
20					
22					
24					



Drilling Log

00044954

Soil Boring **32SB21**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Kamack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 15.0 ft. North 6957952.31 ft East 3306025.24 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/17/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS

11:00-BEGAN DRILLING
32SB21
11:04-SAMPLE 32SB21-01
COLLECTED, INTERVAL 0'-1'
BGS
11:16-SAMPLE 32SB21-09
COLLECTED, INTERVAL 6'-9'
BGS
11:25-SAMPLE 32SB21-15
COLLECTED, INTERVAL 12'-15'
BGS
11:30 COMPLETED DRILLING
32SB21

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 50%		SC	CLAYEY SAND, BROWN, FINE-GRAINED, LOOSE, SLIGHTLY MOIST, NO ODOR, SOME ROOTING
4	0	NA 100%			
6					SANDY CLAY, BROWN, LOW PLASTICITY, STIFF, SLIGHTLY MOIST, NO ODOR
8	0	NA 100%			
10	0	NA 100%		CL	-IRON STAINING
12					-BECOMES LIGHT BROWN IN COLOR
14	0	NA 100%			
16					END OF BORING
18					
20					
22					
24					



Drilling Log

00044955

Soil Boring **32SB22**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 13.0 ft. North 6957695.71 ft East 3306158.74 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller T. Green / D. Pyle Log By M. Allen Willmore, Jr. Date _____ Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
14:00-BEGAN SETTING UP TO
DRILL 32SB22
14:31-SAMPLE 32SB22-01
COLLECTED, INTERVAL 0'-1'
BGS
14:39-SAMPLE 32SB22-06
COLLECTED, INTERVAL 3'-6'
BGS
14:48-SAMPLE 32SB22-12
COLLECTED, INTERVAL 9'-12'
BGS
14:50 COMPLETED DRILLING
32SB22

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0	0	NA 20%		CL ML	SILTY CLAY, BROWN, LOW PLASTICITY, SOFT, IRON STAINING, DRY, NO ODOR
2	0	NA 95%			
4	0	NA 50%			-BECOMES SLIGHTLY STIFF, STILL HAS HIGH PLASTICITY
6	0	NA 100%			
8	0	NA 55%			-BECOMES GRAY, STIFF, NO IRON STAINING
10	0	NA 70%			
12	0	NA 100%			END OF BORING
14					
16					
18					
20					
22					
24					



Drilling Log

Soil Boring

32SB23

00044956

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 13.0 ft. North 6957688.28 ft East 3306144.57 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller T. Green / D. Pyle Log By M. Allen Willmore, Jr. Date Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
14:52-BEGAN SETTING UP TO
DRILL 32SB23
14:54-SAMPLE 32SB23-01
COLLECTED, INTERVAL 0'-1'
15:00-SAMPLE 32SB23-06
COLLECTED, INTERVAL 3'-6'
15:15-SAMPLE 32SB23-12
COLLECTED, INTERVAL 9'-12'
15:17-COMPLETED DRILLING
32SB23

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0	0	NA 50%		CL ML	SILTY CLAY, BROWN, LOW PLASTICITY, SOFT, IRON STAINING, DRY, NO ODOR
2	0	NA 60%			
4	0	NA 80%			
6	0	NA 100%			-BECOMES GRAY, SLIGHTLY STIFF, STILL HAS HIGH PLASTICITY
8	0	NA 100%			-BECOMES STIFF, NO IRON STAINING
10	0	NA 100%			
12	0	NA 100%			END OF BORING
14					
16					
18					
20					
22					
24					



Drilling Log

Temporary Monitoring Well

00044957

32TMW01

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
 Location Karnack, Texas Proj. No. 845714
 Surface Elev. NA Total Hole Depth 20.0 ft. North 6957651.91 ft East 3306238.66 ft.
 Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
 Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
 Casing: Dia NA in. Length NA ft. Type NA
 Fill Material 20/40 Sand, Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
 Drill Co. QRI Method GeoProbe
 Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/19/04 Driller # NA
 Checked By Kay Everett License No. NA

COMMENTS
 10:47-BEGAN DRILLING
 32TMW01
 11:35-COMPLETED DRILING
 32TMW01
 11:41-BEGAN INSTALLING
 32TMW01 (SEE WELL
 COMPLETION DIAGRAM FOR
 DETAILS)
 NO LABORATORY SAMPLES
 COLLECTED

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0						SANDY CLAY, BROWN, LOW PLASTICITY, MEDIUM STIFF, IRON STAINING, SLIGHTLY MOIST, NO ODOR
2		0	NA 100%			-BECOMES DRY
4		0	NA 100%		CL	-BECOMES LESS SANDY, GRAY IN COLOR, HIGH PLASTICITY, VERY HARD, SOME ORGANIC CONTENT
6						
8		0	NA 100%			
10		0	NA 100%		SC	CLAYEY SAND, GRAY, DENSE, MEDIUM STIFF, SLIGHTLY MOIST, NO ODOR
12						
14		0	NA 100%			SANDY CLAY, GRAY, NO ODOR, HIGH PLASTICITY, STIFF, SLIGHTLY MOIST, NO ODOR
16		0	NA 100%		CL	
18						-BECOMES DRY
20		0	NA 100%			END OF BORING
22						
24						

MANCHACA Rev: 10/25/04 SITES 32 50 67 BORING LOGS.GPJ 12/2/04



Drilling Log

Monitoring Well

00044958
35AWW05

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Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. 219.0 ft. Total Hole Depth 75.5 ft. North 6959849.641 East 3304426.136
Top of Casing 221.41 ft. Water Level Initial 43.5 ft. Static 38.2 ft. Diameter 10 in.
Screen: Dia 4 in. Length 10 ft. Type/Size PVC/0.01 in.
Casing: Dia 4 in. Length 67.91 ft. Type Sch. 40 PVC
Fill Material 20/40 Sand, Bentonite Grout Rig/Core Foremost 5500/5' Core Barrel
Drill Co. ETTL Method Hollow Stem Auger w/Mud Rotary Capabilities
Driller Doug Hines Log By Dale Jayne Date 4/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
12" CARBON STEEL SURFACE
CASING SET AT 38' BGS;
APPROXIMATE DIAMETER OF
SECTION 1 BOREHOLE IS 19"
AND SECTION 2 IS 9"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	219.01
2		0.0	NA 75%		ML	SILT, YELLOWISH-RED, MEDIUM STIFF, DRY	218
4		0.0	NA 50%			CLAY, RED-GRAY, MOTTLING PRESENT	216
6		0.0	NA 100%		CL	-BECOMES LIGHT BLUISH-GRAY IN COLOR	214
8							212
10		0.0	NA 80%				210
12					SP	SAND, FINE-GRAINED	208
14					CL	SILTY CLAY, LIGHT BLUISH GRAY	206
16		0.0	NA 100%			CLAYEY SILT, LIGHT BLUISH GRAY, SOFT, MOIST	204
18					ML		202
20		0.0	NA 100%			-BECOMES LIGHT GREENISH-GRAY	200
22					CL	SILTY CLAY, LAYER OF LIGNITE, LIGHT GREENISH-GRAY, SOFT, MOIST	198
24					SP	-BECOMES MEDIUM STIFF SAND, FINE GRAINED, TRACES OF CLAY, LIGHT BLUISH GRAY	196
26		0.0	NA 100%		ML	SILT, TRACES OF CLAY, LIGHT GREENISH-GRAY, SOFT, MOIST	194
28							192
30		0.0	NA 100%		CL	SILTY CLAY, LIGHT BLUISH-GREEN, SOFT, MOIST -BECOMES BROWN AND LIGHT BLUISH GRAY IN COLOR	190

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Drilling Log

Monitoring Well

00044959

35AWW05

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						<i>Continued</i>	
32		0.0	NA 100%			-BECOMES DARK BLUISH-GREEN -ALTERNATING BLACK AND GREEN LAMINATION	188
34						-BECOMES DARK BLUISH-GRAY IN COLOR -BECOMES DRY, FISSILE, HOMOGENOUS	186
36		0.0	NA 100%				184
38						-BECOMES HARD	182
40		0.0	NA 100%			-NO RECOVERY	180
42							178
44						-BECOMES VERY STIFF	176
46		0.0	NA 100%				174
48		0.0	NA 100%			-BECOMES WET	172
50					CL		170
52		0.0	NA 100%				168
54							166
56		0.0	NA 100%			-0.4' LAYER OF LIGNITE, PURE BLACK, ORGANIC, LOW DENSITY, SATURATED -CLAY BECOMES MOIST	164
58						-BECOMES SOFT AND STIFF	162
60						-BECOMES STIFF TO VERY STIFF, WET -2.3' LAYER OF LIGNITE, BLACK, LIGNITE, WET	160
62		0.0	NA 100%			-CLAY HAS FRACTURES ALONG HORIZONTAL PLANES -BECOMES SOFT TO STIFF	158
64							156
66		0.0	NA 100%				154
68						-REAMED HOLE TO 75.5' BGS TO INSTALL WELL, NO LITHOLOGIC LOG	152
70		0.0					150

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MANCHACA Rev: 10/25/04 SITES 32 50 67 BORING LOGS.GPJ 12/2/04



Drilling Log

Monitoring Well

00044960

35AWW05

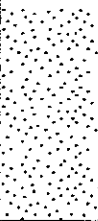
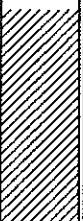
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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
70					CL	Continued	
72		0.0	NA 100%				148
74		0.0	NA 100%				146
76						END OF BORING	144
78							142
80							140
82							138
84							136
86							134
88							132
90							130
92							128
94							126
96							124
98							122
100							120
102							118
104							116
106							114
108							112
110							110



Drilling Log

Monitoring Well

00044961
35BWW03

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Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
 Location Karnack, Texas Proj. No. 845714
 Surface Elev. 201.3 ft. Total Hole Depth 81.0 ft. North 6958034.061 East 3308089.219
 Top of Casing 203.56 ft. Water Level Initial 12.0 ft. Static 21.7 ft. Diameter 10 in.
 Screen: Dia 4 in. Length 10 ft. Type/Size PVC/0.01 in.
 Casing: Dia 4 in. Length 73.21 ft. Type Sch. 40 PVC
 Fill Material 20/40 Sand, Bentonite Grout Rig/Core Foremost 5500/5' Core Barrel
 Drill Co. ETTL Method Hollow Stem Auger w/Mud Rotary Capabilities
 Driller Doug Hines Log By Dale Jayne Date 4/19/04 Driller # NA
 Checked By Kay Everett License No. NA

COMMENTS
 12" CARBON STEEL SURFACE
 CASING SET AT 23' BGS;
 APPROXIMATE DIAMETER OF
 SECTION 1 BOREHOLE IS 16"
 AND SECTION 2 IS 9"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	201.34
2		0.0	NA 75%			SILTY CLAY, YELLOWISH-RED, SOFT, MOIST	200
4		0.0	NA 100%			-GRAY MOTTLING -BECOMES SOFT TO STIFF, LIGHT BLUISH-GRAY COLOR APPEARS WITH YELLOWISH-RED COLOR	198
6		0.0	NA 100%		CL	-BECOMES LIGHT YELLOWISH-BROWN AND LIGHT BLUISH-GRAY	196
8						-BECOMES SOFT, MOIST	194
10		0.0	NA 100%				192
12							190
14					SC	CLAYEY SAND, SOFT, REDDISH-YELLOW AND LIGHT BLUISH-GRAY, WET	188
16		0.0	NA 60%		CL	SANDY CLAY, YELLOW AND LIGHT BLUISH-GRAY, SOFT, WET	186
18					SC	CLAYEY SAND, YELLOW AND LIGHT BLUISH-GRAY, SOFT, WET	184
20		0.0	NA 50%		SP	SAND, (LACK OF SANDS SUGGESTS SANDS FELL 'OUT OF SAMPLER)	182
22					CL	SANDY CLAY, YELLOW AND BLUISH-GRAY	180
24						SAND, LIGHT YELLOWISH-BROWN, LOOSE, SATURATED	178
26		0.0	NA 65%		SP SC	-BECOMES CLAYEY, LIGHT BLUISH BRAY IN COLOR	176
28					CL	SANDY CLAY	174
30		0.0	NA 100%		SP SC	SAND, LIGHT YELLOWISH-BROWN, LOOSE, SATURATED -BECOMES MEDIUM LOOSE GRAINED, LIGHT YELLOWISH-BROWN IN COLOR, SATURATED	172

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Drilling Log

Monitoring Well

00044962

35BWW03

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						Continued	
32		0.0	NA 100%		SC		170
34		0.0	NA 100%			CLAY, YELLOW AND LIGHT BLuish-GRAY, SOFT, SATURATED	168
36		0.0	NA 100%		CL		166
38		0.0	NA 100%				164
40		0.0	NA 100%			-0.1' LOOSE, WET SAND LAYER	162
42		0.0	NA 100%		SP	-NO RESPONSE, SAND INFERRED FROM DRILL RESPONSE	160
44		0.0	NA 50%			CLAY, DARK BLuish-GRAY, VERY STIFF, WET	158
46							156
48		0.0	NA 100%				154
50							152
52							150
54		0.0	NA 100%				148
56					CL	-BECOMES SILTY -BECOMES LESS SILTY	146
58		0.0	NA 100%			-0.2' LIGNITE LAYER	144
60							142
62							140
64		0.0	NA 90%			-2.2' LIGNITE LAYER (BLACK ORGANIC)	138
66							136
68		0.0	NA 70%				134
70					ML	CLAYEY SILT, BLuish-GRAY, SOFT, WET	132

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Drilling Log

Monitoring Well

00044963

35BWW03

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
70		0.0			ML	Continued	130
72							128
74		0.0	NA 50%				126
76							124
78		NA	NA 0%			-REAMED BOREHOLE TO 81', NO LITHOLOGIC LOG END OF BORING	122
80							120
82							118
84							116
86							114
88							112
90							110
92							108
94							106
96							104
98							102
100							100
102							98
104							96
106							94
108							92
110							



Drilling Log

Monitoring Well

00044964

47WW28

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
 Location Karnack, Texas Proj. No. 845714
 Surface Elev. 192.0 ft. Total Hole Depth 23.0 ft. North 6960058.222 East 3310852.659
 Top of Casing 194.43 ft. Water Level Initial 18.0 ft. Static 15.9 ft. Diameter 10 in.
 Screen: Dia 4 in. Length 10 ft. Type/Size PVC/0.01 in.
 Casing: Dia 4 in. Length 15.45 ft. Type Sch. 40 PVC
 Fill Material 20/40 Sand, Bentonite Grout Rig/Core Foremost 5500/5' Core Barrel
 Drill Co. ETTL Method Hollow Stem Auger w/Mud Rotary Capabilities
 Driller Doug Hines Log By Dale Jayne Date 4/21/04 Driller # NA
 Checked By Kay Everett License No. NA

COMMENTS
 APPROXIMATE DIAMETER OF
 BOREHOLE IS 10"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	191.98
2						NO LITHOLOGIC LOG. SEE ADJACENT BOREHOLE 47WW29 LITHOLOGIC LOG	190
4							188
6							186
8							184
10							182
12							180
14							178
16							176
18							174
20							172
22							170
24							168
26							166
28							164
30							162

MANCHACA Rev: 10/25/04 SITES 32 50 67 BORING LOGS.GPJ 12/2/04



Drilling Log

Monitoring Well

00044965
47WW29

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

Surface Elev. 191.6 ft.

Total Hole Depth 63.0 ft.

North 6960059.441 East 3310868.574

Top of Casing 194.08 ft.

Water Level Initial 12.5 ft.

Static 14.5 ft. Diameter 10 in.

Screen: Dia 4 in.

Length 10 ft.

Type/Size PVC/0.01 in.

Casing: Dia 4 in.

Length 55.52 ft.

Type Sch. 40 PVC

Fill Material 20/40 Sand, Bentonite Grout

Rig/Core Foremost 5500/5' Core Barrel

Drill Co. ETTL

Method Hollow Stem Auger w/Mud Rotary Capabilities

Driller Doug Hines

Log By Dale Jayne

Date 4/21/04

Driller # NA

Checked By Kay Everett

License No. NA

COMMENTS

12" CARBON STEEL SURFACE CASING SET AT 22.5' BGS; APPROXIMATE DIAMETER OF SECTION 1 BOREHOLE IS 16" AND SECTION 2 IS 9"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	191.56
2		0.0	NA 25%			SILTY CLAY, STIFF, DRY	190
4		0.0	NA 0%			-BECOMES LIGHT BLUISH-GRAY AND YELLOWISH-RED IN COLOR, VERY, STIFF MOIST	188
6		0.0	NA 100%		CL		186
8							184
10		0.0	NA 100%				182
12							180
14		0.0	NA 80%		SP	SAND, BLUISH-GRAY AND YELLOWISH-RED, LOOSE, MOIST TO WET -BECOMES FINE-GRAINED	178
16						-BECOMES CLAYEY	176
18						-BECOMES LESS CLAYEY	174
20		0.0	NA 100%		CL	CLAY, VERY STIFF, MOIST, LIGHT BLUISH-GRAY	172
22							170
24		0.0	NA 50%		SC	CLAYEY SAND, LIGHT BLUISH-GRAY, LOOSE, SATURATED -NO RECOVERY, MOST LIKELY SAND OR CLAYEY SAND BASED ON DRILLING	168
26						CLAY, STIFF, LIGHT BLUISH-GRAY, SATURATED	166
28					CL		164
30		0.0	NA 50%		SC	CLAYEY SAND, LIGHT BLUISH GRAY, SOFT, SATURATED	162

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Drilling Log

00044966

Monitoring Well **47WW29**

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Project Longhorn Army Ammunition PlantOwner Shaw E&I, Inc.Location Karnack, TexasProj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						Continued	
32		0.0	NA 50%		SC		160
34		0.0	NA 70%			SANDY CLAY, PALE YELLOW AND LIGHT BLUISH GRAY, SOFT TO STIFF, SATURATED	158
36		0.0	NA 70%				156
38							154
40		0.0	NA 90%		CL		152
42							150
44						-NO RECOVERY FROM 43' TO 45' BGS	148
46		0.0	NA 60%				146
48						CLAYEY SAND, GREENISH-GRAY TO LIGHT BLUISH GRAY, SOFT, SATURATED - NO RECOVERY, MOST LIKELY SAND (SP) BASED UPON DRILLING RESPONSE	144
50		0.0	NA 0%				142
52							140
54						-NO RECOVERY, BUT ABUNDANT FINE-GRAINED SAND (SP) IN MUD PIT	138
56		0.0	NA 0%		SC		136
58							134
60		0.0	NA 0%				132
62							130
64						END OF BORING	128
66							126
68							124
70							122

MANCHACA Rev: 10/25/04 SITES 32,50,67 BORING LOGS.GPJ 12/2/04



Drilling Log

Monitoring Well

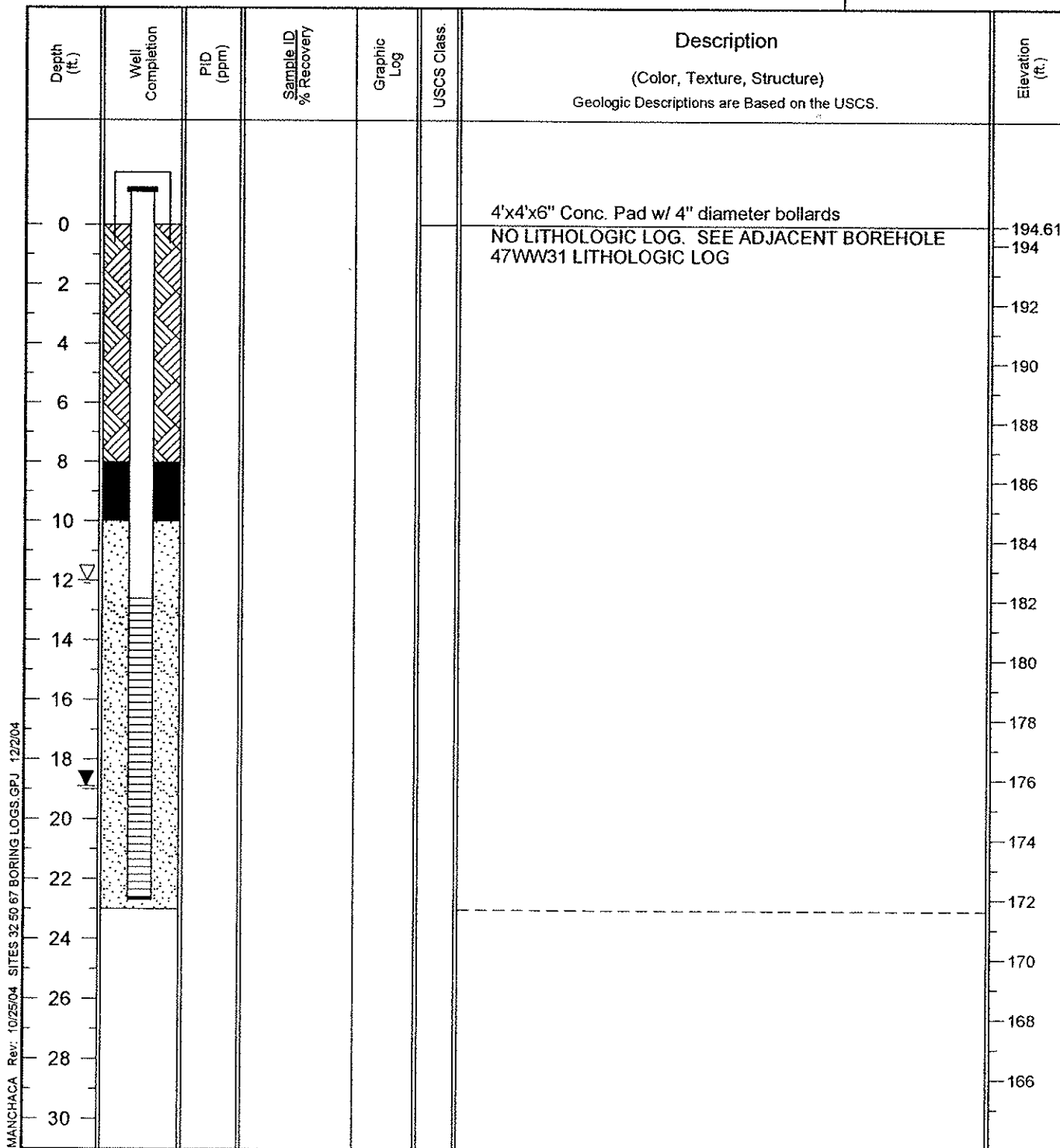
00044967

47WW30

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Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
 Location Karnack, Texas Proj. No. 845714
 Surface Elev. 194.6 ft. Total Hole Depth 23.0 ft. North 6961047.189 East 3310472.4 ft.
 Top of Casing 197.12 ft. Water Level Initial 12.0 ft. Static 18.9 ft. Diameter 10 in.
 Screen: Dia 4 in. Length 10 ft. Type/Size PVC/0.01 in.
 Casing: Dia 4 in. Length 15.50 ft. Type Sch. 40 PVC
 Fill Material 20/40 Sand, Bentonite Grout Rig/Core Foremost 5500/5' Core Barrel
 Drill Co. ETTL Method Hollow Stem Auger w/Mud Rotary Capabilities
 Driller Doug Hines Log By Dale Jayne Date 4/21/04 Driller # NA
 Checked By Kay Everett License No. NA

COMMENTS
 APPROXIMATE DIAMETER OF
 BOREHOLE IS 10"





Drilling Log

Monitoring Well

47WW31

00044968

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Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Surface Elev. 194.6 ft.

Total Hole Depth 50.0 ft.

North 6961056.051 East 3310483.732

Top of Casing 196.94 ft.

Water Level Initial ▽ 13.0 ft.

Static ▽ 18.7 ft. Diameter 10 in.

Screen: Dia 4 in.

Length 10 ft.

Type/Size PVC/0.01 in.

Casing: Dia 4 in.

Length 47.37 ft.

Type Sch. 40 PVC

Fill Material 20/40 Sand, Bentonite Grout

Rig/Core Foremost 5500/5' Core Barrel

Drill Co. ETTL

Method Hollow Stem Auger w/Mud Rotary Capabilities

Driller Doug Hines

Log By Dale Jayne

Date 4/20/04

Driller # NA

Checked By Kay Everett

License No. NA

COMMENTS

12" CARBON STEEL SURFACE CASING SET AT 28' BGS; APPROXIMATE DIAMETER OF SECTION 1 BOREHOLE IS 16" AND SECTION 2 IS 9"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0		0.0	NA 0%			4'x4'x6" Conc. Pad w/ 4" diameter bollards NO RECOVERY	194.57
2		0.0	NA 100%				194
4		0.0	NA 100%			SILTY CLAY, LIGHT BLUISH-GREEN, DRY, VERY STIFF -BECOMES MOIST, LIGHT YELLOWISH-BROWN IN COLOR	192
6		0.0	NA 100%				190
8		0.0	NA 100%		CL		188
10		0.0	NA 100%				186
12		0.0	NA 100%				184
14		0.0	NA 80%		SC	CLAYEY SAND, YELLOW AND LIGHT BLUISH-GRAY, SOFT, MOIST -BECOMES LESS CLAYEY (SP), FINE-GRAINED, TRACES OF CLAY, MOIST TO WET	182
16		0.0	NA 100%			-BECOMES SILTY -BECOMES MORE CLAYEY AS ABOVE	180
18		0.0	NA 100%				178
20		0.0	NA 100%				176
22		0.0	NA 100%		CL	CLAY	174
24		0.0	NA 100%		SC	CLAYEY SAND, BLUISH-GRAY, SOFT, SATURATED	172
26		0.0	NA 100%		CL	CLAY, STIFF, MOIST, LIGHT BLUISH-GRAY	170
28		0.0	NA 50%		SC	CLAYEY SAND, BLUISH-GRAY AND PALE YELLOW CLAY, MEDIUM STIFF, BLUISH-GRAY, MOIST	168
30		0.0	NA 50%		CL	-BECOMES MORE SILTY	166

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Drilling Log

00044969

Monitoring Well **47WW31**

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Project Longhorn Army Ammunition PlantOwner Shaw E&I, Inc.Location Kamack, TexasProj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						<i>Continued</i>	164
32		0.0	NA 50%		ML	CLAYEY SILT, PALE YELLOW AND LIGHT BLuish GRAY, SOFT, WET	162
34					SP	SAND, BLuish-GRAY, LOOSE	160
36		0.0	NA 80%		CL	SILTY CLAY, PALE YELLOW, SOFT, SATURATED	158
38							156
40		0.0	NA 40%		SP	-NO RECOVERY, POSSIBLY SAND BASED ON DRILLING	154
42					CL	SILTY CLAY, BLuish-GRAY, SOFT, WET	152
44		0.0	NA 40%		ML	CLAYEY SILT, WITH SOME SAND	150
46							148
48		0.0	NA 10%		SP	SAND, BLuish-GRAY, VERY FINE-GRAINED SAND, LOOSE, SATURATED	146
50		0.0	NA 0%			-NO RECOVERY, BASED ON DRILLING RESPONSE AND MUD IN PIT, SAND, VERY FINE-GRAINED	144
52						SAND, VERY FINE-GRAINED, BLuish-GRAY, LOOSE, SATURATED -NO LITHOLOGIC LOG FOR 50'-55' BGS	142
54						END OF BORING	140
56							138
58							136
60							134
62							132
64							130
66							128
68							126
70							

MANCHACA Rev: 10/25/04 SITES 32 50 67 BORING LOGS.GPJ 12/2/04



Drilling Log

Monitoring Well

00044970
48WW01

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Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. 190.8 ft. Total Hole Depth 53.0 ft. North 6959110.511 East 3314579.818
Top of Casing 193.24 ft. Water Level Initial 13.0 ft. Static 22.3 ft. Diameter 10 in.
Screen: Dia 4 in. Length 10 ft. Type/Size PVC/0.01 in.
Casing: Dia 4 in. Length 47.42 ft. Type Sch. 40 PVC
Fill Material 20/40 Sand, Bentonite Grout Rig/Core Foremost 5500/5' Core Barrel
Drill Co. ETTL Method Hollow Stem Auger w/Mud Rotary Capabilities
Driller Doug Hines Log By Dale Jayne Date 4/20/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
12" CARBON STEEL SURFACE
CASING SET AT 38' BGS;
APPROXIMATE DIAMETER OF
SECTION 1 BOREHOLE IS 16"
AND SECTION 2 IS 9"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	190.81
2		0.0	NA 100%			SILTY CLAY, REDDISH-YELLOW, STIFF, MOIST	190
4		0.0	NA 100%		CL		188
6		0.0	NA 100%			-BECOMES YELLOW AND LIGHT BLUISH-GRAY IN COLOR	186
8		0.0	NA 100%				184
10		0.0	NA 80%		ML	SILT, PALE YELLOW AND BLUISH-GRAY, SOFT, MOIST	182
12		0.0	NA 80%				180
14		0.0	NA 100%		CL	CLAY, YELLOW W/ GRAY, LIGHT BLUISH GRAY MOTTLING	178
16		0.0	NA 100%		SP	SAND, BROWNISH-YELLOW, FINE-GRAINED, LOOSE, MOIST	176
18		0.0	NA 100%		CL	CLAY, LIGHT BLUISH GRAY, STIFF, MOIST	174
20		0.0	NA 100%		SC	CLAYEY SAND, YELLOW, SOFT, WET	172
22		0.0	NA 100%			CLAY, PALE YELLOW, W/ LIGHT BLUISH-GRAY MOTTLING, STIFF, MOIST	170
24		0.0	NA 100%		CL	-BECOMES SATURATED	168
26		0.0	NA 100%		SC	CLAYEY SAND, SOFT, SATURATED	166
28		0.0	NA 100%		CL	SANDY CLAY, LIGHT YELLOWISH-BROWN, SOFT, SATURATED	164
30		0.0	NA 100%		SC	CLAYEY SAND, YELLOW, LOOSE, SATURATED	162
		0.0	NA 100%		CL	CLAY, PALE YELLOW, STIFF, SATURATED	
		0.0	NA 100%		SC	CLAYEY SAND, SOFT, SATURATED	

Continued Next Page



Drilling Log

00044971

Monitoring Well **48WW01**

Page: 2 of 2

Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Karnack, Texas

Proj. No. 845714

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						<i>Continued</i>	
32		0.0	NA 100%			CLAY, LIGHT BLUISH-GREEN, STIFF TO VERY STIFF, WET	160
34					CL	-BECOMES PALE YELLOW IN COLOR	158
36		0.0	NA 100%				156
38							154
40		0.0	NA 0%			NO RECOVERY, DRILLER REPORTS SOFT DRILLING INDICATIVE OF SANDS	152
42					SP		150
44		0.0	NA 0%				148
46		0.0	NA 50%		CL	SILTY CLAY, BLUISH GRAY, SOFT, SATURATED	146
48						NO RECOVERY, MOST LIKELY FINE-GRAINED SANDS, THAT WASHED OUT CORE BARREL	144
50		0.0	NA 0%		SP		142
52						HOLE REAMED TO 55'	140
54						END OF BORING	138
56							136
58							134
60							132
62							130
64							128
66							126
68							124
70							122

MANCHACA Rev. 10/25/04 SITES 32 50 67 BORING LOGS.GPJ 12/2/04



Drilling Log

00044972

Soil Boring **50SB10**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 10.0 ft. North 6957472.91 ft East 3309618 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS

8:35-BEGAN DRILLING 50SB10
8:40-SAMPLE 50SB10-01
COLLECTED, INTERVAL 0'-1'
BGS
8:50-SAMPLE 50SB10-03
COLLECTED, INTERVAL 3'-6'
BGS
9:10 SAMPLE 50SB10-07
COLLECTED, INTERVAL 7'-10'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%			SANDY CLAY, BROWN, LOW PLASTICITY, IRON STAINING, DRY, NO ODOR, SOME ROOTING
4	0	NA 100%		CL ML	CLAYEY SILT, RED AND BROWN, FINE-GRAINED, HEAVY IRON STAINING, NO ODOR
6					
8	0	NA 100%		SM	-BECOMES WET SILTY SAND, LIGHT BROWN, FINE-GRAINED, WET, NO ODOR
10	0	NA 100%			END OF BORING
12	0	NA 100%			
14					
16					
18					
20					
22					
24					



Drilling Log

00044973

Soil Boring **50SB11**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 10.0 ft. North 6957491.64 ft East 3309442.6 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS

16:00-BEGAN DRILLING
50SB11
16:05-SAMPLE 50SB11-01
COLLECTED, INTERVAL 0'-1'
16:45-SAMPLE 50SB11-06
COLLECTED, INTERVAL 3'-6'
16:54-SAMPLE 50SB11-10
COLLECTED, INTERVAL 7'-10'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%		SC	CLAYEY SAND, BROWN, LOOSE, FINE-GRAINED, DRY, NO ODOR
4	0	NA 100%		CL ML	SILTY CLAY, BROWN, STIFF, IRON STAINING, MOIST, NO ODOR
6					
8	0	NA 100%			
10	0	NA 100%		SC	CLAYEY SAND, BROWN, FINE-GRAINED, IRON STAINING, WET, NO ODOR END OF BORING
12					
14					
16					
18					
20					
22					
24					



Drilling Log

00044974

Soil Boring **50SB12**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 10.0 ft. North 6957418.59 ft East 3309379.96 ft
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS

17:05-BEGAN DRILLING
50SB12
17:15-SAMPLE 50SB12-01
COLLECTED, INTERVAL 0'-1'
BGS
17:25-SAMPLE 50SB12-06
COLLECTED, INTERVAL 3'-6'
BGS
17:30-SAMPLE 50SB12-10
COLLECTED, INTERVAL 7'-10'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 40%		SC	CLAYEY SAND, BROWN, FINE-GRAINED, MEDIUM LOOSE, ROOTING, DRY, NO ODOR
4	0	NA 100%		CL	SANDY CLAY, BROWN, HARD, LOW PLASTICITY, IRON STAINING, MOIST, NO ODOR
6					
8	0	NA 100%			
10	0	NA 100%		SC	CLAYEY SAND, GRAY, FINE-GRAINED, LOOSE, WET, NO ODOR
12					END OF BORING
14					
16					
18					
20					
22					
24					



Drilling Log

00044975
Soil Boring **50SB13**
Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Kamack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 10.0 ft. North 6957352.5 ft. East 3309455.65 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
15:12-BEGAN DRILLING
50SB13
15:15-SAMPLE 50SB13-01
COLLECTED, INTERVAL 0'-1'
15:22-SAMPLE 50SB13-06
COLLECTED, INTERVAL 3'-6'
15:30-SAMPLE 50SB13-10
COLLECTED, INTERVAL 7'-10'

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%		SC	CLAYEY SAND, DARK BROWN, FINE-GRAINED, LOOSE, DRY, ROOTING, NO ODOR
4	0	NA 100%		CL	SANDY CLAY, BROWN, MEDIUM STIFF, LOW PLASTICITY, IRON STAINING, DRY, NO ODOR
6					-BECOMES MORE GRAY
8	0	NA 100%			
10	0	NA 100%		SC	CLAYEY SAND, GRAY, FINE-GRAINED, STIFF, MOIST, NO ODOR
12					END OF BORING
14					
16					
18					
20					
22					
24					



Drilling Log

00044976

Soil Boring **50SB14**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Kamack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 14.0 ft. North 6957401.2 ft. East 3309527.86 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS

11:30-BEGAN DRILLING
50SB14
11:35-SAMPLE 50SB14-01
COLLECTED, INTERVAL 0'-1'
BGS
11:50-SAMPLE 50SB14-09
COLLECTED, INTERVAL 6'-9'
BGS
12:15-SAMPLE 50SB14-11
COLLECTED, INTERVAL 9'-11'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%		SM	SILTY SAND, DARK BROWN, FINE-GRAINED, DENSE, CONSOLIDATED, DRY, ROOTING, NO ODOR
4	0	NA 100%			
6					
8	0	NA 100%		MH	CLAYEY SILT, BROWN, STIFF, HIGH PLASTICITY, IRON STAINING, SLIGHTLY MOIST, NO ODOR
10	0	NA 100%			
12	0	NA 100%		SM	SILTY SAND, GRAY, FINE-GRAINED, MEDIUM LOOSE, WET, NO ODOR, ROOTING
14					END OF BORING
16					
18					
20					
22					
24					



Drilling Log

00044977
Soil Boring **50SB15**
Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Kamack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 10.0 ft. North 6957443.06 ft East 3309564.34 ft
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
10:40-BEGAN DRILLING
50SB15
10:50-SAMPLE 50SB15-01
COLLECTED, 0'-1' BGS
10:55-SAMPLE 50SB15-06
COLLECTED, INTERVAL 3'-6'
BGS
10:58-SAMPLE 50SB15-10
COLLECTED, INTERVAL 9'-10'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 40%		SM	SILTY SAND, DARK BROWN, FINE-GRAINED, LOOSE, DRY, ROOTING, NO ODOR -BECOMES REDDISH IN COLOR, IRON CONTENT, NO ROOTING
4	0	NA 100%		CL	SANDY CLAY, BROWN, LOW PLASTICITY, STIFF, IRON STAINING, DRY, NO ODOR
6					
8	0	NA 100%		SM	SILTY SAND, GRAY, FINE-GRAINED, MEDIUM LOOSE, SLIGHTLY MOIST, NO ODOR -WET AT 6.5'; BECOMES LOOSE
10	0	NA 100%			
12					END OF BORING
14					
16					
18					
20					
22					
24					



Drilling Log

00044978
Soil Boring **50SB16**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 10.0 ft. North 6957534.01 ft East 3309521.32 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
9:30-BEGAN DRILLING 50SB16
9:40-SAMPLE 50SB16-01
COLLECTED, INTERVAL 0'-1'
BGS
9:50-SAMPLE 50SB16-03
COLLECTED, INTERVAL 1'-3'
BGS
9:56-SAMPLE 50SB16-10
COLLECTED, INTERVAL 9'-10'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%		SC	CLAYEY SAND, BROWN, FINE-GRAINED, GRAVEL, LOOSE, IRON STAINING, DRY, NO ODOR -NO GRAVEL -BECOMES SLIGHTLY MOIST -BECOMES MORE DENSE
4	0	NA 100%			
6					
8	0	NA 100%		CL	SILTY SAND, GRAY, FINE-GRAINED, MEDIUM LOOSE, IRON STAINING, WET, NO ODOR
10	0	NA 100%			END OF BORING
12					
14					
16					
18					
20					
22					
24					



Drilling Log

00044979
Soil Boring **50SB17**
Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 14.0 ft. North 6957359.17 ft East 3309553.35 ft
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/18/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS
14:20-BEGAN DRILLING
50SB17
14:31-SAMPLE 50SB17-01
COLLECTED, INTERVAL 0'-1'
BGS
14:40-SAMPLE 50SB17-09
COLLECTED, INTERVAL 6'-9'
BGS
15:00-SAMPLE 50SB17-11
COLLECTED, INTERVAL 9'-11'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 30%		SC	CLAYEY SAND, BROWN, FINE-GRAINED, LOOSE, DRY, ROOTING, NO ODOR
4	0	NA 100%		CL	SANDY CLAY, STIFF, LOW PLASTICITY, IRON STAINING, DRY, NO ODOR
6					
8	0	NA 100%			
10	0	NA 100%		SM	SILTY SAND, GRAY, FINE-GRAINED, LOOSE, MOIST, NO ODOR
12					
14	0	NA 100%			
16					END OF BORING
18					
20					
22					
24					



Drilling Log

00044980

Monitoring Well

50WW06

Page: 1 of 2

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
 Location Kamack, Texas Proj. No. 845714
 Surface Elev. 193.0 ft. Total Hole Depth 58.0 ft. North 6957553.93 ft East 3309790.221 ft.
 Top of Casing 195.35 ft. Water Level Initial 13.0 ft. Static 11.9 ft. Diameter 10 in.
 Screen: Dia 4 in. Length 10 ft. Type/Size PVC/0.01 in.
 Casing: Dia 4 in. Length 50.35 ft. Type Sch. 40 PVC
 Fill Material 20/40 Sand, Bentonite Grout Rig/Core Foremost 5500/5' Core Barrel
 Drill Co. ETTL Method Hollow Stem Auger w/Mud Rotary Capabilities
 Driller Doug Hines Log By Dale Jayne Date 8/3/04 Driller # NA
 Checked By Kay Everett License No. NA

COMMENTS
 APPROXIMATE DIAMETER OF
 BOREHOLE IS 9 7/8"

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
0						4'x4'x6" Conc. Pad w/ 4" diameter bollards	192.99
2		0.0	NA 100%			SILTY CLAY, PALE BROWN, SOFT, MOIST	192
4					CL	-LIGHT BLUISH-GRAY MOTTLING THROUGHOUT THE CORE	190
6		0.0	NA 80%				188
8						SAND, FINE-GRAINED, SOFT, LOOSE, MOIST	186
10						-BECOMES WET, PALE BROWN, LIGHT GREENISH-GRAY THROUGHOUT CORE	184
12		0.0	NA 80%			-BECOMES YELLOW IN COLOR	182
14							180
16		0.0	NA 100%			-SOME CLAY NOTICED	178
18					SP	-BECOMES PALE BROWN	176
20		0.0	NA 80%				174
22							172
24							170
26		0.0	NA 60%				168
28							166
30		0.0	NA 80%				164

MANCHACA Rev: 10/25/04 SITES 32 50 67 BORING LOGS.GPJ 12/2/04

Continued Next Page



Drilling Log

00044981

Monitoring Well **50WW06**

Page: 2 of 2

Project Longhorn Army Ammunition Plant

Owner Shaw E&I, Inc.

Location Kamack, Texas

Proj. No. 845714

MANCHACA Rev: 10/25/04 SITES 32 50 67 BORING LOGS.GPJ 12/2/04

Depth (ft.)	Well Completion	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.	Elevation (ft.)
30						Continued	
32		0.0	NA 80%				162
34							160
36		0.0	NA 40%			-NO RECOVERY 35'-38'	158
38						-BECOMES GREENISH-GRAY	156
40		0.0	NA 20%			-NO RECOVERY 40'-43'	154
42							152
44					SP		150
46		0.0	NA 20%				148
48						-UNCONSOLIDATED LIGNITE NOTICED 48'-53'	146
50		0.0	NA 40%				144
52							142
54							140
56		0.0	NA 40%		CL	NO RECOVERY, LAST AUGER SHOWED A CLAY W/ LIGNITE, STIFF, SATURATED	138
58						END OF BORING	136
60							134
62							132
64							130
66							128
68							126
70							124



Drilling Log

00044982

Soil Boring **67SB04**

Page: 1 of 1

Project Longhorn Army Ammunition Plant Owner Shaw E&I, Inc.
Location Karnack, Texas Proj. No. 845714
Surface Elev. NA Total Hole Depth 14.0 ft. North 6957006.9 ft East 3311522.48 ft.
Top of Casing NA Water Level Initial NA Static NA Diameter 2 in.
Screen: Dia NA in. Length NA ft. Type/Size NA/NA in.
Casing: Dia NA in. Length NA ft. Type NA
Fill Material Bentonite Grout Rig/Core 6610 DPT ATV-REMOTE/Direct Push
Drill Co. QRI Method GeoProbe
Driller Neal Clem Log By M. Allen Willmore, Jr. Date 8/19/04 Driller # NA
Checked By Kay Everett License No. NA

COMMENTS

*THIS BORING WAS ADDED
TO THE SCOPE ON 8/18/04.
8:50-BEGAN DRILLING 67SB04
9:00-SAMPLE 67SB04-03
COLLECTED, INTERVAL 2'-3'
BGS
09:15-SAMPLE 67SB04-06
COLLECTED, INTERVAL 3'-6'
BGS

Depth (ft.)	PID (ppm)	Sample ID % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Geologic Descriptions are Based on the USCS.
0					
2	0	NA 100%		SC	CLAYEY SAND, BROWN, FINE-GRAINED, LOOSE, IRON STAINING, DRY, NO ODOR
4	0	NA 100%		CL	SANDY CLAY, STIFF, HIGH PLASTICITY, IRON STAINING, DRY, NO ODOR
6					-BECOMES MORE SANDY, SLIGHTLY MOIST
8	0	NA 100%			CLAYEY SAND, BROWN, FINE-GRAINED, DENSE, IRON STAINING, SLIGHTLY MOIST, NO ODOR
10	0	NA 100%		SC	-BECOMES WET (SATURATED)
12	0	NA 100%		CH	SILTY CLAY, REDDISH-BROWN, HIGH PLASTICITY, VERY STIFF, HEAVY IRON STAINING, DRY, NO ODOR
14					END OF BORING
16					
18					
20					
22					
24					

Appendix B
Analysis Request and
Chain of Custody Reports



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 04-091004-MK
Page 1 of 1

Project Number: 845714

Samples Shipment Date: 10 SEP 2004

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Radiological ☐

Poison B ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature] / Shaw E & I

Date: 9/10/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-04WW01-GW-L0001-04WW01-REG		09 SEP 2004	15:59	1 L HDPE	1		Perchlorate by 314			N	
L0001-04WW03-GW-L0001-04WW03-REG		09 SEP 2004	16:28	1 L HDPE	1		Perchlorate by 314			N	

00044984

04



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 04-090904-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 09 SEP 2004

Lab Destination: Mitkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPD/66V725

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Enclave Parkway

Houston

TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature] / Shaw E & I

Date: 9/9/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
00001-04WWW02	04WWW02-GW-L0001-04WWW02-REG	09 SEP 2004	13:58	1 L HDPE	1		Perchlorate by 314			N	

00044985

04



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 17-090204-MK
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 02 SEP 2004

Project Name: LONGHORN AAP

Lab Destination: Milkem Lab

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/65V725

Bill To: Accounts Payable

1430 Endlave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Endlave Parkway

Houston

TX 77077

Special Instructions: *SEE ANALYTICAL REQUEST FORM SENT 8/24/04

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☐

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

Date: 9/2/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-17WW10-17WW10-GWL0001-17WW10-REG		02 SEP 2004	15:00	40 mL VOA VIAL	3	HCl<PH 2	Volatiles by SW8260B			N	
L0001-17WW10-17WW10-GWL0001-17WW10-REG		02 SEP 2004	15:00	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N	
L0001-17WW10-17WW10-GWL0001-17WW10-REG		02 SEP 2004	15:00	250 ML HDPE	1		Perchlorate by 314			N	
L0001-17WW13-17WW13-GWL0001-17WW13-REG		02 SEP 2004	10:55	40 mL VOA VIAL	3	HCl<PH 2	Volatiles by SW8260B			N	
L0001-17WW13-17WW13-GWL0001-17WW13-REG		02 SEP 2004	10:55	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N	
L0001-17WW13-17WW13-GWL0001-17WW13-REG		02 SEP 2004	10:55	1 L HDPE	1		Perchlorate by 314			N	
L0001-17WW15-17WW15-GWL0001-17WW15-REG		02 SEP 2004	10:26	40 mL VOA VIAL	3	HCl<PH 2	Volatiles by SW8260B			N	

00044986



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 17-090204-MK
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Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CIP	Condition On Receipt
10001-17WW15-SW-L0001-17WW15-REG		02 SEP 2004	10:26	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
10001-17WW15-SW-L0001-17WW15-REG		02 SEP 2004	10:26	250 ML HDPE	1	Perchlorate by 314				N	

00044987



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 17-090304-MK
Page 1 of 2

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 03 SEP 2004

Lab Destination: Mitkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Enclave Parkway

Houston

TX 77077

Serial Identification:

Possible Hazard Identification:

Non-hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Radiological ☐Unknown ☒

Sample Disposal:

Return to Client ☐Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]
Date: 9/3/04
Time: 1630

1. Received By
(Signature/Affiliation)Date:
Time:2. Relinquished By
(Signature/Affiliation)Date:
Time:2. Received By
(Signature/Affiliation)Date:
Time:3. Relinquished By
(Signature/Affiliation)Date:
Time:3. Received By
(Signature/Affiliation)Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fil	CID	Condition On Receipt
980204-ER	FIELDQC-BW-080204-ER-ER	02 SEP 2004	17:00	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
980204-ER	FIELDQC-BW-080204-ER-ER	02 SEP 2004	17:00	250 ML HDPE	1		Perchlorate by 314			N		
980304-TB	FIELDQC-BW-080304-TB-TB	03 SEP 2004	07:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N		
LD001-17WWW07	GW-LD001-17WWW07-REG	03 SEP 2004	15:15	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
LD001-17WWW07	GW-LD001-17WWW07-REG	03 SEP 2004	15:15	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
LD001-17WWW07	GW-LD001-17WWW07-REG	03 SEP 2004	15:15	250 ML HDPE	1		Perchlorate by 314			N		
LD001-17WWW08	GW-LD001-17WWW08-REG	03 SEP 2004	11:15	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
LD001-17WWW08	GW-LD001-17WWW08-REG	03 SEP 2004	11:15	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by			N		

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 17-090304-MIK
Page 2 of 2



Shaw E & I, Inc.

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
L0001-17WW08	17WW08-GW-L0001-17WW08-REG	03 SEP 2004	11:15	250 ML HDPE	1	8330 Perchlorate by 314				N	
L0001-17WW08	17WW08-GW-L0001-17WW08-CC-FD	03 SEP 2004	11:15	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B				N	
L0001-17WW08	17WW08-GW-L0001-17WW08-CC-FD	03 SEP 2004	11:15	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-17WW08	17WW08-GW-L0001-17WW08-CC-FD	03 SEP 2004	11:15	250 ML HDPE	1	Perchlorate by 314				N	
L0001-17WW11	17WW11-GW-L0001-17WW11-REG	03 SEP 2004	10:51	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B				N	
L0001-17WW11	17WW11-GW-L0001-17WW11-REG	03 SEP 2004	10:51	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-17WW11	17WW11-GW-L0001-17WW11-REG	03 SEP 2004	10:51	250 ML HDPE	1	Perchlorate by 314				N	
L0001-17WW12	17WW12-GW-L0001-17WW12-REG	03 SEP 2004	13:51	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B				N	
L0001-17WW12	17WW12-GW-L0001-17WW12-REG	03 SEP 2004	13:51	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-17WW12	17WW12-GW-L0001-17WW12-REG	03 SEP 2004	13:51	250 ML HDPE	1	Perchlorate by 314				N	
L0001-17WW14	17WW14-GW-L0001-17WW14-REG	03 SEP 2004	14:00	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B				N	
L0001-17WW14	17WW14-GW-L0001-17WW14-REG	03 SEP 2004	14:00	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-17WW14	17WW14-GW-L0001-17WW14-REG	03 SEP 2004	14:00	250 ML HDPE	1	Perchlorate by 314				N	

L0001-17WW04

02 Sep 01 14720 2.50 ml

Perch
Explosives
VOR

1
2
3
1 L Amb
40 ml VOA
VOR

Project Number: 845714

Samples Shipment Date: 03 SEP 2004

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Turnaround Time:

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

☐ Non-hazard

Flammholz

Skin Irritant

Unknown

Return to Client

Sample Disposal:

Ilybv Lab

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

Date: _____
Time: _____

1. Received By
(Signature/Affiliation)

Date: _____
Time: _____

2. Relinquished By
(Signature/Affiliation)

Date: _____
Time: _____

2. Received By
(Signature/Affiliation)

Date: _____
Time: _____

3. Relinquished By
(Signature/Affiliation)

Date: _____
Time: _____

3. Received By _____
(Signature/Affiliation)

Date: _____
Time: _____

Comments: 14 DAY TAT

* Added 17WW09 to this COC (9/8/04)
 samples sent but not on COC (9/03/04)
 17 WW09 added on original COC at Lab

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	File	CID	Condition On Receipt
Q90204-ER	FIELDQC-BW-Q90204-ER-ER	02 SEP 2004	17:00	40 mL VOA VIAL	3	HCl<pH 2	Volatiles by SW8260B				N	
Q90204-ER	FIELDQC-BW-Q90204-ER-ER	02 SEP 2004	17:00	250 ML HDPE	1		Perchlorate by 314				N	
Q90304-TB	FIELDQC-BW-Q90304-TB-TB	03 SEP 2004	07:00	40 mL VOA VIAL	2	HCl<pH 2	Volatiles by SW8260B				N	
L0001-17WVW07	17WVW07-GW-L0001-17WVW07-REG	03 SEP 2004	15:15	40 mL VOA VIAL	3	HCl<pH 2	Volatiles by SW8260B				N	
L0001-17WVW07	17WVW07-GW-L0001-17WVW07-REG	03 SEP 2004	15:15	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330				N	00044990
L0001-17WVW07	17WVW07-GW-L0001-17WVW07-REG	03 SEP 2004	15:15	250 ML HDPE	1		Perchlorate by 314				N	
L0001-17WVW08	17WVW08-GW-L0001-17WVW08-REG	03 SEP 2004	11:15	40 mL VOA VIAL	3	HCl<pH 2	Volatiles by SW8260B				N	
L0001-17WVW08	17WVW08-GW-L0001-17WVW08-REG	03 SEP 2004	11:15	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by				N	



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 17-090304-MK

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Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units	FI	CID	Condition On Receipt
L0001-17WW08	17WW08-GW-L0001-17WW08-REG	03 SEP 2004	11:15	250 ML HDPE	1	Perchlorate by 314			N		
L0001-17WW08	17WW08-GW-L0001-17WW08QC-FD	03 SEP 2004	11:15	40 mL VOA VIAL	3	Volatiles by SW8260B			N		
L0001-17WW08	17WW08-GW-L0001-17WW08QC-FD	03 SEP 2004	11:15	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N		
L0001-17WW08	17WW08-GW-L0001-17WW08QC-FD	03 SEP 2004	11:15	250 ML HDPE	1	Perchlorate by 314			N		
L0001-17WW08	17WW08-GW-L0001-17WW08-REG	02 SEP 2004	18:20	40 mL VOA VIAL	3	Volatiles by SW8260B			N		
L0001-17WW08	17WW08-GW-L0001-17WW08-REG	02 SEP 2004	18:20	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N		
L0001-17WW08	17WW08-GW-L0001-17WW08-REG	02 SEP 2004	18:20	1 L HDPE	1	Perchlorate by 314			N		
L0001-17WW11	17WW11-GW-L0001-17WW11-REG	03 SEP 2004	10:51	40 mL VOA VIAL	3	Volatiles by SW8260B			N		
L0001-17WW11	17WW11-GW-L0001-17WW11-REG	03 SEP 2004	10:51	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N		
L0001-17WW11	17WW11-GW-L0001-17WW11-REG	03 SEP 2004	10:51	250 ML HDPE	1	Perchlorate by 314			N		
L0001-17WW12	17WW12-GW-L0001-17WW12-REG	03 SEP 2004	13:51	40 mL VOA VIAL	3	Volatiles by SW8260B			N		
L0001-17WW12	17WW12-GW-L0001-17WW12-REG	03 SEP 2004	13:51	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N		
L0001-17WW12	17WW12-GW-L0001-17WW12-REG	03 SEP 2004	13:51	250 ML HDPE	1	Perchlorate by 314			N		
L0001-17WW14	17WW14-GW-L0001-17WW14-REG	03 SEP 2004	14:00	40 mL VOA VIAL	3	Volatiles by SW8260B			N		
L0001-17WW14	17WW14-GW-L0001-17WW14-REG	03 SEP 2004	14:00	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N		
L0001-17WW14	17WW14-GW-L0001-17WW14-REG	03 SEP 2004	14:00	250 ML HDPE	1	Perchlorate by 314			N		

00044991



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 17-091404-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 14 SEP 2004

Lab Destination: Mitkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature] Shaw E & I

Date: 9/14/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
091404-TB	FIELDQC-BW-091404-TB-TB	14 SEP 2004	07:00	40 mL VOA VIAL	2	HCl<pH 2	Volatiles by SW8260B			N	
L0001-17WW16	17WW16-GW-L0001-17WW16-REG	14 SEP 2004	12:41	40 mL VOA VIAL	3	HCl<pH 2	Volatiles by SW8260B			N	
L0001-17WW16	17WW16-GW-L0001-17WW16-REG	14 SEP 2004	12:41	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N	
L0001-17WW16	17WW16-GW-L0001-17WW16-REG	14 SEP 2004	12:41	250 ML HDPE	1		Perchlorate by 314			N	

00044992



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 17-090804-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 08 SEP 2004

Lab Destination: Mitkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐ Disposal by Lab ☒ Archive ☐ (mos.)

1. Relinquished By *Dan Holderfield*

Date: 9/8/04
Time: 17:15

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
590804-TB	FIELDQC-BW-090804-TB-TB	08 SEP 2004	07:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N		
L0001-17WWW01	L0001-17WWW01-GW-L0001-17WWW01-REG	07 SEP 2004	15:40	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-17WWW01	L0001-17WWW01-GW-L0001-17WWW01-REG	07 SEP 2004	15:40	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
L0001-17WWW01	L0001-17WWW01-GW-L0001-17WWW01-REG	07 SEP 2004	15:40	250 ML HDPE	1		Perchlorate by 314			N		
L0001-17WWW05	L0001-17WWW05-GW-L0001-17WWW05-REG	07 SEP 2004	17:40	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-17WWW05	L0001-17WWW05-GW-L0001-17WWW05-REG	07 SEP 2004	17:40	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
L0001-17WWW05	L0001-17WWW05-GW-L0001-17WWW05-REG	07 SEP 2004	17:40	250 ML HDPE	1		Perchlorate by 314			N		

00044993



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 18-090304-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 03 SEP 2004

Lab Destination: Mitekem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Enclave Parkway

Houston

TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Polson B ☐ Unknown ☒

Sample Disposal:

Return to Client ☐ Disposal by Lab ☒ Archive (mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]
Date: 9/3/04
Time: 1600

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Qty	Ctr	Preservative	Requested Testing Program	Sample Vol	Units	Fl	CID	Condition On Receipt
10001-18WWZ1-18WWZ1-18WWZ1-REG		03 SEP 2004	10:02	40 mL VOA VIAL	3	HC/pH 2		Volatiles by SW8280B			N		
10001-18WWZ1-18WWZ1-18WWZ1-REG		03 SEP 2004	10:02	1 L HDPE	1			Perchlorate by 314			N		

00044994

18



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 29-082704-MK
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 27 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Milken Lab

Sample Coordinator: Dan Holdenfield

Lab Contact: Evan Philo

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Possible Hazard Identification:				Sample Disposal:			
<input type="checkbox"/> Non-hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Radiological	<input checked="" type="checkbox"/> Return to Client	<input type="checkbox"/> Disposal by Lab	<input checked="" type="checkbox"/> Archive	(mos.)
1. Relinquished By <i>[Signature]</i> / Shaw E & I				1. Received By (Signature/Affiliation)		Date: 8/27/04 Time: 1520	
2. Relinquished By				2. Received By (Signature/Affiliation)		Date: Time:	
3. Relinquished By (Signature/Affiliation)				3. Received By (Signature/Affiliation)		Date: Time:	
Comments: 14 DAY TAT							

Sample No.	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
0001-29WW11	FIELDQC-BW-082504-TB3-TB	25 AUG 2004	12:00	40 mL VOA VIAL	3	HCl<ph 2	Volatiles by SW8260B			N		
0002-04-TB1	FIELDQC-BW-082704-TB1-TB	27 AUG 2004	07:00	40 mL VOA VIAL	2	HCl<ph 2	Volatiles by SW8260B			N		
0001-29WW11	29WW11-GW-0001-29WW11-REG	27 AUG 2004	11:06	40 mL VOA VIAL	3	HCl<ph 2	Volatiles by SW8260B			N		
0001-29WW11	29WW11-GW-0001-29WW11-REG	27 AUG 2004	11:06	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
0001-29WW11	29WW11-GW-0001-29WW11-REG	27 AUG 2004	11:06	250 mL HDPE	1		Perchlorate by 314			N		
0001-29WW11	29WW11-GW-0001-29WW11-REG	27 AUG 2004	11:06	40 mL VOA VIAL	3	HCl<ph 2	Volatiles by SW8260B			N		
0001-29WW11	29WW11-GW-0001-29WW11-REG	27 AUG 2004	11:06	250 mL HDPE	1		Perchlorate by 314			N		
0001-29WW11	29WW11-GW-0001-29WW11-REG	27 AUG 2004	11:06	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by			N		

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 29-082704-MK

Page 2 of 2



Shaw E & I, Inc.

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units	Fil	CIB	Condition On Receipt
L0001-28WW12	28WW12-GW-L0001-28WW12-REG	27 AUG 2004	15:10	40 mL VOA VIAL	3 HCl-pH 2	8330 Volatiles by SW8260B				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-REG	27 AUG 2004	15:10	250 ML HDPE	1	Perchlorate by 314				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-REG	27 AUG 2004	15:10	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-REG	27 AUG 2004	14:40	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-REG	27 AUG 2004	14:40	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8260B				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-REG	27 AUG 2004	10:00	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8260B				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-REG	27 AUG 2004	10:00	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-REG	27 AUG 2004	10:00	250 ML HDPE	1	Perchlorate by 314				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-MS	27 AUG 2004	10:00	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8260B				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-MS	27 AUG 2004	10:00	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-MS	27 AUG 2004	10:00	250 ML HDPE	1	Perchlorate by 314				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-MSD-MS	27 AUG 2004	10:00	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8260B				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-MSD-MS	27 AUG 2004	10:00	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330				N	
L0001-28WW12	28WW12-GW-L0001-28WW12-MSD-MS	27 AUG 2004	10:00	250 ML HDPE	1	Perchlorate by 314				N	



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 28-082604-MK
Page 1 of 2

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 26 AUG 2004

Lab Destination: Milkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/68V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions: SEE ANALYTICAL REQUEST FORM SHIPPED 8/24/04

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐

Radiological ☐

Poison B ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

Diane Meyer

Date: 8/26/04
Time: 1720

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	File CID	Condition On Receipt
082504-1B2	FIELDQC-BW-082504-1B2-TB	25 AUG 2004	12:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N	
082504-1B	FIELDQC-BW-082504-1B-TB	26 AUG 2004	07:00	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
082504-1B1	FIELDQC-BW-082504-1B1-TB	26 AUG 2004	07:00	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
LD001-29WVW05	29WVW05-GW-LD001-29WVW05-REG	26 AUG 2004	09:31	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
LD001-29WVW05	29WVW05-GW-LD001-29WVW05-REG	26 AUG 2004	09:31	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N	
LD001-29WVW05	29WVW05-GW-LD001-29WVW05-REG	26 AUG 2004	09:31	250 ML HDPE	1		Perchlorate by 314			N	
LD001-29WVW13	29WVW13-GW-LD001-29WVW13-REG	26 AUG 2004	12:31	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
LD001-29WVW13	29WVW13-GW-LD001-29WVW13-REG	26 AUG 2004	12:31	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by			N	

00044997



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 29-082604-MK
Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units	Fit	CID	Condition On Receipt
L0001-29WW13-29WW13-REG	29WW13-GW-L0001-29WW13-REG	28 AUG 2004	12:31	250 ML HDPE	1	8330 Perchlorate by 314			N		
L0001-29WW20-29WW20-REG	29WW20-GW-L0001-29WW20-REG	28 AUG 2004	10:20	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8260B			N		
L0001-29WW20-29WW20-REG	29WW20-GW-L0001-29WW20-REG	28 AUG 2004	10:20	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N		
L0001-29WW20-29WW20-REG	29WW20-GW-L0001-29WW20-REG	28 AUG 2004	10:20	250 ML HDPE	1	8330 Perchlorate by 314			N		
L0001-29WW28-29WW28-REG	29WW28-GW-L0001-29WW28-REG	28 AUG 2004	14:42	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8260B			N		
L0001-29WW28-29WW28-REG	29WW28-GW-L0001-29WW28-REG	28 AUG 2004	14:42	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N		
L0001-29WW28-29WW28-REG	29WW28-GW-L0001-29WW28-REG	28 AUG 2004	14:42	250 ML HDPE	1	8330 Perchlorate by 314			N		
L0001-29WW34-29WW34-REG	29WW34-GW-L0001-29WW34-REG	28 AUG 2004	15:51	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8260B			N		
L0001-29WW34-29WW34-REG	29WW34-GW-L0001-29WW34-REG	28 AUG 2004	15:51	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N		
L0001-29WW34-29WW34-REG	29WW34-GW-L0001-29WW34-REG	28 AUG 2004	15:51	250 ML HDPE	1	Perchlorate by 314			N		

00044998



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 29-090104-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 01 SEP 2004

Lab Destination: Milken Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Endlave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Endlave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Radiological ☐

Poison B ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mps.)

1. Relinquished By
(Signature/Affiliation)

[Signature]

Date: 9/1/04
Time: 1730

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 Day

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
L0001-28WVW02-28WVW02-28WVW02-REG		31 AUG 2004	16:02	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-28WVW02-28WVW02-28WVW02-REG		31 AUG 2004	16:02	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
L0001-28WVW02-28WVW02-28WVW02-REG		31 AUG 2004	16:02	250 ML HDPE	1		Perchlorate by 314			N		

00044999

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 29-083104-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 31 AUG 2004

Lab Destination: Milkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By (Signature/Affiliation)	<i>[Signature]</i>	Date: 8/31/04 Time: 17:15	1. Received By (Signature/Affiliation)		Date: Time:
2. Relinquished By (Signature/Affiliation)		Date: Time:	2. Received By (Signature/Affiliation)		Date: Time:
3. Relinquished By (Signature/Affiliation)		Date: Time:	3. Received By (Signature/Affiliation)		Date: Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fil	CID	Condition On Receipt
DE3004-TB	FIELDQC-BW-03004-TB-TB	30 AUG 2004	07:00	40 mL VOA VIAL	2	HCl<pH 2	Volatiles by SW8260B				N	
L0001-29WW23	29WW23-GW-L0001-29WW23-REG	30 AUG 2004	17:35	40 mL VOA VIAL	3	HCl<pH 2	Volatiles by SW8260B				N	
L0001-29WW23	29WW23-GW-L0001-29WW23-REG	30 AUG 2004	17:35	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330				N	
L0001-29WW23	29WW23-GW-L0001-29WW23-REG	30 AUG 2004	17:35	250 ML HDPE	1		Perchlorate by 314				N	
L0001-29WW23	29WW23-GW-L0001-29WW23-REG	30 AUG 2004	17:00	40 mL VOA VIAL	3	HCl<pH 2	Volatiles by SW8260B				N	
L0001-29WW23	29WW23-GW-L0001-29WW23-REG	30 AUG 2004	17:00	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330				N	
L0001-29WW23	29WW23-GW-L0001-29WW23-REG	30 AUG 2004	17:00	1 L HDPE	1		Perchlorate by 314				N	



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 29-083004-MK
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 30 AUG 2004

Bill To: Accounts Payable

Project Name: LONGHORN AAP

Lab Destination: Milkem Lab

1430 Enclave Parkway

Houston TX 77077

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philp

Report To: Diane Meyer

Project Contact: Diane Meyer

1430 Enclave Parkway

Houston TX 77077

Turnaround Time: 14 Day

Carrier/Waybill No.: UPS 66V725

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]
Date: 8/30/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	File	CID	Condition On Receipt
082804-ER	FELDQC-8W-082804-ER-ER	29 AUG 2004	17:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N		
082904-ER	FELDQC-8W-082904-ER-ER	29 AUG 2004	17:00	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
082804-ER	FELDQC-8W-082804-ER-ER	29 AUG 2004	17:00	250 ML HDPE	1		Perchlorate by 314			N		
082904-TB1	FELDQC-8W-082904-TB1-TB	29 AUG 2004	07:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N		
L0001-29WV04	29WV04-6W-L0001-29WV04-REG	29 AUG 2004	11:25	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-29WV04	29WV04-6W-L0001-29WV04-REG	29 AUG 2004	11:25	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
L0001-29WV04	29WV04-6W-L0001-29WV04-REG	29 AUG 2004	11:25	250 ML HDPE	1		Perchlorate by 314			N		

00045001



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-29WW33-GW-L0001-29WW33-REG		29 AUG 2004	15:20	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8280B		N		
L0001-29WW33-GW-L0001-29WW33-REG		29 AUG 2004	15:20	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330		N		
L0001-29WW33-GW-L0001-29WW33-REG		29 AUG 2004	15:20	250 ML HDPE	1	Pentachlorate by 314		N		



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 29-082504-MK

Page 1 of 2

Project Number: 845714

Samples Shipment Date: 25 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Turnaround Time: 14 Days

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/88V725

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diana Meyer

1430 Enclave Parkway

Houston

TX 77077

Special Instructions: SEE ANALYTICAL REQUEST FORM SENT 8/24/04

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By (Signature/Affiliation)

[Signature] Date: 8/25/04 Time: 1720

1. Received By (Signature/Affiliation)

Date: Time:

2. Relinquished By (Signature/Affiliation)

Date: Time:

2. Received By (Signature/Affiliation)

Date: Time:

3. Relinquished By (Signature/Affiliation)

Date: Time:

3. Received By (Signature/Affiliation)

Date: Time:

Comments: 14 DAY

2 weeks

Sample No	Sample Name	Sample Date	Sample Time	Container	Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
082404-TB2	FIELDQC-BW-082404-TB2-TB	25 AUG 2004	15:00	40 mL VOA VIAL	2	HCl+PH 2	Volatiles by SW8260B			N		
082504-TB	FIELDQC-BW-082504-TB-TB	25 AUG 2004	07:00	40 mL VOA VIAL	2	HCl+PH 2	Volatiles by SW8260B			N		
082504-TB1	FIELDQC-BW-082504-TB1-TB	25 AUG 2004	07:05	40 mL VOA VIAL	2	HCl+PH 2	Volatiles by SW8260B			N		
L0001-29WVW07	29WVW07-GWL0001-29WVW07-REG	25 AUG 2004	16:21	40 mL VOA VIAL	3	HCl+PH 2	Volatiles by SW8260B			N		
L0001-29WVW07	29WVW07-GWL0001-29WVW07-REG	25 AUG 2004	16:21	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
L0001-29WVW07	29WVW07-GWL0001-29WVW07-REG	25 AUG 2004	16:21	250 ML HDPE	1		Pentachlorate by 914			N		
L0001-29WVW08	29WVW08-GWL0001-29WVW08-REG	25 AUG 2004	12:11	40 mL VOA VIAL	3	HCl+PH 2	Volatiles by SW8260B			N		
L0001-29WVW08	29WVW08-GWL0001-29WVW08-REG	25 AUG 2004	12:11	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by			N		

00045003

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Shaw E & I, Inc.

ANALYSIS REQUEST AND
CHAIN OF CUSTODY RECORD

Reference Document No: 29-082504-MK

Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	Cid	Condition On Receipt
L0001-29WW08	29WW08-GW-L0001-29WW08-REG	25 AUG 2004	12:11	250 ML HDPE	1	8330				
L0001-29WW15	29WW15-GW-L0001-29WW15-REG	25 AUG 2004	12:15	40 mL VOA VIAL	3 HCl-pH 2	Perchlorate by 314			N	
L0001-29WW15	29WW15-GW-L0001-29WW15-REG	25 AUG 2004	12:15	250 ML HDPE	1	Volatiles by SW8260B			N	
L0001-29WW15	29WW15-GW-L0001-29WW15-REG	25 AUG 2004	12:15	1 L Amb. Glass	2	Perchlorate by 314			N	
L0001-29WW15	29WW15-GW-L0001-29WW15-REG	25 AUG 2004	12:15	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	
L0001-29WW21	29WW21-GW-L0001-29WW21-REG	25 AUG 2004	15:40	250 ML HDPE	1	8330				
L0001-29WW21	29WW21-GW-L0001-29WW21-REG	25 AUG 2004	15:40	40 mL VOA VIAL	3 HCl-pH 2	Perchlorate by 314			N	
L0001-29WW21	29WW21-GW-L0001-29WW21-REG	25 AUG 2004	15:40	40 mL VOA VIAL	3 HCl-pH 2	Volatiles by SW8260B			N	

00045004



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 29-082404-MK
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 24 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

Sample Coordinator: Dan Holderfield

Lab Contact:

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions: *SEE ANALYTICAL REQUEST FORM (INCLUDED) X

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mcs.)

1. Relinquished By
(Signature/Affiliation)

Date: 8/24/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: NORMAL TURNAROUND

Sample No	Sample Name	Sample Date	Sample Time	Container	Qty	Cr	Preservative	Requested Testing Program	Sample Vol	Units	File	Condition On Receipt
002404-TB	FIELDLOC-SW-082404-TB-TB	24 AUG 2004	07:00	40 mL VOA VIAL	2	HC-kph 2		Volatiles by SW8260B		N		
002404-TB1	FIELDLOC-SW-082404-TB1-TB	24 AUG 2004	07:05	40 mL VOA VIAL	2	HC-kph 2		Volatiles by SW8260B		N		
0001-28WWT4	28WWT4-GNLL0001-28WWT4-REG	24 AUG 2004	13:08	40 mL VOA VIAL	3	HC-kph 2		Volatiles by SW8260B		N		
0001-28WWT4	28WWT4-GNLL0001-28WWT4-REG	24 AUG 2004	13:08	1 L Amb. Glass	2			Nitroaromatics and Nitroamines by B330		N		
0001-28WWT4	28WWT4-GNLL0001-28WWT4-REG	24 AUG 2004	13:08	250 ML HDPE	1			Perchlorate by 314		N		
0001-28WWT6	28WWT6-GNLL0001-28WWT6-REG	24 AUG 2004	14:33	40 mL VOA VIAL	3	HC-kph 2		Volatiles by SW8260B		N		
0001-28WWT6	28WWT6-GNLL0001-28WWT6-REG	24 AUG 2004	14:33	1 L Amb. Glass	2			Nitroaromatics and Nitroamines by B330		N		



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-090104-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 01 SEP 2004

Lab Destination: Milkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Endlavs Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Endlavs Parkway

Houston

TX 77077

Special Instructions: SEE ANALYTICAL REQUEST FORM

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation) *Dan Holderfield / Shaw E & I*

Date: 9/1/04
Time: 1730

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

1. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
L0001-113	1113-GWL-D001-113-REG	01 SEP 2004	14:15	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
L0001-32WVW01	32WVW01-GWL-D001-32WVW01-REG	31 AUG 2004	17:20	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330			N		
L0001-32WVW01-02												
L0001-32WVW02												
31 AUG 2004 17:20												
01 Sept 05:30												

00045006

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ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-090804-KE
Page 1 of 1

Project Number: 845714
Project Name: LONGHORN AAP
Sample Coordinator: Dan Holderfield
Turnaround Time: 7 Day

Samples Shipment Date: 08 SEP 2004
Lab Destination: Kemron Lab
Lab Contact:
Project Contact: Diane Meyer
Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable
1430 Endlave Parkway
Houston TX 77077

Report To: Diane Meyer
1430 Endlave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

Date: 9/8/04
Time: 1215

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 7 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
L0001-32SB22	32SB22-SO-L0001-32SB22-REG	08 SEP 2004	14:31	4 oz CWM	1		Metals by SW6020			N		
L0001-32SB23	32SB23-SO-L0001-32SB23-REG	08 SEP 2004	14:54	4 oz CWM	1		Metals by SW6020			N		
L0002-32SB22	32SB22-SO-L0002-32SB22-REG	08 SEP 2004	14:39	4 oz CWM	1		Metals by SW6020			N		
L0002-32SB23	32SB23-SO-L0002-32SB23-REG	08 SEP 2004	15:00	4 oz CWM	1		Metals by SW6020			N		
L0003-32SB22	32SB22-SO-L0003-32SB22-REG	08 SEP 2004	14:48	4 oz CWM	1		Metals by SW6020			N		
L0003-32SB23	32SB23-SO-L0003-32SB23-REG	08 SEP 2004	15:00	4 oz CWM	1		Metals by SW6020			N		

00045007

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ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-090804-MK
Page 1 of 2

Project Number: 845714
Project Name: LONGHORN AAP
Sample Coordinator: Dan Holderfield
Turnaround Time: 7 Day

Samples Shipment Date: 08 SEP 2004
Lab Destination: Mitkem Lab
Lab Contact: Evan Philo
Project Contact: Diane Meyer
Carrier/Waybill No.: UPS/68V725

Bill To: Accounts Payable
1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer
1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☒ Radiological ☐ Return to Client ☐ Disposal by Lab ☒ Archive (mos.)

1. Relinquished By *[Signature]* Date: 9/8/04
(Signature/Affiliation) Time: 12:15

2. Relinquished By
(Signature/Affiliation) Date: Time:

3. Relinquished By
(Signature/Affiliation) Date: Time:

Comments: 7 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
10001-32SB22	32SB22-SO-L0001-32SB22-REG	08 SEP 2004	14:31	4 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A			N		
10001-32SB22	32SB22-SO-L0001-32SB22-REG	08 SEP 2004	14:31	4 oz CWM	1		Nitroaromatics and Nitroamines by 8330			N		
10001-32SB23	32SB23-SO-L0001-32SB23-REG	08 SEP 2004	14:54	4 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A			N		
10001-32SB23	32SB23-SO-L0001-32SB23-REG	08 SEP 2004	14:54	4 oz CWM	1		Nitroaromatics and Nitroamines by 8330			N		
10002-32SB22	32SB22-SO-L0002-32SB22-REG	08 SEP 2004	14:39	4 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A			N		
10002-32SB22	32SB22-SO-L0002-32SB22-REG	08 SEP 2004	14:39	4 oz CWM4	1		Nitroaromatics and Nitroamines by			N		

00045008



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-090804-MK

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Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0002-32SB23	32SB23-SO-L0002-32SB23-REG	08 SEP 2004	15:00	4 oz CWM	1	8330 RCRA Metal + B, Be by 6010B and 7471A			N	
L0002-32SB23	32SB23-SO-L0002-32SB23-REG	08 SEP 2004	15:00	4 oz CWM	1	8330 Nitroaromatics and Nitroamines by 7471A			N	
L0003-32SB22	32SB22-SO-L0003-32SB22-REG	08 SEP 2004	14:48	4 oz CWM	1	8330 RCRA Metal + B, Be by 6010B and 7471A			N	
L0003-32SB22	32SB22-SO-L0003-32SB22-REG	08 SEP 2004	14:48	4 oz CWM	1	8330 Nitroaromatics and Nitroamines by 7471A			N	
L0003-32SB23	32SB23-SO-L0003-32SB23-REG	08 SEP 2004	15:00	4 oz CWM	1	8330 Nitroaromatics and Nitroamines by 7471A			N	
L0003-32SB23	32SB23-SO-L0003-32SB23-REG	08 SEP 2004	15:00	4 oz CWM	1	8330 RCRA Metal + B, Be by 6010B and 7471A			N	

00045009



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-081704-KE
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 17 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Kamron Lab

Sample Coordinator:

Lab Contact:

Turnaround Time:

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐

Radiological ☐

Poison B ☐ Unknown ☐

Sample Disposal:

Return to Client ☐ Disposal by Lab ☐ Archive ☐ (mos.)

1. Relinquished By
(Signature/Affiliation)

Date:
Time:

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: NORMAL TURNAROUND

Sample No	Sample Name	Sample Date	Sample Time	Sample Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	File	CID	Condition On Receipt
10001-32SB15	32SB15-SO-L0001-32SB15-REG	16 AUG 2004	14:05	2 oz CWM	1		Metals by SW6020				N	
10001-32SB16	32SB16-SO-L0001-32SB16-REG	16 AUG 2004	16:05	2 oz CWM	1		Metals by SW6020				N	
10001-32SB17	32SB17-SO-L0001-32SB17-REG	17 AUG 2004	08:17	2 oz CWM	1		Metals by SW6020				N	
10001-32SB18	32SB18-SO-L0001-32SB18-REG	17 AUG 2004	12:55	2 oz CWM	1		Metals by SW6020				N	
10001-32SB18-MS	32SB18-SO-L0001-32SB18-MS-MS	17 AUG 2004	12:55	2 oz CWM	1		Metals by SW6020				N	
10001-32SB18-MSD	32SB18-SO-L0001-32SB18-MSD-MSD	17 AUG 2004	12:55	2 oz CWM	1		Metals by SW6020				N	
10001-32SB19	32SB19-SO-L0001-32SB19-REG	17 AUG 2004	13:50	2 oz CWM	1		Metals by SW6020				N	
10001-32SB20	32SB20-SO-L0001-32SB20-REG	17 AUG 2004	10:00	2 oz CWM	1		Metals by SW6020				N	

00045010

AT



Shaw E&I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-081704-KE
Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-32SB21	32SB21-SO-L0001-32SB21-REG	17 AUG 2004	11:05	2 oz CWM	1	Metals by SW6020			N	
L0001-32SB21Q	32SB21-SO-L0001-32SB21Q-FO	17 AUG 2004	11:05	2 oz CWM	1	Metals by SW6020			N	
L0002-32SB16	32SB16-SO-L0002-32SB16-REG	16 AUG 2004	14:05	2 oz CWM	1	Metals by SW6020			N	
L0002-32SB16	32SB16-SO-L0002-32SB16-REG	16 AUG 2004	16:35	2 oz CWM	1	Metals by SW6020			N	
L0002-32SB17	32SB17-SO-L0002-32SB17-REG	17 AUG 2004	08:40	2 oz CWM	1	Metals by SW6020			N	
L0002-32SB18	32SB18-SO-L0002-32SB18-REG	17 AUG 2004	13:10	2 oz CWM	1	Metals by SW6020			N	
L0002-32SB18Q	32SB18-SO-L0002-32SB18Q-FO	17 AUG 2004	13:10	2 oz CWM	1	Metals by SW6020			N	
L0002-32SB19	32SB19-SO-L0002-32SB19-REG	17 AUG 2004	13:55	2 oz CWM	1	Metals by SW6020			N	
L0002-32SB20	32SB20-SO-L0002-32SB20-REG	17 AUG 2004	10:30	2 oz CWM	1	Metals by SW6020			N	
L0002-32SB21	32SB21-SO-L0002-32SB21-REG	17 AUG 2004	11:16	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB15	32SB15-SO-L0003-32SB15-REG	16 AUG 2004	15:45	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB16	32SB16-SO-L0003-32SB16-REG	16 AUG 2004	16:55	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB17	32SB17-SO-L0003-32SB17-REG	17 AUG 2004	08:45	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB18	32SB18-SO-L0003-32SB18-REG	17 AUG 2004	13:20	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB19	32SB19-SO-L0003-32SB19-REG	17 AUG 2004	14:00	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB19-MSD	32SB19-SO-L0003-32SB19-MSD	17 AUG 2004	14:00	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB19-MSD-MSD	32SB19-SO-L0003-32SB19-MSD-MSD	17 AUG 2004	14:00	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB20	32SB20-SO-L0003-32SB20-REG	17 AUG 2004	10:40	2 oz CWM	1	Metals by SW6020			N	
L0003-32SB21	32SB21-SO-L0003-32SB21-REG	17 AUG 2004	11:25	2 oz CWM	1	Metals by SW6020			N	

00045011



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-081704-MK
Page 1 of 4

Project Number: 845714

Samples Shipped Date: 17 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

Sample Coordination:

Lab Contact:

Turnaround Time:

Project Contact: Diane Meyer

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Enclave Parkway

Houston

TX 77077

Carrier/Manifest No.: UPS/66V725

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Polysorbate ☐ Radiological ☐ Sample Disposal: ☐ Return to Client ☐ Disposal by Lab ☐ Archive ☐ (mos.)

1. Relinquished By
(Signature/Affiliation)

Date:
Time:

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: NORMAL TURNAROUND

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	Cap	Condition On Receipt
L0001-325B15	325B15-SO-L0001-325B15-REG	16 AUG 2004	14:05	4 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A			N		
L0001-325B15	325B15-SO-L0001-325B15-REG	16 AUG 2004	14:05	4 oz CWM	1		Nitroaromatics and Nitroamines by 8330			N		
L0001-325B16	325B16-SO-L0001-325B16-REG	16 AUG 2004	16:05	4 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A			N		
L0001-325B16	325B16-SO-L0001-325B16-REG	16 AUG 2004	16:05	4 oz CWM	1		Nitroaromatics and Nitroamines by 8330			N		
L0001-325B17	325B17-SO-L0001-325B17-REG	17 AUG 2004	08:17	4 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A			N		
L0001-325B17	325B17-SO-L0001-325B17-REG	17 AUG 2004	08:17	4 oz CWM	1		Nitroaromatics and Nitroamines by			N		

00045012



CHAIN OF CUSTODY RECORD

Reference Document No. 32-38704-4K

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00045013

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units ml	CID	Condition On Receipt
L0001-325B16	325B16-SO-L0002-325B16-REG	17 AUG 2004	12:55	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B16	325B16-SO-L0002-325B16-REG	17 AUG 2004	12:55	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B16	325B16-SO-L0002-325B16-IS-MS	17 AUG 2004	12:55	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B16	325B16-SO-L0002-325B16-IS-MS	17 AUG 2004	12:55	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B16	325B16-SO-L0002-325B16-ISD-MSD	17 AUG 2004	12:55	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B16	325B16-SO-L0002-325B16-ISD-MSD	17 AUG 2004	12:55	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B16	325B16-SO-L0002-325B16-REG	17 AUG 2004	13:50	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B16	325B16-SO-L0002-325B16-REG	17 AUG 2004	13:50	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B20	325B20-SO-L0002-325B20-REG	17 AUG 2004	10:00	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B20	325B20-SO-L0002-325B20-REG	17 AUG 2004	10:00	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B21	325B21-SO-L0002-325B21-REG	17 AUG 2004	11:05	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B21	325B21-SO-L0002-325B21-REG	17 AUG 2004	11:05	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B21Q	325B21Q-SO-L0002-325B21Q-CFD	17 AUG 2004	11:05	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0001-325B21Q	325B21Q-SO-L0002-325B21Q-CFD	17 AUG 2004	11:05	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B15	325B15-SO-L0002-325B15-REG	16 AUG 2004	14:05	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B15	325B15-SO-L0002-325B15-REG	16 AUG 2004	14:05	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B16	325B16-SO-L0002-325B16-REG	16 AUG 2004	16:35	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B16	325B16-SO-L0002-325B16-REG	16 AUG 2004	16:35	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B17	325B17-SO-L0002-325B17-REG	17 AUG 2004	08:40	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B17	325B17-SO-L0002-325B17-REG	17 AUG 2004	08:40	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B16	325B16-SO-L0002-325B16-REG	17 AUG 2004	13:10	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B16	325B16-SO-L0002-325B16-REG	17 AUG 2004	13:10	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			
L0002-325B16Q	325B16Q-SO-L0002-325B16Q-CFD	17 AUG 2004	13:10	4 oz CWM	1	BSC Metal + B, Be by EDTMS and Nitramines oy	N			



Reference Document No: 32-01704-146

Figure 1. Schematic representation of the experimental design. The subjects were divided into two groups: the control group and the experimental group. The control group was divided into two subgroups: the control group and the experimental group. The experimental group was divided into two subgroups: the control group and the experimental group. The control group was divided into two subgroups: the control group and the experimental group. The experimental group was divided into two subgroups: the control group and the experimental group.

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units ml	CID	Condition On Receipt
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	13:10	4 oz CPWM		747* A Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	13:55	4 oz CPWM		9350 RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	13:55	4 oz CPWM		747* A Nitrocellulose and Nitrocellulose oy		N		
0000-325B20	325B20-50-1000-125B1300-FC	17 JUN 2004	10:30	4 oz CPWM		9350 RCRA Metal + S, Be by 501015 and		N		
0000-325B20	325B20-50-1000-125B1300-FC	17 JUN 2004	10:30	4 oz CPWM		747* A Nitrocellulose and Nitrocellulose oy		N		
0000-325B21	325B21-50-1000-125B1300-FC	17 JUN 2004	11:15	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B21	325B21-50-1000-125B1300-FC	17 JUN 2004	11:15	4 oz CPWM		9350 RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	16 JUN 2004	15:45	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	16 JUN 2004	15:45	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	16 JUN 2004	16:55	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	16 JUN 2004	16:55	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	08:45	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	08:45	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	13:20	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	13:20	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		747* A RCRA Metal + S, Be by 501015 and		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM		9350 Nitrocellulose and Nitrocellulose oy		N		
0000-325B7-5	325B7-50-1000-125B1300-FC	17 JUN 2004	14:00	4 oz CPWM						



Shaw E & L, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-281704-WK

Page 4 of 4

00045015

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units	SH	CID	Condition On Receipt
0003-325621	325621-80-1003-05021450	17 JUL 2004	11:25	4 oz CWM		8350 RCRA Metal + S-Ba by ETOXIS and 7477 AL			N		
0003-325621	325621-80-1003-05021450	17 JUL 2004	11:25	4 oz CWM		8350 Nitrogenates and Nitrosamines by			N		



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-081604-KE
Page 1 of 1

Project Number: 845714

Samples Shipment Date: 15 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Kemron Lab

Sample Coordinator: *Don Holderfield*

Lab Contact: *Stephanie Mossburg*

Turnaround Time: *Normal*

Project Contact: Diane Meyer

Report To: Diane Meyer

Carrier/Waybill No.: *UPS/ 1Z66V 725*

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

1430 Enclave Parkway

Houston

TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison E ☐

Unknown ☒

Radiological ☐

Samples Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *Don Holderfield / Shaw E&I*

Date: *8/16/04*
Time: *1720*

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

Date:
Time:

Comments: NORMAL TURNAROUND

Sample No	Sample Name	Sample Date	Sample Time	Container	Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fil	CID	Condition On Receipt
L0001-32SB14	32SB14-SO-L0001-32SB14-REG	16 AUG 2004	11:30	2 oz CWM	1		Metals by SW6020			N		
L0002-32SB14	32SB14-SO-L0002-32SB14-REG	16 AUG 2004	12:20	2 oz CWM	1		Metals by SW6020			N		
L0002-32SB14Q	32SB14-SO-L0002-32SB14QC-FD	16 AUG 2004	12:20	2 oz CWM	1		Metals by SW6020			N		
L0003-32SB14	32SB14-SO-L0003-32SB14-REG	16 AUG 2004	13:15	2 oz CWM	1		Metals by SW6020			N		

00045016

32



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 32-081604-MK
Page 1 of 2

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: *Don Holderfield*

Turnaround Time: *Normal*

Samples Shipment Date: 16 AUG 2004

Lab Destination: Mitkem Lab

Lab Contact:

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/ 17666725

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Enclave Parkway

Houston

TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive (mos.)

1. Relinquished By *Don Holderfield*
(Signature/Affiliation)

Date: *8/16/04*
Time: *1720*

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: NORMAL TURNAROUND

Sample No	Sample Name	Sample Date	Sample Time	Cor In/Out	Qty	Str	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
L0001-325B14	325B14-SO-L0001-325B14-REG	16 AUG 2004	11:30	4 oz C / V	1	1		Nitroaromatics and Nitroamines by 8330			N		
L0001-325B14	325B14-SO-L0001-325B14-REG	16 AUG 2004	11:30	4 oz C / V	1	1		RCRA Metal + B, Be by 6010B and 7471A			N		
L0002-325B14	325B14-SO-L0002-325B14-REG	16 AUG 2004	12:20	4 oz C / V	1	1		RCRA Metal + B, Be by 6010B and 7471A			N		
L0002-325B14	325B14-SO-L0002-325B14-REG	16 AUG 2004	12:20	4 oz C / V	1	1		Nitroaromatics and Nitroamines by 8330			N		
L0002-325B14	325B14-SO-L0002-325B14-REG	16 AUG 2004	12:20	4 oz C / V	1	1		RCRA Metal + B, Be by 6010B and 7471A			N		
L0002-325B14	325B14-SO-L0002-325B14-REG	16 AUG 2004	12:20	4 oz C / V	1	1		Nitroaromatics and Nitroamines by 8330			N		
L0002-325B14	325B14-SO-L0002-325B14-REG	16 AUG 2004	12:20	4 oz C / V	1	1		RCRA Metal + B, Be by 6010B and 7471A			N		
L0002-325B14	325B14-SO-L0002-325B14-REG	16 AUG 2004	12:20	4 oz C / V	1	1		Nitroaromatics and Nitroamines by 8330			N		

00045017



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35C-091704-KE
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 17 SEP 2004

Lab Destination: Kemron Lab

Lab Contact: *Stephanie Mossburn*

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable
1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer
1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation) *Dan Holderfield / Shaw E&I*

Date: *9/17/04*
Time: *17:05*

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT, UNPRESERVED METALS TO BE FILTERED BY LAB

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-LHSMW71-GW-L0001-LHSMW71-REG		14 SEP 2004	15:45	500 mL HDPE	1		Metals by SW6020			N	
L0001-LHSMW71-GW-L0001-LHSMW71-REG		14 SEP 2004	15:45	500 mL HDPE	1		Dissolved Metals by SW6020			N	

00045018

35C



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35C-091704-MK

Page 1 of 1

Shaw E & I, Inc.

Project Number: 845714

Samples Shipment Date: 17 SEP 2004

Bill To: Accounts Payable

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

1430 Endlave Parkway

Houston TX 77077

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Report To: Diane Meyer

Turnaround Time: 14 DA

Project Contact: Diane Meyer

1430 Endlave Parkway

Houston TX 77077

Carrier/Waybill No.: UPS/66V725

Special Instructions: ~~EXTRACT ASAP, VOC TAKEN 9/14, METALS 9/15 AND 9/16, PERC ON 9/17~~

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]

Date: 9/17/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT, UNPRESERVED METALS TO BE FILTERED BY LAB

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
091704-TB	FIELDQC-BW-091704-TB-TB	17 SEP 2004	07:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N	
L0001-LHSMW7	LHSMW71-GW-L0001-LHSMW71-REG	14 SEP 2004	15:45	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
L0001-LHSMW7	LHSMW71-GW-L0001-LHSMW71-REG	14 SEP 2004	15:45	1 L HDPE	1		Perchlorate by 314			N	
L0001-LHSMW7	LHSMW71-GW-L0001-LHSMW71-REG	14 SEP 2004	15:45	500 mL HDPE	1		RCRA Metal + B, Be by 6010B and 7470A Dissolved			N	
L0001-LHSMW7	LHSMW71-GW-L0001-LHSMW71-REG	14 SEP 2004	15:45	500 mL HDPE	1	HNO3-pH 2	RCRA Metal + B, Be by 6010B and 7470A			N	

00045019

35c

35c



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35C-091604-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Days

Samples Shipment Date: 16 SEP 2004

Lab Destination: Mitkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *Dan Holderfield*

Shaw E & I

Date: 9/16/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By

(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By

(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
091604-TB	FIELDQC-BW-091604-TB-TB	16 SEP 2004	07:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N	
L0001-LHSMW6	LHSMW67-GW-L0001-LHSMW67-REG	15 SEP 2004	12:30	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
L0001-LHSMW6	LHSMW67-GW-L0001-LHSMW67-REG	15 SEP 2004	12:30	250 ML HDPE	1		Perchlorate by 314			N	

00045020

35C



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35B-091004-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 10 SEP 2004

Lab Destination: Mitkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Endlave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Endlave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Radiological ☐

Poison B ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]
Date: 9/10/04
Time: 1715

Date: 9/10/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
091004-TB	FIELDQC-8WV-091004-TB-TB	10 SEP 2004	07:00	40 mL VOA VIAL	2	HCl<ph 2	Volatiles by SW8260B			N		
L0001-35BWW035BWW01-GW-L0001-35BWW01-REG		10 SEP 2004	14:07	40 mL VOA VIAL	3	HCl<ph 2	Volatiles by SW8260B			N		
L0001-35BWW035BWW03-GW-L0001-35BWW03-REG		10 SEP 2004	14:06	40 mL VOA VIAL	3	HCl<ph 2	Volatiles by SW8260B			N		
L0001-LHSMW51-LHSMW58-GW-L0001-LHSMW58-REG		10 SEP 2004	11:01	40 mL VOA VIAL	3	HCl<ph 2	Volatiles by SW8260B			N		
L0001-LHSMW51-LHSMW59-GW-L0001-LHSMW59-REG		10 SEP 2004	11:35	40 mL VOA VIAL	3	HCl<ph 2	Volatiles by SW8260B			N		

00045021



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35A-090804-MK

Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 08 SEP 2004

Lab Destination: Mitkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Endlave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Endlave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Radiological ☐ Poison B ☐ Unknown ☒ Return to Client ☐ Disposal by Lab ☒ Archive (mos.)

1. Relinquished By *[Signature]*

Date: 9/8/04
Time: 12:5

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
L0001-35AWW05-GW-L0001-35AWW05-REG		08 SEP 2004	12:06	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-LHSMW01-LHSMW07-GW-L0001-LHSMW07-REG		08 SEP 2004	11:06	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		

00045022

35A



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35A-091004-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 10 SEP 2004

Lab Destination: Milkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☐

Archive ☒

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]
Date: 9/10/04
Time: 1715

Date: 9/10/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Qty	Ctr	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-35A000035A0002-GW-L0001-35A00002-REG		10 SEP 2004	11:20	40 mL VOA VIAL	3	HCl<ph 2		Volatiles by SW8260B			N	

00045023

35A



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35A-090904-MK

Page 1 of 2

Project Number: 845714

Samples Shipment Date: 09 SEP 2004

Bill To: Accounts Payable

Project Name: LONGHORN AAP

Lab Destination: Mitek Lab

1430 Enclave Parkway

Houston TX 77077

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Report To: Diane Meyer

Turnaround Time: 14 Day

Project Contact: Diane Meyer

1430 Enclave Parkway

Houston TX 77077

Carrier/Waybill No.: UPD/66V725

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Radiological ☐

Poison B ☐

Unknown ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *[Signature]*

Date: 9/9/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	FI	CID	Condition On Receipt
590904-TB	FIELDQC-BW-350904-TB-TB	09 SEP 2004	07:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N		
L0001-35A-WW03-5A-WW01-GW-L0001-35A-WW01-REG		09 SEP 2004	11:30	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-35A-WW03-5A-WW01-GW-L0001-35A-WW01-MS-M		09 SEP 2004	11:30	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-35A-WW03-5A-WW01-GW-L0001-35A-WW01-MSD-1		09 SEP 2004	11:30	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-35A-WW03-5A-WW03-GW-L0001-35A-WW03-REG		08 SEP 2004	18:30	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-35A-WW03-5A-WW04-GW-L0001-35A-WW04-REG		08 SEP 2004	15:56	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-35A-WW03-5A-WW04-GW-L0001-35A-WW04-QC-FC		08 SEP 2004	15:56	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		
L0001-LHSMW01-LHSMW01-GW-L0001-LHSMW01-REG		09 SEP 2004	13:55	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N		

00045024



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35A-090904-MK

Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-LHSMW01-LHSMW04-GW-L0001-LHSMW04-REG		08 SEP 2004	10:45	40 mL VOA VIAL	3 HCl<pH 2	Volatiles by SW8260B			N	
L0001-LHSMW01-LHSMW05-GW-L0001-LHSMW05-REG		08 SEP 2004	11:20	40 mL VOA VIAL	3 HCl<pH 2	Volatiles by SW8260B			N	
L0001-LHSMW01-LHSMW06-GW-L0001-LHSMW06-REG		08 SEP 2004	15:45	40 mL VOA VIAL	3 HCl<pH 2	Volatiles by SW8260B			N	

00045025



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35C-091504-MK
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 15 SEP 2004

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Endlave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Endlave Parkway
Houston TX 77077

Special Instructions: EXTRA SAMPLE PROVIDED FOR L0001-106 MS/MSD, NOT LOGGED

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐

Poison B ☐

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

D. Holderfield / *Shaw E & I*

Date: 9/15/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr	Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
091404-ER	FIELDQC-BW-091404-ER-ER	14 SEP 2004	17:30	40 mL VOA VIAL	3	3	HCl<pH 2	Volatiles by SW8260B			N		
091404-ER	FIELDQC-BW-091404-ER-ER	14 SEP 2004	17:30	250 ML HDPE	1	1		Perchlorate by 314			N		
091504-ER	FIELDQC-BW-091504-ER-ER	15 SEP 2004	13:15	40 mL VOA VIAL	3	3	HCl<pH 2	Volatiles by SW8260B			N		
091504-ER	FIELDQC-BW-091504-ER-ER	15 SEP 2004	13:15	250 ML HDPE	1	1		Perchlorate by 314			N		
091504-TB	FIELDQC-BW-091504-TB-TB	15 SEP 2004	07:00	40 mL VOA VIAL	2	2	HCl<pH 2	Volatiles by SW8260B			N		
L0001-106	106-GW-L0001-106-REG	14 SEP 2004	15:30	40 mL VOA VIAL	3	3	HCl<pH 2	Volatiles by SW8260B			N		
L0001-106	106-GW-L0001-106-REG	14 SEP 2004	15:30	250 ML HDPE	1	1		Perchlorate by 314			N		
L0001-106QC	106-GW-L0001-106QC-FD	14 SEP 2004	15:30	40 mL VOA VIAL	3	3	HCl<pH 2	Volatiles by SW8260B			N		

00045026



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35C-091504-MK

Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units	Fil	CID	Condition On Receipt
L0001-106QC	106-GW-L0001-106QC-FD	14 SEP 2004	15:30	250 ML HDPE	1	Perchlorate by 314			N		
L0001-107	107-GW-L0001-107-REG	15 SEP 2004	12:10	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B			N		
L0001-107	107-GW-L0001-107-REG	15 SEP 2004	12:10	250 ML HDPE	1	Perchlorate by 314			N		
L0001-LHSMW67	LHSMW67-GW-L0001-LHSMW67-REG	15 SEP 2004	12:30	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B			N		
L0001-LHSMW67	LHSMW67-GW-L0001-LHSMW67-REG	15 SEP 2004	12:30	250 ML HDPE	1	Perchlorate by 314			N		
L0001-LHSMW68	LHSMW68-GW-L0001-LHSMW68-REG	14 SEP 2004	16:30	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B			N		
L0001-LHSMW68	LHSMW68-GW-L0001-LHSMW68-REG	14 SEP 2004	16:30	250 ML HDPE	1	Perchlorate by 314			N		
L0001-LHSMW69	LHSMW69-GW-L0001-LHSMW69-REG	15 SEP 2004	11:51	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B			N		
L0001-LHSMW69	LHSMW69-GW-L0001-LHSMW69-REG	15 SEP 2004	11:51	250 ML HDPE	1	Perchlorate by 314			N		
L0001-LHSMW70	LHSMW70-GW-L0001-LHSMW70-REG	14 SEP 2004	11:55	40 mL VOA VIAL	3 HCl<ph 2	Volatiles by SW8260B			N		
L0001-LHSMW70	LHSMW70-GW-L0001-LHSMW70-REG	14 SEP 2004	11:55	250 ML HDPE	1	Perchlorate by 314			N		

00045027



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 47-090204-MK
Page 1 of 2

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 02-SEP-2004

Lab Destination: Milken Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Maybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]
Date: 9/2/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fill	CID	Condition On Receipt
080204-TB	FIELDQC-BW-090204-TB-TB	02 SEP 2004	07:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B		N		
L0001-47WVW07	47WVW07-GW-L0001-47WVW07-REG	01 SEP 2004	15:35	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B		N		
L0001-47WVW07	47WVW07-GW-L0001-47WVW07-REG	01 SEP 2004	15:35	2x HDPE 250 mL	1		Perchlorate by 314		N		
L0001-47WVW07	47WVW07-GW-L0001-47WVW07-QC-PD	01 SEP 2004	15:35	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B		N		
L0001-47WVW07	47WVW07-GW-L0001-47WVW07-QC-PD	01 SEP 2004	15:35	1x HDPE 250 mL	1		Perchlorate by 314		N		
L0001-47WVW13	47WVW13-GW-L0001-47WVW13-REG	02 SEP 2004	14:25	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B		N		
L0001-47WVW13	47WVW13-GW-L0001-47WVW13-REG	02 SEP 2004	14:25	1x HDPE 250 mL	1		Perchlorate by 314		N		
L0001-47WVW14	47WVW14-GW-L0001-47WVW14-REG	02 SEP 2004	12:52	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B		N		

00045028



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 47-090204-MK

Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-47WW14-GW-L0001-47WW14-REG		02 SEP 2004	12:52	1 L HDPE 2.5 L VIAL	1	Perchlorate by 314			N	
L0001-47WW15-GW-L0001-47WW15-REG		02 SEP 2004	15:05	40 mL VOA VIAL	3	Volatiles by SW8260B			N	
L0001-47WW15-GW-L0001-47WW15-REG		02 SEP 2004	15:05	1 L HDPE 2.5 L VIAL	1	Perchlorate by 314			N	
L0001-47WW30-GW-L0001-47WW30-REG		01 SEP 2004	17:26	40 mL VOA VIAL	3	Volatiles by SW8260B			N	
L0001-47WW30-GW-L0001-47WW30-REG		01 SEP 2004	17:26	1 L HDPE 2.5 L VIAL	1	Perchlorate by 314			N	
L0001-47WW31-GW-L0001-47WW31-REG		02 SEP 2004	15:26	1 L HDPE 2.5 L VIAL	1	Perchlorate by 314			N	
L0001-47WW31-GW-L0001-47WW31-REG		02 SEP 2004	15:26	40 mL VOA VIAL	3	Volatiles by SW8260B			N	

00045029



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 47-090104-MK
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 01 SEP 2004

Project Name: LONGHORN AAP

Lab Destination: Milken Lab

Sample Coordinator: Dan Holdenfield

Lab Contact: Evan Philo

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Report To: Diane Meyer

1430 Endeavor Parkway

Houston TX 77077

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Endeavor Parkway

Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-Hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature] / *Shaw E & I*

Date: 9/1/04
Time: 1730

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
380104-TB	FIELD-08-090104-TB-TB	01 SEP 2004	07:00	40 mL VOA VIAL	2	HCl<PH 2	Volatiles by SW8260B			N		
L0001-47WW03	47WW03-GW-L0001-47WW03-REG	01 SEP 2004	10:25	40 mL VOA VIAL	3	HCl<PH 2	Volatiles by SW8260B			N		
L0001-47WW03	47WW03-GW-L0001-47WW03-REG	01 SEP 2004	10:25	1 L HDPE	1		Perchlorate by 314			N		
L0001-47WW03	47WW03-GW-L0001-47WW03-REG	01 SEP 2004	12:33	40 mL VOA VIAL	3	HCl<PH 2	Volatiles by SW8260B			N		
L0001-47WW03	47WW03-GW-L0001-47WW03-REG	01 SEP 2004	12:33	1 L HDPE	1		Perchlorate by 314			N		
L0001-47WW03	47WW03-GW-L0001-47WW03-REG	01 SEP 2004	12:41	40 mL VOA VIAL	3	HCl<PH 2	Volatiles by SW8260B			N		
L0001-47WW03	47WW03-GW-L0001-47WW03-REG	01 SEP 2004	12:41	1 L HDPE	1		Perchlorate by 314			N		
L0001-47WW03	47WW03-GW-L0001-47WW03-REG	01 SEP 2004	10:21	40 mL VOA VIAL	3	HCl<PH 2	Volatiles by SW8260B			N		

00045030

4



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 47-090104-MK
Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-47WW23-47WW23-GW-L0001-47WW23-REG		01 SEP 2004	10:21	1 L HDPE	1	Perchlorate by 314			N	
L0001-47WW23-47WW23-GW-L0001-47WW23-MS-MS		01 SEP 2004	10:21	40 mL VOA VIAL	3 HCl<pH 2	Volatiles by SW6260B			N	
L0001-47WW23-47WW23-GW-L0001-47WW23-MS-MS		01 SEP 2004	10:21	1 L HDPE	1	Perchlorate by 314			N	
L0001-47WW23-47WW23-GW-L0001-47WW23-MSD-MS		01 SEP 2004	10:21	40 mL VOA VIAL	3 HCl<pH 2	Volatiles by SW6260B			N	
L0001-47WW23-47WW23-GW-L0001-47WW23-MSD-MS		01 SEP 2004	10:21	1 L HDPE	1	Perchlorate by 314			N	

00045031



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 48-091404-CO

Page 1 of 1

Project Number: 845714

Samples Shipment Date: 14 SEP 2004

Bill To: Accounts Payable

Project Name: LONGHORN AAP

Lab Destination: COLUMBIA LABS

1430 Enclave Parkway

Houston TX 77077

Sample Coordinator: Dan Holdenfield

Lab Contact: Jane Freemyer

Report To: Diane Meyer

Turnaround Time: 14 Day

Project Contact: Diane Meyer

1430 Enclave Parkway

Houston TX 77077

Carrier/Waybill No.: UPS/66V725

Special Instructions: See Analytical Request Form sent 9/13/04

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

Dan Holdenfield / Shaw E & I

Date: 9/14/04
Time: 17:25

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fil	CID	Condition On Receipt
0001-LHSMW61-HSMW62-GW-L0001-LHSMW62-REG		13 SEP 2004	16:52	1 L Amb. Glass	2	None except cool to 4 C	Dioxins and Furans by SW8290			N		
0001-LHSMW61-HSMW64-GW-L0001-LHSMW64-REG		13 SEP 2004	15:40	1 L Amb. Glass	2	None except cool to 4 C	Dioxins and Furans by SW8290			N		
0001-LHSMW61-HSMW64-GW-L0001-LHSMW64-MS-M		13 SEP 2004	15:40	1 L Amb. Glass	2	None except cool to 4 C	Dioxins and Furans by SW8290			N		
0001-LHSMW61-HSMW64-GW-L0001-LHSMW64-MSD		13 SEP 2004	15:40	1 L Amb. Glass	2	None except cool to 4 C	Dioxins and Furans by SW8290			N		

00045032



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 48-091404-KE
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 14 SEP 2004

Project Name: LONGHORN AAP

Lab Destination: Kemron Lab

Sample Coordinator: Dan Holderfield

Lab Contact:

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Report To: Diane Meyer

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

1430 Enclave Parkway
Houston TX 77077

Carrier/Waybill No.: UPS/66V725

Special Instructions: See Analytical Request Form sent 9/13/04

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological ☐ Sample Disposal: ☒ Return to Client ☐ Disposal by Lab ☒ Archive (mos.)

1. Relinquished By
(Signature/Affiliation)

Date: 9/14/04
Time: 1713

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	File	CID	Condition On Receipt
L0001-LHSMW61-LHSMW62-GW-L0001-LHSMW62-REG		13 SEP 2004	16:52	500 mL HDPE	1	HNO3-ph 2	RCRA Metal + B, Be by 6010B and 7470A			N		
L0001-LHSMW61-LHSMW62-GW-L0001-LHSMW62-REG		13 SEP 2004	16:52	250 ML HDPE	1		Perchlorate by 314			N		
L0001-LHSMW61-LHSMW64-GW-L0001-LHSMW64-REG		13 SEP 2004	15:40	500 mL HDPE	1	HNO3-ph 2	RCRA Metal + B, Be by 6010B and 7470A			N		
L0001-LHSMW61-LHSMW64-GW-L0001-LHSMW64-REG		13 SEP 2004	15:40	250 ML HDPE	1		Perchlorate by 314			N		
L0001-LHSMW61-LHSMW64-GW-L0001-LHSMW64-MS-M		13 SEP 2004	15:40	500 mL HDPE	1	HNO3-ph 2	RCRA Metal + B, Be by 6010B and 7470A			N		
L0001-LHSMW61-LHSMW64-GW-L0001-LHSMW64-MS-M		13 SEP 2004	15:40	250 ML HDPE	1		Perchlorate by 314			N		
L0001-LHSMW61-LHSMW64-GW-L0001-LHSMW64-MSD		13 SEP 2004	15:40	500 mL HDPE	1	HNO3-ph 2	RCRA Metal + B, Be by 6010B and 7470A			N		

00045033



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 48-091404-KE

Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fill	CID	Condition On Receipt
L0001-LHSMW64-LHSMW64-GW-L0001-LHSMW64-MSD-1		13 SEP 2004	15:40	250 ML HDPE	1	7470A Perchlorate by 314			N	

00045034



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 48-0913940-KE

Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 13 SEP 2004

Lab Destination: Kemron Lab

Lab Contact:

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions: *See Analytical Request Form*

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *[Signature]* / *Shaw E & I* Date: *9/13/04* Time: *1715*
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
L0001-48WW01-48WW01-GW-L0001-48WW01-REG		13 SEP 2004	13:45	500 mL HDPE	1	HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A			N		
L0001-48WW01-48WW01-GW-L0001-48WW01-REG		13 SEP 2004	13:45	1 L HDPE	1		Perchlorate by 314			N		
L0001-48WW01-48WW01-GW-L0001-48WW01-QC-FD		13 SEP 2004	13:45	500 mL HDPE	1	HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A			N		
L0001-48WW01-48WW01-GW-L0001-48WW01-QC-FD		13 SEP 2004	13:45	1 L HDPE	1		Perchlorate by 314			N		

00045035

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ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 48-091204-00
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Days

Samples Shipment Date: 13 SEP 2004

Lab Destination: COLUMBIA LABS

Lab Contact: Jane Freeman

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Endlave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Endlave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature] Date: 9/13/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fill	CID	Condition On Receipt
L0001-48WW01-48WW01-GW-L0001-48WW01-REG		13 SEP 2004	13:45	1 L Amb. Glass	2	None except cool to 4 C	Dioxins and Furans by SW8290			N	
L0001-48WW01-48WW01-GW-L0001-48WW01-OC-FD		13 SEP 2004	13:45	1 L Amb. Glass	2	None except cool to 4 C	Dioxins and Furans by SW8290			N	

00045036



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 50-083104-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 31 AUG 2004

Lab Destination: Mitek Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1480 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1480 Enclave Parkway

Houston

TX 77077

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *Shaw E&I*

(Signature/Affiliation)

Date: 8/31/04
Time: 1715

1. Received By

(Signature/Affiliation)

Date:

Time:

2. Relinquished By

(Signature/Affiliation)

Date:

2. Received By

(Signature/Affiliation)

Date:

Time:

3. Relinquished By

(Signature/Affiliation)

Date:

3. Received By

(Signature/Affiliation)

Date:

Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
083104-TB1	FIELDQC-BW-083104-TB1-TB	31 AUG 2004	07:00	40 mL VOA VIAL	2	HClqH 2	Volatiles by SW8260B			N		
0001-50WW01	50WW01-GW-L0001-50WW01-REG	31 AUG 2004	14:46	40 mL VOA VIAL	3	HClqH 2	Volatiles by SW8260B			N		
0001-50WW01	50WW01-GW-L0001-50WW01-REG	31 AUG 2004	14:46	1 L HDPE	1		Perchlorate by 314			N		
0001-50WW03	50WW03-GW-L0001-50WW03-REG	30 AUG 2004	16:56	40 mL VOA VIAL	3	HClqH 2	Volatiles by SW8260B			N		
0001-50WW03	50WW03-GW-L0001-50WW03-REG	30 AUG 2004	16:56	1 L HDPE	1		Perchlorate by 314			N		
0001-50WW04	50WW04-GW-L0001-50WW04-REG	31 AUG 2004	11:36	40 mL VOA VIAL	3	HClqH 2	Volatiles by SW8260B			N		
0001-50WW04	50WW04-GW-L0001-50WW04-REG	31 AUG 2004	11:36	1 L HDPE	1		Perchlorate by 314			N		

00045037

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 50-083004-MK
Page 1 of 1

Project Number: 845714

Samples Shipment Date: 30 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/669725

Bill To: Accounts Payable

1430 Endlave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Endlave Parkway

Houston

TX 77077

Special Instructions: * SEE ANALYTICAL REQUEST FORM INCLUDED *

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]

Date: 8/30/04

Time: 1715

1. Received By
(Signature/Affiliation)

Date:

Time:

2. Relinquished By
(Signature/Affiliation)

Date:

Time:

2. Received By
(Signature/Affiliation)

Date:

Time:

3. Relinquished By
(Signature/Affiliation)

Date:

Time:

3. Received By
(Signature/Affiliation)

Date:

Time:

Comments: 14 DAY IAI

Sample No	Sample Name	Sample Date	Sample Time	Sample Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
083004-T81	FIELDGC-SW-083004-T81-T8	30 AUG 2004	07:00	40 mL VOA VIAL	2	HCl<pH 2	Volatiles by SW8260B			N		
0001-50WW02	50WW02-GW-L001-50WW02-REG	30 AUG 2004	13:31	40 mL VOA VIAL	3	HCl<pH 2	Volatiles by SW8260B			N		
0001-50WW02	50WW02-GW-L001-50WW02-REG	30 AUG 2004	13:31	1 L HDPE	1		Perchlorate by 314			N		
0001-50WW02	50WW02-GW-L001-50WW02-REG	30 AUG 2004	10:31	40 mL VOA VIAL	3	HCl<pH 2	Volatiles by SW8260B			N		
0001-50WW02	50WW02-GW-L001-50WW02-REG	30 AUG 2004	10:31	1 L HDPE	1		Perchlorate by 314			N		

00045038



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 50-081804-MK
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 18 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Milkem Lab

Sample Coordinator: *Don Holdenfield*

Lab Contact:

Turnaround Time: *Normal*

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Enclave Parkway

Houston

TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Radiological ☐

Poison B ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *Don Holdenfield*
(Signature/Affiliation)

Date: *8/19/04*
Time: *1720*

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: NORMAL TURNAROUND

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
L0001-50SB10	50SB10-SO-L0001-50SB10-REG	18 AUG 2004	08:40	2 oz CWMG,SEP	1		Volatiles by SW8260B			N		
L0001-50SB10	50SB10-SO-L0001-50SB10-REG	18 AUG 2004	08:40	4 oz CWM	1		Perchlorate by 314			N		
L0001-50SB10Q	50SB10-SO-L0001-50SB10QC-FD	18 AUG 2004	08:40	2 OZ CWM	1		Volatiles by SW8260B			N		
L0001-50SB10Q	50SB10-SO-L0001-50SB10QC-FD	18 AUG 2004	08:40	4 oz CWM	1		Perchlorate by 314			N		
L0001-50SB13	50SB13-SO-L0001-50SB13-REG	18 AUG 2004	15:15	2 oz CWMG,SEP	1		Volatiles by SW8260B			N		
L0001-50SB13	50SB13-SO-L0001-50SB13-REG	18 AUG 2004	15:15	4 oz CWM	1		Perchlorate by 314			N		
L0001-50SB14	50SB14-SO-L0001-50SB14-REG	18 AUG 2004	11:35	2 oz CWMG,SEP	1		Volatiles by SW8260B			N		
L0001-50SB14	50SB14-SO-L0001-50SB14-REG	18 AUG 2004	11:35	4 oz CWM	1		Perchlorate by 314			N		

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 50-081804-MK
Page 2 of 2

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Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
L0001-50SB15	50SB15-SO-L0001-50SB15-REG	18 AUG 2004	10:50	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0001-50SB15	50SB15-SO-L0001-50SB15-REG	18 AUG 2004	10:50	4 oz CWM	1	Perchlorate by 314			N	
L0001-50SB16	50SB16-SO-L0001-50SB16-REG	18 AUG 2004	09:40	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0001-50SB16	50SB16-SO-L0001-50SB16-REG	18 AUG 2004	09:40	4 oz CWM	1	Perchlorate by 314			N	
L0002-50SB10	50SB10-SO-L0002-50SB10-REG	18 AUG 2004	08:50	4 oz CWM	1	Perchlorate by 314			N	
L0002-50SB10	50SB10-SO-L0002-50SB10-REG	18 AUG 2004	08:50	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0002-50SB13	50SB13-SO-L0002-50SB13-REG	18 AUG 2004	15:22	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0002-50SB13	50SB13-SO-L0002-50SB13-REG	18 AUG 2004	15:22	4 oz CWM	1	Perchlorate by 314			N	
L0002-50SB14	50SB14-SO-L0002-50SB14-REG	18 AUG 2004	11:50	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0002-50SB14	50SB14-SO-L0002-50SB14-REG	18 AUG 2004	11:50	4 oz CWM	1	Perchlorate by 314			N	
L0002-50SB14	50SB14-SO-L0002-50SB14-MS-MS	18 AUG 2004	11:50	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0002-50SB14	50SB14-SO-L0002-50SB14-MS-MS	18 AUG 2004	11:50	4 oz CWM	1	Perchlorate by 314			N	
L0002-50SB14	50SB14-SO-L0002-50SB14-MSD-MSD	18 AUG 2004	11:50	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0002-50SB14	50SB14-SO-L0002-50SB14-MSD-MSD	18 AUG 2004	11:50	4 oz CWM	1	Perchlorate by 314			N	
L0002-50SB14	50SB14-SO-L0002-50SB14-QC-FD	18 AUG 2004	11:50	2 oz CWM	1	Volatiles by SW8260B			N	
L0002-50SB14	50SB14-SO-L0002-50SB14-QC-FD	18 AUG 2004	11:50	4 oz CWM	1	Perchlorate by 314			N	
L0002-50SB15	50SB15-SO-L0002-50SB15-REG	18 AUG 2004	10:55	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0002-50SB15	50SB15-SO-L0002-50SB15-REG	18 AUG 2004	10:55	4 oz CWM	1	Perchlorate by 314			N	
L0002-50SB16	50SB16-SO-L0002-50SB16-REG	18 AUG 2004	09:50	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0002-50SB16	50SB16-SO-L0002-50SB16-REG	18 AUG 2004	09:50	4 oz CWM	1	Perchlorate by 314			N	
L0003-50SB10	50SB10-SO-L0003-50SB10-REG	18 AUG 2004	09:10	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0003-50SB10	50SB10-SO-L0003-50SB10-REG	18 AUG 2004	09:10	4 oz CWM	1	Perchlorate by 314			N	
L0003-50SB13	50SB13-SO-L0003-50SB13-REG	18 AUG 2004	15:30	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0003-50SB13	50SB13-SO-L0003-50SB13-REG	18 AUG 2004	15:30	4 oz CWM	1	Perchlorate by 314			N	
L0003-50SB14	50SB14-SO-L0003-50SB14-REG	18 AUG 2004	12:17	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0003-50SB14	50SB14-SO-L0003-50SB14-REG	18 AUG 2004	12:17	4 oz CWM	1	Perchlorate by 314			N	
L0003-50SB15	50SB15-SO-L0003-50SB15-REG	18 AUG 2004	10:59	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0003-50SB15	50SB15-SO-L0003-50SB15-REG	18 AUG 2004	10:59	4 oz CWM	1	Perchlorate by 314			N	
L0003-50SB16	50SB16-SO-L0003-50SB16-REG	18 AUG 2004	09:46	2 oz CWMG, SEP	1	Volatiles by SW8260B			N	
L0003-50SB16	50SB16-SO-L0003-50SB16-REG	18 AUG 2004	09:46	4 oz CWM	1	Perchlorate by 314			N	



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 50-081904-MK
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 19 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Mktrem Lab

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Turnaround Time: Normal

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS856V725

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Enclave Parkway

Houston

TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiochemical ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

Dan Holderfield

Date: 8/19/04
Time: 1720

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: NORMAL TURNAROUND

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	File	CID	Condition On Receipt
10001-505811	505811-50-10001-505811-REG	19 AUG 2004	18:05	2 oz CWMG, SEP	1		Volatiles by SW8260B				N	
10001-505811	505811-50-10001-505811-REG	19 AUG 2004	18:05	4 oz CWM	1		Perchlorate by 314				N	
10001-505812	505812-50-10001-505812-REG	19 AUG 2004	17:15	2 oz CWMG, SEP	1		Volatiles by SW8260B				N	
10001-505812	505812-50-10001-505812-REG	19 AUG 2004	17:15	2 oz CWM	2		Perchlorate by 314				N	
10001-505817	505817-50-10001-505817-REG	19 AUG 2004	14:31	2 oz CWMG, SEP	1		Volatiles by SW8260B				N	
10001-505817	505817-50-10001-505817-REG	19 AUG 2004	14:31	4 oz CWM	1		Perchlorate by 314				N	
10002-505811	505811-50-10002-505811-REG	19 AUG 2004	18:45	2 oz CWMG, SEP	1		Volatiles by SW8260B				N	
10002-505811	505811-50-10002-505811-REG	19 AUG 2004	18:45	2 oz CWM	2		Perchlorate by 314				N	

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 67-091304-MK
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 13 SEP 2004

Lab Destination: Milkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Report To: Diane Meyer

1430 Enclave Parkway

Houston

TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *[Signature]*

Date: 9/13/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By *[Signature]*

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By *[Signature]*

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY

Sample No	Sample Name	Sample Date	Sample Time	Container	Qty	Preservative	Requested Testing Program	Sample Vol	Units Fill	CID	Condition On Receipt
091204-TB	FIELDQC-BW-091204-TB-TB	12 SEP 2004	07:00	40 mL VOA VIAL	2	HCl-pH 2	Volatiles by SW8260B			N	
L0001-67WW04	67WW04-GW-L0001-67WW04-REG	12 SEP 2004	15:00	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
L0001-67WW05	67WW05-GW-L0001-67WW05-REG	12 SEP 2004	10:25	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
L0001-67WW06	67WW06-GW-L0001-67WW06-REG	12 SEP 2004	13:56	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
L0001-67WW07	67WW07-GW-L0001-67WW07-REG	12 SEP 2004	11:51	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
L0001-G4WW01	G4WW01-GW-L0001-G4WW01-REG	12 SEP 2004	14:10	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
L0001-G4WW02	G4WW02-GW-L0001-G4WW02-REG	12 SEP 2004	11:00	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	
L0001-G4WW03	G4WW03-GW-L0001-G4WW03-REG	12 SEP 2004	13:55	40 mL VOA VIAL	3	HCl-pH 2	Volatiles by SW8260B			N	

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 35C-091504-CO
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 15 SEP 2004

Lab Destination: COLUMBIA LABS

Lab Contact: Jane Freemyer

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature] / Shaw E & I

Date: 9/15/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr	Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
LO001-LHSMW67-GW-L0001-LHSMW67-REG		15 SEP 2004	12:30	1 L Amb. Glass	2	2	None except cool to 4 C	Dioxins and Furans by SW8290				N	

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ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: 87-081904-MK
Page 1 of 1

Project Number: 845714

Samples Shipment Date: 19 AUG 2004

Project Name: LONGHORN AAP

Lab Destination: Milkern Lab

Sample Coordinator: *Don Holdenfield*

Lab Contact: *Eva Philo*

Turnaround Time: *Normal*

Project Contact: Diane Meyer

Report To: Diane Meyer

Bill To: Accounts Payable

1430 Enclave Parkway

Houston

TX 77077

Carrier/Waybill No.: UPS/68V726

TX 77077

Special Instructions:

Possible Hazard Identification:

Non-Hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiochemical ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *Don Holdenfield / Shaw E & I*

(Signature/Affiliation)

Date: *8/19/04*

Time: *1:20*

1. Received By

(Signature/Affiliation)

Date:

Time:

2. Relinquished By

(Signature/Affiliation)

Date:

Time:

2. Received By

(Signature/Affiliation)

Date:

Time:

3. Relinquished By

(Signature/Affiliation)

Date:

Time:

3. Received By

(Signature/Affiliation)

Date:

Time:

Comments: NORMAL TURNAROUND

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units	Flt	Cib	Condition On Receipt
13001-87-8804-067-8804-50-1-0001-67-8804-02-REG		19 AUG 2004	08:00	2 oz CWM	1		Volatiles by SW6280B			N		
13002-87-8804-067-8804-50-1-0002-67-8804-15-REG		19 AUG 2004	08:15	2 oz CWM	1		Volatiles by SW6280B			N		

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091704-MK

Page 1 of 4

Project Number: 845714

Samples Shipment Date: 17 SEP 2004

Bill To: Accounts Payable

Project Name: LONGHORN AAP

Lab Destination: Mitkem Lab

1430 Enclave Parkway

Houston TX 77077

Sample Coordinator: Dan Holderfield

Lab Contact: Evan Philo

Report To: Diane Meyer

Project Contact: Diane Meyer

1430 Enclave Parkway

Houston TX 77077

Turnaround Time: 14 Day

Carrier/Waybill No.: UPS/66V725

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By *[Signature]*

Date: *9/17/04*

Time: *1:15*

1. Received By
(Signature/Affiliation)

Date:

Time:

2. Relinquished By
(Signature/Affiliation)

Date:

Time:

2. Received By
(Signature/Affiliation)

Date:

Time:

3. Relinquished By
(Signature/Affiliation)

Date:

Time:

3. Received By
(Signature/Affiliation)

Date:

Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fill	CID	Condition On Receipt
091704-ER	FIELDQC-BW-091704-ER-ER	17 SEP 2004	13:00	500 mL HDPE	1	HNO3-pH 2	RCRA Metal + B, Be by 6010B and 7470A		N		
091704-ER	FIELDQC-BW-091704-ER-ER	17 SEP 2004	13:00	1 L Amb. Glass	2		Nitroaromatics and Nitroamines by 8330		N		
091704-ER	FIELDQC-BW-091704-ER-ER	17 SEP 2004	13:00	250 ML HDPE	1		Perchlorate by 314		N		
IWS002	IWS002-SED-IWS002-REG	17 SEP 2004	13:20	8 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A		N		
IWS002	IWS002-SED-IWS002-REG	17 SEP 2004	13:20	8 oz CWM	1		Perchlorate by 314		N		
IWS002	IWS002-SED-IWS002-REG	17 SEP 2004	13:20	8 oz CWM	1		Nitroaromatics and Nitroamines by 8330		N		

SD/S



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091704-MK
Page 2 of 4

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
IWS05	IWS05-SED-IWS05-REG	16 SEP 2004	10:00	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS05	IWS05-SED-IWS05-REG	16 SEP 2004	10:00	8 oz CWM	1	Perchlorate by 314			N	
IWS05	IWS05-SED-IWS05-REG	16 SEP 2004	10:00	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS06	IWS06-SED-IWS06-REG	16 SEP 2004	15:30	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS06	IWS06-SED-IWS06-REG	16 SEP 2004	15:30	8 oz CWM	1	Perchlorate by 314			N	
IWS06	IWS06-SED-IWS06-REG	16 SEP 2004	15:30	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS07	IWS07-SED-IWS07-REG	17 SEP 2004	10:10	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS07	IWS07-SED-IWS07-REG	17 SEP 2004	10:10	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS07	IWS07-SED-IWS07-REG	17 SEP 2004	10:10	8 oz CWM	1	Perchlorate by 314			N	
IWS08	IWS08-SED-IWS08-REG	17 SEP 2004	11:30F	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS08	IWS08-SED-IWS08-REG	17 SEP 2004	11:30F	8 oz CWM	1	Perchlorate by 314			N	
IWS08	IWS08-SED-IWS08-REG	17 SEP 2004	11:30F	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS09	IWS09-SED-IWS09-REG	17 SEP 2004	10:40	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS09	IWS09-SED-IWS09-REG	17 SEP 2004	10:40	8 oz CWM	1	Perchlorate by 314			N	
IWS09	IWS09-SED-IWS09-REG	17 SEP 2004	10:40	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS10	IWS10-SED-IWS10-REG	17 SEP 2004	11:45	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS10	IWS10-SED-IWS10-REG	17 SEP 2004	11:45	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS10	IWS10-SED-IWS10-REG	17 SEP 2004	11:45	8 oz CWM	1	Perchlorate by 314			N	
IWS11	IWS11-SED-IWS11-REG	16 SEP 2004	15:00	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS11	IWS11-SED-IWS11-REG	16 SEP 2004	15:00	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS11	IWS11-SED-IWS11-REG	16 SEP 2004	15:00	8 oz CWM	1	Perchlorate by 314			N	
IWS12	IWS12-SED-IWS12-REG	16 SEP 2004	15:45	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS12	IWS12-SED-IWS12-REG	16 SEP 2004	15:45	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS12	IWS12-SED-IWS12-REG	16 SEP 2004	15:45	8 oz CWM	1	Perchlorate by 314			N	
IWS13	IWS13-SED-IWS13-REG	16 SEP 2004	16:30	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	
IWS13	IWS13-SED-IWS13-REG	16 SEP 2004	16:30	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A			N	
IWS13	IWS13-SED-IWS13-REG	16 SEP 2004	16:30	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330			N	

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091704-MK
Page 3 of 4

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
IWSD13	IWSD13-SED-IWSD13-REG	16 SEP 2004	16:30	8 oz CWM	1	Perchlorate by 314		N		
IWSD14	IWSD14-SED-IWSD14-REG	16 SEP 2004	17:15	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWSD14	IWSD14-SED-IWSD14-REG	16 SEP 2004	17:15	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWSD14	IWSD14-SED-IWSD14-REG	16 SEP 2004	17:15	8 oz CWM	1	Perchlorate by 314		N		
IWSD14-QC	IWSD14-SED-IWSD14-QC-FD	16 SEP 2004	17:15	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWSD14-QC	IWSD14-SED-IWSD14-QC-FD	16 SEP 2004	17:15	8 oz CWM	1	Perchlorate by 314		N		
IWSD14-QC	IWSD14-SED-IWSD14-QC-FD	16 SEP 2004	17:15	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWSD15	IWSD15-SED-IWSD15-REG	17 SEP 2004	08:30	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWSD15	IWSD15-SED-IWSD15-REG	17 SEP 2004	08:30	8 oz CWM	1	Semivolatiles by SW8270C		N		
IWSD15	IWSD15-SED-IWSD15-REG	17 SEP 2004	08:30	8 oz CWM	1	Herbicides by SW8151A		N		
IWSD15	IWSD15-SED-IWSD15-REG	17 SEP 2004	08:30	8 oz CWM	1	PCBs by 8082		N		
IWSD15	IWSD15-SED-IWSD15-REG	17 SEP 2004	08:30	8 oz CWM	1	Pesticides by SW8081A		N		
IWSD15	IWSD15-SED-IWSD15-REG	17 SEP 2004	08:30	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWSD15	IWSD15-SED-IWSD15-REG	17 SEP 2004	08:30	8 oz CWM	1	Perchlorate by 314		N		
IWSD16	IWSD16-SED-IWSD16-REG	17 SEP 2004	09:50	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWSD16	IWSD16-SED-IWSD16-REG	17 SEP 2004	09:50	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWSD16	IWSD16-SED-IWSD16-REG	17 SEP 2004	09:50	8 oz CWM	1	Perchlorate by 314		N		
IWSW08	IWSW08-SW-IWSW08-REG	17 SEP 2004	11:30	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A		N		
IWSW08	IWSW08-SW-IWSW08-REG	17 SEP 2004	11:30	1 L HDPE	1	Perchlorate by 314		N		
IWSW08	IWSW08-SW-IWSW08-REG	17 SEP 2004	11:30	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330		N		
IWSW09	IWSW09-SW-IWSW09-REG	17 SEP 2004	10:40	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A		N		
IWSW09	IWSW09-SW-IWSW09-REG	17 SEP 2004	10:40	1 L HDPE	1	Perchlorate by 314		N		
IWSW09	IWSW09-SW-IWSW09-REG	17 SEP 2004	10:40	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330		N		
IWSW10	IWSW10-SW-IWSW10-REG	17 SEP 2004	11:45	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A		N		
IWSW10	IWSW10-SW-IWSW10-REG	17 SEP 2004	11:45	1 L HDPE	1	Perchlorate by 314		N		
IWSW10	IWSW10-SW-IWSW10-REG	17 SEP 2004	11:45	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330		N		
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A		N		

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091704-MK
Page 4 of 4

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	1 L Amb. Glass	2	Pesticides by SW8081A			N	
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	1 L Amb. Glass	2	PCBs by 8082			N	
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	1 L Amb. Glass	2	Herbicides by SW8151A			N	
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	1 L Amb. Glass	2	Semivolatiles by SW8270C			N	
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	1 L HDPE	1	Perchlorate by 314			N	
IWSW16	IWSW16-SW-IWSW16-REG	17 SEP 2004	09:50	500 mL HDPE	1	RCRA Metal + B, Be by 6010B and 7470A			N	
IWSW16	IWSW16-SW-IWSW16-REG	17 SEP 2004	09:50	1 L HDPE	1	Perchlorate by 314			N	
IWSW16	IWSW16-SW-IWSW16-REG	17 SEP 2004	09:50	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091604-CO
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

17
Samples Shipment Date: 16 SEP 2004

Lab Destination: COLUMBIA LABS

Lab Contact: Jane Freeman

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable
1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer
1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Unknown ☒

Radiological ☐

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive (mos.)

1. Relinquished By
(Signature/Affiliation)

Dan Holderfield / Shaw E & I

Date: 9/17/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr	Qty	Preservative	Requested Testing Program	Sample Vol	Units	Fill	CID	Condition On Receipt
IWS004	IWS004-SED-IWS004-REG	16 SEP 2004	10:35	8 oz CWM	1	1	None except cool to 4 C	Dioxins and Furans by SW8290			N		
IWSW04	IWSW04-SW-IWSW04-REG	16 SEP 2004	10:35	1 L Amb. Glass	2	2	None except cool to 4 C	Dioxins and Furans by SW8290			N		

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SD/SW



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091704-CO
Page 1 of 1

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holdenfield

Turnaround Time: 14 Day

Samples Shipment Date: 17 SEP 2004

Lab Destination: COLUMBIA LABS

Lab Contact: Jane Freemyer

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Radiological ☐

Poison B ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]
Date: 9/17/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
IWS015	IWS015-SED-IWS015-REG	17 SEP 2004	08:30	8 oz CWM	1		Dioxins and Furans by SW8290			N	
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	1 L Amb. Glass	2		Dioxins and Furans by SW8290			N	

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SD/ST



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091694-KE
Page 1 of 2

Project Number: 845714

Samples Shipment Date: 16 SEP 2004

Project Name: LONGHORN AAP

Lab Destination: Kemron Lab

Sample Coordinator: Dan Holderfield

Lab Contact:

Turnaround Time: 14 Day

Project Contact: Diane Meyer

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Carrier/Waybill No.: UPS/66V725

Special Instructions: *Run only Thallium*

Possible Hazard Identification:

Non-hazard ☐ Flammable ☐ Skin Irritant ☐

Radiological ☐

Poison B ☐ Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

Shaw E&I

Date: 9/16/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
IWS001	IWS001-SED-IWS001-REG	16 SEP 2004	12:25	8 oz CWM	402	1	TAL Metals by 6020			N	
IWS003	IWS003-SED-IWS003-REG	16 SEP 2004	11:20	8 oz CWM	1	1	TAL Metals by 6020			N	
IWS003-QC	IWS003-SED-IWS003-QC-FD	16 SEP 2004	11:20	8 oz CWM	1	1	TAL Metals by 6020			N	
IWS004	IWS004-SED-IWS004-REG	16 SEP 2004	10:35	8 oz CWM	1	1	TAL Metals by 6020			N	
IWS017	IWS017-SED-IWS017-REG	16 SEP 2004	09:30	8 oz CWM	1	1	TAL Metals by 6020			N	
IWS018	IWS018-SED-IWS018-REG	15 SEP 2004	15:00	8 oz CWM	1	1	TAL Metals by 6020			N	
IWS019	IWS019-SED-IWS019-REG	15 SEP 2004	15:50	8 oz CWM	1	1	TAL Metals by 6020			N	
IWS020	IWS020-SED-IWS020-REG	15 SEP 2004	15:35	8 oz CWM	1	1	TAL Metals by 6020			N	

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091694-KE

Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
IWSW01	IWSW01-SW-IWSW01-REG	15 SEP 2004	12:25	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020		N		
IWSW03	IWSW03-SW-IWSW03-REG	15 SEP 2004	11:20	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020		N		
IWSW03-QC	IWSW03-SW-IWSW03-QC-FD	15 SEP 2004	11:20	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020		N		
IWSW04	IWSW04-SW-IWSW04-REG	15 SEP 2004	10:35	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020		N		
IWSW17	IWSW17-SW-IWSW17-REG	15 SEP 2004	09:30	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020		N		
IWSW18	IWSW18-SW-IWSW18-REG	15 SEP 2004	15:00	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020		N		
IWSW19	IWSW19-SW-IWSW19-REG	15 SEP 2004	15:50	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020		N		
IWSW20	IWSW20-SW-IWSW20-REG	15 SEP 2004	17:35	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020		N		

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Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091604-MK
Page 1 of 3

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 16 SEP 2004

Lab Destination: Mitkem Lab

Lab Contact: Evan Philo

Project Contact: Diane Meyer

Carrier/Waybill No.: UPS/66V725

Bill To: Accounts Payable

1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer

1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Polson B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

[Signature]
Date: 9/16/04
Time: 1715

Date: 9/16/04
Time: 1715

1. Received By
(Signature/Affiliation)

Date:
Time:

2. Relinquished By
(Signature/Affiliation)

Date:
Time:

2. Received By
(Signature/Affiliation)

Date:
Time:

3. Relinquished By
(Signature/Affiliation)

Date:
Time:

3. Received By
(Signature/Affiliation)

Date:
Time:

Comments: 14 DAY TAT

USE left over sample for MS/MSD (do not run MS/MSD on IWSWSD/sw 04 extended analytical suite)
1 per 20 samples (sets)

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fill	CID	Condition On Receipt
IWSWSD01	IWSWSD01-SED-IWSWSD01-REG	16 SEP 2004	12:25	8 oz CWM	1		Perchlorate by 314		N		
IWSWSD01	IWSWSD01-SED-IWSWSD01-REG	16 SEP 2004	12:25	8 oz CWM	1		Nitroaromatics and Nitroamines by 8330		N		
IWSWSD01	IWSWSD01-SED-IWSWSD01-REG	16 SEP 2004	12:25	8 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A		N		
IWSWSD03	IWSWSD03-SED-IWSWSD03-REG	16 SEP 2004	11:20	8 oz CWM	1		RCRA Metal + B, Be by 6010B and 7471A		N		
IWSWSD03	IWSWSD03-SED-IWSWSD03-REG	16 SEP 2004	11:20	8 oz CWM	1		Perchlorate by 314		N		
IWSWSD03	IWSWSD03-SED-IWSWSD03-REG	16 SEP 2004	11:20	8 oz CWM	1		Nitroaromatics and Nitroamines by 8330		N		

SD/SW



Shaw E&I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091604-MK
Page 2 of 3

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
IWS03-QC	IWS03-SED-IWS03-QC-FD	16 SEP 2004	11:20	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWS03-QC	IWS03-SED-IWS03-QC-FD	16 SEP 2004	11:20	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWS03-QC	IWS03-SED-IWS03-QC-FD	16 SEP 2004	11:20	8 oz CWM	1	Perchlorate by 314		N		
IWS04	IWS04-SED-IWS04-REG	16 SEP 2004	10:35	8 oz CWM	1	Herbicides by SW8151A		N		
IWS04	IWS04-SED-IWS04-REG	16 SEP 2004	10:35	8 oz CWM	1	Semivolatiles by SW8270C		N		
IWS04	IWS04-SED-IWS04-REG	16 SEP 2004	10:35	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWS04	IWS04-SED-IWS04-REG	16 SEP 2004	10:35	8 oz CWM	1	Perchlorate by 314		N		
IWS04	IWS04-SED-IWS04-REG	16 SEP 2004	10:35	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWS04	IWS04-SED-IWS04-REG	16 SEP 2004	10:35	8 oz CWM	1	PCBs by 8082		N		
IWS04	IWS04-SED-IWS04-REG	16 SEP 2004	10:35	8 oz CWM	1	Pesticides by SW8081A		N		
IWS07	IWS07-SED-IWS07-REG	16 SEP 2004	09:30	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWS07	IWS07-SED-IWS07-REG	16 SEP 2004	09:30	8 oz CWM	1	Perchlorate by 314		N		
IWS07	IWS07-SED-IWS07-REG	16 SEP 2004	09:30	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWS08	IWS08-SED-IWS08-REG	15 SEP 2004	15:00	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWS08	IWS08-SED-IWS08-REG	15 SEP 2004	15:00	8 oz CWM	1	Perchlorate by 314		N		
IWS08	IWS08-SED-IWS08-REG	15 SEP 2004	15:00	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWS09	IWS09-SED-IWS09-REG	15 SEP 2004	15:50	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWS09	IWS09-SED-IWS09-REG	15 SEP 2004	15:50	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWS09	IWS09-SED-IWS09-REG	15 SEP 2004	15:50	8 oz CWM	1	Perchlorate by 314		N		
IWS20	IWS20-SED-IWS20-REG	15 SEP 2004	15:35	8 oz CWM	1	RCRA Metal + B, Be by 6010B and 7471A		N		
IWS20	IWS20-SED-IWS20-REG	15 SEP 2004	15:35	8 oz CWM	1	Nitroaromatics and Nitroamines by 8330		N		
IWS20	IWS20-SED-IWS20-REG	15 SEP 2004	15:35	8 oz CWM	1	Perchlorate by 314		N		
IWSW01	IWSW01-SW-IWSW01-REG	16 SEP 2004	12:25	500 mL HDPE	1 HNO3-pH 2	RCRA Metal + B, Be by 6010B and 7470A		N		
IWSW01	IWSW01-SW-IWSW01-REG	16 SEP 2004	12:25	1 L HDPE	1	Perchlorate by 314		N		
IWSW01	IWSW01-SW-IWSW01-REG	16 SEP 2004	12:25	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330		N		
IWSW03	IWSW03-SW-IWSW03-REG	16 SEP 2004	11:20	500 mL HDPE	1 HNO3-pH 2	RCRA Metal + B, Be by 6010B and 7470A		N		
IWSW03	IWSW03-SW-IWSW03-REG	16 SEP 2004	11:20	1 L HDPE	1	Perchlorate by 314		N		

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Shaw E&I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091604-MK

Page 3 of 3

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
IWSW03	IWSW03-SW-IWSW03-REG	16 SEP 2004	11:20	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	
IWSW03-QC	IWSW03-SW-IWSW03-QC-FD	16 SEP 2004	11:20	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A			N	
IWSW03-QC	IWSW03-SW-IWSW03-QC-FD	16 SEP 2004	11:20	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	
IWSW03-QC	IWSW03-SW-IWSW03-QC-FD	16 SEP 2004	11:20	1 L HDPE	1	Perchlorate by 314			N	
IWSW04	IWSW04-SW-IWSW04-REG	16 SEP 2004	10:35	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A			N	
IWSW04	IWSW04-SW-IWSW04-REG	16 SEP 2004	10:35	1 L Amb. Glass	2	PCBs by 8082			N	
IWSW04	IWSW04-SW-IWSW04-REG	16 SEP 2004	10:35	1 L Amb. Glass	2	Herbicides by SW8151A			N	
IWSW04	IWSW04-SW-IWSW04-REG	16 SEP 2004	10:35	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	
IWSW04	IWSW04-SW-IWSW04-REG	16 SEP 2004	10:35	1 L Amb. Glass	2	Semivolatiles by SW8270C			N	
IWSW04	IWSW04-SW-IWSW04-REG	16 SEP 2004	10:35	1 L HDPE	1	Perchlorate by 314			N	
IWSW04	IWSW04-SW-IWSW04-REG	16 SEP 2004	10:35	1 L Amb. Glass	2	Pesticides by SW8081A			N	
IWSW17	IWSW17-SW-IWSW17-REG	16 SEP 2004	09:30	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A			N	
IWSW17	IWSW17-SW-IWSW17-REG	16 SEP 2004	09:30	1 L HDPE	1	Perchlorate by 314			N	
IWSW17	IWSW17-SW-IWSW17-REG	16 SEP 2004	09:30	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	
IWSW18	IWSW18-SW-IWSW18-REG	15 SEP 2004	15:00	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A			N	
IWSW18	IWSW18-SW-IWSW18-REG	15 SEP 2004	15:00	1 L HDPE	1	Perchlorate by 314			N	
IWSW18	IWSW18-SW-IWSW18-REG	15 SEP 2004	15:00	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	
IWSW19	IWSW19-SW-IWSW19-REG	15 SEP 2004	15:50	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A			N	
IWSW19	IWSW19-SW-IWSW19-REG	15 SEP 2004	15:50	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	
IWSW19	IWSW19-SW-IWSW19-REG	15 SEP 2004	15:50	1 L HDPE	1	Perchlorate by 314			N	
IWSW20	IWSW20-SW-IWSW20-REG	15 SEP 2004	17:35	500 mL HDPE	1 HNO3<pH 2	RCRA Metal + B, Be by 6010B and 7470A			N	
IWSW20	IWSW20-SW-IWSW20-REG	15 SEP 2004	17:35	1 L HDPE	1	Perchlorate by 314			N	
IWSW20	IWSW20-SW-IWSW20-REG	15 SEP 2004	17:35	1 L Amb. Glass	2	Nitroaromatics and Nitroamines by 8330			N	

00045055



ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091704-KE
Page 1 of 2

Project Number: 845714

Project Name: LONGHORN AAP

Sample Coordinator: Dan Holderfield

Turnaround Time: 14 Day

Samples Shipment Date: 17 SEP 2004

Lab Destination: Kemron Lab

Lab Contact:

Project Contact: Diane Meyer

Carrier/Waybill No.: UPD/66V725

Bill To: Accounts Payable
1430 Enclave Parkway
Houston TX 77077

Report To: Diane Meyer
1430 Enclave Parkway
Houston TX 77077

Special Instructions:

Possible Hazard Identification:

Non-hazard ☐

Flammable ☐

Skin Irritant ☐

Poison B ☐

Radiological ☐

Unknown ☒

Sample Disposal:

Return to Client ☐

Disposal by Lab ☒

Archive

(mos.)

1. Relinquished By
(Signature/Affiliation)

Date:

Time:

1. Received By
(Signature/Affiliation)

Date:

Time:

2. Relinquished By
(Signature/Affiliation)

Date:

Time:

2. Received By
(Signature/Affiliation)

Date:

Time:

3. Relinquished By
(Signature/Affiliation)

Date:

Time:

3. Received By
(Signature/Affiliation)

Date:

Time:

Comments: 14 DAY TAT

Sample No	Sample Name	Sample Date	Sample Time	Container	Ctr Qty	Preservative	Requested Testing Program	Sample Vol	Units Fil	CID	Condition On Receipt
091704-ER	FIELDQC-BW-091704-ER-ER	17 SEP 2004	13:00	500 mL HDPE	1	HNO3<PH 2	Metals by SW6020				
IWS001	IWS002-SED-IWS001-REG	17 SEP 2004	13:20	8 oz CWM	1		TAL Metals by 6020				
IWS005	IWS005-SED-IWS005-REG	16 SEP 2004	10:00	8 oz CWM	1		TAL Metals by 6020				
IWS006	IWS005-SED-IWS006-REG	16 SEP 2004	15:30	8 oz CWM	1		TAL Metals by 6020				
IWS007	IWS007-SED-IWS007-REG	17 SEP 2004	10:10	8 oz CWM	1		TAL Metals by 6020				
IWS008	IWS008-SED-IWS008-REG	17 SEP 2004	11:30F	8 oz CWM	1		TAL Metals by 6020				
IWS009	IWS009-SED-IWS009-REG	17 SEP 2004	10:40	8 oz CWM	1		TAL Metals by 6020				
IWS010	IWS010-SED-IWS010-REG	17 SEP 2004	11:45	8 oz CWM	1		TAL Metals by 6020				

Yes

SD/SW



Shaw E & I, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No: IWSWSD-091704-KE

Page 2 of 2

Sample No	Sample Name	Sample Date	Sample Time	Container	Preservative	Requested Testing Program	Sample Vol	Units Fill	CID	Condition On Receipt
IWS011	IWS011-SED-IWS011-REG	16 SEP 2004	15:00	1 oz CWM	1	TAL Metals by 6020			N	
IWS012	IWS012-SED-IWS012-REG	16 SEP 2004	15:45	1 oz CWM	1	TAL Metals by 6020			N	
IWS013	IWS013-SED-IWS013-REG	16 SEP 2004	16:30	1 oz CWM	1	TAL Metals by 6020			N	
IWS014	IWS014-SED-IWS014-REG	16 SEP 2004	17:15	1 oz CWM	1	TAL Metals by 6020			N	
IWS014-QC	IWS014-SED-IWS014-QC-FD	16 SEP 2004	17:15	1 oz CWM	1	TAL Metals by 6020			N	
IWS015	IWS015-SED-IWS015-REG	17 SEP 2004	08:30	1 oz CWM	1	TAL Metals by 6020			N	
IWS016	IWS016-SED-IWS016-REG	17 SEP 2004	09:50	1 oz CWM	1	TAL Metals by 6020			N	
IWSW08	IWSW08-SW-IWSW08-REG	17 SEP 2004	11:30	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020			N	
IWSW09	IWSW09-SW-IWSW09-REG	17 SEP 2004	10:40	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020			N	
IWSW10	IWSW10-SW-IWSW10-REG	17 SEP 2004	11:45	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020			N	
IWSW15	IWSW15-SW-IWSW15-REG	17 SEP 2004	08:30	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020			N	
IWSW16	IWSW16-SW-IWSW16-REG	17 SEP 2004	09:50	500 mL HDPE	1 HNO3<PH 2	TAL Metals by 6020			N	

250 ml

00045057

Appendix C
Sample Collection Logs and Groundwater Purge Forms
(data on compact disk)

LHAAP-04

**GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS**

Sample Collection Log

00045060

Page 1 of 2

845714 LONGHORN AAP
Manager: Praveen Srivastav

RFA / COC Number: 04-091004-MK

Location Code: **04WW01**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-04WW01**

Sample Name: **L0001-04WW01-00**

Collection Date: 9/9/02

Collection Time: 15:39

Sampling Method: **BA**

Start Depth: 21.50

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 21.45

Sampling Equip: Bailer

Sample Matrix: **WATER**

QC Partners:

(TB) 091004-TB

(ER) —

(FB) —

Sample Team: A. Willmore, K. Everett,

J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
PERC	N	A	1	1	L	HDPE

ERPIMS Values:

Sacode: —

Lot Control#: —

Groundwater Information:

Measured Well Depth: 27.20

Depth To Water: 9.41

Comments:

Sketch Location:

Logged BY / Date: M. Allen

9/9/04

Reviewed BY / Date: Praveen Srivastav

9/10/04

Sample Collection Log

00045061

Page 2 of 2

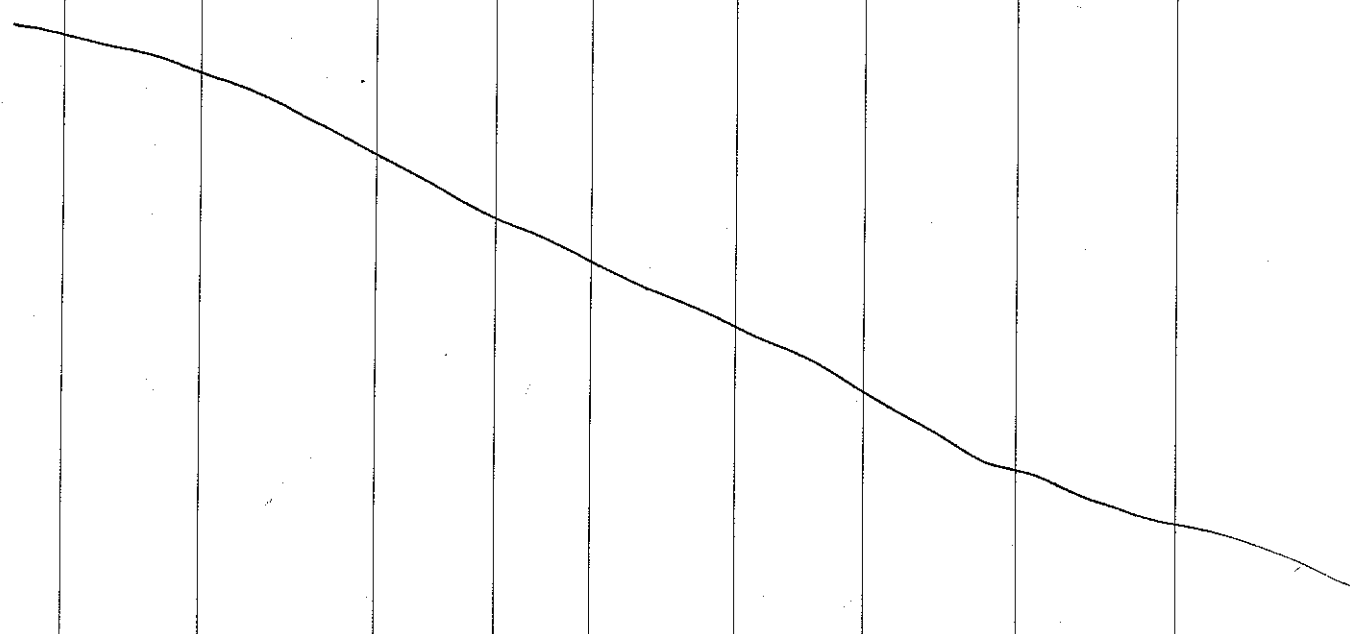
845714 LONGHORN AAP

Manager: Praveen Srivastav


Location Code: 04WW01

Sample Number: L0001-04WW01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	14:35	10.50	-36.1	6.51	3.453	-2.7	1.49	20.51	18 gal.

Logged BY / Date:


9/9/04

Reviewed BY / Date:


9/10/04



GROUNDWATER SAMPLING FORM

00045062

Sheet 1 of 1

Operable Unit/Site ID: _____
Project Name/ #: LHAAP
Weather: Sunny hot

Sampling location ID: 04MW01
Sample ID: L0001-04MW01
Collection Time/Date: _____

Pump Installation

Pump installation crew: K Everett & J Rodriguez
PID/FID reading (well head/background): 2.1 / 0
Casing diameter (inches): 4
Total well Depth (ft. BTOC): 27.20
Initial (pre-installation) DTW/time: 9.61' (9.45' after 15 min. of pump install)
Final (after pump priming) DTW/time: 9.64
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 30

Installation date/beginning time: 9/9/04 1345
Installation date/completion time: _____
Screen Interval (ft. BTOC): 16.7 to 26.7
Pump intake depth (ft BTOC): 21.7
Post-installation DTW/time: _____
Max. sustainable pump rate (mL/min): _____
Appearance of product: N/A
Discharge tube diameter (3/8" or 1/4"): 3/8
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>								
Refill Setting	<u>10</u>								
Discharge Setting	<u>5</u>								
Flow rate (mL/min)	<u>160</u>								

Purging

Purging/sampling crew: A/A
Purge date/beginning time: _____
Initial (pre-purging) DTW (ft. BTOC): _____
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
Purge date/completion time: _____
Final (post-purging) DTW (ft. BTOC): _____
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1410</u>	<u>10.03</u>	<u>160</u>	<u>0.80</u>	<u>23.59</u>	<u>3.459</u>	<u>6.47</u>	<u>-33.0</u>	<u>1.55</u>	<u>-2.9</u>
<u>1415</u>	<u>10.13</u>	<u>100</u>	<u>1.30</u>	<u>23.85</u>	<u>3.443</u>	<u>6.48</u>	<u>-32.9</u>	<u>1.19</u>	<u>-3.2</u>
<u>1420</u>	<u>10.20</u>	<u>100</u>	<u>1.80</u>	<u>24.50</u>	<u>3.448</u>	<u>6.50</u>	<u>-34.4</u>	<u>1.16</u>	<u>-2.7</u>
<u>1425</u>	<u>10.25</u>	<u>100</u>	<u>2.30</u>	<u>24.96</u>	<u>3.454</u>	<u>6.50</u>	<u>-35.2</u>	<u>1.11</u>	<u>-2.2</u>
<u>1430</u>	<u>10.30</u>	<u>75</u>	<u>2.675</u>	<u>25.48</u>	<u>3.459</u>	<u>6.50</u>	<u>-34.7</u>	<u>1.09</u>	<u>-3.0</u>
<u>1435</u>	<u>10.50</u>	<u>150</u>	<u>3.320</u>	<u>26.51</u>	<u>3.453</u>	<u>6.51</u>	<u>-36.1</u>	<u>1.49</u>	<u>-2.7</u>
<u>1440</u>	<u>10.55</u>	<u>100</u>	<u>3.820</u>	<u>26.37</u>					

Bailed Dry Bailed 15 gallons
Recharge 20 min. DTW 21.5'

Compressor Problem

75
5
375

Sample Collection Log

00045064

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 04-090904-mk

Location Code: 04WW02

Sample Number: L0001-04WW02

Sample Name: L0001-04WW02-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip: Dailer

QC Partners:

(TB) 090904-TB (ER) N/A (FB) N/A

Task: GW DATA GAPS AUG04

Collection Date: 9/9/04

Collection Time: 1358

Start Depth: 9.14

End Depth: 12.98

Sample Matrix: WATER

Sample Team: A. Willmore
D. Holderfield

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
PERC						HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 26.68

Depth To Water: 9.14

Comments:

Bailed well dry; let recharge for ~15 minutes

Sketch Location:

Logged BY / Date: Da. Holderfield 9/9/04

Reviewed BY / Date: Da. Holderfield 9/9/04

Sample Collection Log

00045065

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 04WW02

Sample Number: L0001-04WW02

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:	1400	12.98	16.1	6.84	1.141	112.4	7.46	26.80	18 gal

Logged BY / Date: Da/Hobbs 9/9/04

Reviewed BY / Date: Da/Hobbs 9/9/04



GROUNDWATER SAMPLING FORM

00045066

Sheet 1 of 2

Operable Unit/Site ID: 04WW02
Project Name/ID: LNAPL
Weather: CLEAR 90s

Sampling location ID: 04WW02
Sample ID: 04WW02
Collection Time/Date: 9/9/04 1358

Pump Installation

Pump installation crew: A. Willmore, D. Hotterfield
PID/FID reading (well head/background): 0.0
Casing diameter (inches): 4"
Total well Depth (ft. BTOC): 46.23 26.68
Initial (pre-installation) DTW/time: 9.14 13:17
Final (after pump priming) DTW/time: _____
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): —
Discharge tube length (ft.): 60'

Installation date/beginning time: N/A
Installation date/completion time: N/A
Screen Interval (ft. BTOC): 16.68 to 26.68
Pump intake depth (ft BTOC): 12.5
Post-installation DTW/time: _____
Max. sustainable pump rate (mL/min): _____
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = N/A psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, D. Hotterfield
Purge date/beginning time: 9/9/04
Initial (pre-purging) DTW (ft. BTOC): N/A
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
Purge date/completion time: N/A
Final (post-purging) DTW (ft. BTOC): N/A
No. of tubing + pump volumes purged: N/A

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = N/A psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

BAILED DRY DUE TO LOW
RECHARGE CHARACTERISTICS
OF SITE !!



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
				26.80	1.141	6.84	16.1	7.46	112.4

Sampling

Sampling beginning time: 13:58Sampling completion time: 13:59

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
14:00	17.98	—	189.1	26.80	1.141	6.84	16.1	7.46	112.4

Sample Information

Sample ID: 04WW 02Sample collection date/time: 9/9/04 1358Duplicate sample collected (Y/N): NoDuplicate sample ID: —Split sample collected (Y/N): NoSplit sample ID: —COC No(s): —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate	314	1 X 250ml HDPE			

Comments: Broke well lock; would not open

Sample Collection Log

00045068

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 04-091004-MK

Location Code: 04WW03

Task: GW DATA GAPS AUG04

Sample Number: L0001-04WW03

Collection Date: 09-09-04

Sample Name: L0001-04WW03-00

Collection Time: 1628

Sampling Method: BA

Start Depth: 13.53

Sample Type: GW

Sample Purpose: REG

End Depth:

Sampling Equip: QED Non Dedicated Teflon Hoops

Sample Matrix: WATER

QC Partners:

(TB) 091004-TB

(ER)

N/A

(FB)

N/A

Sample Team:

M. Martin / W. C. K.

Containers

Analytical Suite Flt Frtn Qty Size Units Type

PERC N A I I L HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 26.89


Depth To Water: 13.53

Comments:


Handbail well dry. Heavy drawdown

Sketch Location:

Logged BY / Date:


09-04-04

Reviewed BY / Date:


9/10/04

Sample Collection Log

00045069

Page 2 of 2

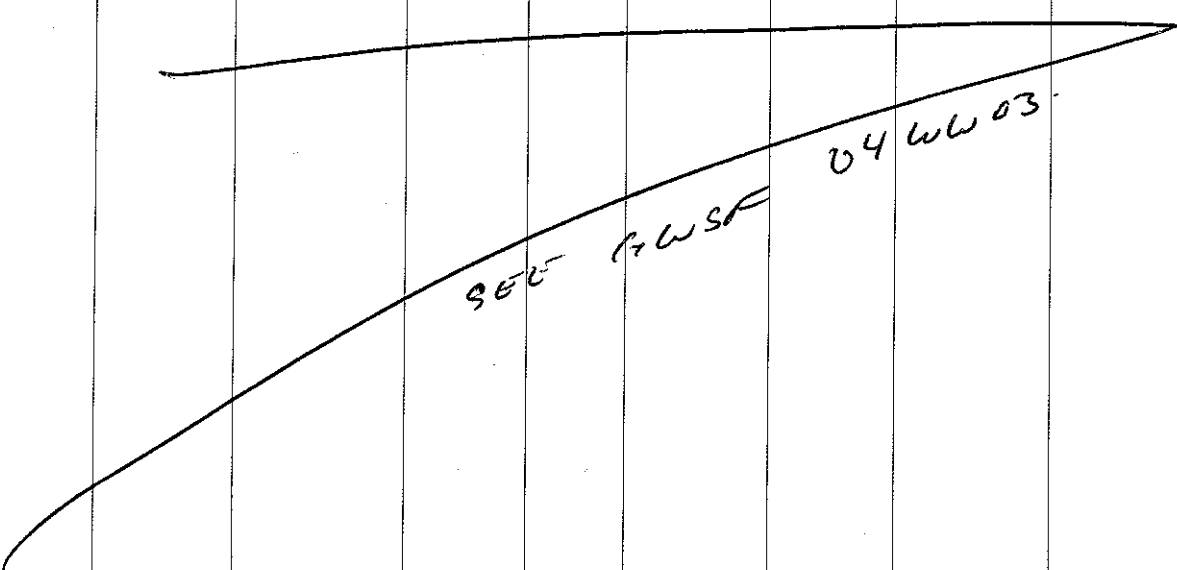
845714 LONGHORN AAP


Manager: Praveen Srivastav


Location Code: 04WW03

Sample Number: L0001-04WW03

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:									

Logged BY / Date: 
09-08-04

Reviewed BY / Date:  9/10/04



GROUNDWATER SAMPLING FORM

00045070

Sheet 2 of 2

Water Quality Parameter Measurements (continued)																		
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$									

10-esp
20

Sampling

Sampling beginning time: 1628

Sampling completion time: _____

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)									

Sample Information

Sample ID: 046603Sample collection date/time: 09-09-04Duplicate sample collected (Y/N): noDuplicate sample ID: n/aSplit sample collected (Y/N): noSplit sample ID: n/a

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
<u>Perchlorate</u>	<u>314</u>	<u>1-250mL HDPE</u>			

Comments: Hand bailed well dry @ 15.9m
Sampled w/ disp. bailer.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

[illegible]

LHAAP-17

**GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS**

Sample Collection Log

00045073

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090804-MR

Location Code: **17WW01**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-17WW01**

Collection Date: 9/7/04

Sample Name: **L0001-17WW01-00**

Collection Time: 1330 1540

Sampling Method: **BA**

Start Depth: 9.28

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 9.30

Sampling Equip: Bladder Pump QED

Sample Matrix: **WATER**

QC Partners:

(TB) 090804-TB (ER) N/A (FB) N/A

Sample Team: K. Everett, J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 33.68

Depth To Water: 9.07

Comments:

Sketch Location:

Logged BY / Date: K. Everett 9/7/04

Reviewed BY / Date: [Signature] 9/7/04

Sample Collection Log

00045074

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW01

Sample Number: L0001-17WW01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<i>See GW Sampling Form</i>									
Sample:	1555	9.30	-7.4	6.0	4.885	17.7	0.63	24.71	~5

Logged BY / Date: K Everett 9/7/04

Reviewed BY / Date: [Signature] 9/8/04



GROUNDWATER SAMPLING FORM

00045075

Sheet 1 of 2

Operable Unit/Site ID: PID/BED Bladder
Project Name/ #: _____
Weather: Hot, Sunny

Sampling location ID: Site 17 17WW01
Sample ID: L0001 - 17WW01
Collection Time/Date: _____

Pump Installation

Pump installation crew: KEverett, J Rodriguez
PID/FID reading (well head/background): 0/0
Casing diameter (inches): 4" PVC
Total well Depth (ft. BTOC): 33.68'
Initial (pre-installation) DTW/time: 9.07' 1455
Final (after pump priming) DTW/time: 9.30
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 100'

Installation date/beginning time: 9/7/94 1335
Installation date/completion time: begin pumping 1415
Screen Interval (ft. BTOC): 23 to 33
Pump intake depth (ft BTOC): 25'
Post-installation DTW/time: _____
Max. sustainable pump rate (mL/min): _____
Appearance of product: N/A
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): N

Shape
Filt.:
10.8-
30.8'

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 14.5 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>25</u>	<u>25</u>							
Refill Setting	<u>10</u>	<u>107</u>							
Discharge Setting	<u>5</u>	<u>53</u>							
Flow rate (mL/min)	<u>—</u>	<u>190</u>							

Purging

Purging/sampling crew: A/A
Purge date/beginning time: 9/7/94 1415
Initial (pre-purging) DTW (ft. BTOC): 9.04
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): ~~0/0~~
Purge date/completion time: _____
Final (post-purging) DTW (ft. BTOC): _____
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1425	9.28	190	9.50	28.01	5.001	6.03	-15.6	2.06	23.9
1430	9.28	190	19.00	25.93	4.979	6.02	-11.0	1.48	22.7
1435	9.28	185	28.25	25.23	4.961	6.02	-8.8	1.29	24.6
1440	9.28	185	3.750	24.56	4.942	6.02	-6.4	0.99	27.1
1446	9.28	190	4.700	24.30	4.934	6.02	-5.5	0.87	25.3
1450	9.28	190	5.650	24.23	4.921	6.03	-4.8	0.75	27.3
1455	9.28	190	6.600	24.12	4.923	6.03	-4.9	0.74	29.4
1500	9.28	185	7.525	23.97	4.916	6.03	-5.2	0.64	28.4



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1505	9.28	190	8.475	23.84	4.910	6.04	-4.7	0.68	24.7
1510	9.28	190	9.425	23.74	4.908	6.04	-4.8	0.65	26.2
1515	9.28	190	10.375	23.90	4.894	6.05	-5.9	0.65	22.7
1520	9.28	190	11.325	24.40	4.891	6.05	-6.1	0.63	19.4
1525	9.28	190	12.275	24.31	4.896	6.05	-6.2	0.58	19.1
1530	9.30	190	13.225	24.16	4.894	6.05	-6.1	0.59	20.6
1535	9.30	190	14.175	24.17	4.890	6.05	-6.1	0.63	14.5

10-esp
20

Sampling

Sampling beginning time: 1540Sampling completion time: 1550

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1555	9.30	190	15.125 (5 gnl/min)	24.71	4.885	6.06	-7.4	0.63	17.7

Sample Information

Sample ID: LSample collection date/time: 9/7/04 1540Duplicate sample collected (Y/N): NDuplicate sample ID: NASplit sample collected (Y/N): NSplit sample ID: NACOC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Expl.		2-Amber L			
VOCs		3-VOAs			
Perchlorate		1-HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045077

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090804-MR

Location Code: **17WW05**

Sample Number: **L0001-17WW05**

Sample Name: **L0001-17WW05-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 9/7/04

Collection Time: 17:40

Start Depth: 13.19

End Depth: 13.20

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners: 090804-1B
(TB) 10/11

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore, D. Holterfield

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 46.5

Depth To Water: 13.14

Comments:

Sketch Location:

Logged BY / Date:

M. M. C.
9/7/04

Reviewed BY / Date:

P. Srivastav 9/8/04

Sample Collection Log

00045078

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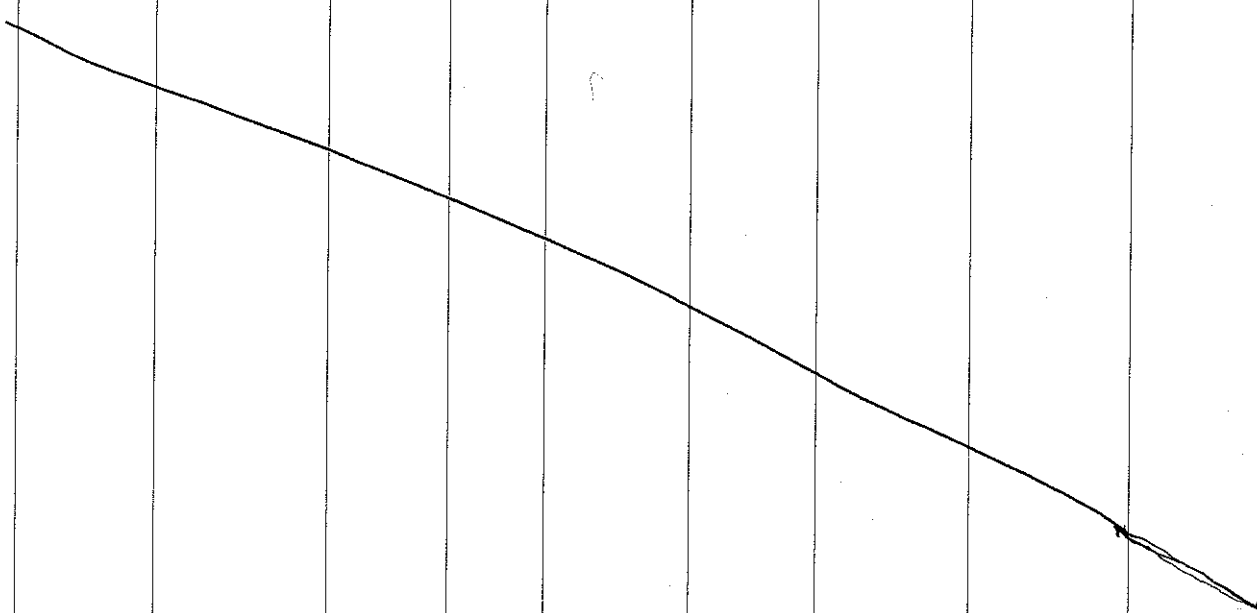
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW05

Sample Number: L0001-17WW05

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	18.12	13.20	-93.9	8.35	1.288	44.4	1.18	24.31	2.7

Logged BY / Date:

M. McC
9/7/04

Reviewed BY / Date:

[Signature] 9/2/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 17
 Project Name/ID: LNAAP
 Weather: Clear, Low 90s

Sampling location ID: 17W003
 Sample ID: 17W003
 Collection Time/Date: 17:40 9/7/04

Pump Installation

Pump installation crew: A. Willmore, D. Hottel
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 145.50
 Initial (pre-installation) DTW/time: 12.57 16:57 11.57
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 160'

Installation date/beginning time: 9/7/04
 Installation date/completion time: 9/7/04
 Screen Interval (ft. BTOC): 135.5 to 145.5
 Pump intake depth (ft BTOC): 140
 Post-installation DTW/time: 11.13
 Max. sustainable pump rate (mL/min): 110
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 60.2 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, D. Hottel
 Purge date/beginning time: 9/7/04 16:55
 Initial (pre-purging) DTW (ft. BTOC): 11.57
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 9/7/04
 Final (post-purging) DTW (ft. BTOC): 19.19
 No. of tubing + pump volumes purged: —

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 60.2 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>65</u>	<u>75</u>	<u>68</u>	<u>78</u>	<u>80</u>				<u>85</u>
Refill Setting	<u>20</u>	<u>25</u>	<u>32</u>	<u>8</u>	<u>60</u>				<u>30</u>
Discharge Setting	<u>10</u>	<u>5</u>	<u>0</u>	<u>7</u>	<u>10</u>				<u>10</u>
Flow rate (mL/min)	<u>90</u>	<u>90</u>	<u>105</u>	<u>110</u>	<u>165</u>				<u>105</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume g Purged (g)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>16:35</u>	<u>11.70</u>	<u>90</u>	<u>0.1</u>	<u>27.74</u>	<u>0.690</u>	<u>7.70</u>	<u>173.1</u>	<u>6.65</u>	<u>11.2</u>
<u>16:40</u>	<u>11.79</u>	<u>125</u>	<u>0.2</u>	<u>27.73</u>	<u>0.633</u>	<u>7.90</u>	<u>156.0</u>	<u>6.67</u>	<u>11.3</u>
<u>16:45</u>	<u>11.98</u>	<u>105</u>	<u>0.3</u>	<u>26.58</u>	<u>1.081</u>	<u>8.24</u>	<u>-20.0</u>	<u>6.81</u>	<u>38.9</u>
<u>16:50</u>	<u>12.20</u>	<u>165</u>	<u>0.5</u>	<u>25.71</u>	<u>1.253</u>	<u>8.29</u>	<u>-49.5</u>	<u>4.22</u>	<u>32.5</u>
<u>16:55</u>	<u>12.42</u>	<u>105</u>	<u>0.6</u>	<u>25.66</u>	<u>1.274</u>	<u>8.30</u>	<u>-63.3</u>	<u>3.33</u>	<u>35.4</u>
<u>17:00</u>	<u>12.46</u>	<u>110</u>	<u>0.7</u>	<u>25.20</u>	<u>1.287</u>	<u>8.30</u>	<u>-72.0</u>	<u>2.52</u>	<u>36.6</u>
<u>17:05</u>	<u>12.78</u>	<u>105</u>	<u>0.9</u>	<u>24.49</u>	<u>1.289</u>	<u>8.31</u>	<u>-82.8</u>	<u>1.92</u>	<u>35.3</u>
<u>17:10</u>	<u>12.90</u>	<u>105</u>	<u>1.1</u>	<u>24.37</u>	<u>1.287</u>	<u>8.31</u>	<u>-89.1</u>	<u>1.62</u>	<u>38.9</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
17:15	13.09	105	1.3	24.23	1.287	8.52	-92.6	1.48	37.8
17:22	13.10	105	1.4	24.30	1.296	8.35	-92.6	1.29	39.8
17:25	13.11	105	1.5	24.32	1.296	8.33	-92.6	1.29	39.9
17:30	13.15	105	1.7	24.38	1.290	8.33	-92.7	1.30	40.0
17:35	13.14	105	1.8	24.40	1.290	8.33	-92.7	1.29	40.2

Sampling

Sampling beginning time: 17:40Sampling completion time: 17:59

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
18:12	13.20	105	2.7	24.31	1.285	8.35	-93.9	1.18	44.4

Sample Information

Sample ID: 17WW05Sample collection date/time: 9/1/04 17:40Duplicate sample collected (Y/N): NoDuplicate sample ID: Split sample collected (Y/N): NoSplit sample ID: COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs	8260	40 mil Voa Viol			
Perchlorate	314	HDPE			
Explosives	8330	1-L Amber			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045081

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090304-m/k

Location Code: **17WW07**

Sample Number: **L0001-17WW07**

Sample Name: **L0001-17WW07-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 9/3/04

Collection Time: 1515

Start Depth: 53' / 9.61' DTW

End Depth: 63' / 9.78' DTW

Sample Matrix: **WATER**

Sampling Equip: Bladder pump

QC Partners:

(TB) 090304-TB (ER) N/A (FB) N/A

Sample Team: K. Everett, J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 58.37

Depth To Water: 9.61

Comments:

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: [Signature] / 9/3/04

Sample Collection Log

00045082

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW07

Sample Number: L0001-17WW07

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW SAMPLING FORM									
Sample:									

Logged BY / Date: _____

Reviewed BY / Date: De/10/2011 9/3/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: PID 100292 / RED Bladder
 Project Name/ #: LHAAP
 Weather: Sunny hot humid

Sampling location ID: 17WWD7
 Sample ID: L0001- 17WWD7
 Collection Time/Date: 09/03/04 1515

Pump Installation

Pump installation crew: K. Everett / I. Rodriguez
 PID/FID reading (well head/background): 0 / 0 1230
 Casing diameter (inches): 5 4"
 Total well Depth (ft. BTOC): 58.37
 Initial (pre-installation) DTW/time: 3 9.61 (9.40)
 Final (after pump priming) DTW/time: 3 9.40
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): 100
 Discharge tube length (ft.): 100

Installation date/beginning time: 9-3-04 / 1245
 Installation date/completion time: 9-3-04 1300
 Screen Interval (ft. BTOC): 48 to 58
 Pump intake depth (ft. BTOC): 53'
 Post-installation DTW/time: 9.40' 1230
 Max. sustainable pump rate (mL/min): 130
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	40	40	35	35	35				
Refill Setting	7	7	7	9	9				
Discharge Setting	3	3	3	6	6				
Flow rate (mL/min)	190	190	200	100	130				

Purging

Purging/sampling crew: same as above
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1310	9.80	190		24.69	0.994	6.95	-174.6	1.10	49.9
1315	9.78	185		24.50	0.994	6.98	-176.2	0.82	80.9
1320	9.80	210		24.47	0.994	7.01	-181.5	0.50	80.7
1325	9.81	200	159.2	24.55	0.991	7.01	-181.7	0.47	58.2
1330	9.81	200		24.91	0.989	7.01	-181.2	0.46	85.4
1335	9.78	200		25.24	0.989	7.00	-178.9	0.41	92
1340	9.69	100		27.10	0.987	6.98	-179.1	0.34	81
1345	9.69	100		27.62	0.987	6.97	-177.1	0.33	99.2



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 0.3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1350	9.72	100		28.55	0.986	6.96	-171.9	0.33	62.9
1355	9.72	100		28.65	0.985	6.97	-172.3	0.31	81.0
1400	9.72	95		28.47	0.985	6.95	-177.5	0.30	59.9
1405	9.72	130		28.47	0.986	6.95	-177.0	0.28	74.4
1410	9.72	130		28.11	0.986	6.94	-177.6	0.29	54.5
1415	9.72	130	2.5 gal	27.80	0.982	6.93	-176.0	0.28	64.8
1420	9.78	130		27.60	0.981	6.93	-175.1	0.28	62.2
1425	9.78	130		27.25	0.978	6.91	-171.0	0.33	45.5
1430	9.78	130		26.88	0.979	6.91	-168.6	0.31	38.1
1435	9.78	130		26.86	0.979	6.90	-168.4	0.31	35.8
1440	9.78	130		26.54	0.977	6.90	-166.8	0.31	35.6
1445	9.78	130		26.59	0.975	6.89	-162.3	0.30	37.1
1450	9.78	130		26.30	0.974	6.89	-161.5	0.29	31.5
1455	9.78	130		26.98	0.972	6.87	-158.5	0.29	30.9

Sampling

Sampling beginning time: _____

Sampling completion time: _____

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1500	9.78	130		27.42	0.973	6.87	-158.9	0.29	27.2
1505	9.78	130		26.25	0.977	6.87	-158.6	0.30	24.2
1535	9.75	130		25.05	0.981	6.86	-156.4	0.30	23.8

APR 15 2004
Sampling

Sample Information

Sample ID: L0001-17WW07Sample collection date/time: 9-3-04 / 1515Duplicate sample collected (Y/N): NDuplicate sample ID: NASplit sample collected (Y/N): NSplit sample ID: NA

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs		3-Vials			
Expt		2-Amber			
Perch		1-Plastic			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045085

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090304-mk

Location Code: 17WW08

Sample Number: L0001-17WW08

Sample Name: L0001-17WW08-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Task: GW DATA GAPS AUG04

Collection Date: 9/3/04

Collection Time: 1115

Start Depth: 28.3'

End Depth: 28.3'

Sample Matrix: WATER

Sampling Equip: Bladder pump

QC Partners:

(TB) 090304-TB

(ER)

N/A

(FB)

N/A

Sample Team: K. Everett; J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 33.86

Depth To Water: 9.50'

Comments:

Sketch Location:

Logged BY / Date: K. Everett 9/3/04

Reviewed BY / Date: [Signature] 9/3/04

Sample Collection Log

00045086

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW08

Sample Number: L0001-17WW08

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p><i>KEA Su GW Sampling Feom</i></p>									
Sample:									

Logged BY / Date: KEA 9/3/04

Reviewed BY / Date: Praveen Srivastav 9/3/04

Sample Collection Log

00045087

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090304-mk

Location Code: **17WW08**

Sample Number: **L0001-17WW08**

Sample Name: **L0001-17WW08-00-QC**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **FD**

Task: **GW DATA GAPS AUG04**

Collection Date: 9/3/04

Collection Time: 1115

Start Depth: 28.3'

End Depth: 28.3'

Sample Matrix: **WATER**

Sampling Equip: Bladder pump

QC Partners:

(TB) 090304-TB

(ER)

N/A

(FB)

N/A

Sample Team: Kenneth J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 33.8c

Depth To Water: 9.50'

Comments:

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: Debra M. 9/3/04

Sample Collection Log

00045088

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW08

Sample Number: L0001-17WW08

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See Purging & Sampling Form									
Sample:									

Logged BY / Date: K. Everett 9/3/04

Reviewed BY / Date: [Signature] 9/3/04



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: PID= 100292-xx
 Project Name/ #: LHAAP
 Weather: Sunny - Very humid

Sampling location ID: 17WW08
 Sample ID: L0001-17WW08
 Collection Time/Date: 09/03/04 1115

Pump Installation

Pump installation crew: K. Everett, J. Rodriguez
 PID/FID reading (well head/background): 0/0 ppm
 Casing diameter (inches): 4" SS
 Total well Depth (ft. BTOC): 33.86
 Initial (pre-installation) DTW/time: 9.50' 0900
 Final (after pump priming) DTW/time: 9.74 0930
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.):

Installation date/beginning time: 9/3/04 - 0915
 Installation date/completion time: 9/3/04 - 0925
 Screen Interval (ft. BTOC): 23.3 to 33.3
 Pump intake depth (ft BTOC): 28.3
 Post-installation DTW/time: 9.80
 Max. sustainable pump rate (mL/min): 170
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	30	30	25	25					
Refill Setting	10	7	7	7					
Discharge Setting	5	3	3	3					
Flow rate (mL/min)	—	155	130	120					

Purging

Purging/sampling crew: A/A
 Purge date/beginning time:
 Initial (pre-purging) DTW (ft. BTOC):
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background):
 Purge date/completion time:
 Final (post-purging) DTW (ft. BTOC):
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0935	9.85	155	0.775	22.79	1.625	6.48	24.1	1.59	185.3
0940	9.84	130	1.425	22.46	1.627	6.47	24.1	1.27	196.3
0943	9.80	130	2.075	22.20	1.627	6.46	23.6	1.12	207
0945	9.78	130	2.725	22.28	1.625	6.47	23.2	1.03	186.3
0950	9.77	130	3.375	22.35	1.626	6.48	23.0	0.95	182.7
0955	9.77	130	4.025	22.41	1.625	6.48	22.8	0.87	178
1000	9.77	130	4.675	22.39	1.625	6.48	22.9	0.79	159.6
1005	9.77	130	5.325	22.47	1.628	6.48	22.9	0.71	139.3



GROUNDWATER SAMPLING FORM

00045090

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1010	9.77	160	6.125	22.53	1.623	6.48	22.9	0.67	126.6
1015	9.77	160	6.925	22.62	1.622	6.48	22.9	0.64	115.7
1020	9.77	160	7.725	22.74	1.622	6.48	23.0	0.62	104.3
1025	9.77	190	8.575	22.80	1.620	6.48	23.2	0.61	94.2
1030	9.77	190	9.420	22.85	1.617	6.49	23.6	0.57	89.5
1035	9.77	160	10.220	22.88	1.617	6.49	23.7	0.58	82.8
1040	9.77	170	11.075	22.81	1.618	6.49	24.2	0.56	75.6
1045	9.77	170	11.920	22.91	1.616	6.49	24.2	0.54	70.6
1050	9.77	160	12.720	23.30	1.614	6.49	24.0	0.54	59.9
1055	9.77	170	13.575	23.60	1.614	6.49	23.9	0.52	60.0
1100	9.77	170	14.420	23.95	1.612	6.49	24.9	0.52	55
1105	9.77	170	15.275	24.07	1.613	6.48	24.7	0.52	50
1110	9.77	170	16.130	24.10	1.618	6.48	26.9	0.52	48.8
1200	9.80	160	16.930	23.85	1.618	6.47	34.2	0.98	25.0

 $\frac{10 - esp}{20}$

Sampling

Sampling beginning time: 1115Sampling completion time: 1200

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1200	9.80	160	16.930 (8 gallons)	23.85	1.618	6.47	34.2	0.98	25.0

Sample Information

Sample ID: 0001-17WW08Sample collection date/time: 9/3/04 1115Duplicate sample collected (Y/N): YDuplicate sample ID: 0001-17WW08QCSplit sample collected (Y/N): NSplit sample ID: NA

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs		3-VOCs	VOC		3
Expl.		2-Amber L.	Expl.		2
Perch.		1-HDPE	Perch.		1

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045091

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090304-MK

Location Code: 17WW09

Sample Number: L0001-17WW09

Sample Name: L0001-17WW09-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Task: GW DATA GAPS AUG04

Collection Date: 9/2/04

Collection Time: 1820

Start Depth: 11.92

End Depth: 12.01

Sample Matrix: WATER

Sample Team: K. Everett
J. Rodriguez

Sampling Equip: Bladder pump

QC Partners:

(TB) 090304-TB

(ER) N/A

(FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 54.25

Depth To Water: 11.60

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

9/2/04

Sample Collection Log

00045092

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW09

Sample Number: L0001-17WW09

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<i>See Gal Sampling Form</i>									
Sample:	1840	12.01	-405	5.34 6.34	0.535 2.33	0.57	0.88	20.33	7 gal.

Logged BY / Date: K. Everett 9/7/04

Reviewed BY / Date: [Signature] 9/7/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: YS16820-36920
 Project Name/ID: LHAAP
 Weather: hot humid

Sampling location ID: _____
 Sample ID: 17 WWD9
 Collection Time/Date: _____

Pump Installation

Pump installation crew: K. Everett / J. Rodriguez
 PID/FID reading (well head/background): 0 / 0 ppm
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 54.25
 Initial (pre-installation) DTW/time: 11.60
 Final (after pump priming) DTW/time: 11.78
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: 9/2/04-1630
 Installation date/completion time: _____
 Screen Interval (ft. BTOC): 43.0 to 53.0
 Pump intake depth (ft. BTOC): 48'
 Post-installation DTW/time: 12.01 / 1640
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>35</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>				
Refill Setting	<u>10</u>	<u>11</u>	<u>11</u>	<u>7</u>	<u>11</u>				
Discharge Setting	<u>5</u>	<u>4</u>	<u>4</u>	<u>3</u>	<u>9</u>				
Flow rate (mL/min)	<u>130</u>	<u>90</u>	<u>70</u>	<u>50</u>	<u>210</u>				

Purging

Purging/sampling crew: Same as above
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): 11.92
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH ± 0.1	Eh (mv) +/- 10	DO (mg/L) ± 10%	Turbidity (NTU) ± 10%
1700	11.92	90	220.45	27.06	0.482	6.25	-29.7	3.48	177.7
1705	11.92	50	.42	26.34	0.510	6.23	-31.9	3.02	192.2
1710	11.92	110	.76	24.69	0.537	6.23	-34.6	2.06	220.0
1715	11.92	110	1.09	24.34	0.537	6.23	-35.4	1.72	214.6
1720	11.92	110	1.42	24.34	0.536	6.23	-35.8	1.62	183.6
1725	11.92	115	1.76	24.37	0.536	6.24	-36.6	1.52	179.4
1730	11.92	110	2.09	24.44	0.535	6.24	-37.7	1.44	149.7
1735	11.93	110	2.42	24.51	0.535	6.24	-38.8	1.36	134.5



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10^{\circ}$	$\pm 3\%$ Electrical Conductivity (uMhos/cm)	pH $\pm .1$	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1740	11.93	110	2.75	24.45	0.535	6.25	-39.0	1.20	111
1745	11.95	110	3.08	24.38	0.534	6.25	-39.8	1.06	98.4
1750	11.95	110	3.41	24.32	0.534	6.25	-40.3	0.97	97.9
1755	11.95	110	3.72	24.23	0.533	6.25	-40.4	0.89	90.8
1800	11.95	110	4.05	24.12	0.533	6.25	-41.1	0.83	84.3
1805	11.95	110	4.38	24.00	0.532	6.25	-41.2	0.78	78.9
1810	11.95	110	4.71	23.94	0.531	6.25	-41.5	0.74	73.5
1815	11.95	110	5.04 6.60	23.88	0.531	6.25	-41.5	0.72	73.3
								</	

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1840	12.01	110	5.37	20.33	0.535	6.24	-40.5	0.88	57.0

Sample Information	
Sample ID: <u>17WW09</u>	Sample collection date/time: <u>9/2/04</u> <u>1820</u>
Duplicate sample collected (Y/N): <u>N</u>	Duplicate sample ID: <u>NA</u>
Split sample collected (Y/N): <u>N</u>	Split sample ID: <u>NA</u>
COC No(s): <u> </u>	

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs		3 - VOAs			
Explosives		2 - Amber			
Perchlorate		1 - Plastic			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045095

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090204-mk

Location Code: **17WW10**

Sample Number: **L0001-17WW10**

Sample Name: **L0001-17WW10-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: Bladder Pump

QC Partners:

(TB) 090204-TB (ER) N/A (FB) N/A

Task: **GW DATA GAPS AUG04**

Collection Date: 9/2/04 ~~75~~

Collection Time: 1500

Start Depth: 11.34

End Depth: 11.77

Sample Matrix: **WATER**

K. Everett

Sample Team: J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 33.49

Depth To Water: 11.34

Comments:

very silty - brown water which cleared during last hour of purging.

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: Da [signature] 9/2/04

Sample Collection Log

00045096

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW10

Sample Number: L0001-17WW10

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Sampling Form									
Sample:	1450	11.77	19.0	6.37	3.960	53.6	0.69 2.20	23.04	5 gal

Logged BY / Date: K. Emert 5/2/04

Reviewed BY / Date: Dr. H. H. H. 5/2/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: OED Bather Pump
 Project Name/ID: LHAAP
 Weather: Sunny/Hot/humid

Sampling location ID: 17WW10
 Sample ID: L0001-17WW10
 Collection Time/Date: _____

Pump Installation

Pump installation crew: K. Everett; J. Rodriguez
 PID/FID reading (well head/background): 0 / 0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 33.49
 Initial (pre-installation) DTW/time: 11.34
 Final (after pump priming) DTW/time: 33.7
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: 9/2/04 1420
 Installation date/completion time: _____
 Screen Interval (ft. BTOC): 23.0 to 33.0
 Pump intake depth (ft BTOC): 28'
 Post-installation DTW/time: 11.77 1520
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: N/A
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: Same as above
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	35	25	20	20	20	25			
Refill Setting	10	11	11	11	7	7			
Discharge Setting	5	4	4	4	3	3			
Flow rate (mL/min)	320	310	100	90	70	120			

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1330	11.80	300	1.5	25.53	4.096	6.34	15.2	1.13	19.5
1340	11.80	310	3	23.38	4.060	6.34	13.2	1.11	178.5
1345	11.90	300	4.2	22.37	4.023	6.34	25.0	0.87	175.7
1350	11.74	90	4.19	22.36	4.001	6.35	23.0	0.76	155.6
1355	11.68	90	4.28	22.77	4.004	6.37	21.7	0.80	150.2
1400	11.68	120	4.28	23.46	4.004	6.37	22.8	0.87	148.2
1405	11.74	120	4.40	24.09	4.002	6.37	21.1	0.84	122
1410	11.75	120	4.52	24.00	4.006	6.37	20.1	0.79	81.2



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

9.8

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity $\pm 3\%$ (uMhos/cm)	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1415	11.75	120	1.664	23.93	3.995	6.37	19.6	0.74	132.4
1420	11.76	110	1.775	23.95	3.987	6.37	19.0	0.105	120.2
1425	11.75	115	1.845	23.69	3.980	6.37	18.8	0.96	98.1
1430	11.75	120	1.985	23.59	3.975	6.37	18.9	0.88	87.3
1435	11.75	120		23.36	3.973	6.37	18.7	0.80	76.2
1440	11.75	120		23.25	3.969	6.37	18.8	0.75	65.1
1445	11.75	120		23.22	3.965	6.37	18.9	0.75	64.0
1450	11.77	120		23.04	3.960	6.37	19.0	0.69	53.6
1515	11.77	120	5 gallons	23.17	3.960	6.38	19.2	2.22	32.6

Sampling

Sampling beginning time: _____

Sampling completion time: _____

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Sample Information

Sample ID: _____

Sample collection date/time: 9/2/04 1500

Duplicate sample collected (Y/N): _____

Duplicate sample ID: _____

Split sample collected (Y/N): _____

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Explosives		2 - Amber			
Perchlorate		1 - Plastic, unpres.			
3 VOCs		3 - VOCs			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045099

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090304-mk

Location Code: **17WW11**

Sample Number: **L0001-17WW11**

Sample Name: **L0001-17WW11-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: G9-03-04

Collection Time: 10:51

Start Depth: 11.30

End Depth: 12.12

Sample Matrix: **WATER**

Sampling Equip: GED nondedicated pump Teflon Bladder

QC Partners:

(TB) 090304-TB

(ER) N/A

(FB) N/A

Sample Team: M. Martinez / G.C. Jr

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 17.95

Depth To Water: 11.30

Comments:

Sketch Location:

Logged BY / Date:

[Signature]
09-03-04

Reviewed BY / Date:

[Signature] 9/3/04

Sample Collection Log

00045100

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW11

Sample Number: L0001-17WW11

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
SEE GUSE 17WW11									
Sample: 1051	1120	12.12	69.3	5.55	1.430	71.3	0.85	20.13	11.175 4+05

Logged BY / Date:

[Signature]
09-03-01

Reviewed BY / Date:

[Signature] 2/3/01



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 17 Longhorn AAP
 Project Name/ID: Longhorn AAP
 Weather: _____

Sampling location ID: 176611
 Sample ID: 176611
 Collection Time/Date: 09-03-04 / 1051

Pump Installation

Pump installation crew: M. Martinez / W. Criss
 PID/FID reading (well head/background): 0.0 / 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 17.95
 Initial (pre-installation) DTW/time: 11.30 / 0945
 Final (after pump priming) DTW/time: 11.31 / 1010
 Free product (circle): LNAPL/DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 48

Installation date/beginning time: 09-03-04 / 0957
 Installation date/completion time: 09-03-04 / 0958
 Screen Interval (ft. BTOC): 7.95 to 17.95
 Pump intake depth (ft. BTOC): 15.00
 Post-installation DTW/time: 11.30 / 1000
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / W. Criss
 Purge date/beginning time: 09-03-04 / 1008
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0 / 0.0
 Purge date/completion time: 09-03-04 / 1120
 Final (post-purging) DTW (ft. BTOC): 12.12
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>14</u>	<u>14</u>	<u>20</u>	<u>17</u>	<u>17</u>	<u>15.5</u>			<u>15.5</u>
Refill Setting	<u>12.5</u>	<u>13.0</u>	<u>13.0</u>	<u>13.0</u>	<u>13.5</u>	<u>13.5</u>			<u>13.5</u>
Discharge Setting	<u>2.5</u>	<u>2.0</u>	<u>2.0</u>	<u>2.0</u>	<u>1.5</u>	<u>1.5</u>			<u>1.5</u>
Flow rate (mL/min)	<u>125</u>	<u>80</u>	<u>260</u>	<u>200</u>	<u>125</u>	<u>100</u>			<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1010</u>	<u>11.45</u>	<u>125</u>	<u>0</u>	<u>24.45</u>	<u>1.022</u>	<u>5.45</u>	<u>131.5</u>	<u>3.01</u>	<u>74.0</u>
<u>1015</u>	<u>11.53</u>	<u>110</u>	<u>0.425</u>	<u>25.52</u>	<u>1.254</u>	<u>5.45</u>	<u>110.5</u>	<u>2.34</u>	<u>75.2</u>
<u>1020</u>	<u>11.65</u>	<u>100</u>	<u>1.175</u>	<u>24.74</u>	<u>1.402</u>	<u>5.47</u>	<u>87.4</u>	<u>1.18</u>	<u>79.0</u>
<u>1025</u>	<u>11.74</u>	<u>100</u>	<u>1.475</u>	<u>24.78</u>	<u>1.417</u>	<u>5.49</u>	<u>77.4</u>	<u>0.95</u>	<u>75.7</u>
<u>1030</u>	<u>11.80</u>	<u>100</u>	<u>2.175</u>	<u>24.94</u>	<u>1.419</u>	<u>5.48</u>	<u>74.6</u>	<u>0.92</u>	<u>75.4</u>
<u>1035</u>	<u>11.85</u>	<u>100</u>	<u>2.475</u>	<u>25.16</u>	<u>1.421</u>	<u>5.50</u>	<u>74.6</u>	<u>0.90</u>	<u>74.6</u>
<u>1040</u>	<u>11.95</u>	<u>100</u>	<u>3.175</u>	<u>25.37</u>	<u>1.420</u>	<u>5.50</u>	<u>71.3</u>	<u>0.87</u>	<u>75.7</u>
<u>1045</u>	<u>12.00</u>	<u>100</u>	<u>3.475</u>	<u>25.60</u>	<u>1.420</u>	<u>5.51</u>	<u>70.6</u>	<u>0.84</u>	<u>76.0</u>

Sheet 2 of 2

[illegible]

Sampling

Sampling beginning time: 1051

Sampling completion time: 115

[illegible]

Sample Information

Sample ID: 176611

Sample collection date/time: 09-03-04 / 1051

Duplicate sample collected (Y/N): no

Duplicate sample ID: 4/A

Split sample collected (Y/N): NO

Split sample ID: 2/A

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Vac-Full	8206b	3 Jug's			
Exp. - 1000	8530	256 mL HDPE (2x 1L Amber)			
Perchlorate	314	256 mL (HDPE) (K)			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045103

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090304-MK

Location Code: **17WW12**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-17WW12**

Collection Date: 09-03-04

Sample Name: **L0001-17WW12-00**

Collection Time: 10:13:51

Sampling Method: **BA**

Start Depth: 10.44

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 10.60

Sampling Equip: RED non-dedicated pump Teflon Hadder

Sample Matrix: **WATER**

QC Partners:

(TB) 040304-TB

(ER)

W/A

(FB)

N/A

Sample Team: M. Martinez / W. Critz

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 48.63

Depth To Water: 10.44

Comments:

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: 2/3/04

Sample Collection Log

00045104

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW12

Sample Number: L0001-17WW12

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<div> <div>SE-E</div> <div>GW SF</div> <div>17 WW12</div> </div>									
Sample:									

Logged BY / Date: _____

Reviewed BY / Date: Praveen Srivastav 9/3/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 17W6012
 Project Name/ #: Loughorn AAP
 Weather: Mostly cloudy

Sampling location ID: 17W6012
 Sample ID: 17W6012
 Collection Time/Date: 1351 9/3/04

Pump Installation

Pump installation crew: W. Critz / M. Martinez
 PID/FID reading (well head/background): 0.0 / 0.0
 Casing diameter (inches): 4 in.
 Total well Depth (ft. BTOC): 48.63
 Initial (pre-installation) DTW/time: 10.44 / 1150
 Final (after pump priming) DTW/time: 10.65 / 1215
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 60'

Installation date/beginning time: 9/3/04 1204
 Installation date/completion time: 9/3/04 1205
 Screen Interval (ft. BTOC): 38 to 48
 Pump intake depth (ft. BTOC): 43
 Post-installation DTW/time: 10.27 / 1200
 Max. sustainable pump rate (mL/min): 110
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz / M. Martinez
 Purge date/beginning time: 9/3/04
 Initial (pre-purging) DTW (ft. BTOC): 10.44
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0 / 0.0
 Purge date/completion time: 9/3/04
 Final (post-purging) DTW (ft. BTOC): 10.60
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>30</u>	<u>30</u>							<u>30</u>
Refill Setting	<u>12</u>	<u>13</u>							<u>13</u>
Discharge Setting	<u>3</u>	<u>2</u>							<u>2</u>
Flow rate (mL/min)	<u>220</u>	<u>110</u>							<u>110</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1220	10.65	110	0	23.42	1.348	5.72	27.0	3.88	211.8
1225	10.61	110	0.55	23.00	1.422	5.74	11.6	2.69	212.3
1230	10.60	110	1.1	23.22	1.478	5.78	-0.1	1.95	223.2
1235	10.60	110	1.65	23.79	1.520	5.81	-9.4	1.61	237.9
1240	10.60	110	2.2	24.13	1.537	5.82	-13.2	1.38	217.9
1245	10.60	110	2.75	24.36	1.552	5.83	-19.4	1.08	230.9
1250	10.60	110	3.3	24.18	1.566	5.84	-24.1	0.91	240.0
1255	10.60	110	3.85	24.07	1.571	5.84	-26.7	0.83	224.3



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1300	10.60	110	4.4	23.96	1.575	5.83	-29.6	0.74	213.3
1305	10.60	110	4.95	23.98	1.579	5.83	-30.0	0.71	190.2
1310	10.60	110	5.5	24.06	1.579	5.85	-32.3	0.66	180.5
1315	10.60	110	6.05	24.26	1.583	5.86	-32.8	0.62	168.2
1320	10.60	110	6.6	24.39	1.585	5.85	-32.8	0.61	158.8
1325	10.60	110	7.15	24.72	1.587	5.87	-35.1	0.60	152.7
1330	10.60	110	7.7	25.22	1.588	5.86	-36.0	0.58	143.9
1335	10.60	110	8.25	25.49	1.589	5.87	-37.1	0.57	131.9
1340	10.60	110	8.8	25.78	1.589	5.87	-37.4	0.56	131.7
1345	10.60	110	9.35	26.02	1.589	5.87	-38.9	0.54	120.6
1350	10.60	110	9.9	25.79	1.575	5.87	-39.2	0.53	119.5

Sampling

Sampling beginning time: 1351Sampling completion time: 1424

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1424	10.60	110	13.2	28.17	1.595	5.86	-40.5	0.65	97.3

Sample Information

Sample ID: 17WW12Sample collection date/time: 9/3/04 1351Duplicate sample collected (Y/N): NDuplicate sample ID: N/ASplit sample collected (Y/N): NSplit sample ID: N/A

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC Full	8260B	3 - 40 mL HCL vials			
Perchlorate	314	1 - 250 mL HDPE			
Explosives	8330	2 - 1L amber			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045107

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090204-mk

Location Code: **17WW13**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-17WW13**

Collection Date: 9/2/04

Sample Name: **L0001-17WW13-00**

Collection Time: 1055

Sampling Method: **BA**

Start Depth: 9.10

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 9.29

Sampling Equip: QED Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 090204-TB (ER) N/A (FB) N/A

Sample Team: K. Everett, J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 34.55

Depth To Water: 9.10'

Comments:

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: Praveen Srivastav 9/2/04

Sample Collection Log

00045108

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW13

Sample Number: L0001-17WW13

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<i>KEA See GW Sampling Form</i>									
Sample:	10:55	9.29	-31.5	6.43	4.132	-1.5	0.67	26.38	2.5-3 gal.

Logged BY / Date: _____

Reviewed BY / Date: Praveen Srivastav 9/2/09



GROUNDWATER SAMPLING FORM

00045109

Sheet 1 of 2

Operable Unit/Site ID: Shaw 36 920 - YSI 6820
Project Name/ #: LHAAP
Weather: Sunny

Sampling location ID: Site 17 17WW13
Sample ID: L 17WW13
Collection Time/Date: 9/2/04 1035

Pump Installation

Pump installation crew: K. Everett / J. Rodriguez
PID/FID reading (well head/background): 0/8
Casing diameter (inches): 4"
Total well Depth (ft. BTOC): 34.55'
Initial (pre-installation) DTW/time: 9.10'
Final (after pump priming) DTW/time: _____
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 100'

Installation date/beginning time: 9/2/04 - 0910
Installation date/completion time: 9/2/04 0940
Screen Interval (ft. BTOC): 24 to 34
Pump intake depth (ft BTOC): 29'
Post-installation DTW/time: 9.30 - 0915 before startup
Max. sustainable pump rate (mL/min): 110
Appearance of product: NA
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 15 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>35</u>	<u>20.22</u>	<u>22</u>						
Refill Setting	<u>10</u>	<u>10</u>	<u>10</u>						
Discharge Setting	<u>5</u>	<u>5</u>	<u>5</u>						
Flow rate (mL/min)	<u>280</u>	<u>100</u>	<u>110</u>						

Purging

Purging/sampling crew: Same as above
Purge date/beginning time: _____
Initial (pre-purging) DTW (ft. BTOC): _____
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): NA
Purge date/completion time: _____
Final (post-purging) DTW (ft. BTOC): _____
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 10.9 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
0915	9.55	280	2	20.89	4.168	6.41	-12.3	1.70	-2.3
0945	9.29	100	4	25.54	4.205	6.43	-24.1	2.91	-2.5
0950	9.29	110	5.1	25.46	4.207	6.44	-24.7	1.80	-2.7
0955	9.29	110	6.2	25.39	4.198	6.43	-27.3	1.31	-2.5
1000	9.29	110	7.3	25.47	4.190	6.43	-29.8	1.12	-2.2
1005	9.29	110	8.4	25.55	4.188	6.43	-30.2	1.01	-2.4
1010	9.29	110	9.5	25.37	4.182	6.43	-30.4	0.93	-1.5
1015	9.29	110	10.6	24.97	4.173	6.43	-31.2	0.86	-1.9

2.547

0.1257

0.112

<10
equiv



Shaw E & I, Inc.

Sample Collection Log

00045111

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090304-m/2

Location Code: 17WW14

Sample Number: L0001-17WW14

Sample Name: L0001-17WW14-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip: 3" PVC Bailor

QC Partners:

(TB) 090304-TB

(ER)

N/A

(FB)

N/A

Task: GW DATA GAPS AUG04

Collection Date: 9/3/04

Collection Time: 14:00

Start Depth: 18.01

End Depth: 21.61

Sample Matrix: WATER

Sample Team: A. Willmore, C. McPhee

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 26.49

Depth To Water: 11.60

Comments: Bailed dry due to low recharge rate characteristics of shallow water-bearing zone @ Site 17

Sketch Location:

Logged BY / Date:

M. Allen
9/3/04

Reviewed BY / Date:

P. Srivastav 9/5/04

Sample Collection Log

00045112

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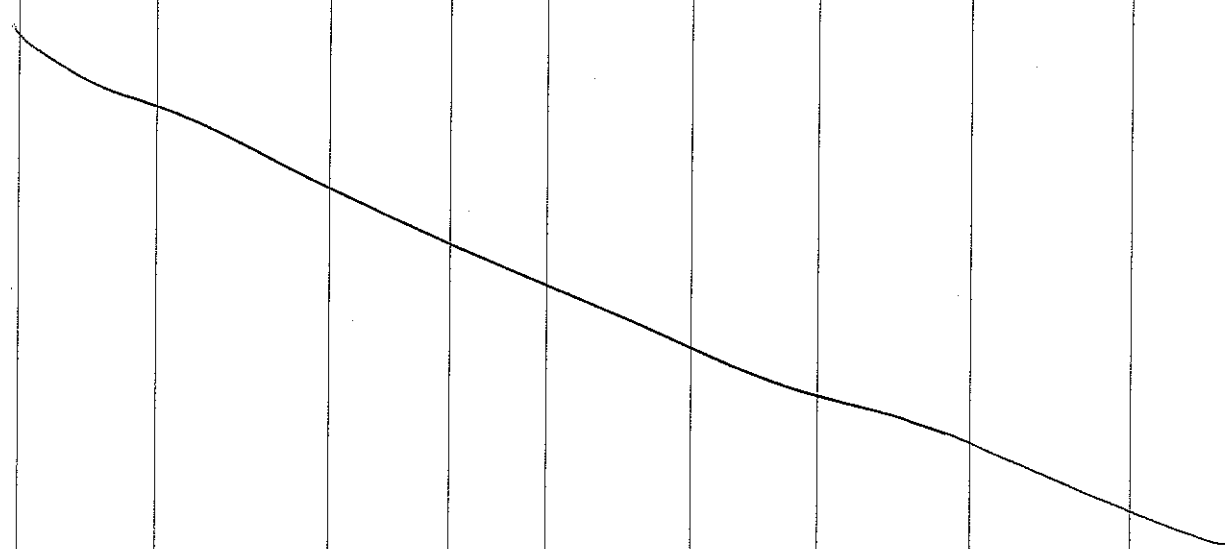
845714 LONGHORN AAP

Manager: Praveen Srivastav


Location Code: 17WW14

Sample Number: L0001-17WW14

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	—	—	—	—	—	—	—	—	—

Logged BY / Date:


9/3/04

Reviewed BY / Date:


9/3/04

Sheet 1 of

Pump Installation	
Pump installation crew: <u>K. Willmore, C. Wade</u>	Installation date/beginning time: <u>N/A</u>
PID/FID reading (well head/background): <u>0.0</u>	Installation date/completion time: <u>N/A</u>
Casing diameter (inches): <u>4"</u>	Screen Interval (ft. BTOC): <u>16.49</u> to <u>26.49</u>
Total well Depth (ft. BTOC): <u>36.49</u>	Pump intake depth (ft BTOC): <u>N/A</u>
Initial (pre-installation) DTW/time: <u>11.00</u>	Post-installation DTW/time: <u>N/A</u>
Final (after pump priming) DTW/time: _____	Max. sustainable pump rate (mL/min): <u>N/A</u>
Free product (circle): <u>LNAPL / DNAPL</u>	Appearance of product: <u>—</u>
Volume of water removed during priming (mL): _____	Discharge tube diameter (3/8" or 1/4"): <u>N/A</u>
Discharge tube length (ft.): <u>—</u>	Inlet reducer used (Y/N): <u>N/A</u>

Initial air pressure = H (ft.) X 0.43 = psi

[illegible]

Purging/sampling crew: A. Williams, C. Mabe
 Purge date/beginning time: Boiled @ 12:00
 Initial (pre-purging) DTW (ft. BTOC): 26.47 11.65
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: Boiled @ 12:20
 Final (post-purging) DTW (ft. BTOC): 18.01 11.65
 No. of tubing + pump volumes purged: 1

Initial air pressure = H (ft.) X 0.43 = _____ psi

[illegible][illegible]

Sheet of

[illegible]

Sampling beginning time: _____ Sampling completion time: _____

[illegible]

Sample ID: _____ Sample collection date/time: _____
 Duplicate sample collected (Y/N): _____ Duplicate sample ID: _____
 Split sample collected (Y/N): _____ Split sample ID: _____
 COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments: Bailed Well for due to low recharge characteristics of site
IT.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045115

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-090204-MK

Location Code: **17WW15**

Sample Number: **L0001-17WW15**

Sample Name: **L0001-17WW15-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 9/2/04

Collection Time: 1026

Start Depth: 13.03

End Depth: 14.72

Sampling Equip: Bladder pump

QC Partners:

(TB) 090204-TB

(ER)

N/A

(FB)

N/A

Sample Matrix: **WATER**

Sample Team:

D. Holdenfield
W. Lutz

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 55.00

Depth To Water: 13.03

Comments:

Sketch Location:

Logged BY / Date: D. Holdenfield 9/2/04

Reviewed BY / Date: D. Holdenfield 9/2/04

Sample Collection Log

00045116

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW15

Sample Number: L0001-17WW15

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Sample form 17WW15									
Sample:	1055	14.72	55.0 -68.0	6.43	0.563	2.2	0.57 mg/L	23.34	8.4 L

Logged BY / Date: Sanjiv Bhat 9/2/04

Reviewed BY / Date: Sanjiv Bhat 9/2/04



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: 17 WW 15
 Project Name/ #: Loughorn AAP
 Weather:

Sampling location ID: 17 WW 15
 Sample ID: 17 WW 15
 Collection Time/Date: 1026 9/2/04

Pump Installation

Pump installation crew: W. Critz / D. Holderfield
 PID/FID reading (well head/background): 0.9/0.0
 Casing diameter (inches): 4 in.
 Total well Depth (ft. BTOC): 55 ft
 Initial (pre-installation) DTW/time: 13.03 835
 Final (after pump priming) DTW/time: 13.26 920
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 60

Installation date/beginning time: 9/2/04 855
 Installation date/completion time: 9/2/04 857
 Screen Interval (ft. BTOC): 45 to 55
 Pump intake depth (ft BTOC): 50
 Post-installation DTW/time: 12.53 857
 Max. sustainable pump rate (mL/min): 100
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz / D. Holderfield
 Purge date/beginning time: 9/2/04 930
 Initial (pre-purging) DTW (ft. BTOC): 13.03
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.9/0.0
 Purge date/completion time: 9/2/04
 Final (post-purging) DTW (ft. BTOC): 14.72
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>38</u>	<u>30</u>	<u>30</u>	<u>30</u>	<u>32</u>	<u>30</u>			<u>30</u>
Refill Setting	<u>27.0</u>	<u>27.0</u>	<u>26.0</u>	<u>25.0</u>	<u>26.0</u>	<u>26.0</u>			<u>26.0</u>
Discharge Setting	<u>3.0</u>	<u>3.0</u>	<u>4.0</u>	<u>5.0</u>	<u>4.0</u>	<u>4.0</u>			<u>4.0</u>
Flow rate (mL/min)	<u>140</u>	<u>50</u>	<u>80</u>	<u>110</u>	<u>110</u>	<u>100</u>			<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
930	13.45	80	0	21.64	0.539	6.38	-50.2	1.78	0.5
935	13.56	110	0.4	21.75	0.543	6.39	-54.8	1.48	0.8
940	13.76	110	0.9	21.80	0.543	6.40	-62.3	1.21	0.5
945	13.88	110	1.4	21.93	0.545	6.43	-67.9	0.90	0.3
950	13.95	100	1.9	22.10	0.545	6.42	-69.2	0.84	0.3
955	14.06	100	2.4	22.33	0.546	6.43	-71.1	0.78	0.4
1000	14.14	100	2.9	22.36	0.547	6.40	-71.1	0.73	0.4
1005	14.22	100	3.4	22.25	0.547	6.40	-71.6	0.67	0.6



GROUNDWATER SAMPLING FORM

Sheet ___ of ___

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1010	14.31	100	3.9	22.24	0.547	6.40	-74.2	0.61	1.2
1015	14.33	100	4.4	22.23	0.547	6.40	-74.1	0.60	0.7
1020	14.40	100	4.9	22.23	0.547	6.40	-75.0	0.57	0.4
1025	14.45	100	5.4	22.36	0.547	6.40	-75.7	0.55	0.8

Sampling

Sampling beginning time: 1026

Sampling completion time: 1052

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1055	14.72	100	8.4	23.34	0.563	6.43	-68.0	0.57	2.2

Sample Information

Sample ID: 17WW15

Sample collection date/time: 9/2/04 1026

Duplicate sample collected (Y/N): N

Duplicate sample ID: N/A

Split sample collected (Y/N): N

Split sample ID: N/A

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC Full	8260B	3-40mL HD vials			
Perchlorate	314	1-250mL HDPE			
Explosives	8330	2-1L amber			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Shaw E & I, Inc.

Sample Collection Log

00045119

Page 1 of 2

845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 17-091404-M/R

Location Code: 17WW16

Sample Number: L0001-17WW16

Sample Name: L0001-17WW16-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip: Bladder pump

QC Partners:

(TB) 091404-TB

(ER) N/A

(FB) N/A

Task: GW DATA GAPS AUG04

Collection Date: 9/14/04

Collection Time: 1241

Start Depth: 11.50

End Depth: 13.61

Sample Matrix: WATER

Sample Team: D. C. Fritz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 153.83

Depth To Water: 11.50

Comments:

Sketch Location:

Logged BY / Date: D. C. Fritz 9/14/04

Reviewed BY / Date: D. C. Fritz 9/14/04

Sample Collection Log

00045120

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 17WW16

Sample Number: L0001-17WW16

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>See Sampling Form 17WW16</p> <p>USE</p>									
Sample:	1315	14.77	287.3	6.16	2.785	104.3	0.86	24.24	2.91

Logged BY / Date: DesCritz 9/14/04 Reviewed BY / Date: Praveen Srivastav 9/14/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 17 Longhorn HAP
 Project Name/ID: Longhorn HAP
 Weather: _____

Sampling location ID: 17 W.W. 16
 Sample ID: 17 W.W. 16
 Collection Time/Date: 09-14-04 / 11:24

Pump Installation

Pump installation crew: M. Martinez / W. C. 112
 PID/FID reading (well head/background): 0.0 / 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 153.83
 Initial (pre-installation) DTW/time: 11.56 908
 Final (after pump priming) DTW/time: 11.52 1034
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 160

Installation date/beginning time: 09-14-04 / 0935
 Installation date/completion time: 09-14-04 / 0938
 Screen Interval (ft. BTOC): 143 to 153
 Pump intake depth (ft. BTOC): 148
 Post-installation DTW/time: 10.27 0939
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: oil
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / W. C. 112
 Purge date/beginning time: 9/14/04 1100 1115
 Initial (pre-purging) DTW (ft. BTOC): 11.50
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0 / 0.0
 Purge date/completion time: 9/14/04 1315
 Final (post-purging) DTW (ft. BTOC): 14.77
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>100</u>	<u>100</u>	<u>100</u>						<u>100</u>
Refill Setting	<u>40</u>	<u>45</u>	<u>43</u>						<u>43</u>
Discharge Setting	<u>20</u>	<u>15</u>	<u>17</u>						<u>17</u>
Flow rate (mL/min)	<u>200</u>	<u>40</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1140</u>	<u>11.56</u>	<u>200</u>	<u>1.0</u>	<u>22.96</u>	<u>2.751</u>	<u>6.33</u>	<u>236.4</u>	<u>4.56</u>	<u>149.2</u>
<u>1145</u>	<u>11.81</u>	<u>200</u>	<u>2.0</u>	<u>22.83</u>	<u>2.750</u>	<u>6.21</u>	<u>254.6</u>	<u>3.02</u>	<u>158.7</u>
<u>1150</u>	<u>12.02</u>	<u>100</u>	<u>2.5</u>	<u>22.31</u>	<u>2.761</u>	<u>5.86</u>	<u>304.3</u>	<u>1.44</u>	<u>94.1</u>
<u>1155</u>	<u>12.19</u>	<u>100</u>	<u>3.0</u>	<u>22.89</u>	<u>2.757</u>	<u>5.84</u>	<u>312.4</u>	<u>1.12</u>	<u>86.6</u>
<u>1200</u>	<u>12.37</u>	<u>100</u>	<u>3.5</u>	<u>23.26</u>	<u>2.755</u>	<u>5.82</u>	<u>311.9</u>	<u>1.09</u>	<u>82.9</u>
<u>1205</u>	<u>12.62</u>	<u>100</u>	<u>4.0</u>	<u>23.05</u>	<u>2.745</u>	<u>5.81</u>	<u>306.3</u>	<u>0.77</u>	<u>107.5</u>
<u>1210</u>	<u>12.70</u>	<u>100</u>	<u>4.5</u>	<u>23.77</u>	<u>2.748</u>	<u>5.88</u>	<u>303.4</u>	<u>0.89</u>	<u>99.2</u>
<u>1215</u>	<u>12.86</u>	<u>100</u>	<u>5.0</u>	<u>24.04</u>	<u>2.749</u>	<u>6.00</u>	<u>298.1</u>	<u>1.05</u>	<u>98.5</u>

Sheet 1 of

Pump Installation	
Pump installation crew: <u>W. Critz / M. Martinez</u>	Installation date/beginning time: <u>9/2/04 1327</u>
PID/FID reading (well head/background): <u>1.1 / 0.0</u>	Installation date/completion time: <u>9/2/04 1329</u>
Casing diameter (inches): <u>4 in</u>	Screen Interval (ft. BTOC): <u>143</u> to <u>153</u>
Total well Depth (ft. BTOC): <u>153.85</u>	Pump intake depth (ft BTOC): <u>148</u>
Initial (pre-installation) DTW/time: <u>11.33 1320</u>	Post-installation DTW/time: <u>9.41 1324</u>
Final (after pump priming) DTW/time: <u>10.55 1525</u>	Max. sustainable pump rate (mL/min): _____
Free product (circle): <u>LNAPL / DNAPL</u>	Appearance of product: _____
Volume of water removed during priming (mL): _____	Discharge tube diameter (3/8" or 1/4"): <u>3/8"</u>
Discharge tube length (ft.): <u>162</u>	Inlet reducer used (Y/N): <u>N</u>
Pneumatic Controller Tuning:	
Initial air pressure = H (ft.) X 0.43 = _____	psi

[illegible]

Purging/sampling crew: W. Crite / M. Martinez PID/FID reading (well head/background): 1.1 / 0.0
Purge date/beginning time: 9/2/04 Purge date/completion time: 9/2/04
Initial (pre-purging) DTW (ft. BTOC): _____ Final (post-purging) DTW (ft. BTOC): _____
Calculated tubing + pump volume: _____ NA No. of tubing + pump volumes purged: _____
Pneumatic Controller Tuning:
Initial air pressure = H (ft.) X 0.43 = _____ psi

[illegible][illegible]

Sheet ____ of ____

[illegible]

Sampling beginning time: _____ Sampling completion time: _____

[illegible]

Sample ID: _____
Duplicate sample collected (Y/N): _____
Split sample collected (Y/N): _____
COC No(s): _____

Sample collection date/time: _____
Duplicate sample ID: _____
Split sample ID: _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments: Bladder in pump blew out. New bladder was installed but kept slipping out from under the clamp. A fourth attempt secured the bladder and water was able to be pumped.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

LHAAP-18

**GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS**

Sample Collection Log

00045126

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 18-090304-MK

Location Code: **18WW21**

Sample Number: **L0001-18WW21**

Sample Name: **L0001-18WW21-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 9/3/04

Collection Time: 10:02

Start Depth: 26.19

End Depth: 26.17

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 090304-TB

(ER) N/A

(FB) N/A

Sample Team: A. Willmore, C. Mober

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 61.71

Depth To Water: 26.06

Comments:

Sketch Location:

Logged BY / Date: [Signature]

Reviewed BY / Date: [Signature]

9/3/04

9/3/04

Sample Collection Log

00045127

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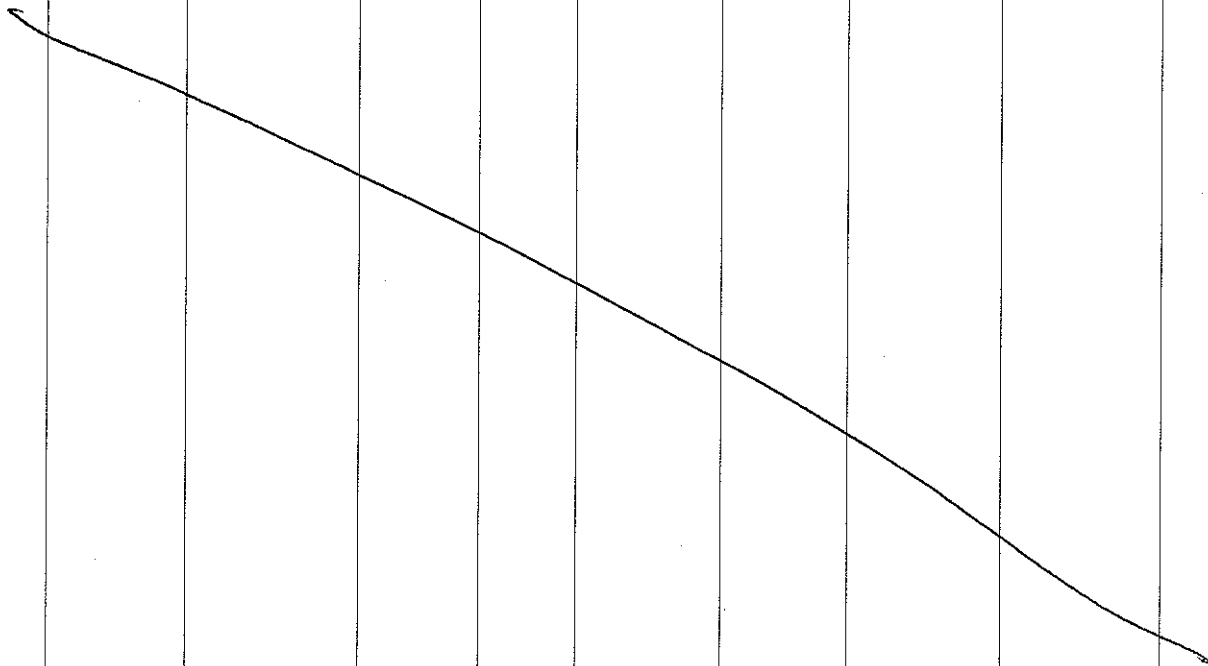
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 18WW21

Sample Number: L0001-18WW21

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	10:30	26.19	314.2	9.28	1.214	9.8	0.94	20.93	2.3 gal

Logged BY / Date: M. [Signature]
9/3/04

Reviewed BY / Date: [Signature] 9/3/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 18
 Project Name/ID: CHAMP
 Weather: Cloudy 80s to 90s

Sampling location ID: 18ww21
 Sample ID: 18ww21
 Collection Time/Date: 10:02 9/3/04

Pump Installation

Pump installation crew: A. Willmore, C. Mabe
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 61.71
 Initial (pre-installation) DTW/time: 26.06
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 60'

Installation date/beginning time: 9/3/04 9:08
 Installation date/completion time: 9/3/04 9:09
 Screen Interval (ft. BTOC): 51.71 to 61.71
 Pump intake depth (ft. BTOC): 56.71
 Post-installation DTW/time: 25.92 9:10
 Max. sustainable pump rate (mL/min): 105
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/4" 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 24.38 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, C. Mabe
 Purge date/beginning time: 9/3/04 9:12
 Initial (pre-purging) DTW (ft. BTOC): 26.06
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 24.38 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>								<u>30</u>
Refill Setting	<u>13</u>								<u>13</u>
Discharge Setting	<u>3</u>								<u>3</u>
Flow rate (mL/min)	<u>105</u>								<u>105</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0920	26.19	105	0.1	22.55	0.242	8.16	-118.0	7.43	7.6
0925	26.19	105	0.2	21.41	1.084	9.29	-280.0	7.94	9.5
0930	26.19	105	0.4	21.02	1.190	9.25	-305.4	6.24	9.7
0935	26.19	105	0.5	20.93	1.220	9.26	-315.0	1.72	10.0
0940	26.19	105	0.6	20.99	1.227	9.28	-324.3	1.34	10.0
0945	26.19	105	0.8	21.01	1.230	9.28	-329.8	1.22	10.6
0950	26.19	105	1.0	20.96	1.228	9.28	-351.6	0.84	10.3
0955	26.19	105	1.2	20.96	1.227	9.28	-334.5	0.97	10.1

0935

0940

0945

0950

Sheet 2 of 2

[illegible]

Sampling beginning time: 10:02

Sampling completion time: 10:09

[illegible]

Sample ID: BWWZ1

Sample collection date/time: 18 JUL

Duplicate sample collected (Y/N): No

Duplicate sample ID:

Split sample collected (Y/N): Ne

Split sample ID:

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate	314	HDR			
VOCs	8060	Vog Vial			

Comments:

LHAAP-29

GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS

Sample Collection Log

00045131

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: 29WW02

Sample Number: L0001-29WW02

Sample Name: L0001-29WW02-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip: Bladder pump

QC Partners: 083104-TB

(TB) ~~082404-FB~~

(ER)

N/A

(FB)

N/A

Task: GW DATA GAPS AUG04

Collection Date: 8/31/04

Collection Time: 16:02

Start Depth: ~~25.30~~ 32.41

End Depth: 33.71

Sample Matrix: WATER

Sample Team: A. Willmore, C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 42.9

Depth To Water: 33.57

Comments:

Had to bail day b/cuz well recharged slow

Sketch Location:

Logged BY / Date:

[Signature]
8/31/04

Reviewed BY / Date:

Sample Collection Log

00045132

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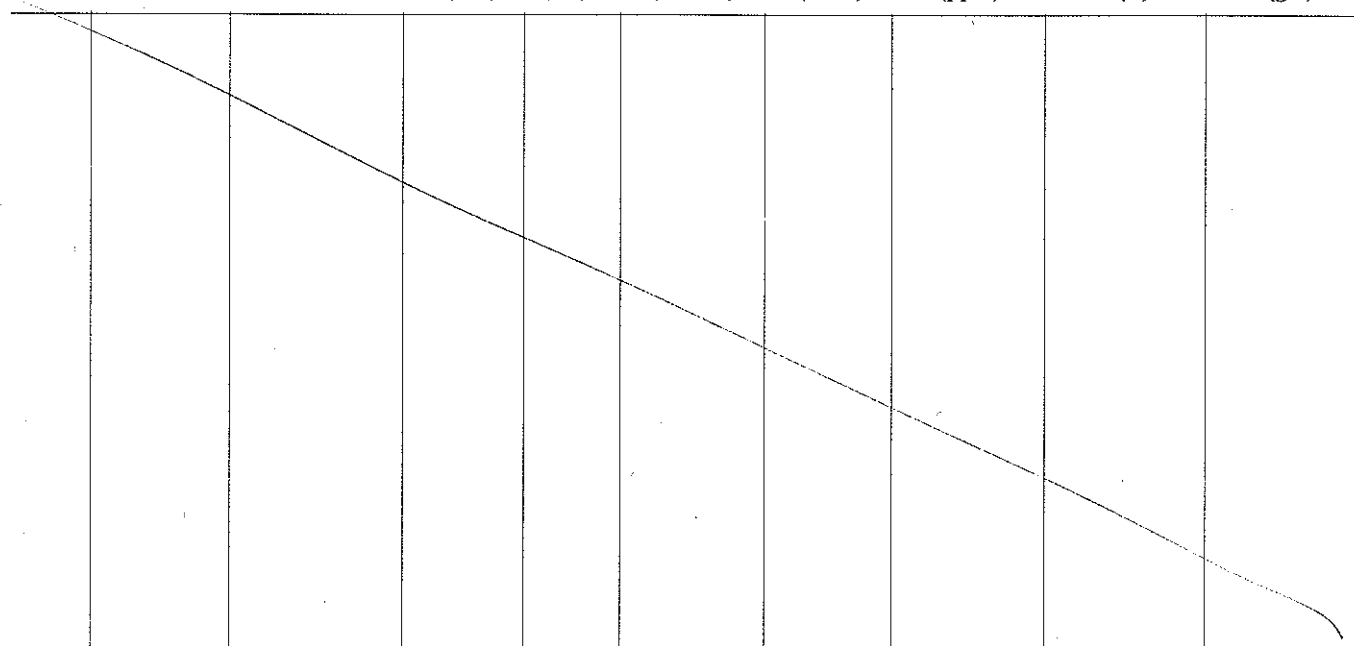
845714 LONGHORN AAP

Manager: Praveen Srivastav


Location Code: 29WW02

Sample Number: L0001-29WW02

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	16:02	33.71	144.3	6.96	4.982	5.7	0.99	24.10	14 gallon

Logged BY / Date:


8/31/04

Reviewed BY / Date:



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 29
 Project Name/#: CHAAP
 Weather: Partly Cloudy High 80's / Low 60's

Sampling location ID: 29 WW02
 Sample ID: 29 WW02
 Collection Time/Date: 8/30/04

Pump Installation

Pump installation crew: A. Willmore, C. Major
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 42.9'
 Initial (pre-installation) DTW/time: 33.16 / 11:13
 Final (after pump priming) DTW/time: /
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 60'

Installation date/beginning time: 8/30/04 / 15:20
 Installation date/completion time: 8/30/04 / 15:31
 Screen Interval (ft. BTOC): 32.9' to 42.9'
 Pump intake depth (ft. BTOC): 38'
 Post-installation DTW/time: 33.35 / 15:13
 Max. sustainable pump rate (mL/min): 225
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): M.

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 15.91 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, C. Major
 Purge date/beginning time: 8/30/04 12:55
 Initial (pre-purging) DTW (ft. BTOC): 33.57
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.6
 Purge date/completion time: 8/30/04
 Final (post-purging) DTW (ft. BTOC): 34.16
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 15.91 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>15</u>	<u>15</u>	<u>16</u>	<u>18</u>	<u>20</u>			<u>20</u>
Refill Setting	<u>10</u>	<u>10</u>	<u>12</u>	<u>10</u>	<u>12</u>	<u>12.5</u>			<u>12.5</u>
Discharge Setting	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>8</u>	<u>2.5</u>			<u>2.6</u>
Flow rate (mL/min)	<u>225</u>	<u>25</u>	<u>60</u>	<u>95</u>	<u>70</u>	<u>120</u>			

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>15:23</u>	<u>33.65</u>	<u>225</u>	<u>0.2 gal</u>	<u>23.98</u>	<u>4.949</u>	<u>7.80</u>	<u>169.8</u>	<u>2.11</u>	<u>5.53</u>
<u>15:28</u>	<u>33.67</u>	<u>180</u>	<u>0.4</u>	<u>24.86</u>	<u>4.951</u>	<u>7.85</u>	<u>161.1</u>	<u>1.74</u>	<u>5.6</u>
<u>15:33</u>	<u>33.68</u>	<u>25</u>	<u>0.5</u>	<u>26.98</u>	<u>4.950</u>	<u>7.87</u>	<u>159.2</u>	<u>1.56</u>	<u>5.5</u>
<u>15:38</u>	<u>33.71</u>	<u>60</u>	<u>0.6</u>	<u>27.20</u>	<u>4.968</u>	<u>7.91</u>	<u>161.5</u>	<u>1.46</u>	<u>5.2</u>
<u>15:43</u>	<u>33.79</u>	<u>95</u>	<u>0.7</u>	<u>27.31</u>	<u>4.975</u>	<u>7.91</u>	<u>162.0</u>	<u>1.41</u>	<u>4.6</u>
<u>15:48</u>	<u>33.82</u>	<u>70</u>	<u>0.9</u>	<u>26.28</u>	<u>4.997</u>	<u>7.90</u>	<u>156.3</u>	<u>1.20</u>	<u>6.8</u>
<u>15:53</u>	<u>33.84</u>	<u>80</u>	<u>1.0</u>	<u>26.30</u>	<u>4.998</u>	<u>7.90</u>	<u>156.4</u>	<u>1.20</u>	<u>6.9</u>
<u>13:58</u>	<u>33.93</u>	<u>120</u>	<u>1.1</u>	<u>25.92</u>	<u>5.014</u>	<u>7.84</u>	<u>155.3</u>	<u>1.00</u>	<u>5.9</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
14:03	34.02	120	1.3	25.50	4.982	7.88	151.2	0.96	5.0
14:08	34.11	120	1.5	25.06	4.983	7.88	149.1	0.95	5.5
14:10	34.16	120	1.7	24.21	4.979	7.88	137.2	1.33	5.0

MUST BAIL WELL !!

Sampling

Sampling beginning time: _____

Sampling completion time: _____

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
16:02	33.71	—	14 gallons	24.10	4.982	7.96	149.3	0.99	5.7

Sample Information

Sample ID: 24WW02Sample collection date/time: 16:02Duplicate sample collected (Y/N): NoDuplicate sample ID: —Split sample collected (Y/N): NoSplit sample ID: —

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate	314	HDPE			
VOCs	8260	VOR VIE			
Nitro Explosives	8330	1-L Amber			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045135

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-083104-MK

Location Code: **29WW03**

Sample Number: **L0001-29WW03**

Sample Name: **L0001-29WW03-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 8/30/04

Collection Time: 17:35

Start Depth: 18.81

End Depth: ~~18.81~~ 19.14

Sample Matrix: **WATER**

Sample Team: A. Willmore, C. Mabe

Sampling Equip: Bladder Pump

QC Partners:

(TB) 083004-TB

(ER) N/A

(FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 30.12

Depth To Water: 28.83

Comments: Had to collect sample w/ 1/2" bailer (PVC) b/cuz well was too slow to recharge

Sketch Location:

Logged BY / Date:

M. Mabe
8/30/04

Reviewed BY / Date:

P. Mabe 8/31/04

Sample Collection Log

00045136

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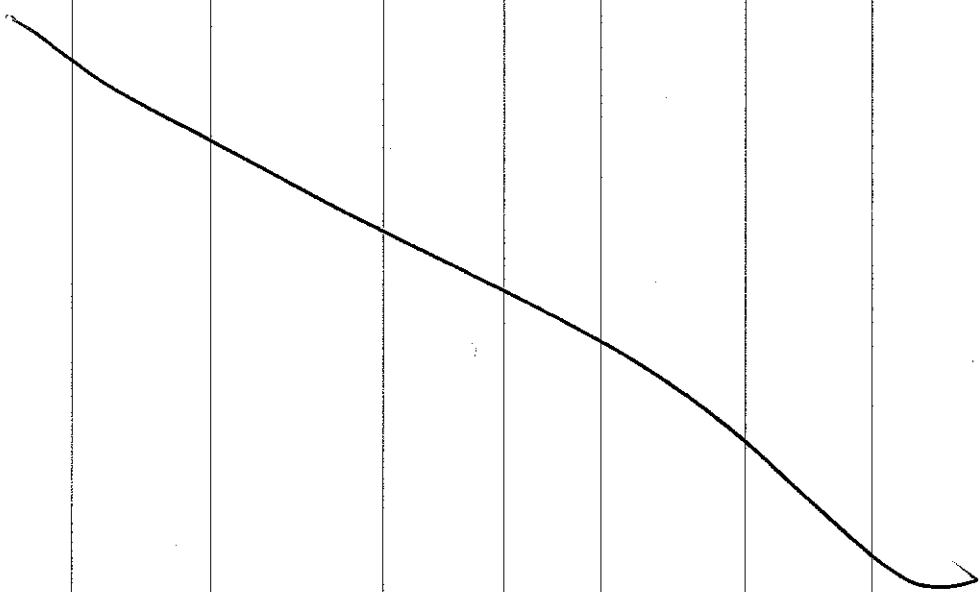
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW03

Sample Number: L0001-29WW03

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	17:50	19.4	135.4	6.83	1.194	10.60	2.31	26.91	2.4 gal

Logged BY / Date:

M. P. L. n
3/30/04

Reviewed BY / Date:

Praveen Srivastav



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 29
 Project Name/ID: CHAMP
 Weather: Partly cloudy, 90s

Sampling location ID: 29WW03
 Sample ID: 29WW03
 Collection Time/Date: 17:35 / 8/30/04

Pump Installation

Pump installation crew: A.W. Hines
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 30.12
 Initial (pre-installation) DTW/time: 25.77 / 17:40
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 60'

Installation date/beginning time: 8/30/04 17:35
 Installation date/completion time: 8/30/04 17:45
 Screen Interval (ft. BTOC): 20.12 to 30.12
 Pump intake depth (ft. BTOC): 25.67
 Post-installation DTW/time: 25.59
 Max. sustainable pump rate (mL/min): 125
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 11.0 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willman, K. Everett
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): 25.83
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 11.61 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>120.11</u>	<u>16.1</u>	<u>14</u>						
Refill Setting	<u>10</u>	<u>8.1</u>	<u>10.1</u>						
Discharge Setting	<u>5</u>	<u>3</u>	<u>3</u>						
Flow rate (mL/min)	<u>125</u>	<u>120</u>	<u>50</u>						

25.67

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
8/29/04 16:30	26.32	50	0.5	28.34	1.183	6.67	140.7	2.38	9.7
8/29/04 16:35	26.34	100	0.6	28.21	1.194	6.65	135.2	2.22	10.2
	26.40								
MUST BAIL WELL !!									
8/30/04 10:17	25.57	22 gal/min	1.90	27.95	1.192	6.73	149.40	2.10	10.4
			2.90	27.94	1.191	6.72	135.4	2.24	10.3



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Sampling

Sampling beginning time: _____

Sampling completion time: _____

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
17:50	19.34	—	2.4 g	26.91	NA4	6.83	135.4	2.31	16.60

Sample Information

Sample ID: 29W403Sample collection date/time: 8/30/04 17:35Duplicate sample collected (Y/N): NoDuplicate sample ID: —Split sample collected (Y/N): NoSplit sample ID: —COC No(s): —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs	8260	Voa (40 ml)			
Perc	814	HDPE			
Explosives	8330	1 L Amber			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045139

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-083004-MK

Location Code: **29WW04**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-29WW04**

Collection Date: 8/29/04

Sample Name: **L0001-29WW04-00**

Collection Time: 1125

Sampling Method: **BA**

Start Depth: 47.23

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 48.68

Sampling Equip: Bladder pump

Sample Matrix: **WATER**

QC Partners:

(TB) 082904-TB1

(ER)

N/A

(FB)

N/A

Sample Team: D. Holder, M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 157.09

Depth To Water: 47.23

Comments:

Sketch Location:

Logged BY / Date: De. 1/10/04 8/29/04

Reviewed BY / Date: De. 1/10/04 8/29/04

Sample Collection Log

00045140

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW04

Sample Number: L0001-29WW04

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
[Table body is crossed out with a diagonal line]									
Sample:	1125	48.80	178.8	8.76	0.907	0.7	1.79	22.19	13.0

Logged BY / Date:

[Signature] 8/29/04

Reviewed BY / Date:

[Signature] 8/29/04



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: Area 29 Levenson AAP
 Project Name/ID: Levenson AAP
 Weather: 75-80° S/C Zero winds

Sampling location ID: 29WW04
 Sample ID: 29WW04
 Collection Time/Date: 08-29-04

Pump Installation

Pump installation crew: M. Martinez / A. Holderfield
 PID/FID reading (well head/background): 0.0/0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 157.09
 Initial (pre-installation) DTW/time: 47.23 / 0830
 Final (after pump priming) DTW/time: 47.23 /
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 160'

Installation date/beginning time: 8-29-04 / 0853
 Installation date/completion time: 08-29-04 / 0855
 Screen Interval (ft. BTOC): 145' to 155'
 Pump intake depth (ft. BTOC): 150'
 Post-installation DTW/time: 46.10 / 0856
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: N/A
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / D. Holderfield
 Purge date/beginning time: 08-29-04 / 0915
 Initial (pre-purging) DTW (ft. BTOC): 47.23
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0/0.0
 Purge date/completion time: 08-29-04
 Final (post-purging) DTW (ft. BTOC): 48.80
 No. of tubing + pump volumes purged: N/A

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = N/A psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	100	100	100						100
Refill Setting	10.0	20	22						22
Discharge Setting	5.0	16	8						8
Flow rate (mL/min)	None	105	100						100

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0950	47.23	100	0	21.34	0.861	8.45	391.0	9.89	4.8
0955	47.55	100	0.5	21.44	0.872	8.72	244.4	8.44	1.3
1000	47.63	100	1.0	21.51	0.869	8.77	207.5	8.79	1.3
1005	47.73	100	1.5	21.57	0.875	8.80	176.0	6.78	1.2
1010	47.83	100	2.5	21.61	0.880	8.82	156.5	5.91	1.1
1015	47.93	100	3.0	21.55	0.891	8.88	146.1	5.03	1.1
1020	48.03	100	3.5	21.61	0.891	8.89	140.8	4.28	1.2
1025	48.13	100	4.0	21.63	0.892	8.88	141.3	3.81	1.3



GROUNDWATER SAMPLING FORM

Sheet ___ of ___

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1030	48.23	100	4.5	21.74	0.895	8.89	142.2	3.27	1.1
1035	48.31	100	5.0	21.84	0.897	8.89	144.2	3.13	1.1
1040	48.35	100	5.5	21.94	0.897	8.89	146.3	2.82	1.0
1045	48.40	100	6.0	22.02	0.899	8.90	148.6	2.42	1.2
1050	48.45	100	6.5	22.02	0.898	8.89	149.5	2.32	0.9
1055	48.48	100	7.0	22.18	0.899	8.90	152.1	2.21	1.2
1100	48.53	100	7.5	22.19	0.899	8.89	152.7	2.06	1.0
1105	48.57	100	8.0	22.04	0.900	8.88	154.7	1.95	0.9
1110	48.63	100	8.5	21.97	0.899	8.86	156.4	1.87	1.0
1115	48.65	100	9.0	21.81	0.899	8.85	158.1	1.83	1.0
1120	48.68	100	9.5	21.68	0.899	8.84	158.7	1.79	1.0
	48.82								

Sampling

Sampling beginning time: 11:25

Sampling completion time: 11:50

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1205	48.80	100	13.5	22.19	0.907	8.76	173.8	1.79	0.7

Sample Information

Sample ID: L0001-29W004

Sample collection date/time: 11/25 / 08/29/04

Duplicate sample collected (Y/N) ☒

Duplicate sample ID: N/A

Split sample collected (Y/N) ☒

Split sample ID: N/A

COC No(s): 29-083004-MK

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8260 B	3 X 40 mL			
Explosives	8330	2 X 1 L Amber			
perchlorate	314	1 X 250 mL HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045143

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082604-MK

Location Code: **29WW05**

Sample Number: **L0001-29WW05**

Sample Name: **L0001-29WW05-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 08-26-04

Collection Time: 0931

Start Depth: 17.58

End Depth: 17.99

Sample Matrix: **WATER**

Sample Team: M. Martinez / E. C. 142

Sampling Equip: GED Pump non dedicated Teflon bladder

QC Partners:

(TB) 082604-TB-1 (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 24.97

Depth To Water: 17.58

Comments:

Sketch Location:

Logged BY / Date: [Signature]

Reviewed BY / Date: [Signature] 8/26/04

Sample Collection Log

00045144

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW05

Sample Number: L0001-29WW05

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
SEE GWSF 29WW05									
Sample:	10:10	17.99	270.1 1185 mV	6.10	1.185	2.0	0.85	24.77	8.06

Logged BY / Date: [Signature]

Reviewed BY / Date: [Signature] 8/26/09



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 29WW05 Coughlin AWP
 Project Name/#: Coughlin
 Weather: Sunny hot / 82-94 °C Windy

Sampling location ID: 29WW05
 Sample ID: 29WW05
 Collection Time/Date: _____

Pump Installation

Pump installation crew: M. Martinez, N. Ortiz
 PID/FID reading (well head/background): 0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 24.97
 Initial (pre-installation) DTW/time: 17.45' / 8/23/04 = 1600
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL/DNAPL N/A
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 30'

Installation date/beginning time: 08-26-04 / 0832
 Installation date/completion time: 08-26-04 / 0832
 Screen Interval (ft. BTOC): 12 to 22
 Pump intake depth (ft BTOC): 17 20.5'
 Post-installation DTW/time: 17.42 / 0833
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: N/A
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 12.9 psi

Top of Vault to Top of Casing

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / W. Ortiz
 Purge date/beginning time: 08-26-04 / 0845
 Initial (pre-purging) DTW (ft. BTOC): 17.58
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 08-26-04 /
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 12.9 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>22</u>	<u>20</u>	<u>18</u>						<u>18</u>
Refill Setting	<u>10.0</u>	<u>12.5</u>	<u>13.5</u>						<u>13.5</u>
Discharge Setting	<u>5.0</u>	<u>2.5</u>	<u>1.5</u>						<u>1.5</u>
Flow rate (mL/min)	<u>195</u>	<u>150</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>0850</u>	<u>17.77</u>	<u>100</u>	<u>0</u>	<u>22.61</u>	<u>1.210</u>	<u>6.10</u>	<u>306.2</u>	<u>0.80</u>	<u>-2.8</u>
<u>0855</u>	<u>17.84</u>	<u>100</u>	<u>0.5</u>	<u>22.79</u>	<u>1.212</u>	<u>6.13</u>	<u>296.9</u>	<u>0.76</u>	<u>-2.8</u>
<u>0900</u>	<u>17.86</u>	<u>100</u>	<u>1.0</u>	<u>22.98</u>	<u>1.212</u>	<u>6.15</u>	<u>284.7</u>	<u>0.70</u>	<u>-2.8</u>
<u>0905</u>	<u>17.87</u>	<u>100</u>	<u>1.5</u>	<u>23.05</u>	<u>1.211</u>	<u>6.15</u>	<u>280.3</u>	<u>0.69</u>	<u>-2.9</u>
<u>0910</u>	<u>17.89</u>	<u>100</u>	<u>2.0</u>	<u>23.14</u>	<u>1.211</u>	<u>6.15</u>	<u>274.4</u>	<u>0.67</u>	<u>-2.9</u>
<u>0915</u>	<u>17.90</u>	<u>100</u>	<u>2.5</u>	<u>23.18</u>	<u>1.210</u>	<u>6.16</u>	<u>270.6</u>	<u>0.63</u>	<u>-2.9</u>
<u>0920</u>	<u>17.92</u>	<u>100</u>	<u>3.0</u>	<u>23.29</u>	<u>1.208</u>	<u>6.16</u>	<u>265.2</u>	<u>0.59</u>	<u>-2.8</u>
<u>0925</u>	<u>17.93</u>	<u>100</u>	<u>3.5</u>	<u>23.38</u>	<u>1.205</u>	<u>6.17</u>	<u>264.3</u>	<u>0.58</u>	<u>-2.8</u>

Sheet 2 of 2

[illegible]

Sampling beginning time: 0431

Sampling completion time: 0455

[illegible]

Sample ID: 29wwos

Sample collection date/time: 08-26-04 / 0931

Duplicate sample collected (Y/N): *no*

Duplicate sample ID: *n/a*

Split sample collected (Y/N): no

Split sample ID: NA

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC-Full	8260B	3 VOAS			
Explosives	8320	2 x 1L Ambers			
Perchlorate	314	1x 250mL HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045147

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845714 LONGHORN AAP
Manager: Praveen Srivastav

RFA / COC Number: 29-082504-MK

Location Code: 29WW07

Task: GW DATA GAPS AUG04

Sample Number: L0001-29WW07

Sample Name: L0001-29WW07-00

Collection Date: 8/24/04

Collection Time: 1621

Sampling Method: BA

Start Depth: 23.64

Sample Type: GW

Sample Purpose: REG

End Depth: 25.70

Sampling Equip: QED non-dedicated bladder pump (teflon)

Sample Matrix: WATER

QC Partners:

(TB) 082404-TBZ (ER) N/A (FB) N/A

Sample Team: W. Critz
M. Martinez

Containers
Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 40.08'

Depth To Water: 23.64'

Comments:**Sketch Location:**

Logged BY / Date:

Reviewed BY / Date: J. H. P. 8/25/04

Sample Collection Log

00045148

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW07

Sample Number: L0001-29WW07

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Sampling Form Well # 29WW07									
Sample:	1635	25.70	173.5	6.25	3.995	2.2	0.70	22.73	2.5 gal.

Logged BY / Date: W. Critz 8/24/04

Reviewed BY / Date: [Signature] 8/25/04



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: 29WW07 Loughorn AAP
 Project Name/ID: Loughorn
 Weather: Partly Cloudy mid 90's

Sampling location ID: Site 29
 Sample ID: 29WW07 -WASPB Nest
 Collection Time/Date:

W. Critz

Pump Installation

Pump installation crew: M. MartinezPID/FID reading (well head/background): 290*8/23/04/1699Installation date/beginning time: 8/24/04 1500Installation date/completion time: 8/24/04 1640Casing diameter (inches): 4Screen Interval (ft. BTOC): 27 to 37Total well Depth (ft. BTOC): 40.68 (32)Pump intake depth (ft. BTOC): 32 ft.Initial (pre-installation) DTW/time: 23.60/8/23/04 1800Post-installation DTW/time: 25.70 1635Final (after pump priming) DTW/time: 25.70 1635Max. sustainable pump rate (mL/min): 100Free product (circle): LNAPL / DNAPLAppearance of product: ClearVolume of water removed during priming (mL): Discharge tube diameter (3/8" or 1/4"): 3/8"Discharge tube length (ft.): 60 ft.Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 25.8 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	25								
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

W. Critz

Purging

Purging/sampling crew: M. MartinezPID/FID reading (well head/background): 699/0Purge date/beginning time: 8/24/04 1504Purge date/completion time: 8/24/04Initial (pre-purging) DTW (ft. BTOC): 23.64Final (post-purging) DTW (ft. BTOC): 25.70Calculated tubing + pump volume: NANo. of tubing + pump volumes purged: 8.5 L

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 25.8 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>23</u>	<u>23</u>	<u>23</u>	<u>23</u>	<u>20</u>				<u>20</u>
Refill Setting	<u>10</u>	<u>12.5</u>	<u>13.5</u>	<u>12</u>	<u>13</u>				<u>13</u>
Discharge Setting	<u>5</u>	<u>2.5</u>	<u>1.5</u>	<u>2</u>	<u>2</u>				<u>2</u>
Flow rate (mL/min)	<u>470</u>	<u>250</u>	<u>90</u>	<u>155</u>	<u>115</u>				<u>1.5</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1535	24.75	45	0	28.04	3.958	6.31	241.8	1.06	2.7
1540	24.83	100	0.5	28.59	3.938	6.30	229.1	1.02	2.4
1545	24.81	100	1.0	28.64	3.936	6.30	228.3	1.02	2.4
1550	24.93	100	1.5	28.58	3.945	6.30	221.4	0.99	2.3
1555	24.98	100	2.0	28.53	3.955	6.30	205.2	0.96	2.5
1600	25.03	100	2.5	28.43	3.941	6.29	181.5	0.92	2.0
1605	25.12	100	3.0	28.67	3.932	6.31	176.3	0.87	2.3
1612	25.20	100	3.5	28.96	3.926	6.31	165.9	0.81	2.3

* Sprayed outside of vault w/ wasp spray; background was 5; cap tight + probe inside well - 290-372 ppm.



GROUNDWATER SAMPLING FORM

Sheet ___ of ___

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1615	25.23	100	4.0	29.08	3.968	6.31	161.9	0.85	2.3
1620	25.30	100	4.5	29.19	3.973	6.31	156.3	0.88	2.3

Sampling

Sampling beginning time: 1621Sampling completion time: 1630

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1635	25.70	100	5.0	22.73	3.995	6.25	173.5	0.70	2.2

Sample Information

Sample ID: 29WW07
 Duplicate sample collected (Y/N): Y
 Split sample collected (Y/N): Y
 COC No(s): _____

Sample collection date/time: 8/24/04 1621
 Duplicate sample ID: _____
 Split sample ID: _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
UDC - FULL	8260B	3 - 40 mL			
Explosives	8330	2 - 1L Amber			
Perchlorate	314	2 - 250 mL			

Comments: At 1535 we started recording parameter readings. We started pumping at 1504, but had difficulty keeping the static water level in the well. Approx. 4L were purged prior to recording parameters.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045151

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082504-MK

Location Code: **29WW08**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-29WW08**

Sample Name: **L0001-29WW08-00**

Collection Date: 08-25-04

Sampling Method: **BA**

Collection Time: 1211

Sample Type: **GW**

Sample Purpose: **REG**

Start Depth: 33.37'

End Depth: 33.80'

Sampling Equip: GED Pump non dedicated Teflon Bladder Pump

Sample Matrix: **WATER**
Wet Core

QC Partners:

(TB) 082504-TB1 (ER) NA (FB) NA

Sample Team: Michael Martine

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 132.32'

Depth To Water: 33.37'

Comments:

Sketch Location:

Logged BY / Date:

[Signature]

Reviewed BY / Date:

[Signature] 8/25/04

Sample Collection Log

00045152

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW08

Sample Number: L0001-29WW08

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
SEE GWSF 29 WW08									
Sample:	1318	33-80	1080 250.1	7.07	1.080	4.1	0.99	27.01	14.5L

Logged BY / Date: [Signature]

Reviewed BY / Date: [Signature] 8/25/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 29-600034 Lonsdale AAP
 Project Name/ID: Lonsdale AAP
 Weather: 0/C Winds from the West 5-5 mph

Sampling location ID: Site 29
 Sample ID: 29W08
 Collection Time/Date: 08/25/04 @ 1211

Pump Installation

Pump installation crew: M. M. Hines / L. C. Hines
 PID/FID reading (well head/background): 0.9 ppm/0
 Casing diameter (inches): 4
 Total well Depth (ft. BTOC): 132.32' 135
 Initial (pre-installation) DTW/time: 33.32 / 8/23/04 1740
 Final (after pump priming) DTW/time: 33.08 / 1030
 Free product (circle): LNAPL/DNAPL from well
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 100

Installation date/beginning time: 08-25-04 / 0930
 Installation date/completion time: 08-25-04 / 0934
 Screen Interval (ft. BTOC): 122 to 132
 Pump intake depth (ft. BTOC): 127'
 Post-installation DTW/time: 0953 / 32.80
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: N/A
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 69 psi

8/25/04 DTW @ 33.37

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>69</u>								
Refill Setting	<u>10.0</u>								
Discharge Setting	<u>5.0</u>								
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. M. Hines
 Purge date/beginning time: 3337 / 33.08 / 1034
 Initial (pre-purging) DTW (ft. BTOC): 33.08 / 1030
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0 / 0.0
 Purge date/completion time: 08/25/04 / 1319
 Final (post-purging) DTW (ft. BTOC): 33.30
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>69</u>	<u>70</u>	<u>75</u>						<u>75</u>
Refill Setting	<u>10.0</u>	<u>10</u>	<u>10</u>						<u>10</u>
Discharge Setting	<u>5.0</u>	<u>5</u>	<u>5</u>						<u>5</u>
Flow rate (mL/min)	<u>65</u>	<u>90</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1100</u>	<u>33.71</u>	<u>100</u>	<u>0</u>	<u>28.00</u>	<u>1.080</u>	<u>7.64</u>	<u>271.6</u>	<u>3.89</u>	<u>2.3</u>
<u>1105</u>	<u>33.73</u>	<u>100</u>	<u>0.5</u>	<u>28.13</u>	<u>1.083</u>	<u>7.69</u>	<u>259.6</u>	<u>3.71</u>	<u>2.9</u>
<u>1110</u>	<u>33.75</u>	<u>100</u>	<u>1.0</u>	<u>28.39</u>	<u>1.085</u>	<u>7.71</u>	<u>253.1</u>	<u>3.25</u>	<u>3.3</u>
<u>1115</u>	<u>33.77</u>	<u>100</u>	<u>1.5</u>	<u>28.32</u>	<u>1.089</u>	<u>7.70</u>	<u>255.5</u>	<u>3.06</u>	<u>4.1</u>
<u>1120</u>	<u>33.79</u>	<u>100</u>	<u>2.0</u>	<u>28.53</u>	<u>1.088</u>	<u>7.67</u>	<u>253.4</u>	<u>2.48</u>	<u>4.0</u>
<u>1125</u>	<u>33.80</u>	<u>100</u>	<u>2.5</u>	<u>28.54</u>	<u>1.089</u>	<u>7.69</u>	<u>254.0</u>	<u>2.41</u>	<u>4.1</u>
<u>1130</u>	<u>33.80</u>	<u>100</u>	<u>3.0</u>	<u>28.41</u>	<u>1.090</u>	<u>7.66</u>	<u>254.2</u>	<u>1.98</u>	<u>4.2</u>
<u>1135</u>	<u>33.80</u>	<u>100</u>	<u>3.5</u>	<u>28.49</u>	<u>1.089</u>	<u>7.66</u>	<u>253.6</u>	<u>1.85</u>	<u>4.1</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1140	33.82	100	4.0	28.38	1.091	7.67	253.7	1.74	4.3
1145	33.83	100	4.5	27.85	1.094	7.65	255.4	1.56	4.1
1150	33.83	100	5.0	27.02	1.089	7.64	255.5	1.28	4.3
1155	33.83	100	5.5	27.02	1.087	7.64	255.3	1.19	4.4
1200	33.83	100	6.0	27.16	1.085	7.65	255.1	1.16	4.4
1205	33.83	100	6.5	27.37	1.085	7.66	253.1	1.13	4.4
1210	33.83	100	7.0	27.45	1.085	7.68	251.9	1.08	4.6

Sampling

Sampling beginning time: 1211Sampling completion time: 1300

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1318	33.86	100	14.5	27.61	1.086	7.67	250.1	0.99	4.1

Sample Information

Sample ID: 296608Sample collection date/time: 08-25-04/1211Duplicate sample collected (Y/N): NoDuplicate sample ID: N/ASplit sample collected (Y/N): NoSplit sample ID: N/A

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC- Full	82408	3 vOA			
Explosives	8330	2 x 1 L Amber			
Perchlorate	3141	1 x 250mL HOPK			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045155

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082704-mk

Location Code: 29WW11

Sample Number: L0001-29WW11

Sample Name: L0001-29WW11-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Task: GW DATA GAPS AUG04

Collection Date: 08-27-04

Collection Time: 1106

Start Depth: 22.25

End Depth: 24.05

Sampling Equip: GED Pump nondescript Teflon Bladder

Sample Matrix: WATER

QC Partners:

(TB) 082704-TB1 (ER) NA

(FB) NA

Sample Team: M. Martore / W. Critz

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 30.08

Depth To Water: 22.25

Comments:

Duplicate 29WW11 QC

Sketch Location:

Logged BY / Date:

08-27-04

Reviewed BY / Date:

P. Martore 8/27/04

Sample Collection Log

00045156

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW11

Sample Number: L0001-29WW11

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
SEE GW SF 29WW11									
Sample:	1212	24.05	98.1	6.19	6.808	-1.9	0.98	24.01	12.06

Logged BY / Date:

[Signature]
08-27-04

Reviewed BY / Date:

[Signature] 8/27/04

Sample Collection Log

00045157

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082704-mk

Location Code: **29WW11**

Sample Number: **L0001-29WW11**

Sample Name: **L0001-29WW11-00-QC**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **FD**

Task: **GW DATA GAPS AUG04**

Collection Date: 8/27/04

Collection Time: 1106

Start Depth: 22.25

End Depth: 24.05

Sample Matrix: **WATER**

Sample Team: W. Cntz
M. Martinez

Sampling Equip: Bladder pump

QC Partners:

(TB) 082704-7B1 (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 30.08

Depth To Water: 22.25

Comments:

Sketch Location:

Logged BY / Date:

[Signature]
082704

Reviewed BY / Date:

[Signature]

Sample Collection Log

00045158

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW11 - FD

Sample Number: L0001-29WW11

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:	1212	24.05	98.1	6.19	6.868	-1.9	0.98	26.01	12.06

Logged BY / Date: _____

Reviewed BY / Date: _____

[Signature] 8/27/01



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Mine 29
 Project Name/ID: Loughlin SAP
 Weather: Sunny

Sampling location ID: Site 29
 Sample ID: 29WW11
 Collection Time/Date: 8-27-04 / 11:00

Pump Installation

Pump installation crew: M. Martinez / W. Crize
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 30.08
 Initial (pre-installation) DTW/time: 22.24 / 1030
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 40"

Installation date/beginning time: 08-27-04 / 0938
 Installation date/completion time: 08-27-04 / 0938
 Screen Interval (ft. BTOC): 17 to 27
 Pump intake depth (ft. BTOC): 26'
 Post-installation DTW/time: 22.18 / 0939
 Max. sustainable pump rate (mL/min): 105
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (X) N/A

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi DTW 22.25 @ 0930

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>18</u>	<u>18</u>						<u>18</u>
Refill Setting	<u>10</u>	<u>12.5</u>	<u>13.0</u>						<u>13.0</u>
Discharge Setting	<u>5</u>	<u>2.5</u>	<u>1.0</u>						<u>1.0</u>
Flow rate (mL/min)	<u>105</u>	<u>115</u>	<u>105</u>						<u>105</u>

Purging

Purging/sampling crew: M. Martinez / W. Crize
 Purge date/beginning time: 08-27-04 / 1000
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0/0.0
 Purge date/completion time: 08-27-04 / 1217
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1010	<u>22.25</u>	<u>105</u>	<u>0</u>	<u>25.52</u>	<u>6732</u>	<u>6.20</u>	<u>267.0</u>	<u>1.24</u>	<u>-0.4</u>
1015	<u>22.50</u>	<u>105</u>	<u>0.525</u>	<u>25.66</u>	<u>6769</u>	<u>6.19</u>	<u>259.8</u>	<u>1.04</u>	<u>-0.7</u>
1020	<u>22.85</u>	<u>105</u>	<u>1.05</u>	<u>25.96</u>	<u>6768</u>	<u>6.19</u>	<u>253.2</u>	<u>0.97</u>	<u>-1.2</u>
1025	<u>22.87</u>	<u>105</u>	<u>1.575</u>	<u>26.18</u>	<u>6771</u>	<u>6.19</u>	<u>247.1</u>	<u>0.94</u>	<u>-1.2</u>
1030	<u>22.90</u>	<u>105</u>	<u>2.10</u>	<u>26.22</u>	<u>6782</u>	<u>6.19</u>	<u>240.7</u>	<u>0.93</u>	<u>-1.2</u>
1035	<u>22.93</u>	<u>105</u>	<u>2.625</u>	<u>26.10</u>	<u>6798</u>	<u>6.19</u>	<u>198.4</u>	<u>0.91</u>	<u>-1.3</u>
1040	<u>22.95</u>	<u>105</u>	<u>3.150</u>	<u>25.81</u>	<u>6807</u>	<u>6.19</u>	<u>155.2</u>	<u>0.89</u>	<u>-1.4</u>
1045	<u>23.28</u>	<u>105</u>	<u>3.675</u>	<u>25.38</u>	<u>6798</u>	<u>6.18</u>	<u>122.9</u>	<u>0.58</u>	<u>-1.3</u>

Sheet 2 of 2

[illegible]

Sampling

Sampling beginning time: 1106

Sampling completion time: 1200

[illegible]

Sample Information

Sample ID: 2962211

Sample collection date/time: 08-27-04 / 1106e

Duplicate sample collected (Y/N): yes

Duplicate sample ID: 296wv1 QC

Split sample collected (Y/N):

Split sample ID: 1234

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
WOC	8200B	3 x 40 mL			
Explosives	8320	2 x 1 L Ambers			
Residue	314	250 mL HDPE (12)			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045161

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082704-MK

Location Code: **29WW12**

Sample Number: **L0001-29WW12**

Sample Name: **L0001-29WW12-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 08-27-04

Collection Time: 1510

Start Depth: 30.04'

End Depth: 32-30

Sample Matrix: **WATER**

Sampling Equip: Disposable bailer

QC Partners:

(TB) 082704-751

(ER)

N/A

(FB)

N/A

Sample Team: M. Martin / W. C. Jr

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 32.30

Depth To Water: 30.04

Comments: Sampled w Disposable bailer

Sketch Location:

Logged BY / Date:

[Signature]
08-27-04

Reviewed BY / Date:

[Signature] 8/27/04

Sample Collection Log

00045162

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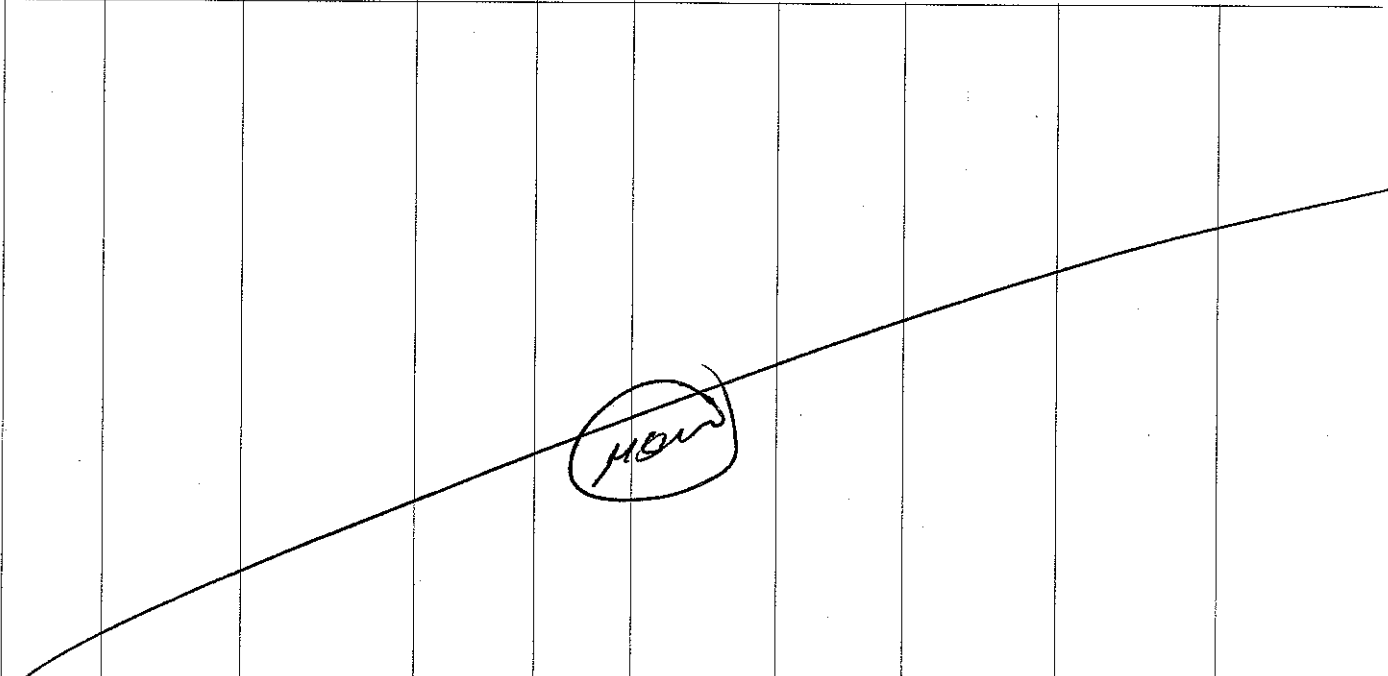
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW12


Sample Number: L0001-29WW12

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	1510	30.04'	198.5	0.40	4.374	0.5.8	0.300	18.93	5.0 D/V

Note Bailed D/V
Sample w Disposable bailer

Logged BY / Date:


08/07/04

Reviewed BY / Date:


8/27/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 29 WW12 Longhorn HAP
 Project Name/ #: Longhorn HAP - Data Gap
 Weather: Partly Sunny 90's

Sampling location ID: 29 WW12
 Sample ID: 29 WW12
 Collection Time/Date: 1451 8/26/04

W. Critz, M. Martinez
 Pump installation crew: A. Williams, E. Mabe
 PID/FID reading (well head/background): 0/0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 46.89 32.30
 Initial (pre-installation) DTW/time: 26.89/13:25
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL/DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 48 ft.

Pump Installation

Installation date/beginning time: 8/26/04 1355
 Installation date/completion time: 8/26/04 1356
 Screen Interval (ft. BTOC): 19 to 29
 Pump intake depth (ft BTOC): 28 ft
 Post-installation DTW/time: 26.83 1357
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: Amber tint - clear
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi 26.93 DTW 1355

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

W. Critz
 Purging/sampling crew: M. Martinez
 Purge date/beginning time: 8/26/04 1405
 Initial (pre-purging) DTW (ft. BTOC): 26.93
 Calculated tubing + pump volume: _____ NA

Purging

PID/FID reading (well head/background): 0/0
 Purge date/completion time: 8/26/04
 Final (post-purging) DTW (ft. BTOC): 27.90
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>22</u>	<u>22</u>	<u>18.5 25</u>						<u>25</u>
Refill Setting	<u>12.5</u>	<u>13</u>	<u>13.5</u>						<u>13.5</u>
Discharge Setting	<u>2.5</u>	<u>2</u>	<u>1.5</u>						<u>1.5</u>
Flow rate (mL/min)	<u>210</u>	<u>140</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1420</u>	<u>27.12</u>	<u>140</u>	<u>0</u>	<u>24.78</u>	<u>4.210</u>	<u>6.27</u>	<u>56.9</u>	<u>1.81</u>	<u>2.6</u>
<u>1425</u>	<u>27.20</u>	<u>100</u>	<u>0.5</u>	<u>24.63</u>	<u>4.190</u>	<u>6.25</u>	<u>48.3</u>	<u>1.37</u>	<u>2.4</u>
<u>1430</u>	<u>27.30</u>	<u>100</u>	<u>1.0</u>	<u>24.80</u>	<u>4.186</u>	<u>6.25</u>	<u>48.0</u>	<u>1.23</u>	<u>3.0</u>
<u>1435</u>	<u>27.35</u>	<u>100</u>	<u>1.5</u>	<u>24.60</u>	<u>4.180</u>	<u>6.25</u>	<u>47.7</u>	<u>1.14</u>	<u>2.8</u>
<u>1440</u>	<u>27.43</u>	<u>100</u>	<u>2.0</u>	<u>24.77</u>	<u>4.154</u>	<u>6.25</u>	<u>46.5</u>	<u>1.09</u>	<u>3.4</u>
<u>1445</u>	<u>27.5</u>	<u>100</u>	<u>2.5</u>	<u>24.71</u>	<u>4.144</u>	<u>6.25</u>	<u>47.3</u>	<u>1.05</u>	<u>3.2</u>
<u>1450</u>	<u>27.53</u>	<u>100</u>	<u>3.0</u>	<u>24.60</u>	<u>4.120</u>	<u>6.25</u>	<u>47.4</u>	<u>1.04</u>	<u>2.6</u>

Sheet 2 of 2

[illegible]

Sampling beginning time: 1451 Sampling completion time: 1520

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1530	27.9	100	4.5	25.27	4.081	6.27	161.1	1.22	2.0
NOTE: Sample Disregarded									

Sample Information	
Sample ID: <u>29 WW12</u>	Sample collection date/time: <u>8/26/04 1451</u>
Duplicate sample collected (Y/N): <u>N</u>	Duplicate sample ID: <u>N/A</u>
Split sample collected (Y/N): <u>N</u>	Split sample ID: <u>N/A</u>
COC No(s): _____	

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC - FULL	8260B	3 - 40ml Vials			
Explosives	8330	2 - 1L Amber			
Perchlorate	314	1 - 250ml HDPE			

Comments: water characteristics & water has an amber tint to it.
(Sample not sent.)
(Sample not good. will need to hand bail.)

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045165

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082604-Mk

Location Code: **29WW13**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-29WW13**

Sample Name: **L0001-29WW13-00**

Collection Date: 08-26-04

Collection Time: 1231

Sampling Method: **BA**

Start Depth: 33-70'

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 34-35

Sampling Equip: GED Pump non-dedicated Teflon Model

Sample Matrix: **WATER**

QC Partners:

(TB) 082604-TB1 (ER) N/A (FB) N/A

Sample Team: M. Martinez / W. G. Jr.

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 59.83'

Depth To Water: 33.70'

Comments:

Sketch Location:

Logged BY / Date:

[Signature]
08-26-04

Reviewed BY / Date:

[Signature] 8/26/04

Sample Collection Log

00045166

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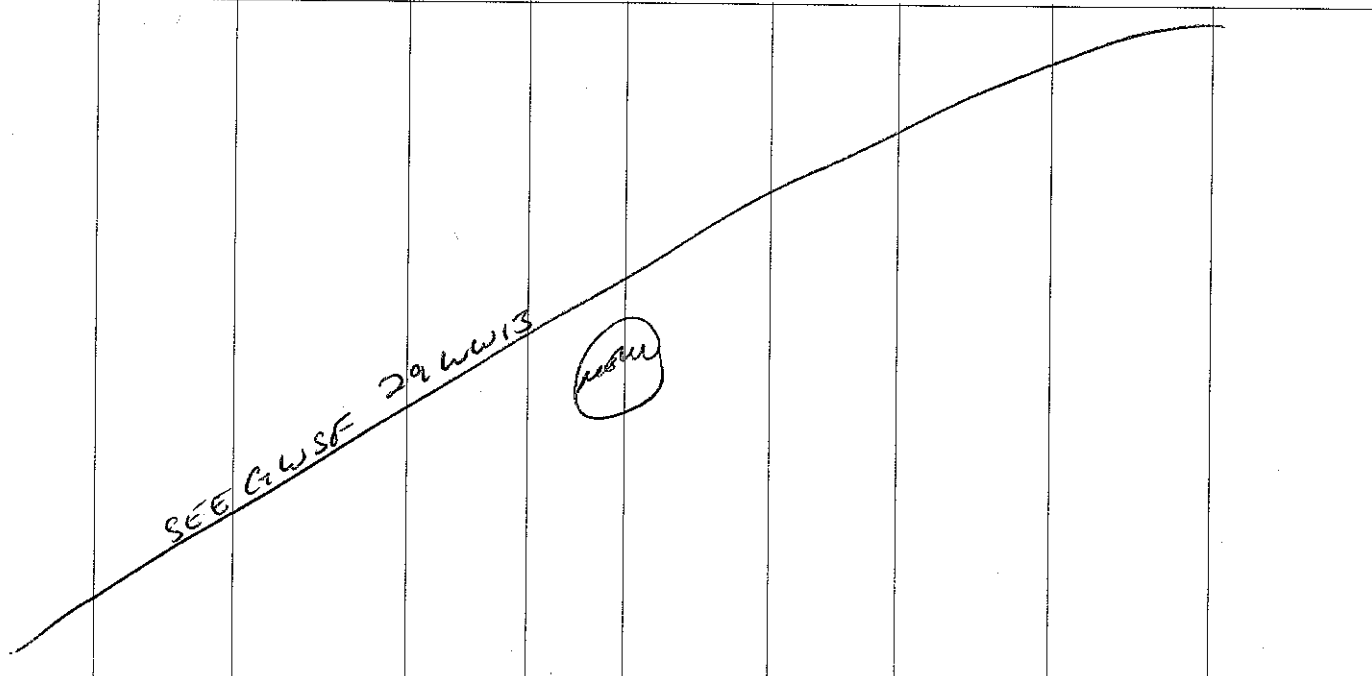
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW13

Sample Number: L0001-29WW13

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	1307	34.35	-107.7	6.74	1.112	-2.5	0.75	21.88	9.52

Logged BY / Date: [Signature]
08-20-09

Reviewed BY / Date: [Signature] 8/26/09



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

29 WW13 Louisa AAP
 Operable Unit/Site ID: MiniRac 37313
 Project Name/ #: Louisa AAP
 Weather: hot humid S/C Wind from W = 2-3 mph

Sampling location ID: Site 29
 Sample ID: 29WW13
 Collection Time/Date: _____

33.56' DTW

Pump Installation

Pump installation crew: M. Martinez, W. Critz, K. Ebert
 PID/FID reading (well head/background): 0.0/0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 59.83'
 Initial (pre-installation) DTW/time: 33.56' / 8/23/04 1510
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 60'

Installation date/beginning time: 08-20-04 1100
 Installation date/completion time: 08-20-04 1100
 Screen Interval (ft. BTOC): 47 to 57
 Pump intake depth (ft. BTOC): 33
 Post-installation DTW/time: 33.42 / 1107
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

DTW @ 33-70 @ 1055

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	30	28	25						
Refill Setting	10.0	11.5	11.5						
Discharge Setting	5.0	3.5	3.5						
Flow rate (mL/min)	200	155	100						

Purging

Purging/sampling crew: M. Martinez / W. Critz
 Purge date/beginning time: 08-20-04 / 1115
 Initial (pre-purging) DTW (ft. BTOC): 33.70
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0/0.0
 Purge date/completion time: 08-20-04
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	30	28	25						2.5
Refill Setting	10.0	11.5	11.5						11.5
Discharge Setting	5.0	3.5	3.5						3.5
Flow rate (mL/min)	200	155	100						100

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1135	34.11	100	0	21.92	1.043	6.71	-79.6	1.71	-2.1
1140	34.13	100	0.5	22.17	1.078	6.74	-83.5	1.46	-2.0
1145	34.15	100	1.0	22.36	1.088	6.77	-78.2	1.19	-2.3
1150	34.16	100	1.5	22.55	1.093	6.78	-80.3	1.03	-2.3
1155	34.18	100	2.0	22.56	1.101	6.77	-86.4	0.93	-2.6
1200	34.20	100	2.5	22.44	1.111	6.75	-99.6	0.76	-2.2
1205	34.21	100	3.0	22.42	1.111	6.75	-101.8	0.74	-2.1
1210	34.23	100	3.5	22.16	1.111	6.75	-105.9	0.66	-2.2



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1215	34.24	100	4.0	22.20	1.108	6.75	-113.0	0.59	-2.5
1220	34.24	100	4.5	22.36	1.108	6.76	-114.0	0.57	-2.5
1225	34.24	100	5.0	22.37	1.108	6.78	-115.7	0.55	-2.1
1230	34.24	100	5.5	22.38	1.108	6.78	-116.3	0.53	-2.5

Sampling

Sampling beginning time: 1231Sampling completion time: 1255

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1307	34.35	100	9.5	21.88	1.116	6.74	-107.7	0.75	-2.5

Sample Information

Sample ID: 29 WW13Sample collection date/time: 08-26-04 / 1231Duplicate sample collected (Y/N): NODuplicate sample ID: N/ASplit sample collected (Y/N): NOSplit sample ID: N/ACOC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC - Full	8260B	3 vial			
Chlorides	8330	2 x 1 L Amber			
Perchlorate	314	1 x 250mL HOPF			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045169

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082404-mk

Location Code: 29WW14

Task: GW DATA GAPS AUG04

Sample Number: L0001-29WW14

Collection Date: 8/24/04

Sample Name: L0001-29WW14-00

Collection Time: 1308

Sampling Method: BA

Start Depth: 29.89

Sample Type: GW

Sample Purpose: REG

End Depth: 29.89

Sampling Equip: Bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 082404-TB

(ER)

N/A

(FB)

N/A

Sample Team: W. Cratz
M. Martinez

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	mL	HDPE

Lot Control#:

Groundwater Information:

Measured Well Depth: 87.77

Depth To Water: 29.89

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

Sample Collection Log

00045170

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW14

Sample Number: L0001-29WW14

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<i>Separate GW purge form</i>									
Sample:	1337	29.89	244.8	6.86	0.925	4.8	0.80	27.57	

Logged BY / Date:

[Signature]
08-24-04

Reviewed BY / Date:

[Signature] 8/24/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 29 Longhorn AAP
 Project Name/ #: Longhorn
 Weather: muggy/alternate sunny w cloudy

Sampling location ID: Site 29
 Sample ID: 29WW14
 Collection Time/Date: 08-24-04 / 1308

Pump Installation

Pump installation crew: M. Martinez, W. CriteInstallation date/beginning time: 08-24-04 / 1040PID/FID reading (well head/background): 1.6 / 1.4Installation date/completion time: 08-24-04 / 1040Casing diameter (inches): 4Screen Interval (ft. BTOC): 75' to 85'Total well Depth (ft. BTOC): 87.77 (80')Pump intake depth (ft BTOC): ~80'Initial (pre-installation) DTW/time: 29.69 / 8/23/04 1730Post-installation DTW/time: 29.74 / 1057Final (after pump priming) DTW/time: 29.74 / 8/24/04 1035Max. sustainable pump rate (mL/min): 165Free product (circle): LNAPL / DNAPLAppearance of product: N/AVolume of water removed during priming (mL): Discharge tube diameter (3/8" or 1/4"): 3/8"Discharge tube length (ft.): 100'Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 43 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / W. CritePID/FID reading (well head/background): 0.7 / 0.0Purge date/beginning time: 08-24-04 / 1107Purge date/completion time: 08-24-04 / 1338Initial (pre-purging) DTW (ft. BTOC): 29.74Final (post-purging) DTW (ft. BTOC): Calculated tubing + pump volume: NANo. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 45 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>45</u>								<u>45</u>
Refill Setting	<u>9.0</u>								<u>9.0</u>
Discharge Setting	<u>6.0</u>								<u>6.0</u>
Flow rate (mL/min)	<u>165</u>								<u>165</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1120</u>	<u>29.74</u>	<u>165</u>	<u>0</u>	<u>25.88</u>	<u>0.903</u>	<u>6.92</u>	<u>331.9</u>	<u>4.74</u>	<u>34.8</u>
<u>1125</u>	<u>29.89</u>	<u>165</u>	<u>0.825</u>	<u>26.12</u>	<u>0.918</u>	<u>6.95</u>	<u>324.7</u>	<u>2.52</u>	<u>39.9</u>
<u>1130</u>	<u>29.89</u>	<u>165</u>	<u>1.65</u>	<u>25.75</u>	<u>0.924</u>	<u>6.95</u>	<u>326.3</u>	<u>2.40</u>	<u>35.9</u>
<u>1135</u>	<u>29.89</u>	<u>165</u>	<u>2.475</u>	<u>23.70</u>	<u>0.926</u>	<u>6.91</u>	<u>329.1</u>	<u>1.72</u>	<u>24.4</u>
<u>1140</u>	<u>29.89</u>	<u>165</u>	<u>3.3</u>	<u>23.04</u>	<u>0.920</u>	<u>6.90</u>	<u>329.6</u>	<u>1.08</u>	<u>19.2</u>
<u>1145</u>	<u>29.89</u>	<u>165</u>	<u>4.125</u>	<u>23.34</u>	<u>0.918</u>	<u>6.93</u>	<u>328.0</u>	<u>0.92</u>	<u>18.1</u>
<u>1150</u>	<u>29.89</u>	<u>165</u>	<u>4.95</u>	<u>23.00</u>	<u>0.919</u>	<u>6.97</u>	<u>326.1</u>	<u>0.85</u>	<u>15.6</u>
<u>1155</u>	<u>29.89</u>	<u>165</u>	<u>5.775</u>	<u>23.96</u>	<u>0.919</u>	<u>6.98</u>	<u>325.2</u>	<u>0.82</u>	<u>13.5</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1200	29.89	165	6.60	23.97	0.920	6.97	324.6	0.76	12.9
1205	29.89	165	7.425	23.77	0.921	6.95	324.1	0.74	12.6
1210	29.89	165	8.25	23.68	0.919	6.92	323.4	0.70	12.4
1215	29.89	165	9.075	23.57	0.919	6.94	317.7	0.68	10.0
1220	29.89	165	9.9	23.39	0.918	6.92	313.1	0.66	9.9
1225	29.89	165	10.725	23.85	0.917	6.96	307.1	0.63	9.4
1230	29.89	165	11.55	24.45	0.919	6.98	299.4	0.63	9.1
1235	29.89	165	12.375	25.12	0.919	6.98	293.5	0.62	7.8
1240	29.89	165	13.20	25.49	0.919	6.98	290.5	0.62	8.1
1245	29.89	165	14.025	26.04	0.919	6.96	278.6	0.62	7.6
1250	29.89	165	14.85	26.09	0.920	6.95	268.1	0.62	7.6
1255	29.89	165	15.675	26.27	0.920	6.94	257.0	0.63	7.3
1300	29.89	165	16.50	26.40	0.920	6.95	245.9	0.63	7.4
1305	29.89	165	17.325	26.12	0.922	6.93	229.3	0.62	6.7

Sampling

Sampling beginning time: 1308Sampling completion time: 1324

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1337	29.89	165	18.15	27.57	0.925	6.86	244.8	0.80	4.8

Sample Information

Sample ID: 29 WW14Sample collection date/time: 08-24-04 / 1308Duplicate sample collected (Y/N): NODuplicate sample ID: N/ASplit sample collected (Y/N): NOSplit sample ID: N/A

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC - Full	8260B	3 VOC'S			
Explosives	8330	2 x 1 L Amber			
Perchlorate	314	1 x 250 HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045173

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082504-mk

Location Code: **29WW15**

Sample Number: **L0001-29WW15**

Sample Name: **L0001-29WW15-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 8/25/04

Collection Time: 12:15

Start Depth: 28.33

End Depth: 28.96

Sampling Equip: BLADDER

Sample Matrix: **WATER**

QC Partners:

(TB) 082504-TB (ER) N/A (FB) N/A

Sample Team: A. Willmore, C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	2.50	ML	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 33'

Depth To Water: 28.33'

Comments:

Sketch Location:

Logged BY / Date:

Y. J. Ch 8/25/04

Reviewed BY / Date:

Praveen Srivastav 8/25/04

Sample Collection Log

00045174

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW15

Sample Number: L0001-29WW15

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:	1243	28.96	-42.1	4.519	4.519	263.0	75.1	19.87	150

6.86

Logged BY / Date:

M. S. S. S. 8/25/04

Reviewed BY / Date:

P. S. S. S. 8/25/04

Sheet 1 of

Sampling location ID: ~~29WW17~~ 29WW19
Sample ID: 29WW45
Collection Time/Date: 12:15 / 8-25-04

Pump installation crew: C. MARE, A. Willmore
PID/FID reading (well head/background): 0.0 - 4.4
Casing diameter (inches): 4"
Total well Depth (ft. BTOC): 33'
Initial (pre-installation) DTW/time: 28' 2.5 = 15.55 16:12
Final (after pump priming) DTW/time: _____
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 30'

Installation date/beginning time: 8/26/04 / 11:37
Installation date/completion time: 8/26/04 / 12:48
Screen Interval (ft. BTOC): 20 to 30'
Pump intake depth (ft BTOC): 30'
Post-installation DTW/time: 28.46
Max. sustainable pump rate (mL/min): 200
Appearance of product: clear
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): No

Initial air pressure = H (ft.) X 0.43 = 12.9 psi

[illegible]

Purging/sampling crew: A. Williams C. Mahr
Purge date/beginning time: 8/25/04 11:37
Initial (pre-purging) DTW (ft. BTOC): 28.56
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 3.3
Purge date/completion time: 8/25/04 / 12:47
Final (post-purging) DTW (ft. BTOC): 28.96
No. of tubing + pump volumes purged: _____

Initial air pressure = H (ft.) X 0.43 = **12.9** psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	45	40	40	46					40
Refill Setting	5	3.5	2.5	2					2
Discharge Setting	10	11.5	12.5	13					13
Flow rate (mL/min)	110	155	149	150					160

[illegible]

Sheet ____ of ____

[illegible]

Sampling beginning time: _____ Sampling completion time: _____

[illegible]

Sample ID: 60001-29WW15
Duplicate sample collected (Y/N): N
Split sample collected (Y/N): N
COC No(s): 29-082504-mk

Sample collection date/time: 8/25/04 / 1215
Duplicate sample ID: n/a
Split sample ID: n/a

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8260B	3 x 40 ml			
Explosives	8330	2 x 1 L Amber			
Perchlorate	315	1 x 250 ml HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082404-MK

Location Code: 29WW16

Task: GW DATA GAPS AUG04

Sample Number: L0001-29WW16

Sample Name: L0001-29WW16-00

Sampling Method: BA

Collection Date: 8/24/04

Collection Time: 1433

Sample Type: GW

Sample Purpose: REG

Start Depth: 41.30

End Depth: 42.73

Sampling Equip:

Bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 082404-TB1

(ER)

N/A

(FB)

N/A

Sample Team:

A. Willmore
C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 88.0

Depth To Water: 41.3

Comments:

Sketch Location:

Logged BY / Date:

M. MLC 8/24/04

Reviewed BY / Date:

Danford 8/24/04

Sample Collection Log

00045178

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW16

Sample Number: L0001-29WW16

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p><i>purge record on GW Sampling Form</i></p>									
Sample:									

Logged BY / Date:

M. Shetty 8/24/04

Reviewed BY / Date:

Praveen Srivastav 8/24/04

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082404-MK

Location Code: **29WW16**

Sample Number: **L0001-29WW16**

Sample Name: **L0001-29WW16-00-QC**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **FD**

Sampling Equip: Bladder pump

QC Partners:

(TB) 082404-TB1

(ER)

N/A

(FB)

N/A

Task: **GW DATA GAPS AUG04**

Collection Date: 8/24/04

Collection Time: 1433

Start Depth: 41.30

End Depth: 42.73

Sample Matrix: **WATER**

Sample Team: A. Willmore
C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 88.0

Depth To Water: 41.3

Comments:

Sketch Location:

Logged BY / Date:

M. [Signature]

8/24/04

Reviewed BY / Date:

[Signature] 8/24/04

Sample Collection Log

00045180

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW16

Sample Number: L0001-29WW16

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p><i>purge record on GW Sampling Form</i></p>									
Sample:									

Logged BY / Date:

[Signature] 8/24/04

Reviewed BY / Date:

[Signature] 8/24/04

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GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Group 2 Site 29
 Project Name/ #: LAAP Data Gaps
 Weather: ptly cldy 90s - humid

Sampling location ID: 29WW16
 Sample ID: 29WW16 - 10001
 Collection Time/Date: 8/24/04 / 14:33

Pump Installation

Pump installation crew: C. Mabe A. Williams
 PID/FID reading (well head/background): 1.1
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 88'
 Initial (pre-installation) DTW/time: 41.5 / 16:15
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: 8/24 12:00
 Installation date/completion time: 8/24 12:10
 Screen Interval (ft. BTOC): 78' to 88'
 Pump intake depth (ft. BTOC): 83'
 Post-installation DTW/time: 41.3 12:15
 Max. sustainable pump rate (mL/min): 175 mL/min
 Appearance of product: None
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 35.69 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>42.10</u>								
Refill Setting	<u>5.0</u>								
Discharge Setting	<u>5.0</u>								
Flow rate (mL/min)	<u>135</u>								

Purging

Purging/sampling crew: C. Mabe A. Williams
 Purge date/beginning time: 8/24/04 / 13:20
 Initial (pre-purging) DTW (ft. BTOC): 41.5
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 8/24/04 / 14:21
 Final (post-purging) DTW (ft. BTOC): 42.13
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>42</u>								<u>40</u>
Refill Setting	<u>5</u>								<u>5</u>
Discharge Setting	<u>10</u>								<u>10</u>
Flow rate (mL/min)	<u>135</u>								<u>130</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO %	Turbidity (NTU)
<u>13:25</u>									
<u>13:27</u>	<u>41.3</u>	<u>135</u>	<u>135</u>	<u>25.65</u>	<u>1.293</u>	<u>6.98</u>		<u>16.27</u>	<u>5.0</u>
<u>13:30</u>	<u>41.6</u>	<u>125</u>		<u>23.56</u>	<u>1.332</u>	<u>6.97</u>		<u>22.47</u>	<u>6.2</u>
<u>13:35</u>	<u>42.0</u>	<u>125</u>		<u>22.99</u>	<u>1.314</u>	<u>6.97</u>		<u>17.97</u>	<u>5.8</u>
<u>13:40</u>	<u>42.12</u>	<u>100</u>		<u>23.29</u>	<u>1.304</u>	<u>6.97</u>		<u>13.2</u>	<u>5.0</u>
<u>13:48</u>	<u>42.35</u>	<u>140</u>		<u>22.33</u>	<u>1.292</u>	<u>6.97</u>		<u>13.81</u>	<u>6.8</u>
<u>13:52</u>	<u>42.35</u>	<u>175</u>		<u>22.61</u>	<u>1.283</u>	<u>6.97</u>		<u>11.97</u>	<u>6.4</u>
<u>13:57</u>	<u>42.35</u>	<u>175</u>		<u>22.51</u>	<u>1.275</u>	<u>6.97</u>		<u>10.77</u>	<u>5.4</u>
<u>14:01</u>	<u>42.35</u>	<u>175</u>		<u>22.52</u>	<u>1.266</u>	<u>6.97</u>		<u>9.97</u>	<u>5.6</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
14:09	42.35	175		22.84	1.257	6.98		9.01	8.4
14:11	42.35	175		22.90	1.257	6.98		8.91	5.4
14:16	42.67	130		23.46	1.244	6.99		8.91	4.9
14:21	42.73	130		23.04	1.295	6.98		8.9	4.8

Sampling

Sampling beginning time: 14:33Sampling completion time: 1540

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1545	43.13	150	3.7	22.84	1.348	7.05		9.670	1.3

Sample Information

Sample ID: 20001-29WW16Sample collection date/time: 14:33 / 8/24/04Duplicate sample collected (Y/N): 20001-29WW16-QCDuplicate sample ID: 20001-29WW16-QCSplit sample collected (Y/N): NSplit sample ID: N/ACOC No(s): 29-082404-MK

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOL	8260B	3x 40 ml			
Explosives	8330	2x 1 L Amber			
perchlorate	314	1x 250 ml HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Group 2 Site 29
 Project Name/ID: LAAP Data Gaps
 Weather: partly cloudy 90° - humid

Sampling location ID: 29WW16
 Sample ID: 29WW16-10001
 Collection Time/Date: 8/21/04 / 14:33

Pump Installation

Pump installation crew: C. Mabe A. Williams
 PID/FID reading (well head/background): 1.1
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 88'
 Initial (pre-installation) DTW/time: 41.5 / 16:15
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: 8/24 12:00
 Installation date/completion time: 8/24 12:10
 Screen Interval (ft. BTOC): 78' to 88'
 Pump intake depth (ft. BTOC): 83'
 Post-installation DTW/time: 41.3 12:15
 Max. sustainable pump rate (mL/min): 175 mL/min
 Appearance of product: None
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 35.69 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>42.40</u>								
Refill Setting	<u>5.0</u>								
Discharge Setting	<u>5.0</u>								
Flow rate (mL/min)	<u>135</u>								

Purging

Purging/sampling crew: C. Mabe A. Williams
 Purge date/beginning time: 8/24/04 / 13:20
 Initial (pre-purging) DTW (ft. BTOC): 41.5
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 8/24/04 / 14:21
 Final (post-purging) DTW (ft. BTOC): 42.13
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>42</u>								<u>40</u>
Refill Setting	<u>5</u>								<u>5</u>
Discharge Setting	<u>10</u>								<u>10</u>
Flow rate (mL/min)	<u>135</u>								<u>130</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO %	Turbidity (NTU)
<u>13:25</u>									
<u>13:27</u>	<u>41.5</u>	<u>135</u>	<u>135</u>	<u>25.65</u>	<u>1.293</u>	<u>6.98</u>		<u>16.2%</u>	<u>5.0</u>
<u>13:30</u>	<u>41.6</u>	<u>125</u>		<u>25.56</u>	<u>1.332</u>	<u>6.97</u>		<u>22.4%</u>	<u>6.2</u>
<u>13:35</u>	<u>42.0</u>	<u>125</u>		<u>22.99</u>	<u>1.314</u>	<u>6.97</u>		<u>17.5%</u>	<u>3.8</u>
<u>13:40</u>	<u>42.12</u>	<u>100</u>		<u>23.29</u>	<u>1.304</u>	<u>6.97</u>		<u>13.2</u>	<u>5.0</u>
<u>13:48</u>	<u>42.35</u>	<u>140</u>		<u>23.33</u>	<u>1.292</u>	<u>6.97</u>		<u>13.8%</u>	<u>6.8</u>
<u>13:52</u>	<u>42.35</u>	<u>175</u>		<u>22.61</u>	<u>1.283</u>	<u>6.97</u>		<u>11.9%</u>	<u>6.4</u>
<u>13:57</u>	<u>42.35</u>	<u>175</u>		<u>22.51</u>	<u>1.275</u>	<u>6.97</u>		<u>10.7%</u>	<u>5.4</u>
<u>14:01</u>	<u>42.35</u>	<u>175</u>		<u>22.52</u>	<u>1.266</u>	<u>6.97</u>		<u>9.9%</u>	<u>5.6</u>

Sheet 2 of 2

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045185

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082604-MK

Task: **GW DATA GAPS AUG04**

Location Code: **29WW20**

Sample Number: **L0001-29WW20**

Sample Name: **L0001-29WW20-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Collection Date: 8/26/04

Collection Time: 16:20

Start Depth: 27.36

End Depth: 28.34

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 082604-TB

(ER)

N/A

(FB)

N/A

Sample Team: C. Mabe, A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	150	AL	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 32.77

Depth To Water: 27.36

Comments:

Sketch Location:

Logged BY / Date:

M. Allen 8/26/04

Reviewed BY / Date:

[Signature] 8/26/04

Sample Collection Log

00045186

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW20

Sample Number: L0001-29WW20

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Purge record on GW Sampling Form									
Sample:	10:55	28.34	-79.9	6.55	2.413	1.3	2.83	23.83	3 gal

Logged BY / Date: U. M. C. 8/26/04 Reviewed BY / Date: D. L. J. 8/26/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Sue 29
 Project Name/ID: LWAPP
 Weather: cloudy, mid 80's

Sampling location ID: 29WW20
 Sample ID: 29WW20
 Collection Time/Date: 10:20 10/20

Pump Installation

Pump installation crew: C. MADE, A. Willmore
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 32'
 Initial (pre-installation) DTW/time: 27.28 / 17:23
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): 11
 Discharge tube length (ft.): 60'

Installation date/beginning time: 8/26/04 0930
 Installation date/completion time: 8/26/04
 Screen Interval (ft. BTOC): 22' to 32'
 Pump intake depth (ft. BTOC): 29 30'
 Post-installation DTW/time: 28.34
 Max. sustainable pump rate (mL/min): 150
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, C. Made
 Purge date/beginning time: 8/26/04 0930
 Initial (pre-purging) DTW (ft. BTOC): 27.36
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 8/26/04
 Final (post-purging) DTW (ft. BTOC): 28.34
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 12.9 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>46</u>	<u>46</u>	<u>40</u>	<u>38</u>	<u>40</u>				<u>40</u>
Refill Setting	<u>10.5 10</u>	<u>10.5</u>	<u>10.1</u>	<u>10.1</u>	<u>10.1</u>				<u>10.1</u>
Discharge Setting	<u>5</u>	<u>4</u>	<u>5</u>	<u>5</u>	<u>5</u>				<u>5</u>
Flow rate (mL/min)	<u>245</u>	<u>80</u>	<u>140</u>	<u>95</u>	<u>140</u>				<u>140</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume (gal) Purged (ft)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0930	27.59	140	0.15 gal	22.07	3.179	6.28	-29	12.51	2.2
0935	27.63	130	0.3 gal	22.72	3.196	6.29	-26.3	12.17	1.9
0940	27.68	130	0.5 gal	22.5	3.201	6.29	-26.2	11.07	1.4
0945	27.77	115	0.77 gal	22.48	3.197	6.30	-25.7	9.47	1.8
0950	27.83	140	1 gal	22.57	3.191	6.31	-24.5	8.67	1.5
0955	27.88	150	1.2 gal	22.75	3.156	6.33	-22	8.27	0.8
10:00	29.95	140	1.8 gal	22.89	3.106	6.35	-14.8	7.51	0.8
10:06	28.04	95	2.5 gal	22.96	2.957	6.42	-11.5	7.5	0.4

Sheet 2 of 2

[illegible]

Sampling beginning time: _____ Sampling completion time: _____

[illegible]

Sample ID: _____ Sample collection date/time: _____
 Duplicate sample collected (Y/N): _____ Duplicate sample ID: _____
 Split sample collected (Y/N): _____ Split sample ID: _____
 COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045189

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-062504-mk

Task: **GW DATA GAPS AUG04**

Location Code: **29WW21**

Sample Number: **L0001-29WW21**

Sample Name: **L0001-29WW21-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Collection Date: 8/25/04

Collection Time: 15:40

Start Depth: 45.57

End Depth: 46.13

Sample Matrix: **WATER**

Sampling Equip: Bladder Pump

QC Partners:

(TB) 082504-ZB

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore, C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 75'

Depth To Water: 46.13

Comments:

Sketch Location:

Logged BY / Date:

M. P. L. C. 8/25/04

Reviewed BY / Date:

P. A. M. 8/25/04

Sample Collection Log

00045190

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW21

Sample Number: L0001-29WW21

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Sample form 29WW21									
Sample:									

Logged BY / Date: _____

Reviewed BY / Date: Praveen Srivastav 8/25/04



GROUNDWATER SAMPLING FORM

00045191

Sheet 1 of 2

Operable Unit/Site ID: _____
Project Name/#: LHAA0
Weather: Partly Cloudy, Low 80's

Sampling location ID: 29WW21
Sample ID: 29WW21
Collection Time/Date: 15:40 / 8/25/04

Pump Installation

Pump installation crew: A. Williams, C. Mabe
PID/FID reading (well head/background): 0.0
Casing diameter (inches): 4"
Total well Depth (ft. BTOC): 78'
Initial (pre-installation) DTW/time: 45.20/10:23
Final (after pump priming) DTW/time: _____
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 100'

Installation date/beginning time: 8/25/04 / 14:10
Installation date/completion time: 8/25/04 /
Screen Interval (ft. BTOC): 6.5 to 7.5
Pump intake depth (ft BTOC): 60' 70'
Post-installation DTW/time: _____
Max. sustainable pump rate (mL/min): 195
Appearance of product: _____
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 30.1 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Williams, C. Mabe
Purge date/beginning time: 8/25/04 / 14:30
Initial (pre-purging) DTW (ft. BTOC): 45.57
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
Purge date/completion time: 8/25/04
Final (post-purging) DTW (ft. BTOC): _____
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 30.1 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>30.0</u>	<u>30.0</u>	<u>30.0</u>	<u>30.6</u>					<u>30.0</u>
Refill Setting	<u>12</u>	<u>11</u>	<u>11.5</u>	<u>12</u>					<u>12</u>
Discharge Setting	<u>3</u>	<u>4</u>	<u>3.5</u>	<u>3</u>					<u>3</u>
Flow rate (mL/min)	<u>80</u>	<u>195</u>	<u>195</u>	<u>125</u>					<u>125</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L) %	Turbidity (NTU)
<u>14:58</u>									
<u>17:05</u>	<u>46.05</u>	<u>195</u>	<u>0.25 gal</u>	<u>24.72</u>	<u>0.622</u>	<u>8.31</u>	<u>61.1</u>	<u>36.4</u>	<u>-0.4</u>
<u>17:03</u>	<u>46.13</u>	<u>165</u>	<u>0.38 gal</u>	<u>24.38</u>	<u>0.621</u>	<u>8.31</u>	<u>78.9</u>	<u>20.5</u>	<u>-0.4</u>
<u>15:08</u>	<u>46.13</u>	<u>125</u>	<u>0.42 gal</u>	<u>24.77</u>	<u>0.621</u>	<u>8.32</u>	<u>85.6</u>	<u>32.9</u>	<u>-0.4</u>
<u>15:13</u>	<u>46.13</u>	<u>135</u>	<u>0.72</u>	<u>25.89</u>	<u>0.622</u>	<u>8.33</u>	<u>90.1</u>	<u>17.1</u>	<u>-0.2</u>
<u>15:18</u>	<u>46.17</u>	<u>145</u>	<u>0.90</u>	<u>25.86</u>	<u>0.624</u>	<u>8.33</u>	<u>93.2</u>	<u>16.2</u>	<u>-0.4</u>
<u>15:23</u>	<u>46.13</u>	<u>120</u>	<u>1.3</u>	<u>25.86</u>	<u>0.624</u>	<u>8.33</u>	<u>96.4</u>	<u>14.9</u>	<u>0.1</u>
<u>15:28</u>	<u>46.13</u>	<u>125</u>	<u>1.5</u>	<u>26.05</u>	<u>0.623</u>	<u>8.3</u>	<u>98.9</u>	<u>14.0</u>	<u>-0.2</u>

Sheet of

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082704-MK

Location Code: **29WW22**

Sample Number: **L0001-29WW22**

Sample Name: **L0001-29WW22-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 8/27/04

Collection Time: 14:40

Start Depth: 28.02

End Depth: 28.08

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 082704-TB3

(ER) N/A

(FB) N/A

Sample Team: A. W. W. M. C. M. A. B. C.

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 35.55

Depth To Water: 27.05

Comments: High pH

Sketch Location:

Logged BY / Date:

M. L. C.

8/27/04 Reviewed BY / Date:

P. S. S. 8/27/04

Sample Collection Log

00045194

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW22

Sample Number: L0001-29WW22

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:	14:40	28.08	96.1	6.41	1.790 1.790	69.2	16.37	25.82	4 gal.

Logged BY / Date:

M. [Signature] 8/27/04

Reviewed BY / Date:

[Signature] 8/27/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: SITE 29
 Project Name/ #: LHAAP
 Weather: Partly Cloudy; mid 90s

Sampling location ID: 29WW22
 Sample ID: 29WW22
 Collection Time/Date: 14:40 / 8/23/04

Pump Installation

Pump installation crew: A. Williams
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 35.85
 Initial (pre-installation) DTW/time: 27.05 / 16:31
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 60'

Installation date/beginning time: 8/27/04 13:00
 Installation date/completion time: 8/27/04 15:28
 Screen Interval (ft. BTOC): 25 to 35
 Pump intake depth (ft. BTOC): 30'
 Post-installation DTW/time: 27.32
 Max. sustainable pump rate (mL/min): 215
 Appearance of product: →
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 12.9 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Williams
 Purge date/beginning time: 8/27/04 13:28
 Initial (pre-purging) DTW (ft. BTOC): 27.05
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 8/27/04 15:20
 Final (post-purging) DTW (ft. BTOC): 28.08
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 12.9 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>15</u>							<u>15</u>
Refill Setting	<u>11.5</u>	<u>11.0</u>							<u>11.0</u>
Discharge Setting	<u>3.5</u>	<u>4.0</u>							<u>4.0</u>
Flow rate (mL/min)	<u>215</u>	<u>115</u>							<u>115</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (gal)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>13:26</u>	<u>27.32</u>	<u>215</u>	<u>0.1 gal</u>	<u>26.72</u>	<u>1.662</u>	<u>3.23</u>	<u>75.5</u>	<u>32.6</u>	<u>114.3</u>
<u>13:31</u>	<u>27.33</u>	<u>125</u>	<u>0.3 gal</u>	<u>25.67</u>	<u>1.746</u>	<u>3.23</u>	<u>78.6</u>	<u>25.7</u>	<u>115.3</u>
<u>13:36</u>	<u>27.45</u>	<u>115</u>	<u>0.5 gal</u>	<u>26.20</u>	<u>1.767</u>	<u>3.27</u>	<u>35.1</u>	<u>22.3</u>	<u>126.8</u>
<u>13:41</u>	<u>27.54</u>	<u>115</u>	<u>0.7</u>	<u>26.50</u>	<u>1.789</u>	<u>3.30</u>	<u>91.6</u>	<u>20.9</u>	<u>112.7</u>
<u>13:46</u>	<u>27.68</u>	<u>135</u>	<u>0.1 gal</u>	<u>25.85</u>	<u>1.800</u>	<u>3.30</u>	<u>93.0</u>	<u>19.8</u>	<u>100.0</u>
<u>13:51</u>	<u>27.74</u>	<u>125</u>	<u>1.25 gal</u>	<u>25.69</u>	<u>1.796</u>	<u>3.31</u>	<u>91.0</u>	<u>18.5</u>	<u>92.6</u>
<u>13:56</u>	<u>27.79</u>	<u>125</u>	<u>6.0 gal</u>	<u>25.72</u>	<u>1.795</u>	<u>3.32</u>	<u>89.5</u>	<u>18.3</u>	<u>89.5</u>
<u>14:01</u>	<u>27.84</u>	<u>115</u>	<u>1.7 gal</u>	<u>25.92</u>	<u>1.797</u>	<u>3.34</u>	<u>98.8</u>	<u>18.1</u>	<u>75.4</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L) %	Turbidity (NTU)
14:05	27.90	115	2 gal	25.94	1797	3.34	98.4	18.1%	71.9
14:11	27.94	120	2.1	26.28	1793	3.34	96.5	18.1	71.3
14:16	27.97	120	2.3	26.03	1793	3.33	96.4	18.1	70.4
14:21	28.0	120	2.4	26.14	1794	3.33	96.7	18.2	71.2
14:26	28.02	120	2.5	26.34	1793	3.34	96.3	18.1%	72.2

Sampling

Sampling beginning time: 14:40

Sampling completion time: _____

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
14:40	28.08	120	4 gal.	25.32	1790	3.41	96.1	16.3%	69.2

Sample Information

Sample ID: 29WW24Sample collection date/time: 8/27/04 / 14:40Duplicate sample collected (Y/N): No

Duplicate sample ID: _____

Split sample collected (Y/N): No

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs	B260 B	VOA vial 8260			
Explosives	B330	Amb glass 1-L			
PRVC	314 HDPE	HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045197

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-083104-mk

Location Code: **29WW23**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-29WW23**

Collection Date: 8/30/04

Sample Name: **L0001-29WW23-00**

Collection Time: 17:00

Sampling Method: **BA**

Start Depth: 20.04

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 20.41

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 083054-TB

(ER) N/A

(FB) N/A

Sample Team: A. Williams, C. Marks

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 38.47

Depth To Water: 25.87

Comments: Samples taken from bailer (1/2" dia.)

Sketch Location:

Logged BY / Date: M. H. [Signature] 8/30/04

Reviewed BY / Date: [Signature] 8/31/04

Sample Collection Log

00045198

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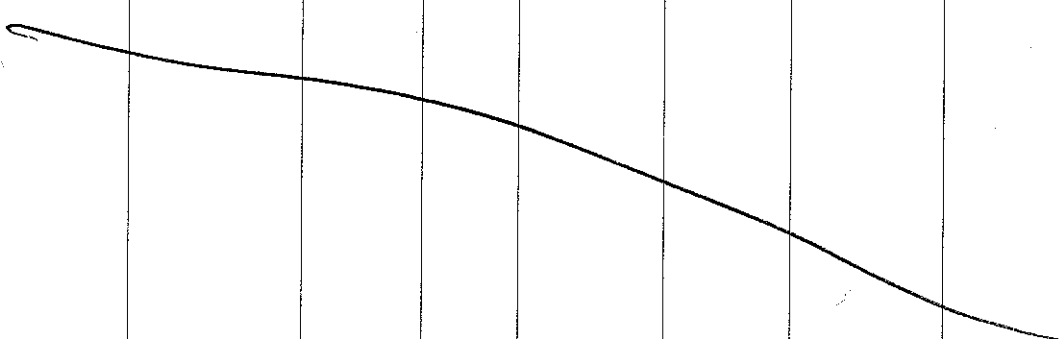
845714 LONGHORN AAP

Manager: Praveen Srivastav


Location Code: 29WW23

Sample Number: L0001-29WW23

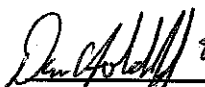
PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	17:00	20.41	121.6	2.52	121.5 4.701	80.0	80.0 1.09	25.10	1.9 gal

Logged BY / Date:


8/30/04

Reviewed BY / Date:

 8/31/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 29WW23
 Project Name/ #: LHAP
 Weather: CLEAR, 90's

Sampling location ID: 29WW23
 Sample ID: 29WW23
 Collection Time/Date: 8/30/04

Pump Installation

Pump installation crew: A. Willmore, C. Mehl
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 38.47
 Initial (pre-installation) DTW/time: 25.43 / 16:48
 Final (after pump priming) DTW/time: 25.71 / 10:11
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 60'

Installation date/beginning time: 8/30/04 09:48
 Installation date/completion time: 8/30/04 09:48
 Screen Interval (ft. BTOC): 24.47 to 38.47
 Pump intake depth (ft. BTOC): 38.47
 Post-installation DTW/time: 25.42 / 09:48
 Max. sustainable pump rate (mL/min): 255
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 14.3921 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, C. Mehl
 Purge date/beginning time: 8/30/04 / 10:11
 Initial (pre-purging) DTW (ft. BTOC): 25.57
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 6.0
 Purge date/completion time: 8/30/04
 Final (post-purging) DTW (ft. BTOC): 26.72
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 14.3921 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>38.18</u>	<u>14</u>	<u>15</u>	<u>15</u>					<u>15</u>
Refill Setting	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>					<u>10</u>
Discharge Setting	<u>5</u>	<u>4</u>	<u>5</u>	<u>5</u>					<u>5</u>
Flow rate (mL/min)	<u>255</u>	<u>115</u>	<u>80</u>	<u>100</u>					<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume (gallons) Purged (ft)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
9:11	25.71	255	0.1 gal	23.04	4.562	2.41	117.8	2.66	150.5
10:16	25.71	115	0.2 gal	22.07	4.757	2.50	108.8	1.67	146.5
10:21	25.89	150	0.3 gal	22.49	4.772	2.52	114.3	1.40	136.4
10:26	25.93	100	0.5 gal	22.75	4.780	2.53	117.3	1.57	118.7
10:31	26.06	100	0.7 gal	22.94	4.790	2.55	120.2	1.12	79.7
10:36	26.10	165	0.9 gal	22.92	4.793	2.54	121.5	1.09	87.9
10:41	26.18	110	1.0 gal	22.77	4.796	2.54	120.7	1.08	82.0
10:46	26.29	110	1.2 gal	22.94	4.787	2.54	121.5	1.22	72.0

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
10:51	26.32	110	1.39	23.09	4.788	2.54	122.6	1.14	88.0
MUST BAIL WELL!!									

Sampling beginning time: 17:00

Sampling completion time: ~~17:00~~ 17:00

[illegible]

Sample ID: 29WW23

Sample collection date/time: 17:00 / 8/30/04

Duplicate sample collected (Y/N): No

Duplicate sample ID:

Split sample collected (Y/N): NO

Split sample ID:

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Vocs	8260	Voa 40 ml			
Perchlorate	314	MDPE			
explosives	8330	1L Amber			

Comments: Well had to be baited b/cuz recharge was slow!!

Sample Collection Log

845714 LONGHORN AAP
Manager: Praveen Srivastav

RFA / COC Number: 29-082704-MK

Location Code: 29WW24
Sample Number: L0001-29WW24-MS
Sample Name: 29WW24-GW-L0001-29WW24-MS-MS
Sampling Method: BA
Sample Type: GW

Sample Purpose: MS

Task: GW DATA GAPS AUG0
Collection Date: 27-AUG-04
Collection Time: 10:00
Start Depth: 32.93
End Depth: 32.93
Sample Matrix: WATER
Sample Team: AW

ERPIMS Values:
Sacode:
Lot Control#:

Analytical Suite	Containers					Units	Type
	Flt	Frtn	Qty	Size			
VOC-FULL	N	A	3	40	mL	VOA	VIAL
EXPLOSIVES	N	B	2	1	L	Amb.	Glass
PERC	N	C	1	250	ML	HDPE	

Comments:

Sketch Location:

Logged BY / Date: 8/27/04

Reviewed BY / Date: 8/27/04



Sample Collection Log

00045202

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 21-082704-mk

Location Code: 29WW24

Sample Number: L0001-29WW24

Sample Name: L0001-29WW24-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Task: GW DATA GAPS AUG04

Collection Date: 08/27/04

Collection Time: 10:00

Start Depth: 32.93

End Depth: 32.93

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) 082704-7B

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore, C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 73' BTOC

Depth To Water: 32.91

Comments: MS/MSD TAKEN w/ THIS SAMPLE

Sketch Location:

Logged BY / Date: M. L. L. 8/27/04

Reviewed BY / Date: D. J. L. 8/27/04

Sample Collection Log

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082704-MK

Location Code: 29WW24

Task: GW DATA GAPS AUG0

Sample Number: L0001-29WW24-MSD

Collection Date: 27-AUG-04

Sample Name: 29WW24-GW-L0001-29WW24-MSD-MSD

Collection Time: 10:00

Sampling Method: BA

Start Depth: 32.93

Sample Type: GW

Sample Purpose: MSD

End Depth: 32.93

Sample Matrix: WATER

Sample Team: AW

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Containers					Units	Type
	Flt	Frtn	Qty	Size			
VOC-FULL	N	A	3	40	mL	VOA	VIAL
EXPLOSIVES	N	B	2	1	L	Amb.	Glass
PERC	N	C	1	250	ML	HDPE	

Comments:

Sketch Location:

Logged BY / Date: Jan 1/04 8/27/04

Reviewed BY / Date: Jan 1/04 8/27/04

Sample Collection Log

00045204

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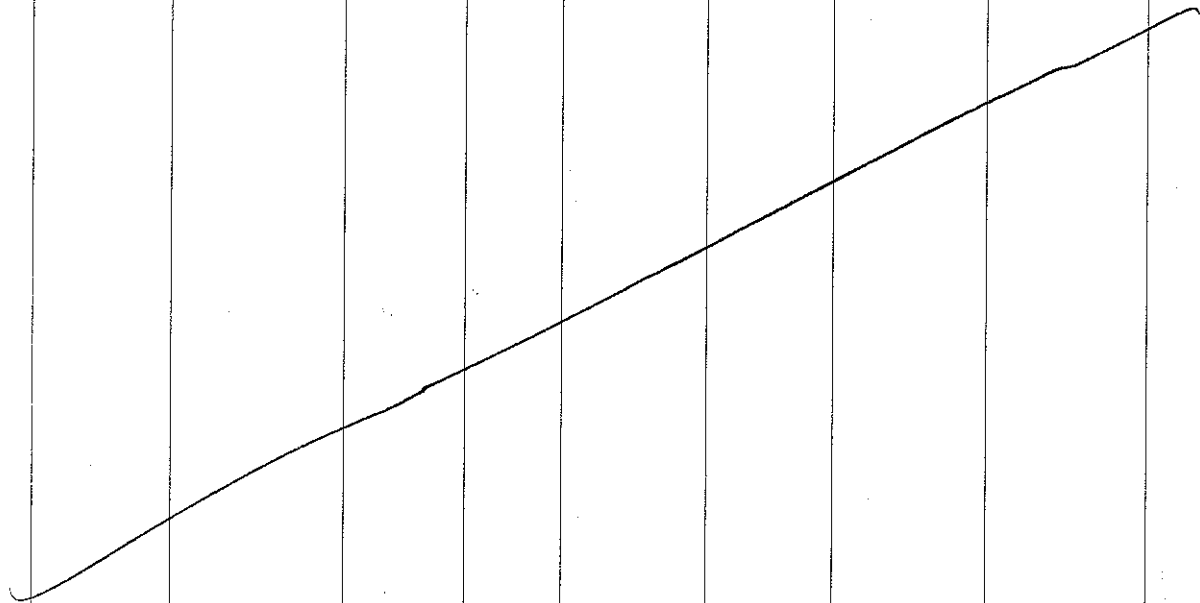
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW24

Sample Number: L0001-29WW24 plus MS, MSD

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	10:50	32.37	-61.9	3.98	1.060	8.4	6.3	25.14	4

Logged BY / Date:

[Signature] 8/27/04

Reviewed BY / Date:

[Signature] 8/27/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 29
 Project Name/ID: LHAP
 Weather: Partly Cloudy ; 8 mid 80s

Sampling location ID: 29WWZ4
 Sample ID: 29WWZ4
 Collection Time/Date: _____

Pump Installation

Pump installation crew: A. Willmore, C. Mabe
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 73'
 Initial (pre-installation) DTW/time: 32.55 / 16:50
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: _____
 Installation date/completion time: _____
 Screen Interval (ft. BTOC): 63 to 73
 Pump intake depth (ft BTOC): 68'
 Post-installation DTW/time: 32.54
 Max. sustainable pump rate (mL/min): 220
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 29.94 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, C. Mabe
 Purge date/beginning time: 8/27/04
 Initial (pre-purging) DTW (ft. BTOC): 32.76
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 1.4
 Purge date/completion time: 8/27/04
 Final (post-purging) DTW (ft. BTOC): 32.91
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 29.24 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>29.30</u>	<u>38</u>	<u>36</u>						<u>30</u>
Refill Setting	<u>10</u>	<u>9</u>	<u>10</u>						<u>10</u>
Discharge Setting	<u>5</u>	<u>6</u>	<u>5</u>						<u>5</u>
Flow rate (mL/min)	<u>180</u>	<u>225</u>	<u>180</u>						<u>180</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L) %	Turbidity (NTU)
0900	32.91	180	0.15 gal	25.60	0.184	2.25	231.7	15.81	5.6
0905	32.93	160	0.4 gal	23.13	1.035	3.78	31.0	22.8	6.0
0910	32.93	140	0.6 gal	23.86	1.041	3.91	11.1	23.4	6.3
0915	32.93	175	0.8 gal	24.62	1.048	3.99	5.3	18.4	6.4
0920	32.98	175	1.0 gal	25.55	1.054	4.07	18.3	16.5	6.6
0925	32.93	180	1.3 g	25.54	1.064	4.08	-14.7	14.2	7.0
0930	32.93	175	1.8 g	24.80	1.062	4.06	-14.4	12.1	10.0
0935	32.93	140	2.0 g	24.5	1.058	4.04	-28.7	10.5	11.0

Sheet 2 of 2

Sampling

Sampling beginning time: 10:00 Sampling completion time: 11:00

Sample Information	
Sample ID: 29WV14	Sample collection date/time:

Duplicate sample collected (Y/N): No Yes MSD Duplicate sample ID: MS/MSD
Split sample collected (Y/N): No Split sample ID: _____
COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate 314	314	1 x 250 HDPE			
VOCs 8260B	8260	3 x 40 ml			
Explosive 8330	8330	2 x 1 L Amber			

Comments:



Sample Collection Log

00045207

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082604-mk

Location Code: 29WW28

Sample Number: L0001-29WW28

Sample Name: L0001-29WW28-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Task: GW DATA GAPS AUG04

Collection Date: 8/26/04

Collection Time: 14:42

Start Depth: 42.14

End Depth: 42.14

Sample Matrix: WATER

Sample Team: A. Willmore, C. Mabe

Sampling Equip: Bladder Pump

QC Partners:

(TB) 082604-TB (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth:

Depth To Water:

Comments:

Sketch Location:

Logged BY / Date:

M. S. S. S.

Reviewed BY / Date:

Sample Collection Log

00045208

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW28

Sample Number: L0001-29WW28

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:	15:05	42.14	309.0	7.04	1.024	11.3	14.32	25.39	2.894

Logged BY / Date:

M. J. McC

9/26/04 Reviewed BY / Date:



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Site 29
 Project Name/ #: CHAP
 Weather: Partly Cloudy; 90's

Sampling location ID: 29WW28
 Sample ID: 29WW 28
 Collection Time/Date: 14:42

Pump Installation

Pump installation crew: A. Willmore, C. Moore
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 79.5
 Initial (pre-installation) DTW/time: 41.75 / 13:08
 Final (after pump priming) DTW/time: 42.13 / 13:48
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 74.

Installation date/beginning time: 8/26/04 13:35
 Installation date/completion time: 8/26/04
 Screen Interval (ft. BTOC): 69.5 to 79.5
 Pump intake depth (ft BTOC): 74.5
 Post-installation DTW/time: ~~74.5~~ 42.14
 Max. sustainable pump rate (mL/min): 250
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 32.25 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, C. Moore
 Purge date/beginning time: 8/26/04 13:35
 Initial (pre-purging) DTW (ft. BTOC): 41.89
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 8/26/04
 Final (post-purging) DTW (ft. BTOC): 42.14
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 32.25 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>38</u>	<u>36</u>	<u>38</u>						
Refill Setting	<u>10</u>	<u>10</u>	<u>10</u>						
Discharge Setting	<u>5</u>	<u>5</u>	<u>5</u>						
Flow rate (mL/min)	<u>230</u>	<u>225</u>	<u>125</u>						

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (gal)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO % (mg/L)	Turbidity (NTU)
13:48	42.13	225	0.2 gal	25.96	0.944	7.06	657.1	83.4	57.6
13:53	42.14	175	0.4 gal	25.11	0.985	7.02	542.0	38.31	52.9
13:58	42.14	145	0.6 gal	25.23	1.000	7.00	465	51.9	51.1
14:03	42.14	115	0.8 gal	25.21	1.012	7.01	432.4	36.1	38.3
14:08	42.14	160	1.0 gal	25.22	1.014	7.02	413.6	29.7	30.1
14:13	42.14	160	1.2	24.98	1.015	7.02	401.7	24.2	28.8
14:18	42.14	115	1.4	24.83	1.013	7.02	388.0	20.4	22.7
14:23	42.14	150	1.6	25.50	1.013	7.03	375.4	18.7	22.7



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
14:28	42.14	135	1.8	25.86	1.016	7.03	364.1	15.7	19.1
14:33	42.14	135	2.0	25.33	1.016	7.03	361.6	15.1	20.2
14:38									
14:43									

Sampling

Sampling beginning time: _____

Sampling completion time: _____

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO % (mg/L)	Turbidity (NTU)
15:05	42.14	165	2.89	25.89	1.024	7.04	304.0	14.3%	11.3

Sample Information

Sample ID: _____

Sample collection date/time: _____

Duplicate sample collected (Y/N): _____

Duplicate sample ID: _____

Split sample collected (Y/N): _____

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045211

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 24-083004-mk

Location Code: **29WW33**

Sample Number: **L0001-29WW33**

Sample Name: **L0001-29WW33-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 8/29/04

Collection Time: 1520

Start Depth: 26.14

End Depth: 26.41

Sampling Equip: Bladder pump

Sample Matrix: **WATER**

QC Partners:

(TB) 082904-TB1

(ER)

082904-ER

(FB)

N/A

Sample Team: M. Martinez
D. Holderfield

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 43.06

Depth To Water: 26.14

Comments:

Sketch Location:

Logged BY / Date: D. Holderfield 8/29/04

Reviewed BY / Date: D. Holderfield 8/29/04

Sample Collection Log

00045212

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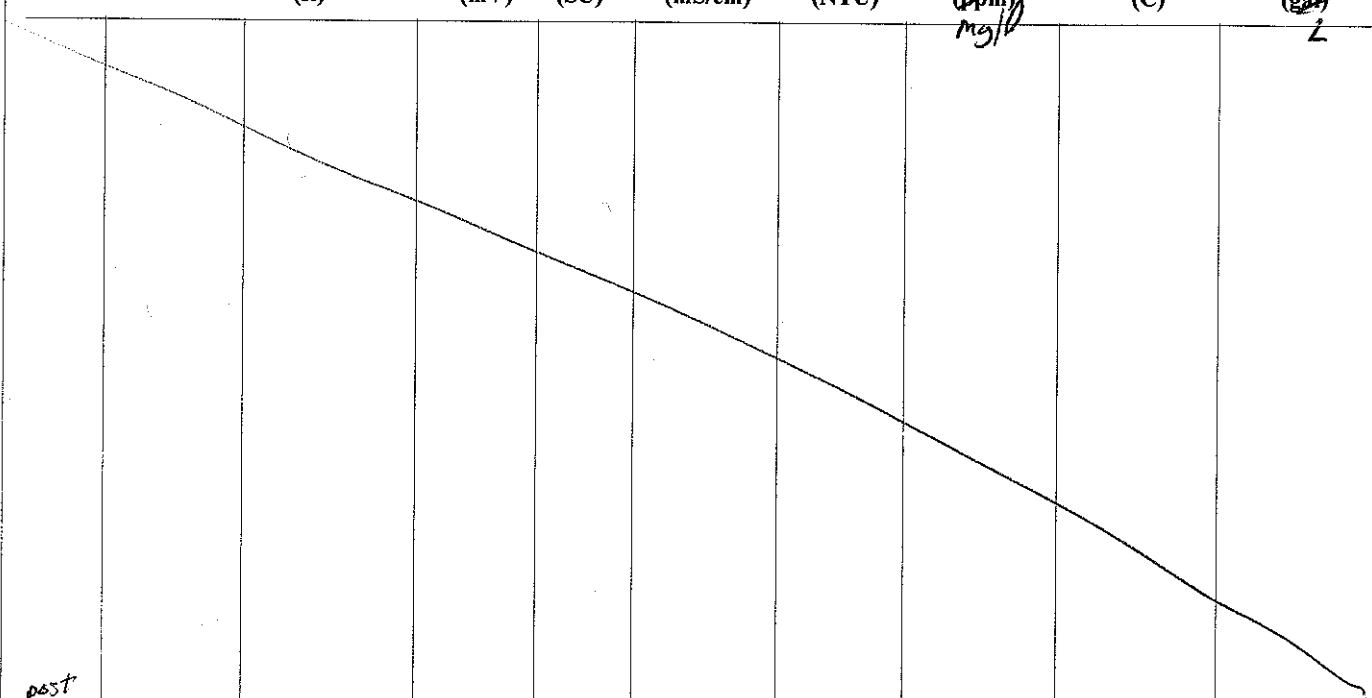
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 29WW33

Sample Number: L0001-29WW33

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm) <i>mg/l</i>	Temperature (C)	Purge Volume (gal) <i>L</i>
									
<i>post</i> Sample:	1550	26.33	228.4	6.57	3.831	3.0	1.03	21.91	14.0

Logged BY / Date: *DLH* 8/28/04

Reviewed BY / Date: *DLH* 8/29/04

Sample Collection Log

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: No COC

Location Code: **FIELDQC**

Sample Number: **082904-ER**

Sample Name: **FIELDQC-BW-082904-ER-ER**

Sampling Method: **BP**

Sample Type: **BW**

Sample Purpose: **ER**

Task:

Collection Date: **29-AUG-04**

Collection Time: **17:00**

Start Depth:

End Depth:

Sample Matrix: **WQ**

Sample Team: **DH**

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Containers					Units	Type
	Flt	Frtn	Qty	Size			
VOC-FULL	N	A	2	40		mL	VOA VIAL
EXPLOSIVES	N	B	2	1		L	Amb. Glass
PERC	N	C	1	250		ML	HDPE

Comments: *Associate w/ 29WW33*

Sketch Location:

Logged BY / Date: *[Signature]* 8/29/04

Reviewed BY / Date: *[Signature]* 8/29/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Site 29
 Project Name/ID: LAAP
 Weather: Sunny; hot 90°

Sampling location ID: 29WW33
 Sample ID: Locol-29WW33
 Collection Time/Date: 8/24/04

Pump Installation

Pump installation crew: M. Martinez / D. Holderfield
 PID/FID reading (well head/background): 0.0 ppm
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 43.00
 Initial (pre-installation) DTW/time: 25.92 / 1237
 Final (after pump priming) DTW/time: 26.05
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.):

Installation date/beginning time: 8/29/04 12:45
 Installation date/completion time: 8/29/04 13:00
 Screen Interval (ft. BTOC): 33 to 43
 Pump intake depth (ft. BTOC): 38
 Post-installation DTW/time: 25.70 1353
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: N/A
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: D. Holderfield / M. Martinez
 Purge date/beginning time: 8/29/04 / 1321
 Initial (pre-purging) DTW (ft. BTOC): 25.92
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0 ppm
 Purge date/completion time: 8/29/04 / 1515
 Final (post-purging) DTW (ft. BTOC): 46.31
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>60</u>	<u>30</u>							<u>30</u>
Refill Setting	<u>10</u>	<u>13.5</u>							<u>13.5</u>
Discharge Setting	<u>5</u>	<u>1.5</u>							<u>1.5</u>
Flow rate (mL/min)	<u>480</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1330	26.14	100	Initial	22.24	3.756	6.38	340.8	1.99	101.5
1335	26.32	100	0.5	22.25	3.759	6.42	355.8	1.68	79.9
1340	26.31	100	1.0	22.45	3.768	6.44	359.0	1.52	65.5
1345	26.29	100	1.5	22.66	3.789	6.48	361.4	1.33	32.0
1350	26.29	100	2.0	22.68	3.790	6.48	359.2	1.29	35.1
1355	26.28	100	2.5	22.65	3.794	6.50	353.7	1.14	24.7
1400	26.28	100	3.0	22.58	3.798	6.51	338.2	1.04	18.9
1405	26.28	100	3.5	22.54	3.792	6.52	321.3	0.99	15.9



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1410	26.28	100	4.0	22.32	3.796	6.56	300.0	0.94	13.3
1415	26.28	100	4.5	22.36	3.781	6.57	205.2	0.87	11.0
1420	26.30	100	5.0	22.34	3.790	6.55	222.7	0.87	9.3
1425	26.30	100	5.5	22.28	3.786	6.55	221.4	0.78	8.7
1430	26.30	100	6.0	22.24	3.781	6.56	199.0	0.72	7.2
1435	26.30	100	6.5	22.18	3.786	6.56	172.7	0.68	6.2
1440	26.31	100	7.0	22.23	3.785	6.56	165.9	0.65	5.7
1445	26.31	100	7.5	22.25	3.784	6.56	160.0	0.64	5.7
1450	26.31	100	8.0	22.20	3.790	6.56	147.0	0.60	5.3
1455	26.31	100	8.5	22.23	3.784	6.56	139.6	0.59	4.5
1500	26.31	100	9.0	22.10	3.785	6.57	130.2	0.56	4.2
1505	26.31	100	9.5	22.06	3.785	6.57	129.0	0.54	3.9
1510	26.31	100	10.0	22.06	3.785	6.57	128.4	0.53	3.5
1515	26.31	100	10.5	22.14	3.783	6.57	123.6	0.52	3.1

Sampling

Sampling beginning time: 1516/1520Sampling completion time: 1540

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1530	26.31	100	11	21.91	3.831	6.57	228.4	1.03	3.0

Sample Information

Sample ID: L0001-29WW33Sample collection date/time: 8/29/04Duplicate sample collected (Y/N): NDuplicate sample ID: N/ASplit sample collected (Y/N): NSplit sample ID: N/ACOC No(s): 29-083004-mk

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8260 B	3 x 40 ml			
Explosives	8330	2 x 1 L Amber			
perchlorate	314	250ml HOPE (x1)			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045216

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 29-082604-MK

Location Code: 29WW34

Task: GW DATA GAPS AUG04

Sample Number: L0001-29WW34

Sample Name: L0001-29WW34-00

Collection Date: 08/25/04

Collection Time: 1551

Sampling Method: BA

Start Depth: 25.00

Sample Type: GW

Sample Purpose: REG

End Depth: 25.21

Sampling Equip: QED Pump non-dedicated Teflon Bladder

Sample Matrix: WATER

QC Partners:

(TB) 082504-TB2 (ER) N/A (FB) N/A

Sample Team: M. Martinez / W. Critz

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
EXPLOSIVES	N	B	2	1	L	Amb. Glass
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 87.50

Depth To Water: 25.00

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

8/26/04

Sample Collection Log

00045217

Page 2 of 2

845714 LONGHORN AAP


Manager: Praveen Srivastav


Location Code: 29WW34

Sample Number: L0001-29WW34

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>SEE GWSF 29WW34 (MSM)</p>									
Sample: 1551	1623	25.21	271.0	7.24	0.833	4.5	0.69	26.09	11.76 L

Logged BY / Date: 

Reviewed BY / Date:  8/26/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 29WW34 Lonsdon AAP needs back
 Project Name/ID: Mini-Kare 38313 Sampling location ID: Site 29
 Weather: Sunny hot Sample ID: 29WW34
 Collection Time/Date: 08/25/04

Pump Installation

Pump installation crew: M. Martinez, W. Critz Installation date/beginning time: 08/25/04 / 1423
 PID/FID reading (well head/background): 5.7 ppm Installation date/completion time: 08/25/04 / 1424
 Casing diameter (inches): 4" Screen Interval (ft. BTOC): 72.6 to 83.6
 Total well Depth (ft. BTOC): 87.86 Pump intake depth (ft. BTOC): 78.1
 Initial (pre-installation) DTW/time: 24.98 / 1550 Post-installation DTW/time: 24.04 @ 1420
 Final (after pump priming) DTW/time: 25.30 / 1445 Max. sustainable pump rate (mL/min): 120
 Free product (circle): LNAPL / DNAPL Appearance of product: 2/A
 Volume of water removed during priming (mL): _____ Discharge tube diameter (3/8" or 1/4"): 3/8
 Discharge tube length (ft.): 100' Inlet reducer used (Y/N) No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 43 psi

Top of Vault to Top of Casing _____
25.06 DTW @ 1350

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / Critz, Wes PID/FID reading (well head/background): 2.2 / 0.0
 Purge date/beginning time: 08/25/04 / 1432 Purge date/completion time: 08/25/04 / 1433
 Initial (pre-purging) DTW (ft. BTOC): 25.06 / 1436 Final (post-purging) DTW (ft. BTOC): 25.21
 Calculated tubing + pump volume: NA No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 43 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>45</u>	<u>50</u>							<u>50</u>
Refill Setting	<u>10.0</u>	<u>12.5</u>							<u>12.5</u>
Discharge Setting	<u>5.0</u>	<u>2.5</u>							<u>2.5</u>
Flow rate (mL/min)	<u>375</u>	<u>120</u>							<u>120</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1445	25.30	120	0	24.52	0.819	7.36	253.0	2.29	7.0
1450	25.25	120	0.6	26.12	0.822	7.38	277.8	1.92	6.5
1455	25.21	120	1.2	27.08	0.828	7.47	284.1	1.67	5.3
1500	25.21	120	1.8	27.75	0.832	7.48	287.2	1.43	5.1
1505	25.21	120	2.4	27.63	0.835	7.46	299.1	1.15	4.7
1510	25.21	120	3.0	27.50	0.840	7.44	293.1	1.11	4.1
1515	25.21	120	3.6	27.08	0.846	7.37	295.5	0.99	4.3
1520	25.21	120	4.2	27.17	0.832	7.36	299.5	0.89	4.0



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1525	25.21	120	4.8	26.04	0.836	7.36	300.4	0.81	5.0
1530	25.21	120	5.4	26.04	0.834	7.35	301.6	0.79	4.4
1535	25.21	120	6.0	25.90	0.833	7.34	303.5	0.72	5.4
1540	25.21	120	6.6	26.17	0.829	7.34	303.5	0.69	5.5
1545	25.21	120	7.2	26.43	0.828	7.36	300.4	0.66	5.0
1550	25.21	120	7.8	26.42	0.829	7.37	298.0	0.65	5.1

Sampling

Sampling beginning time: 1551Sampling completion time: 1614

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1623	25.21 <u>25.21</u> <u>(15.9)</u>	120	11.76	26.09	0.833	7.24	271.6	0.69	4.5

Sample Information

Sample ID: 29 WW34Sample collection date/time: 08/25/04 / 1551Duplicate sample collected (Y/N): NODuplicate sample ID: N/ASplit sample collected (Y/N): NOSplit sample ID: N/ACOC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC - Full	8260B	3 VOAs			
Explosives	8330	2 x 1 L Amber			
Perchlorate	314	1 x 250ML HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

LHAAP-32

**GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS**



Shaw E & I, Inc.

Sik 32

Sample Collection Log

845714 - LONGHORN AAP

Manager: Praveen Srivastav

00045221

Page 1 of 2

RFA / COC Number: 32-090104-m/k

Location Code: 113

Sample Number: L0001-113

Sample Name: 113-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip: Bladder pump

QC Partners:

(TB)

(ER)

(FB)

Task: GW DATA GAPS AUG04

Collection Date: 9/1/04

Collection Time: 1445

Start Depth: 22.04

End Depth: 24.90

Sample Matrix: WATER

Sample Team: Rodriguez / Everett

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	ml	HDPE
EXPLOSIVES	N	B	2	1	L	Amb. Glass
METALS-0020	N	C	1	500	ml	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 28.50

Depth To Water: 25.57'

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: P. H. M. / 9/08/04



845714 - LONGHORN AAP

Page 2 of 2

Sample Number: L0001-113

[illegible]

Reviewed BY / Date: De Hs / 9/8/09

[illegible]

Sheet 2 of 2

[illegible]

Sampling beginning time: _____ Sampling completion time: _____

[illegible]

Sample ID: _____ Sample collection date/time: _____
Duplicate sample collected (Y/N): _____ Duplicate sample ID: _____
Split sample collected (Y/N): _____ Split sample ID: _____
COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments: Well extremely silty; after adjusting flow rate, well continued to draw down. Necessary to bail dry using disposable bailer. About 2:45 or 3PM came back + checked water level. About 3' in well - sampled with clean disposable bailer.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045225

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-090104-MK

Location Code: **32WW01**

Sample Number: **L0001-32WW01**

Sample Name: **32WW01-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 8/31/04

Collection Time: 17:20

Start Depth: 41.01

End Depth: 42.31

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 083004-IB (ER) N/A (FB) N/A

Sample Team: A. Willmore, C. Mgr

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
EXPLOSIVES	N	B	2	1	L	Amb. Glass
METALS-6020	N	C	1	500	mL	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 56.5

Depth To Water: 35.00

Comments: Had to bail dry b/c of slow recharge

Sketch Location:

Logged BY / Date: [Signature]

Reviewed BY / Date: [Signature]

Sample Collection Log

00045226

Page 2 of 2

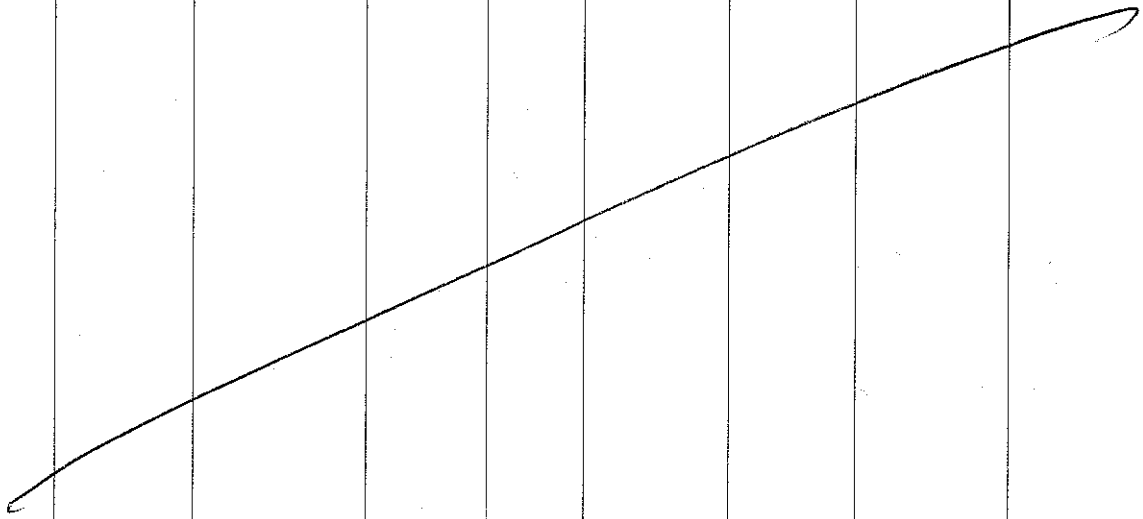
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 32WW01

Sample Number: L0001-32WW01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	17:20	42.31	94.3	6.71	1.701	38.1	1.27	23.14°	14 gal.

6.71

Logged BY / Date: M. McC 8/31/04 Reviewed BY / Date: De. Hobb 9/1/04

Sample Collection Log

00045227

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-090104-nk

Location Code: 32WW01

Sample Number: L0001-32WW01

Sample Name: 32WW01-00-QC

Sampling Method: BA

Sample Type: GW

Sample Purpose: FD

Task: GW DATA GAPS AUG04

Collection Date: 8/31/04

Collection Time: 17:20

Start Depth: 41.01

End Depth: 42.31

Sample Matrix: WATER

Sample Team: A. Willmore, C. Make

Sampling Equip: Bladder Pump

QC Partners:

(TB) 083084-TB

(ER)

N/A

(FB)

N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
EXPLOSIVES	N	B	2	1	L	Amb. Glass
METALS-6020	N	C	1	500	mL	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 30.5

Depth To Water: 35.66

Comments:

Had to bail dry before of slow recharge

Sketch Location:

Logged BY / Date:

M. Hill

8/31/04

Reviewed BY / Date:

D. Hill

Sample Collection Log

00045228

Page 2 of 2


845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 32WW01

Sample Number: L0001-32WW01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	12:20	42.31	94.3	6.71	1.701	38.1	1.27	23.14	14

Logged BY / Date:



3/21/04

Reviewed BY / Date:





GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 32WW01
 Project Name/#: LNAPP
 Weather: SUNNY, 90°

Sampling location ID: 32WW01
 Sample ID: 32WW01
 Collection Time/Date: 17:20 / 8/31/04

Pump Installation

Pump installation crew: A. Willmore, D. Holterfeld
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 60.5
 Initial (pre-installation) DTW/time: 35.66
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 60'

Installation date/beginning time: 8/31/04 12:30
 Installation date/completion time: 8/31/04 1331
 Screen Interval (ft. BTOC): 40.5 to 50.5
 Pump intake depth (ft. BTOC): 35.7 45'
 Post-installation DTW/time: 35.71
 Max. sustainable pump rate (mL/min): 225
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 19.34 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>35</u>	<u>25</u>							
Refill Setting	<u>12.5</u>	<u>12.5</u>							
Discharge Setting	<u>2.5</u>	<u>2.5</u>							
Flow rate (mL/min)	<u>225</u>	<u>115</u>							

Purging

Purging/sampling crew: A. Willmore, C. Make
 Purge date/beginning time: 8/31/04
 Initial (pre-purging) DTW (ft. BTOC): 35.66
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 8/31/04
 Final (post-purging) DTW (ft. BTOC): 37.00
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 19.43 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>35</u>	<u>25</u>							
Refill Setting	<u>12.5</u>	<u>12.5</u>							
Discharge Setting	<u>2.5</u>	<u>2.5</u>							
Flow rate (mL/min)	<u>225</u>	<u>115</u>							

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
12:40	36.3	<u>225</u>	0.1	24.01	1.693	6.69	183.8	2.98	27.6
12:45	36.45	115	0.3	23.00	1.713	6.68	163.4	2.02	24.7
12:50	36.51	115	0.4	23.34	1.712	6.68	157.9	1.81	27.2
12:55	36.65	115	0.6	23.88	1.717	6.69	153.8	1.50	23.1
13:00	36.75	115	0.9	23.80	1.718	6.69	153.5	1.48	25.6
13:05	36.77	115	1.0	23.19	1.715	6.69	150.9	1.32	20.3
13:10	36.79	115	1.2	22.41	1.710	6.69	120.1	1.28	14.7
13:15	36.82	115	1.3	20.91	1.699	6.69	109.4	1.20	10.1



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
13:20	36.84	115	20.18	20.18	1.694	6.68	106.6	1.24	9.6
13:25	36.87	110	20.18	20.18	1.694	6.69	106.7	1.28	9.4
13:30	36.88	110	20.17	20.17	1.694	6.69	106.7	1.29	9.5
13:35	36.90	110	20.16	20.16	1.694	6.68	106.6	1.28	9.4
13:40	36.93	110	20.16	20.16	1.694	6.68	106.6	1.28	9.6
13:45	36.95	110	20.17	20.17	1.694	6.68	106.5	1.28	9.7
13:50	36.96	110	2.1	20.82	1.685	6.69	98.1	1.23	9.3
13:55	36.97	110	2.2	20.81	1.687	6.69	98.4	1.23	9.4
14:00	37.00	110	2.5	20.80	1.690	6.69	98.1	1.23	9.2
Must BAIL DRY!!!									

Sampling

Sampling beginning time: 17:20Sampling completion time: 17:25

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
17:20	42.31	—	14.0g	23.14	1.701	6.71	94.3	1.27	38.1

Sample Information

Sample ID: 32 WWO 1Sample collection date/time: 8/31/04 17:20Duplicate sample collected (Y/N): No YESDuplicate sample ID: 32 WWO 1 - acSplit sample collected (Y/N): No

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Metals	6020	HDPE			
RCRA 8 Metals	W	HDPE			
Explosive	8330	1-L Amber			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045231

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-090104-mk

Location Code: **32WW02**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-32WW02**

Collection Date: 8/31/04

Sample Name: **32WW02-00**

Collection Time: 1515

Sampling Method: **BA**

Start Depth: 33.38

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 35.23

Sampling Equip: Bladder pump

Sample Matrix: **WATER**

QC Partners:

(TB) 083004-TB (ER) N/A (FB) N/A

Sample Team: K. Everett
Jorge Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	ml	HDPE
EXPLOSIVES	N	B	2	1	L	Amb. Glass
METALS-6020	N	C	1	500	ml	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 47.48

Depth To Water: 42.0

Comments:

09/01/04
Well bailed dry @ 0830 ; sampled with bailer.

Sketch Location:

Logged BY / Date: K. Everett 9/1/04

Reviewed BY / Date:

Sample Collection Log

00045232

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 32WW02

Sample Number: L0001-32WW02

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Sampling form 32WW02									
Sample:	8/31/04 1640	42.0	65.8	6.68	3.217	2.4	1.05	24.45	26 gal. 9/1/04 (8/31/04 20 L)

Logged BY / Date: _____

Reviewed BY / Date: _____



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: _____
 Project Name/ #: Longhorn
 Weather: Sunny - hot

Sampling location ID: 32WW02
 Sample ID: 32W LH 32WW02
 Collection Time/Date: _____

Pump Installation

Pump installation crew: K. Everett / J. Rodriguez
 PID/FID reading (well head/background): 0/0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 47.48
 Initial (pre-installation) DTW/time: 33.38 / 13:10
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: 8/31/04 / 13:10
 Installation date/completion time: 8/31/04 / 14:10
 Screen Interval (ft. BTOC): 35 to 59.5
 Pump intake depth (ft. BTOC): 40'
 Post-installation DTW/time: 32.54 / 14:10
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 20.21 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>35</u>	<u>25</u>	<u>25</u>	<u>30</u>				
Refill Setting	<u>10</u>	<u>10</u>	<u>10</u>	<u>11.5</u>	<u>12</u>				
Discharge Setting	<u>5</u>	<u>5</u>	<u>5</u>	<u>3.5</u>	<u>3</u>				
Flow rate (mL/min)	<u>0</u>	<u>350</u>	<u>200</u>	<u>100</u>	<u>100</u>				

Purging

Purging/sampling crew: SAA
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1530</u>	<u>33.90</u>	<u>100</u>							
<u>1550</u>	<u>34.20</u>	<u>100</u>	<u>2</u>		<u>UNIT NOT FILLED FOR MEAS.</u>				
<u>1555</u>	<u>34.25</u>	<u>100</u>	<u>2.15</u>						
<u>1620</u>	<u>34.40</u>				<u>Leaking @ large change out w/ another unit</u>				
<u>1625</u>	<u>34.40</u>	<u>100</u>	<u>9.5</u>	<u>23.37</u>	<u>3.222</u>	<u>6.67</u>	<u>68.7</u>	<u>0.98</u>	<u>3.8</u>
<u>1630</u>	<u>34.50</u>	<u>100</u>	<u>10</u>	<u>24.18</u>	<u>3.218</u>	<u>6.67</u>	<u>67.5</u>	<u>1.01</u>	<u>3.2</u>
<u>1635</u>	<u>35.17</u>	<u>100</u>	<u>15</u>	<u>24.37</u>	<u>3.217</u>	<u>6.68</u>	<u>64.4</u>	<u>1.04</u>	<u>1.5</u>

Sheet 2 of 2

[illegible]

Sampling beginning time: _____ Sampling completion time: _____

[illegible]

Sample ID: _____ Sample collection date/time: _____
Duplicate sample collected (Y/N): _____ Duplicate sample ID: _____
Split sample collected (Y/N): _____ Split sample ID: _____
COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045235

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: **32-TMW-01**

Sample Number: **L0001-32-TMW-0**

Sample Name: **32-TMW-01-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: _____

QC Partners:

(TB) _____

(ER) _____

(FB) _____

Task: **GW DATA GAPS AUG04**

Collection Date: No Sample collected

Collection Time: _____

Start Depth: _____

End Depth: _____

Sample Matrix: **WATER**

Sample Team: _____

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
EXPLOSIVES	N	B	2	1	L	Amb. Glass
METALS-6020	N	C	1	500	mL	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 25.0

by casing

Depth To Water: 24.68 Top of Csg to water 24.68

19.88 Stick up is 4.8' - 4.8

19.88

Comments: Replace cap; est. 0.12' water - wait + check tomorrow.
A. Willmore; B. Finley checked well 9/14/04 - still not enough water.
Same level.

Sketch Location:

25.00

9/9/04 24.85

00.15

Logged BY / Date: KEM

Reviewed BY / Date: _____



845714 - LONGHORN AAP

Manager: Praveen Srivastav

Page 2 of 2.

Sample Number: **L0001-32-TMW-0**

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
---------	------------	----------------------	------------	------------	-------------------------	--------------------	---------------------	--------------------	-----------------------

Sample:									

Logged BY / Date: K. Ernst

Reviewed BY / Date:

LHAAP-35A(58)
GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS



Shaw Environmental & Infrastructure, Inc.

00045238

By _____ Date _____ Subject _____ Sheet No. _____ of _____

Chkd. By _____ Date _____ Proj. No. _____

.25 in. X .25 in.

35A

depth of water after pump turn on
18.50

depth of inlet = 20.94

MW-03

9:23	cycle 10/5	psi 20	depth 18.55	Flow 120
------	---------------	-----------	----------------	-------------

9:37	Temp 23.27	cond 0.289	DO % 91.9	DO 7.81	pH 5.76	OPR 191.3	NTU 23.8	depth 9.78
------	---------------	---------------	--------------	------------	------------	--------------	-------------	---------------

9:39	cycle 7/3	psi 20	depth 9.8	Flow 95
------	--------------	-----------	--------------	------------

9:42	Temp 23.58	cond 0.290	DO % 90.7	DO 7.69	pH 5.74	OPR 198.7	NTU 21.9
------	---------------	---------------	--------------	------------	------------	--------------	-------------



Sample Collection Log

00045239

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35A-090904-mk

Location Code: 35AWW01

Task: GW DATA GAPS AUG04

Sample Number: L0001-35AWW01

Sample Name: L0001-35AWW01-00 + MS, MSD

Collection Date: 9/9/04

Sampling Method: BA

Collection Time: 1130

Sample Type: GW

Start Depth: 35.00'

Sample Purpose: REG

End Depth: 35.00'

Sampling Equip: Bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 090904-TB (ER) N/A (FB) N/A

Sample Team: D. Holderfield
A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL N A 3 40 mL VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 72.45

Depth To Water: 34.90

Comments:

Sketch Location:

Logged BY / Date: Pa. Holderfield 9/9/04Reviewed BY / Date: Pa. Holderfield 9/9/04

Sample Collection Log

00045240

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 35AWW01

Sample Number: L0001-35AWW01 + m3, msp

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See 6W sampling Form 35AWW01									
Sample:	1130	35.00	-26.6	6.73	0.864	80.0	6.84	23.29	4.0

Logged BY / Date: Deborah 9/9/04

Reviewed BY / Date: Deborah 9/9/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 35A
 Project Name/ #: LHAAP
 Weather: Clear 80°

Sampling location ID: 35W02 04 W02 35A W02
 Sample ID: 35W02 04 W02 35A W02
 Collection Time/Date: _____

Pump Installation

Pump installation crew: A. Willman D. Hokenfield
 PID/FID reading (well head/background): 6.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 72.45
 Initial (pre-installation) DTW/time: 34.90 9:15
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: 9:17 9/9/04
 Installation date/completion time: 9:18 9/9/04
 Screen Interval (ft. BTOC): 62.45 to 72.45
 Pump intake depth (ft. BTOC): 67.45
 Post-installation DTW/time: 34.74 9:20
 Max. sustainable pump rate (mL/min): 200
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 29.55 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore D. Hokenfield
 Purge date/beginning time: 9:38
 Initial (pre-purging) DTW (ft. BTOC): 34.9
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 9/9/04
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 29.55 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>30</u>	<u>20</u>	<u>38</u>						<u>38</u>
Refill Setting	<u>10</u>	<u>10</u>	<u>10</u>						<u>10</u>
Discharge Setting	<u>5</u>	<u>5</u>	<u>5</u>						<u>5</u>
Flow rate (mL/min)	<u>1</u>	<u>200</u>	<u>105</u>						<u>105</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume of Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>9:43</u>	<u>35.00</u>	<u>105</u>	<u>0.1</u>	<u>22.81</u>	<u>1.041</u>	<u>6.73</u>	<u>10.5</u>	<u>11.12</u>	<u>526.1</u>
<u>9:46</u>	<u>35.00</u>	<u>105</u>	<u>0.2</u>	<u>22.70</u>	<u>1.001</u>	<u>6.73</u>	<u>4.3</u>	<u>10.40</u>	<u>526.3</u>
<u>9:53</u>	<u>35.00</u>	<u>105</u>	<u>0.4</u>	<u>22.30</u>	<u>0.825</u>	<u>6.73</u>	<u>4.1</u>	<u>3.60</u>	<u>525.3</u>
<u>9:58</u>	<u>35.00</u>	<u>105</u>	<u>0.5</u>	<u>23.07</u>	<u>0.834</u>	<u>6.74</u>	<u>3.9</u>	<u>3.32</u>	<u>459.8</u>
<u>10:03</u>	<u>35.00</u>	<u>105</u>	<u>0.7</u>	<u>23.40</u>	<u>0.844</u>	<u>6.75</u>	<u>2.3</u>	<u>2.78</u>	<u>438.0</u>
<u>10:08</u>	<u>35.00</u>	<u>105</u>	<u>0.8</u>	<u>23.69</u>	<u>0.848</u>	<u>6.75</u>	<u>1.8</u>	<u>2.51</u>	<u>338.1</u>
<u>10:13</u>	<u>35.00</u>	<u>105</u>	<u>0.9</u>	<u>23.77</u>	<u>0.850</u>	<u>6.75</u>	<u>-0.6</u>	<u>2.37</u>	<u>328.8</u>
<u>10:18</u>	<u>35.00</u>	<u>105</u>	<u>1.1</u>	<u>23.79</u>	<u>0.852</u>	<u>6.75</u>	<u>-0.8</u>	<u>2.18</u>	<u>347.8</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
10:23	35.00	105	1.3	24.33	0.853	6.76	-1.5	2.01	324.1
10:28	35.00	105	1.4	25.02	0.852	6.74	-0.8	1.82	201
10:33	35.00	105	1.5	25.03	0.852	6.74	-0.8	1.83	198.3
10:38	35.00	105	1.6	25.26	0.860	6.74	-0.9	1.74	201.6
10:43	35.00	105	1.8	25.70	0.862	6.74	0.0	1.68	228.0
10:48	35.00	105	2.0	25.92	0.870	6.74	-2.3	1.65	62.2
10:53	35.00	105	2.1	26.87	0.865	6.74	-1.3	1.64	300
10:58	35.00	105	2.2	26.91	0.864	6.74	-0.4	1.57	253.1
11:03	35.00	105	2.4	23.28	0.864	6.74	-10.3	1.13	205.2
11:08	35.00	105	2.5	23.31	0.865	6.74	-18.1	1.09	119.1
11:13	35.00	105	2.6	23.32	0.864	6.74	-18.1	1.02	118.0
11:18	35.00	105	2.9	23.30	0.864	6.74	-18.4	1.00	116.7
11:23	35.00	105	2.7	23.29	0.865	6.74	-19.0	0.99	115.8

Sampling

Sampling beginning time: 11:30Sampling completion time: 11:37

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
11:30	35.00	105	4.0	23.29	0.864	6.73	-26.6	0.89	800

Sample Information

Sample ID: 35A WWO1Sample collection date/time: 9/9/04 11:30Duplicate sample collected (Y/N): MS, MSDDuplicate sample ID: MS, MSDSplit sample collected (Y/N): NoSplit sample ID: ---COC No(s): ---

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs	8260B	40 mL - Vac V/V			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045243

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35A-091004-MK

Location Code: 35AWW02

Task: GW DATA GAPS AUG04

Sample Number: L0001-35AWW02

Collection Date: 9/10/04

Sample Name: L0001-35AWW02-00

Collection Time: 1120

Sampling Method: BA

Start Depth: 42.53'

Sample Type: GW

Sample Purpose: REG

End Depth: 42.53'

Sampling Equip:

Bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 091004-TB

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore
D. Holderfield

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL N A 3 40 mL VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 445.04

Depth To Water: 42.07

Comments:

Sketch Location:

Logged BY / Date: De-12/11/04 9/10/04Reviewed BY / Date: De-12/11/04 9/10/04

Sample Collection Log

00045244

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 35AWW02

Sample Number: L0001-35AWW02

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm) <i>mg/l</i>	Temperature (C)	Purge Volume (gal)
<i>See GW sampling form 35AWW02</i>									
Sample:	1120	42.53	76.5	9.66	1.169	3.1	2.49	25-31	2

Logged BY / Date: *Ra H. K. M. 9/10/04*

Reviewed BY / Date: *Ra H. K. M. 9/10/04*



GROUNDWATER SAMPLING FORM

Sheet 1 of 3

Operable Unit/Site ID: 35A
 Project Name/ #: LHAAP
 Weather: Partly Cloudy 80s to 90s

Sampling location ID: 35A W02
 Sample ID: 35A W02
 Collection Time/Date: 11:20 9/10/04

Pump Installation

Pump installation crew: A. Willmore, D. Hotterfeld
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 145.04
 Initial (pre-installation) DTW/time: 42.07 9:11
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: 9:31
 Installation date/completion time: 9:32
 Screen Interval (ft. BTOC): 135.04 to 145.04
 Pump intake depth (ft BTOC): 140 ft.
 Post-installation DTW/time: 41.38 9:33
 Max. sustainable pump rate (mL/min): 190
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 60.2 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, D. Hotterfeld
 Purge date/beginning time: 9/10/04 10:53
 Initial (pre-purging) DTW (ft. BTOC): 42.07
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 9/10/04 11:09
 Final (post-purging) DTW (ft. BTOC): 42.53
 No. of tubing + pump volumes purged: —

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 60.2 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>86</u>	<u>86</u>	<u>86</u>						<u>86</u>
Refill Setting	<u>10</u>	<u>4.13</u>	<u>14</u>						<u>14</u>
Discharge Setting	<u>5</u>	<u>7</u>	<u>6</u>						<u>6</u>
Flow rate (mL/min)	<u>190</u>	<u>120</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (g)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>10:33</u>	<u>42.51</u>	<u>120</u>	<u>0.1</u>	<u>23.01</u>	<u>1.018</u>	<u>9.67</u>	<u>105.4</u>	<u>7.32</u>	<u>11.1</u>
<u>10:38</u>	<u>42.53</u>	<u>100</u>	<u>0.2</u>	<u>22.99</u>	<u>1.013</u>	<u>9.67</u>	<u>106.9</u>	<u>6.55</u>	<u>6.0</u>
<u>10:43</u>	<u>42.53</u>	<u>100</u>	<u>0.4</u>	<u>23.73</u>	<u>1.093</u>	<u>9.69</u>	<u>86.5</u>	<u>4.25</u>	<u>4.10</u>
<u>10:48</u>	<u>42.53</u>	<u>100</u>	<u>0.5</u>	<u>24.49</u>	<u>1.138</u>	<u>9.69</u>	<u>77.5</u>	<u>3.26</u>	<u>4.0</u>
<u>10:53</u>	<u>42.53</u>	<u>100</u>	<u>0.7</u>	<u>24.63</u>	<u>1.139</u>	<u>9.68</u>	<u>74.3</u>	<u>3.19</u>	<u>3.7</u>
<u>10:58</u>	<u>42.53</u>	<u>100</u>	<u>0.9</u>	<u>25.17</u>	<u>1.149</u>	<u>9.68</u>	<u>71.0</u>	<u>2.80</u>	<u>4.1</u>
<u>11:03</u>	<u>42.53</u>	<u>100</u>	<u>1.0</u>	<u>25.18</u>	<u>1.154</u>	<u>9.68</u>	<u>69.1</u>	<u>2.74</u>	<u>3.4</u>
<u>11:08</u>	<u>42.53</u>	<u>100</u>	<u>1.2</u>	<u>25.30</u>	<u>1.152</u>	<u>9.68</u>	<u>69.5</u>	<u>2.58</u>	<u>3.3</u>

Sheet 2 of 2[illegible]

Sampling beginning time: 11:20

Sampling completion time: 11:25

[illegible]

Sample ID: 35A WW02

Sample collection date/time: 9/10/21 11:20
35A NW 02

Duplicate sample collected (Y/N): N

Duplicate sample ID:

Split sample collected (Y/N): Na

Split sample ID:

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs	8260	40 mil - Veg Vial			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045247

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35A-090904-mk

Location Code: 35AWW03

Sample Number: L0001-35AWW03

Sample Name: L0001-35AWW03-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Task: GW DATA GAPS AUG04

Collection Date: 9/8/04

Collection Time: 1830

Start Depth: 18.55

End Depth: 19.22

Sampling Equip:

Baker

Sample Matrix: WATER

QC Partners:

(TB) 090904-PB

(ER)

N/A

(FB)

N/A

Sample Team: K. Everett, J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA-VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 21.94

Depth To Water: 19.60

Comments:

Well was bailed dry ~2 gallons 1830, 9/8/04 and sampled 1830, 9/8/04. Very silty, turbid appearance.

Sketch Location:

Logged BY / Date: K. Everett 9/8/04

Reviewed BY / Date: Dan Holdorf 9/9/04

Sample Collection Log

00045248

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 35AWW03

Sample Number: L0001-35AWW03

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<i>See Gw Sampling Form</i>									
Sample:	1022	19.22	204.2	5.71	0.239	22.6	90.1	25.00	2 gal.

Logged BY / Date: Ken 9/8/04

Reviewed BY / Date: Praveen 9/8/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 35A
 Project Name/ID: HAAP
 Weather: Sunny / clear

Sampling location ID: 35A WW 03
 Sample ID: LD001 - 35A WW 03
 Collection Time/Date: 9/8/04 1830

Pump Installation

Pump installation crew: K. Everett; J. Rodriguez
 PID/FID reading (well head/background): 0.1 / 0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 21.94
 Initial (pre-installation) DTW/time: 18.60 / 0930
 Final (after pump priming) DTW/time: 18.48
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 100'

Installation date/beginning time: 0935 9/8/04
 Installation date/completion time:
 Screen Interval (ft. BTOC): 7' to 21'
 Pump intake depth (ft BTOC): 20'
 Post-installation DTW/time: 19.22 / 1030
 Max. sustainable pump rate (mL/min): ~90
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew:
 Purge date/beginning time:
 Initial (pre-purging) DTW (ft. BTOC):
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background):
 Purge date/completion time:
 Final (post-purging) DTW (ft. BTOC):
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>20</u>	<u>20</u>	<u>20</u>	<u>25</u>	<u>25</u>			
Refill Setting	<u>10</u>	<u>7</u>	<u>6</u>	<u>8</u>	<u>10</u>	<u>7</u>			
Discharge Setting	<u>5</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>5</u>	<u>3</u>			
Flow rate (mL/min)	<u>120</u>	<u>95</u>	<u>110</u>	<u>85</u>	<u>120</u>	<u>90</u>			

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>9:37</u>	<u>18.55</u>	<u>120</u>		<u>23.27</u>	<u>0.289</u>	<u>5.76</u>	<u>191.3</u>	<u>91.9</u>	<u>23.82</u>
<u>9:42</u>	<u>18.78</u>	<u>95</u>		<u>23.58</u>	<u>0.290</u>	<u>5.74</u>	<u>198.7</u>	<u>90.7</u>	<u>21.9</u>
<u>9:47</u>	<u>18.93</u>	<u>110</u>		<u>23.70</u>	<u>0.290</u>	<u>5.73</u>	<u>199.7</u>	<u>90.5</u>	<u>22.6</u>
<u>9:52</u>	<u>18.95</u>	<u>85</u>		<u>23.78</u>	<u>0.291</u>	<u>5.73</u>	<u>201.8</u>	<u>90.7</u>	<u>23.8</u>
<u>9:57</u>	<u>19.00</u>	<u>90</u>		<u>23.85</u>	<u>0.291</u>	<u>5.73</u>	<u>200.7</u>	<u>90.5</u>	<u>21.2</u>
<u>10:02</u>	<u>19.03</u>	<u>120</u>		<u>23.96</u>	<u>0.290</u>	<u>5.73</u>	<u>195.1</u>	<u>90.9</u>	<u>19.9</u>
<u>10:07</u>	<u>19.06</u>	<u>120</u>		<u>24.26</u>	<u>0.290</u>	<u>5.72</u>	<u>199.5</u>	<u>90.9</u>	<u>20.0</u>
<u>10:12</u>	<u>19.12</u>	<u>120</u>		<u>24.51</u>	<u>0.290</u>	<u>5.72</u>	<u>200.3</u>	<u>90.8</u>	<u>20.5</u>

Sample Collection Log

00045251

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35A-090904-m/r

Location Code: **35AWW04**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-35AWW04**

Sample Name: **L0001-35AWW04-00**

Collection Date: 9/8/04

Collection Time: 1556

Sampling Method: **BA**

Start Depth: 21.88

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 22.18

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 090904-TB

(ER) N/A

(FB) N/A

Sample Team: W. Critz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
----------	---	---	---	----	----	----------

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 25.37 Depth To Water: 21.88

Comments:

Sketch Location:

Logged BY / Date: W. Critz 9/8/04

Reviewed BY / Date: [Signature] 9/9/04

Sample Collection Log

00045252

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35A-090904-mk

Location Code: 35AWW04

Task: GW DATA GAPS AUG04

Sample Number: L0001-35AWW04

Sample Name: L0001-35AWW04-00-QC

Collection Date: 9/8/04

Collection Time: 1556

Sampling Method: BA

Start Depth: 21.88

Sample Type: GW

Sample Purpose: FD

End Depth: 22.18

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) 090904-TB

(ER) N/A

(FB) N/A

Sample Team: W. Critz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
----------	---	---	---	----	----	----------

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 25.37

Depth To Water: 21.88

Comments: Duplicate for 35AWW04

Sketch Location:

Logged BY / Date: Des Critz 9/9/04

Reviewed BY / Date: Des Critz 9/9/04

Sample Collection Log

00045253

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 35AWW04

Sample Number: L0001-35AWW04

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>See GW Sampling Form 35AWW04</p> <p>WCC</p>									
Sample:	1610	22.14	12.6	5.85	8.820	7.1	1.69	22.70	2.38 gal.

Logged BY / Date: Des Critz 9/8/04

Reviewed BY / Date: [Signature] 9/8/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 35
 Project Name/ID: Loughran AAP
 Weather: Sunny low 90's

Sampling location ID: 35Aww04
 Sample ID: 35Aww04
 Collection Time/Date: _____

Pump Installation

Pump installation crew: W. Critz / M. Martinez
 PID/FID reading (well head/background): 0.0 / 0.0
 Casing diameter (inches): 4 in
 Total well Depth (ft. BTOC): 26.37 25.37
 Initial (pre-installation) DTW/time: 21.88 1409
 Final (after pump priming) DTW/time: 22.00 1431
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 48'

Installation date/beginning time: 9/8/04 / 1415
 Installation date/completion time: 9/8/04 / 1416
 Screen Interval (ft. BTOC): 4 15 to 25
 Pump intake depth (ft BTOC): 24.37 / 1417
 Post-installation DTW/time: 21.79 1417
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz / M. Martinez
 Purge date/beginning time: 9/8/04 / 1427
 Initial (pre-purging) DTW (ft. BTOC): 21.88
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0 / 0.0
 Purge date/completion time: 9/8/04
 Final (post-purging) DTW (ft. BTOC): 22.18
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>								<u>20</u>
Refill Setting	<u>13</u>								<u>13</u>
Discharge Setting	<u>2</u>								<u>2</u>
Flow rate (mL/min)	<u>100</u>								<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1440	22.10	100	0	24.17	8.232	5.34	32.0	3.25	90.2
1445	22.13	100	0.5	22.86	9.949	5.40	4.2	1.86	95.7
1450	22.13	100	1.0	22.63	10.02	5.41	-0.4	1.75	95.7
1455	22.13	100	1.5	22.64	9.992	5.43	-4.8	1.60	78.6
1500	22.16	100	2.0	22.81	9.976	5.44	-6.1	1.54	80.3
1505	22.16	100	2.5	22.79	9.948	5.48	-7.7	1.47	70.1
1510	22.16	100	3.0	22.70	9.911	5.51	-8.7	1.42	62.8
1515	22.16	100	3.5	22.27	9.858	5.56	-10.6	1.33	54.8



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1520	22.17	100	4.0	22.22	9.706	5.60	-12.5	1.32	47.5
1525	22.17	100	4.5	22.09	9.557	5.66	-14.2	1.29	38.7
1530	22.18	100	5.0	22.29	9.420	5.69	-14.7	1.27	35.1
1535	22.18	100	5.5	22.26	9.337	5.72	-14.2	1.25	29.0
1540	22.18	100	6.0	22.47	9.238	5.74	-13.6	1.25	24.9
1545	22.18	100	6.5	22.67	9.170	5.76	-12.4	1.25	18.7
1550	22.18	100	7.0	22.84	9.086	5.79	-10.4	1.25	13.7
1555	22.18	100	7.5	22.72	9.030	5.81	-6.6	1.33	9.5

10-esp.
20

Sampling

Sampling beginning time: 1556Sampling completion time: 1604

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1610	22.18	100	9.0	22.70	8.820	5.85	12.6	1.69	7.1

Sample Information

Sample ID: 35Aww04Sample collection date/time: 9/8/04 1556Duplicate sample collected (Y/N): YDuplicate sample ID: 35Aww04QSplit sample collected (Y/N): NSplit sample ID: N/ACOC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC Full	8260B	3 - 40mL HCl vials			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045256

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35A-090804-mk

Location Code: 35AWW05

Task: GW DATA GAPS AUG04

Sample Number: L0001-35AWW05

Collection Date: 9/8/04

Sample Name: L0001-35AWW05-00

Collection Time: 1206

Sampling Method: BA

Start Depth: 38.15

Sample Type: GW

Sample Purpose: REG

End Depth: 38.58

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) (ER) N/A (FB) N/A

Sample Team: W. Critz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL N A 3 40 mL VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 71.96

Depth To Water: 38.15

Comments:

Sketch Location:

Logged BY / Date: W. Critz 9/8/04

Reviewed BY / Date: D. Smith 9/8/04

Sample Collection Log

00045257

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 35AWW05

Sample Number: L0001-35AWW05

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>see GW Sample Form 35AWW05 LSC</p>									
Sample:	1215	38.58	-124.4	7.24	2.924	24.7	0.69 mg/L	27.10	10.05 L

Logged BY / Date: Wes C. / 9/6/04

Reviewed BY / Date: Praveen / 9/8/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Site 35
 Project Name/ID: Loughran AAP
 Weather: Sunny low 90's

Sampling location ID: 35Aww05
 Sample ID: 35Aww05
 Collection Time/Date: 1206 9/8/04

Pump Installation

Pump installation crew: W. Critz / M. Martinez
 PID/FID reading (well head/background): 1.5/0.0
 Casing diameter (inches): 4 in
 Total well Depth (ft. BTOC): 71.96
 Initial (pre-installation) DTW/time: 38.15 950
 Final (after pump priming) DTW/time: 38.19 1031
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 100'

Installation date/beginning time: 9/8/04 1010
 Installation date/completion time: 9/8/04 1011
 Screen Interval (ft. BTOC): 61' to 71'
 Pump intake depth (ft BTOC): 66
 Post-installation DTW/time: 37.69 1012
 Max. sustainable pump rate (mL/min): 100
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz / M. Martinez
 Purge date/beginning time: 9/8/04 1035
 Initial (pre-purging) DTW (ft. BTOC): 38.15
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 1.5/0.0
 Purge date/completion time: 9/8/04 1215
 Final (post-purging) DTW (ft. BTOC): 38.58
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>47</u>	<u>47</u>	<u>40</u>	<u>40</u>					<u>40</u>
Refill Setting	<u>12</u>	<u>13</u>	<u>12</u>	<u>11.5</u>					<u>11.5</u>
Discharge Setting	<u>3</u>	<u>2</u>	<u>3</u>	<u>3.5</u>					<u>3.5</u>
Flow rate (mL/min)	<u>140</u>	<u>45</u>	<u>70</u>	<u>100</u>					<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1035	<u>38.24</u>	<u>140</u>	<u>0</u>	<u>25.17</u>	<u>2.067</u>	<u>7.53</u>	<u>178.1</u>	<u>5.07</u>	<u>18.4</u>
1040	<u>38.48</u>	<u>70</u>	<u>10.7</u>	<u>25.11</u>	<u>2.223</u>	<u>7.46</u>	<u>132.2</u>	<u>4.92</u>	<u>17.6</u>
1045	<u>38.50</u>	<u>100</u>	<u>1.05</u>	<u>25.23</u>	<u>2.569</u>	<u>7.40</u>	<u>96.7</u>	<u>4.72</u>	<u>17.3</u>
1050	<u>38.51</u>	<u>100</u>	<u>1.55</u>	<u>25.44</u>	<u>2.744</u>	<u>7.29</u>	<u>2.5</u>	<u>3.84</u>	<u>18.0</u>
1055	<u>38.54</u>	<u>100</u>	<u>2.05</u>	<u>25.50</u>	<u>2.843</u>	<u>7.26</u>	<u>-43.3</u>	<u>2.45</u>	<u>17.2</u>
1100	<u>38.54</u>	<u>100</u>	<u>2.85</u>	<u>25.55</u>	<u>2.825</u>	<u>7.25</u>	<u>-67.5</u>	<u>2.28</u>	<u>17.5</u>
1105	<u>38.56</u>	<u>100</u>	<u>3.05</u>	<u>25.59</u>	<u>2.867</u>	<u>7.25</u>	<u>-84.6</u>	<u>1.92</u>	<u>17.1</u>
1110	<u>38.56</u>	<u>100</u>	<u>3.55</u>	<u>25.68</u>	<u>2.870</u>	<u>7.24</u>	<u>-98.0</u>	<u>1.72</u>	<u>18.1</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1175 1215	38.56	100	4.05	25.77	2.874	7.23	-104.5	1.54	18.6
1120 1220	38.56	100	4.55	25.90	2.878	7.23	-110.6	1.40	16.5
1125 1225	38.57	100	5.05	25.93	2.881	7.23	-111.8	1.29	19.1
1130 1230	38.57	100	5.55	25.96	2.884	7.23	-115.0	1.17	17.3
1135 1235	38.57	100	6.05	26.04	2.885	7.23	-119.0	1.03	18.2
1140 1240	38.57	100	6.55	26.08	2.888	7.23	-118.7	0.96	18.8
1145 1245	38.57	100	7.05	26.21	2.888	7.23	-122.9	0.89	18.2
1150 1250	38.57	100	7.55	26.32	2.891	7.23	-123.1	0.82	18.6
1155 1255	38.58	100	8.05	26.38	2.893	7.23	-125.5	0.80	18.4
1200 1300	38.58	100	8.55	26.69	2.899	7.24	-125.8	0.76	19.2
1205 1305	38.58	100	9.05	26.85	2.903	7.23	-128.0	0.73	19.3

10-esp
20

Sampling

Sampling beginning time: 1306 1206Sampling completion time: 1310 1210

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1215 1315	38.58	100	10.05	27.10	2.924	7.24	-124.4	0.69	24.7

Sample Information

Sample ID: _____
 Duplicate sample collected (Y/N): _____
 Split sample collected (Y/N): _____
 COC No(s): _____

Sample collection date/time: _____
 Duplicate sample ID: _____
 Split sample ID: _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC Full	8260B	3-40mL HCl vials			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045260

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35A-090904-MK

Location Code: LHSMW01

Task: GW DATA GAPS AUG04

Sample Number: L0001-LHSMW0

Collection Date: 09-09-04

Sample Name: L0001-LHSMW01-00

Collection Time: 1355

Sampling Method: BA

Start Depth: 8.16

Sample Type: GW

Sample Purpose: REG

End Depth: w/lt

Sampling Equip: QED non dedicated Pump Teflon Hoods

Sample Matrix: WATER

QC Partners:

(TB) 090904-TB

(ER)

w/lt

(FB)

w/lt

Sample Team: M. Martinez / W. Chase

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 17.93

Depth To Water: 8.16

Comments:

Monitor well Hand Bailed Dry 10.0 Gallons
Sampled well @ 1355 09-09-04

Sketch Location:

Logged BY / Date:

[Signature]
09-09-04

Reviewed BY / Date:

[Signature]
9/9/04

Sample Collection Log

00045261

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845714

LONGHORN AAP

Manager:

Praveen Srivastav

Location Code: LHSMW01

Sample Number: L0001-LHSMW0

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>SEE GWSE LHSMW01</p> <p>(WSE)</p> <p>Hand Sorted well</p>									
Sample:									

Logged BY / Date:

[Signature]
09-09-02

Reviewed BY / Date:

[Signature] 9/2/02



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 35
 Project Name/ID: Loughran AAP
 Weather: Sunny 90's

Sampling location ID: CHSMW01
 Sample ID: CHSMW01
 Collection Time/Date: _____

Pump Installation

Pump installation crew: W. Critz / M. Martinez
 PID/FID reading (well head/background): 1.0 / 0.0
 Casing diameter (inches): 4 in
 Total well Depth (ft. BTOC): 17.93 1157
 Initial (pre-installation) DTW/time: 8.46 1156
 Final (after pump priming) DTW/time: 8.23 1225
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 48'

Installation date/beginning time: 09-09-04 1215
 Installation date/completion time: 09-09-04 1246
 Screen Interval (ft. BTOC): 7.93 to 17.93
 Pump intake depth (ft. BTOC): 13
 Post-installation DTW/time: 7.99 1217
 Max. sustainable pump rate (mL/min): N/A
 Appearance of product: N/A
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>18.0</u>								
Refill Setting	<u>13.5</u>								
Discharge Setting	<u>1.5</u>								
Flow rate (mL/min)	<u>100</u>								

Purging

Purging/sampling crew: W. Critz / M. Martinez
 Purge date/beginning time: 09-09-04 1222
 Initial (pre-purging) DTW (ft. BTOC): 8.46
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 1.0 / 0.0
 Purge date/completion time: 09-09-04 1355
 Final (post-purging) DTW (ft. BTOC): N/A
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>18.0</u>								
Refill Setting	<u>13.5</u>								
Discharge Setting	<u>1.5</u>								
Flow rate (mL/min)	<u>100</u>								

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1240</u>	<u>8.45</u>	<u>100</u>	<u>0</u>	<u>29.31</u>	<u>11.00</u>	<u>6.21</u>	<u>302.1</u>	<u>1.41</u>	<u>14.2</u>
<u>1245</u>	<u>8.55</u>	<u>100</u>	<u>0.5</u>	<u>29.46</u>	<u>11.00</u>	<u>6.22</u>	<u>286.4</u>	<u>1.24</u>	<u>15.8</u>
<u>1250</u>	<u>8.62</u>	<u>100</u>	<u>1.0</u>	<u>29.55</u>	<u>11.03</u>	<u>6.22</u>	<u>275.1</u>	<u>1.10</u>	<u>15.0</u>
<u>1255</u>	<u>8.68</u>	<u>100</u>	<u>1.5</u>	<u>29.51</u>	<u>11.02</u>	<u>6.22</u>	<u>272.1</u>	<u>1.09</u>	<u>15.0</u>
<u>1300</u>	<u>8.73</u>	<u>100</u>	<u>2.0</u>	<u>29.46</u>	<u>10.99</u>	<u>6.22</u>	<u>264.6</u>	<u>0.98</u>	<u>13.3</u>
<u>1305</u>	<u>8.82</u>	<u>100</u>	<u>2.5</u>	<u>29.63</u>	<u>10.94</u>	<u>6.22</u>	<u>256.5</u>	<u>1.54</u>	<u>14.7</u>
<u>1310</u>	<u>8.86</u>	<u>100</u>	<u>3.0</u>	<u>29.69</u>	<u>10.90</u>	<u>6.22</u>	<u>249.7</u>	<u>1.40</u>	<u>12.1</u>
<u>1315</u>	<u>8.95</u>	<u>100</u>	<u>3.5</u>	<u>29.80</u>	<u>10.79</u>	<u>6.22</u>	<u>239.1</u>	<u>0.93</u>	<u>10.4</u>



Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35A-090904-MK

Location Code: LHSMW04

Task: GW DATA GAPS AUG04

Sample Number: L0001-LHSMW0

Sample Name: L0001-LHSMW04-00

Collection Date: 9/9/04

Collection Time: 1046

Sampling Method: BA

Start Depth: 20.98

Sample Type: GW

Sample Purpose: REG

End Depth: 21.05

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) 090904-TB

(ER) MA

(FB) N/A

Sample Team: W. Critz / M. Martine

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 30.97

Depth To Water: 20.98

Comments:

Sketch Location:

Logged BY / Date: W. Critz 9/9/04

Reviewed BY / Date: P. Srivastav 9/9/04

Sample Collection Log

00045265

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: LHSMW04

Sample Number: L0001-LHSMW0

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>See GW Sample Form LHSMW04</p> <p>WOL</p>									
Sample:	1055	21.05	271.1 5.72	5.72	7.768	8.1	1.10	23.33	1.97

Logged BY / Date: Wes Critz 9/9/04 Reviewed BY / Date: Praveen Srivastav 9/9/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 35 Loughorn AAP
 Project Name/ #: Loughorn AAP
 Weather: Sunny 90's

Sampling location ID: LHS MW-04
 Sample ID: LHS MW-04
 Collection Time/Date: 1046 9/9/04

Pump Installation

Pump installation crew: M. Martinez / L. Critz
 PID/FID reading (well head/background): 0.0/0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 30.97
 Initial (pre-installation) DTW/time: 20.98 / 0915
 Final (after pump priming) DTW/time: 21.04 / 0944
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 48'

Installation date/beginning time: 09-09-04 / 0930
 Installation date/completion time: 09-09-04 / 0937
 Screen Interval (ft. BTOC): 20.97 to 30.97
 Pump intake depth (ft BTOC): 20.96 25'
 Post-installation DTW/time: 20.96 / 0938
 Max. sustainable pump rate (mL/min): 110
 Appearance of product: L/A
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / L. Critz
 Purge date/beginning time: 09-09-04 / 0942
 Initial (pre-purging) DTW (ft. BTOC): 20.97
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0/0.0
 Purge date/completion time: 09-09-04 /
 Final (post-purging) DTW (ft. BTOC): 21.05
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>								
Refill Setting	<u>13.0</u>								<u>20</u>
Discharge Setting	<u>2.0</u>								<u>13</u>
Flow rate (mL/min)	<u>115</u>								<u>115</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0950	21.06	115	0	20.62	7.711	5.68	374.0	1.86	140.5
0955	21.06	115	0.575	20.66	7.835	5.68	354.6	1.38	96.8
1000	21.06	115	1.15	20.73	7.854	5.69	339.3	1.27	68.6
1005	21.06	115	1.725	21.00	7.840	5.70	317.2	1.16	39.0
1010	21.06	115	2.3	21.08	7.831	5.70	311.4	1.14	29.6
1015	21.06	115	2.875	21.24	7.802	5.70	301.8	1.11	23.5
1020	21.06	115	3.45	21.33	7.786	5.70	298.2	1.09	20.1
1025	21.06	115	4.025	21.52	7.762	5.71	292.5	1.07	17.9



Sample Collection Log

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845714

LONGHORN AAP

Manager:

Praveen Srivastav

RFA / COC Number: 35A-090904-mk

Location Code: LHSMW05

Task: GW DATA GAPS AUG04

Sample Number: L0001-LHSMW0

Sample Name: L0001-LHSMW05-00

Collection Date: 9/9/04

Collection Time: 1120

Sampling Method: BA

Start Depth: 20.46

Sample Type: GW

Sample Purpose: REG

End Depth: 20.85

Sampling Equip: Bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 090904-tB (ER) N/A (FB) N/A

Sample Team: K. Everett
J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 24.46

Depth To Water: 20.85

Comments:

Sketch Location:

Logged BY / Date:

K. Everett

Reviewed BY / Date:

K. Everett 9/9/04

Sample Collection Log

00045269

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: **LHSMW05**

Sample Number: **L0001-LHSMW0**

<u>PURGE RECORD:</u>									
Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (°C)	Purge Volume (gal) L
Sample:	1130	20.91	209.9	5.28	6.122	10.6	0.98	25.57	12.10

Logged BY / Date: _____

Reviewed BY / Date: 9/09/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Needs Lock

Operable Unit/Site ID: _____
 Project Name/ #: LHAAP
 Weather: hot sunny

Sampling location ID: 35A
 Sample ID: L0001-LHSMW05
 Collection Time/Date: 9/9/04-1120

Pump Installation

Pump installation crew: K. Everett, J. Rodriguez
 PID/FID reading (well head/background): 0/0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 24.46
 Initial (pre-installation) DTW/time: 20.41 / 0900
 Final (after pump priming) DTW/time: 20.91
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 30'

Installation date/beginning time: 9/9/04 0930
 Installation date/completion time: " "
 Screen Interval (ft. BTOC): 14 to 24
 Pump intake depth (ft. BTOC): 22.5
 Post-installation DTW/time: 20.91
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	15	15	20	17	17	17	20	17	
Refill Setting	10	10	10	10	10	7	10	10	
Discharge Setting	5	5	5	5	5	3	5	5	
Flow rate (mL/min)	—	40	210	190	110	75	180	100	

Purging

Purging/sampling crew: A/A
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0945	20.50	40	0.2	22.13	6.449	5.29	155.9	1.71	29.6
0950	20.58	190	1.15	21.80	6.488	5.26	159.2	1.31	79.0
0955	20.48	110	1.70	21.51	6.486	5.26	159.4	1.07	44.5
1000	20.60	110	3.25	21.70	6.474	5.26	162.4	0.87	97.6
1005	20.60	110	3.70	21.83	6.468	5.26	162.4	0.80	27.1
1010	20.62	110	4.25	22.41	6.453	5.26	163.9	0.77	33.4
1015	20.65	110	4.80	22.44	6.459	5.26	164.1	0.79	33.8
1020	20.67	110	5.35	22.91	6.450	5.26	165.2	0.72	30.9

40 190 110
 5 5 5
 200 950 550



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1025	20.70	110	5.90	22.90	6.444	5.26	167.0	0.75	29.1
1030	20.70	110	6.45	23.03	6.440	5.26	169.2	0.75	27.8
1035	20.73	80	6.85	23.73	6.417	5.27	169.5	0.73	25.3
1040	20.73	80	7.25	24.03	6.405	5.27	170.6	0.76	25.4
1045	20.73	170	8.10	23.70	6.372	5.26	172.5	0.80	20.9
1050	20.79	100	8.60	22.58	6.287	5.26	185.8	0.82	19.1
1055	20.79	100	9.10	23.18	6.267	5.26	187.6	0.80	16.7
1100	20.84	100	9.60	24.00	6.227	5.27	195.5	0.84	14.2
1105	20.85	100	10.10	24.22	6.224	5.27	195.8	0.86	13.0
1110	20.85	100	10.60	24.26	6.224	5.27	197.1	0.89	15.8
1115	20.85	100	11.10	24.45	6.208	5.27	200.6	0.89	13.9
1120	20.85	100	11.60	24.70	6.183	5.27	201.3	0.93	10.2

Sampling

Sampling beginning time: _____

Sampling completion time: _____

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1130	20.91	100	12.10	25.57	6.122	5.28	209.9	0.98	10.6

Sample Information

Sample ID: _____

Sample collection date/time: _____

Duplicate sample collected (Y/N): _____

Duplicate sample ID: _____

Split sample collected (Y/N): _____

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs		3-VOCs			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

80 170
 5 5
 400 850



Sample Collection Log

00045272

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845714

LONGHORN AAP

Manager:

Praveen Srivastav

RFA / COC Number: 35A-090904-mkLocation Code: **LHSMW06**Task: **GW DATA GAPS AUG04**Sample Number: **L0001-LHSMW0**Sample Name: **L0001-LHSMW06-00**Collection Date: 9/8/04Sampling Method: **BA**Collection Time: 1545Sample Type: **GW**Sample Purpose: **REG**Start Depth: 16.48End Depth: 16.92Sampling Equip: Bladder PumpSample Matrix: **WATER**

QC Partners:

(TB) 090904-TB (ER) N/A (FB) N/ASample Team: K. Everett J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 23.45Depth To Water: 16.48

Comments:

Sketch Location:

Logged BY / Date: [Signature] 9/9/04Reviewed BY / Date: [Signature] 9/9/04

Sample Collection Log

00045273

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: LHSMW06

Sample Number: L0001-LHSMW0

<u>PURGE RECORD:</u>									
Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:	1550	16.90	133.2	6.37	3.803	-6.7	0.59	22.88	8.675

Logged BY / Date: _____

Reviewed BY / Date: Praveen Srivastav 9/9/04



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: _____
 Project Name/ID: LHAAP
 Weather: Hot Sunny

Sampling location ID: 145 MW06
 Sample ID: L0001-145 MW06
 Collection Time/Date: 9/8/04 1545

Pump Installation

Pump installation crew: K. Everett, J. Rodriguez
 PID/FID reading (well head/background): 0/0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 23.45
 Initial (pre-installation) DTW/time: 16.48 / 1405
 Final (after pump priming) DTW/time: 16.68 / 1435
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 30'

Installation date/beginning time: 9/8/04 1430
 Installation date/completion time:
 Screen Interval (ft. BTOC): 13 to 23
 Pump intake depth (ft. BTOC): 18 to 19
 Post-installation DTW/time: _____
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	25	25	25	20	15				
Refill Setting	10	10	11	20	10				
Discharge Setting	3	5	9	10	5				
Flow rate (mL/min)	—	175	150	210	100				

Purging

Purging/sampling crew: A/A
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1435	16.68	175	167.5	23.62	3.812	6.35	108.3	1.11	17.5
1440	16.68	150	142.5	23.51	3.813	6.35	107.6	1.02	17.8
1445	16.74	130	207.5	23.52	3.813	6.35	107.8	0.80	11.3
1450	16.82	100	257.5	23.27	3.829	6.35	109.6	0.67	4.0
1455	16.84	100	307.5	23.34	3.822	6.36	107.7	0.64	3.5
1500	16.84	110	362.5	23.49	3.818	6.36	110.0	0.60	1.0
1505	16.88	110	417.5	23.44	3.813	6.36	113.5	0.55	1.6
1510	16.88	110	472.5	23.43	3.812	6.37	114.1	0.55	1.5

175 150 130 100 110
5 5 5 5 5
 875 750 650 500 550



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1515	16.88	110	5.275	23.44	3.807	6.37	115.7	0.53	-3.6
1520	16.88	110	5.825	23.43	3.802	6.37	118.2	0.52	-3.6
1525	16.80	110	6.575	23.20	3.799	6.37	121.8	0.52	-5.2
1530	16.90	110	7.125	23.08	3.791	6.37	125.3	0.51	-5.6
1535	16.90	100	7.625	23.01	3.793	6.37	126.2	0.51	-6.2
1540	16.90	100	8.125	23.23	3.789	6.37	127.1	0.52	-6.3

Sampling

Sampling beginning time: 1545Sampling completion time: 1550

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1545	16.92	100	9.625	23.45	3.803	6.37	135.5	0.59	-5.6
1550	16.90	110	9.675	22.88	3.803	6.37	133.2	0.59	-6.7

Not Filled

(30)

Sample Information

Sample ID: L0001-LHSMW06Sample collection date/time: 9/3/04 1545Duplicate sample collected (Y/N): NDuplicate sample ID: NASplit sample collected (Y/N): NSplit sample ID: NA

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs		3-VoAs			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045276

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845714 LONGHORN AAP

Manager: Praveen Srivastav

site 35A

RFA / COC Number: 35A-090804-TMK

Location Code: LHSMW07

Task: GW DATA GAPS AUG04

Sample Number: L0001-LHSMW0

Collection Date: 09-08-04

Sample Name: L0001-LHSMW07-00

Collection Time: 1100

Sampling Method: BA

Start Depth: 16.80

Sample Type: GW

Sample Purpose: REG

End Depth: 17.00

Sampling Equip: QED non dedicated pump Teflon bladder

Sample Matrix: WATER

QC Partners:

(TB) 090804-TB (ER) N/A (FB) N/A

Sample Team: M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
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ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 30.40

Depth To Water: 16.80

Comments:

Sketch Location:

Logged BY / Date: [Signature]
09-08-04Reviewed BY / Date: [Signature] 9/8/04

Sample Collection Log

00045277

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: LHSMW07

Sample Number: L0001-LHSMW0

<u>PURGE RECORD:</u>									
Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
SEE MWSF LHSMW 07									
Sample: 1102 1110		17.00	218.2	6.13	14.39	-0.8	1.00	23.68	2.379 gallons

Logged BY / Date: [Signature]
09-08-04

Reviewed BY / Date: [Signature] 9/8/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 35 Longhorn AAP
 Project Name/ID: Longhorn AAP
 Weather: Sunny clear skies - 85° 90°

Sampling location ID: Area 35 LHS MW-07
 Sample ID: LHS MW 07
 Collection Time/Date: 09-08-09 / 1100

Pump Installation

Pump installation crew: M. Martinez / G. Carriz
 PID/FID reading (well head/background): 0.15/0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 30.40
 Initial (pre-installation) DTW/time: 16.80 / 0930
 Final (after pump priming) DTW/time: 17.02 / 0959
 Free product (circle): LNAPL/DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 48'

Installation date/beginning time: 09-08-09 / 0940
 Installation date/completion time: 09-08-09 / 0941
 Screen Interval (ft. BTOC): 20 to 30'
 Pump intake depth (ft. BTOC): 25'
 Post-installation DTW/time: 16.80 / 0942
 Max. sustainable pump rate (mL/min): 150
 Appearance of product: W/1
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): NO

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)				<u>20</u>					
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez
 Purge date/beginning time: 09-08-09 / 0957
 Initial (pre-purging) DTW (ft. BTOC): 16.80
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 1.5/0.0
 Purge date/completion time: 09-08-09 / 1111
 Final (post-purging) DTW (ft. BTOC): 17.00
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>								<u>20</u>
Refill Setting	<u>13.0</u>								<u>13.0</u>
Discharge Setting	<u>20</u>								<u>20</u>
Flow rate (mL/min)	<u>150</u>								<u>150</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1010</u>	<u>17.00</u>	<u>150</u>	<u>0.0</u>	<u>22.44</u>	<u>14.23</u>	<u>6.14</u>	<u>308.7</u>	<u>2.08</u>	<u>11.4</u>
<u>1015</u>	<u>17.00</u>	<u>150</u>	<u>0.75</u>	<u>22.72</u>	<u>14.28</u>	<u>6.14</u>	<u>275.5</u>	<u>1.59</u>	<u>8.1</u>
<u>1020</u>	<u>17.00</u>	<u>150</u>	<u>1.5</u>	<u>22.77</u>	<u>14.30</u>	<u>6.15</u>	<u>270.0</u>	<u>1.44</u>	<u>7.0</u>
<u>1025</u>	<u>17.00</u>	<u>150</u>	<u>2.25</u>	<u>22.91</u>	<u>14.29</u>	<u>6.13</u>	<u>262.7</u>	<u>1.33</u>	<u>5.4</u>
<u>1030</u>	<u>17.00</u>	<u>150</u>	<u>3.00</u>	<u>23.15</u>	<u>14.20</u>	<u>6.13</u>	<u>247.0</u>	<u>1.10</u>	<u>2.8</u>
<u>1035</u>	<u>17.00</u>	<u>150</u>	<u>3.75</u>	<u>23.22</u>	<u>14.26</u>	<u>6.13</u>	<u>245.5</u>	<u>1.15</u>	<u>3.0</u>
<u>1040</u>	<u>17.00</u>	<u>150</u>	<u>4.50</u>	<u>23.53</u>	<u>14.23</u>	<u>6.13</u>	<u>237.5</u>	<u>1.12</u>	<u>1.0</u>
<u>1045</u>	<u>17.00</u>	<u>150</u>	<u>5.25</u>	<u>23.07</u>	<u>14.22</u>	<u>6.13</u>	<u>232.8</u>	<u>1.10</u>	<u>0.4</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1050	17.00	150	6.0	23.70	14.21	6.13	227.4	1.11	0.0
1055	17.00	150	6.75	23.85	14.24	6.13	225.7	1.06	-0.8
1100	17.00	150	7.50	23.88	14.23	6.13	222.9	1.05	-0.8
1105	17.00	150	8.25	24.01	14.21	6.13	219.5	1.03	-0.9

Sampling

Sampling beginning time: 1100Sampling completion time: 1107

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1110	17.00	150	9.0	24.08	14.39	6.13	218.2	1.00	-0.8

Sample Information

Sample ID: LHSMW07Sample collection date/time: 09-08-07Duplicate sample collected (Y/N): NODuplicate sample ID: N/ASplit sample collected (Y/N): NOSplit sample ID: N/A

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs - Full	2600B	3 VOCs			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

LHAAP-35B(37)
GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35B-091004-MK

Location Code: **35BWW01**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-35BWW01**

Collection Date: 9/10/04

Sample Name: **L0001-35BWW01-00**

Collection Time: 14:07

Sampling Method: **BA**

Start Depth: 13.41

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 13.52

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

Sample Team: A. Wellmore, J. Rodriguez

(TB) N/A (ER) N/A (FB) N/A

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	3	40	mL	VOA VIAL
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Lot Control#:

Groundwater Information:

Measured Well Depth: 21.34

Depth To Water: 12.90

Comments:

Sketch Location:

Logged BY / Date:

M. Miller
9/10/04

Reviewed BY / Date:

Sample Collection Log

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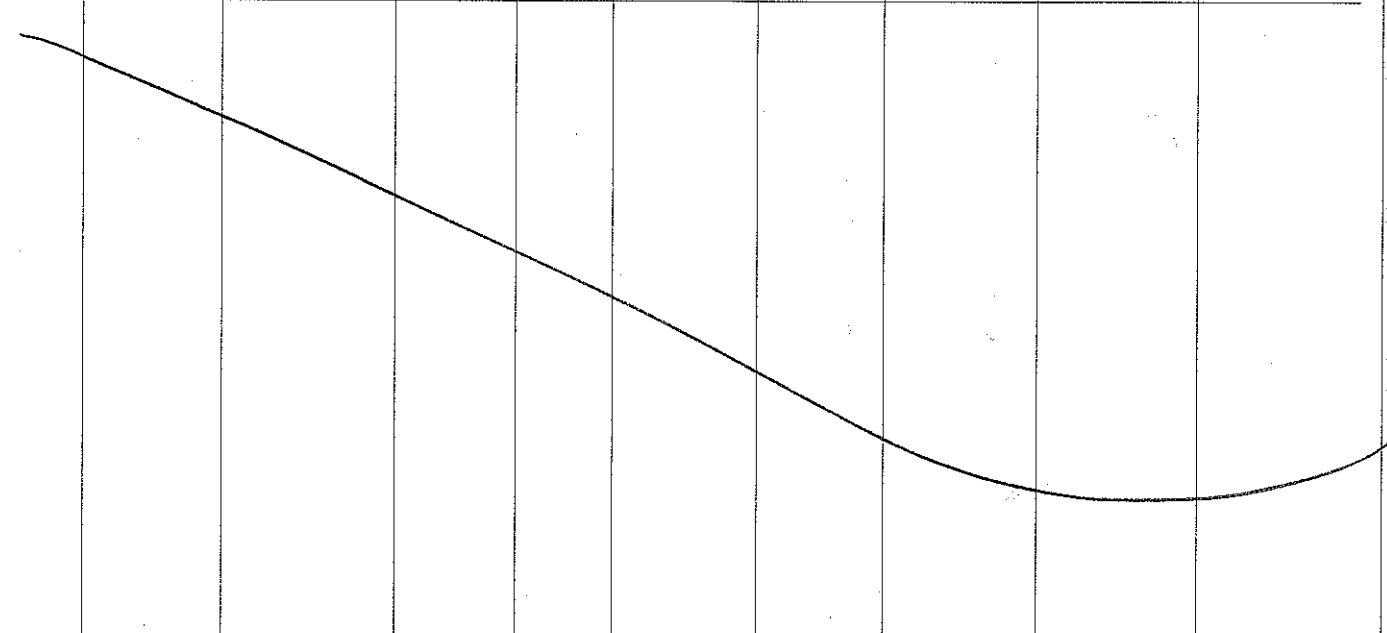
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 35BWW01

Sample Number: L0001-35BWW01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	4:14	1361	187.2	6.30	0.066	67.4	1.49	26.01	1.8

Logged BY / Date:



Reviewed BY / Date:

2/10/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 35B26
 Project Name/ID: LHAAP
 Weather: Clear 90°

Sampling location ID: 35B WW01
 Sample ID: 35B WW01
 Collection Time/Date: 9/10/04

Pump Installation

Pump installation crew: A. Willmore, D. Holterhoff
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 21.34
 Initial (pre-installation) DTW/time: 12.90 13:04
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 30'

Installation date/beginning time: 9/10/04 13:12
 Installation date/completion time: 9/10/04 13:13
 Screen Interval (ft. BTOC): 11.34 to 21.34
 Pump intake depth (ft. BTOC): 21.3 16.35
 Post-installation DTW/time: 12.81 12:15
 Max. sustainable pump rate (mL/min): 200
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 7.03 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, D. Holterhoff
 Purge date/beginning time: 9/10/04 13:04
 Initial (pre-purging) DTW (ft. BTOC): 12.90
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 9/10/04
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 7.03 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>15</u>							<u>15</u>
Refill Setting	<u>10</u>	<u>11</u>							<u>11</u>
Discharge Setting	<u>15</u>	<u>4</u>							<u>4</u>
Flow rate (mL/min)	<u>200</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (g)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
13:27	13.11	200	0.1	23.82	0.072	5.40	191.1	1.91	79.0
13:34	13.18	100	0.2	23.29	0.068	5.30	192.5	1.32	71.2
13:39	13.22	100	0.4	23.72	0.067	5.31	194.3	1.32	70.5
13:44	13.31	100	0.5	24.52	0.067	5.32	198.1	1.32	68.1
13:49	13.34	100	0.7	24.81	0.067	5.32	199.3	1.31	67.5
13:54	13.40	100	0.8	25.52	0.067	5.32	201.9	1.32	65.1
13:59	13.41	100	1.0	25.69	0.067	5.33	204.3	1.31	64.6

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: N/A

Location Code: **35BWW02**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-35BWW02**

Sample Name: **L0001-35BWW02-00**

Collection Date:

Sampling Method: **BA**

Collection Time:

Sample Type: **GW**

Sample Purpose: **REG**

Start Depth:

End Depth:

Sampling Equip: N/A

Sample Matrix: **WATER**

QC Partners:

Sample Team: K. Everett, J. Rodriguez

(TB) N/A (ER) N/A (FB) N/A

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	3	40	mL	VOA VIAL
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Lot Control#:

Groundwater Information:

Measured Well Depth: 16.9' Depth To Water: No Water

Comments: No groundwater in well; well dry.

Sketch Location:

No Sample Taken

Logged BY / Date: K. Everett 9/10/04

Reviewed BY / Date: [Signature] 9/10/04

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: **35BWW02**

Sample Number: **L0001-35BWW02**

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>No Water - Dry Well K End 9/10/04</p>									
Sample:									

Logged BY / Date: K. Everett 9/10/04

Reviewed BY / Date: _____

[illegible]



Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35B-091004-Mk

Location Code: 35BWW03

Sample Number: L0001-35BWW03

Sample Name: L0001-35BWW03-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip:

Bladder Pump

QC Partners:

(TB) 091004-TB

(ER)

N/A

(FB)

N/A

Task: GW DATA GAPS AUG04

Collection Date: 9/10/04

Collection Time: 1406

Start Depth: 21.68

End Depth: 22.91

Sample Matrix: WATER

Sample Team: W. Critz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL N A 3 40 mL VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 82.82

Depth To Water: 21.68

Comments:

Sketch Location:

Logged BY / Date: W. Critz 9/10/04

Reviewed BY / Date: M. Martinez 9/10/04

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 35BWW03

Sample Number: L0001-35BWW03

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:	1415	22.91	96.9	9.97	1.016	3.0	2.28	29.18	3.06

Logged BY / Date: Wes Carter 9/10/04 Reviewed BY / Date: Praveen Srivastav 9/10/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Aca 35B
 Project Name/ID: Longhorn AAP
 Weather: Clear 90's

Sampling location ID: 35BWW03
 Sample ID: 35BWW03
 Collection Time/Date: 1406 9/10/04

Pump Installation

Pump installation crew: W. Critz / M. Martinez
 PID/FID reading (well head/background): 10.0 / 0.0
 Casing diameter (inches): 4 in
 Total well Depth (ft. BTOC): 82.82
 Initial (pre-installation) DTW/time: 21.68 9:19
 Final (after pump priming) DTW/time: 22.16
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 100

Installation date/beginning time: 9/10/04 1139
 Installation date/completion time: 9/10/04 1140
 Screen Interval (ft. BTOC): 72.82 to 82.82
 Pump intake depth (ft BTOC): 77.50
 Post-installation DTW/time: 21.10 1143
 Max. sustainable pump rate (mL/min): 100
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): no

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz / M. Martinez
 Purge date/beginning time: 9/10/04
 Initial (pre-purging) DTW (ft. BTOC): 21.68
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 10.0 / 0.0
 Purge date/completion time: 9/10/04
 Final (post-purging) DTW (ft. BTOC): 21.32
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>48</u>	<u>48</u>	<u>45</u>	<u>42</u>					<u>42</u>
Refill Setting	<u>25</u>	<u>26</u>	<u>26</u>	<u>25</u>					<u>25</u>
Discharge Setting	<u>5</u>	<u>4</u>	<u>4</u>	<u>5</u>					<u>5</u>
Flow rate (mL/min)	<u>160</u>	<u>110</u>	<u>70</u>	<u>100</u>					<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1230	22.16	160	0.8	25.02	1.711	10.89	71.3	2.08	7.1
1235	22.27	110	1.35	25.39	1.707	10.92	65.5	1.87	5.9
1240	22.45	110	1.9	25.74	1.708	10.93	56.2	1.54	5.5
1245	22.55	110	2.45	26.00	1.708	10.93	51.2	1.28	3.9
1250	22.60	110	3	26.31	1.707	10.92	47.8	1.13	5.2
1255	22.68	110	3.55	26.47	1.711	10.91	47.7	0.97	4.4
1300	22.73	110	4.1	26.81	1.706	10.91	43.8	0.91	4.0
1305	22.74	100	4.6	26.96	1.706	10.89	43.8	0.87	4.3



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1310	22.75	100	5.1	27.31	1.701	10.87	43.3	0.84	3.9
1315	22.79	100	5.6	27.43	1.681	10.81	44.9	0.79	3.0
1320	22.82	100	6.1	27.64	1.655	10.75	47.5	0.76	3.2
1325	22.85	100	6.6	27.78	1.575	10.65	50.0	0.71	2.6
1330	22.88	100	7.1	27.84	1.543	10.62	50.8	0.69	2.9
1335	22.88	100	7.6	27.94	1.493	10.58	52.4	0.64	1.9
1340	22.88	100	8.1	28.14	1.489	10.55	53.1	0.62	2.4
1345	22.91	100	8.6	28.32	1.451	10.51	54.4	0.59	2.4
1350	22.91	100	9.1	28.38	1.459	10.47	57.4	0.56	1.5
1355	22.91	100	9.6	28.55	1.456	10.43	61.2	0.54	1.4
1400	22.91	100	10.1	28.80	1.434	10.47	61.8	0.50	1.3
1405	22.91	100	10.6	28.97	1.412	10.41	65.2	0.49	1.3

Sampling

Sampling beginning time: 1406Sampling completion time: 1408

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1415	22.91	100	11.6	29.18	1.016	9.97	96.9	2.28	3.0

Sample Information

Sample ID: 35BWW03Sample collection date/time: 9/10/04 1406Duplicate sample collected (Y/N): NDuplicate sample ID: N/ASplit sample collected (Y/N): NSplit sample ID: N/A

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOL FULL	8260B	3-40mL HCL vials			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35B-091004-mk

Location Code: LHSMW58

Task: GW DATA GAPS AUG04

Sample Number: L0001-LHSMW5

Sample Name: L0001-LHSMW58-00

Collection Date: 9/10/04

Collection Time: 1101

Sampling Method: BA

Start Depth: 17.25

Sample Type: GW

Sample Purpose: REG

End Depth: 17.32

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) 091004-TB

(ER) N/A

(FB) N/A

Sample Team: W. Citz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 35.12

Depth To Water: 17.25

Comments:

Sketch Location:

Logged BY / Date: Wes Citz 9/10/04

Reviewed BY / Date: [Signature] 9/10/04

Sample Collection Log

00045294

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: **LHSMW58**

Sample Number: **L0001-LHSMW5**

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>See GW Sampling Form LHSMW58</p> <p><i>[Signature]</i></p>									
Sample:	1110	17.32	356.4	5.74	0.403	0.4	0.60	22.59	2.11 gal.

Logged BY / Date:

[Signature] 9/10/04

Reviewed BY / Date:

[Signature] 9/10/04



GROUNDWATER SAMPLING FORM

00045295

Sheet 1 of 2

Operable Unit/Site ID: 8th Area 35B
 Project Name/ID: Loughorn AAP
 Weather: Partly Cloudy 90's

Sampling location ID: LHS MWS8
 Sample ID: _____
 Collection Time/Date: _____

Pump Installation

Pump installation crew: M. Martinez / W. Cruz
 PID/FID reading (well head/background): 0.0/0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 35.12
 Initial (pre-installation) DTW/time: 17.25 / 905
 Final (after pump priming) DTW/time: 17.32 942
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 48'

Installation date/beginning time: 09-10-04 936
 Installation date/completion time: 09-10-04 937
 Screen Interval (ft. BTOC): 25 to 35
 Pump intake depth (ft BTOC): 30
 Post-installation DTW/time: 17.24 / 938
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Cruz / M. Martinez
 Purge date/beginning time: 9/10/04 939
 Initial (pre-purging) DTW (ft. BTOC): ~~17.25~~ 17.25
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0/0.0
 Purge date/completion time: 9/10/04 944
 Final (post-purging) DTW (ft. BTOC): 17.32
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>25</u>								<u>25</u>
Refill Setting	<u>13.5</u>								<u>13.5</u>
Discharge Setting	<u>1.5</u>								<u>1.5</u>
Flow rate (mL/min)	<u>100</u>								<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
950	17.33	100	0	20.45	0.497	5.76	397.3	2.65	2.4
955	17.33	100	0.5	20.41	0.468	5.73	395.3	2.09	2.5
1000	17.32	100	1.0	20.40	0.441	5.71	392.5	1.67	3.3
1005	17.32	100	1.5	20.42	0.423	5.71	388.7	1.29	3.2
1010	17.32	100	2.0	20.46	0.415	5.71	385.5	1.15	2.7
1015	17.32	100	2.5	20.54	0.411	5.70	382.0	0.98	2.9
1020	17.32	100	3.0	20.61	0.407	5.68	379.1	0.88	2.9
1025	17.32	100	3.5	20.72	0.404	5.69	375.0	0.80	2.7

Sample Collection Log

00045297

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35B-091004-MK

Location Code: LHSMW59

Task: GW DATA GAPS AUG04

Sample Number: L0001-LHSMW59

Sample Name: L0001-LHSMW59-00

Collection Date: 9/10/04

Collection Time: 1135

Sampling Method: BA

Start Depth: 17.89

Sample Type: GW

Sample Purpose: REG

End Depth: 18.02

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) 091054-TB

(ER) M/A

(FB) M/A

Sample Team: K. Everett J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 51.36

Depth To Water: 17.89

Comments:

Sketch Location:

Logged BY / Date: K. Everett 9/10/04

Reviewed BY / Date: [Signature] 9/10/04

Sample Collection Log

00045298

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: LHSMW59

Sample Number: L0001-LHSMW5

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Collection/Purging Form KES									
Sample:	1140	18.01	149.4	7.00	1.231	22.2	0.96	21.93	6 gal

Logged BY / Date: K. Everett 9/6/04

Reviewed BY / Date: [Signature] 9/10/04



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: _____
 Project Name/ID: LHAAP
 Weather: clear hot

Sampling location ID: LHSMW 59
 Sample ID: L0001-LHSMW59
 Collection Time/Date: 9/10/04 1135

Pump Installation

Pump installation crew: K Everett
 PID/FID reading (well head/background): 0/0
 Casing diameter (inches): 4" PVC
 Total well Depth (ft. BTOC): 51.36
 Initial (pre-installation) DTW/time: 17.89
 Final (after pump priming) DTW/time: 17.98
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 100'

Installation date/beginning time: 9/10/04 0945
 Installation date/completion time: _____
 Screen Interval (ft. BTOC): 40.85 to 50.86
 Pump intake depth (ft BTOC): 45.85
 Post-installation DTW/time: _____
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	30	35	30	30	25	35	35		
Refill Setting	10	10	10	7	7	7	7		
Discharge Setting	5	5	5	3	3	3	3		
Flow rate (mL/min)	80	350	80	280	85	180	300		

Purging

Purging/sampling crew: A/A
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1005	17.98	80	0.40	21.40	1.164	7.00	180	5.83	83.6
1010	17.99	380	1.65	20.63	1.230	6.98	175.9	5.98	117.9
1015	18.02	180	2.55	20.37	1.231	6.99	170.8	2.14	114.8
1020	18.02	180	3.45	20.18	1.230	7.00	161.1	2.01	80.0
1025	18.02	180	4.35	20.60	1.228	7.00	156.7	1.50	76.4
1030	18.03	180	5.25	20.60	1.230	7.00	155.8	1.38	70.0
1035	18.04	300	6.75	20.43	1.230	7.00	153.7	1.17	43.6
1040	18.04	300	7.25	20.42	1.230	7.00	152.6	1.16	46.4

80 250 180 300
5 5 5 5
 400 1250 900 1500

[illegible]

Sampling beginning time: 1135 Sampling completion time: _____

[illegible]

Sample Information

Sample ID: L0001-LHSMW59
Duplicate sample collected (Y/N): N
Split sample collected (Y/N): N
COC No(s): _____

Sample collection date/time: 9/10/04 1135
Duplicate sample ID: N/A
Split sample ID: N/A

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOCs		3 VOAs			

Comments:

Pump Rate Fluctuated some, probably due to faulty compressor - however, static water level remained at 18.01' pumping $< 300 \text{ ml/min}$. Sustainable at 150-180 ml/min.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

$$\begin{array}{r} 220 \\ 5 \\ \hline 1100 \end{array} \quad \begin{array}{r} 180 \\ 5 \\ \hline 900 \end{array} \quad \begin{array}{r} 150 \\ 5 \\ \hline 750 \end{array} \quad \begin{array}{r} 170 \\ 5 \\ \hline 850 \end{array}$$

LHAAP-35C(53)
GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS

Sample Collection Log

00045302

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35C-091504-mk

Location Code: **106**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-106**

Sample Name: **L0001-106-00**

Collection Date: 9/14/04

Collection Time: 1530

Sampling Method: **BA**

Start Depth: 12.82

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 13.34

Sampling Equip: Bladder pump

Sample Matrix: **WATER**

QC Partners:

(TB) 091504-TB (ER) 091404-ER (FB) N/A

Sample Team: K. Everett, J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 23.90

Depth To Water: 12.82

Comments:

Additional sample sent for MS/MSD but not logged or associated w/ COC
per Diane Meyer (Project chemist; Shaw E&I)

Sketch Location:

Logged BY / Date: K. Everett 9/14/04

Reviewed BY / Date: [Signature] 9/15/04

Sample Collection Log

00045303

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 106

Sample Number: L0001-106QC

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See CW Sampling Form Kewitt									
Sample:	1545	13.34	299.7	4.88	0.481	15.5	2.90	23.78	

Logged BY / Date: KEveritt 9/14/94

Reviewed BY / Date: Deborah 9/14/94



Sample Collection Log

00045304

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35C-091504-mk

Location Code: 106

Task: GW DATA GAPS AUG04

Sample Number: L0001-106QC

Sample Name: L0001-106-00-QC

Sampling Method: BA

Sample Type: GW

Sample Purpose: FD

Collection Date: 9/14/04

Collection Time: 1530

Start Depth: 12.82

End Depth: 13.34

Sampling Equip:

Bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 091504-TB

(ER) 091404-ER

(FB) N/A

Sample Team: K. Everett, J. Rodriguez

Containers

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

Groundwater Information:

Measured Well Depth: 23.90

Depth To Water: 12.82

Comments:

Sketch Location:

Logged BY / Date: K. Everett 9/14/04

Reviewed BY / Date: J. Rodriguez 9/15/04

Sample Collection Log

00045305

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 106

Sample Number: L0001-106

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Sampling									
Sample:	1545	13.34	299.7	4.88	0.481	15.5	2.90	23.78	

Logged BY / Date: K Everett 9/14/04

Reviewed BY / Date: D. [Signature] 9/15/04



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: _____
 Project Name/ #: LHAAP
 Weather: hot, sunny Mesquitos abound

Sampling location ID: Site 35C (53) *106
 Sample ID: L0001-106
 Collection Time/Date: _____

Pump Installation

Pump installation crew: K. Everett, J. Rodriguez
 PID/FID reading (well head/background): 0/0 ppm
 Casing diameter (inches): 2" PVC
 Total well Depth (ft. BTOC): 23.90 (TOC PVC CSG)
 Initial (pre-installation) DTW/time: 12.82
 Final (after pump priming) DTW/time: 14.20
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 30'

Installation date/beginning time: 9/14/04 1300
 Installation date/completion time: 9/14/04 1330
 Screen Interval (ft. BTOC): 13.5 to 23.5
 Pump intake depth (ft BTOC): 19'
 Post-installation DTW/time: _____
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

(Shape
 Fil
 8'-23.5'
 Screen)

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	15	15	12	20	20	20			
Refill Setting	10	11	11	11	11	11			
Discharge Setting	5	9	9	9	9	9			
Flow rate (mL/min)	380	280	280	330	190	120			

Purging

Purging/sampling crew: A/A
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1340	14.20	280	0.9	21.34	0.518	4.87	246.3	4.63	357.2
1345	14.20	280	1.8	21.40	0.518	4.87	256.2	4.60	352.0
1350	14.15	280	2.7	21.68	0.508	4.84	269.6	4.64	246.7
1355	14.29	330	4.35	21.45	0.507	4.83	274.5	4.69	192.8
1400	14.29	190	5.3	21.65	0.506	4.83	278.3	4.83	168.2
1405	14.00	160	6.1	21.99	0.502	4.84	281.4	5.07	150.3
1410	13.49	160	6.9	22.08	0.502	4.84	282.3	5.07	132.8
1415	13.32	100	7.4	22.47	0.439	4.85	287.5	4.85	116.7



GROUNDWATER SAMPLING FORM

Sheet ___ of ___

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1420	13.29	100	7.9	22.94	0.439	4.85	289.4	4.3	95.7
1425	13.49	120	8.5	23.09	0.439	4.85	292.6	3.82	59.1
1430	13.49	120	9.1	22.89	0.438	4.85	293.3	3.75	48.9
1435	13.34	120	9.7	23.20	0.436	4.86	298.2	3.70	46.5
1440	13.34	120	10.3	23.49	0.496	4.87	299.3	3.54	39.4
1445	13.34	120	10.9	23.52	0.496	4.87	299.6	3.53	37.3
1450	13.34	110	11.45	23.43	0.495	4.86	299.2	3.31	32.0
1455	13.34	110	12	23.29	0.494	4.86	299.6	3.26	25.1
1500	13.34	110	12.55	23.93	0.490	4.86	299.6	3.16	22.3
1505	13.34	110	13.1	23.06	0.488	4.87	300.2	3.06	20.2
1510	13.34	110	13.65	23.09	0.487	4.87	300.0	3.02	20.5
1515	13.34	110	14.2	23.07	0.486	4.87	299.5	2.96	17.3
1520	13.34	110	14.75	22.98	0.483	4.87	300.0	2.88	15.3
1525	13.34	110	15.3	23.04	0.482	4.87	301.7	2.83	13.9

Sampling

Sampling beginning time: 1530

Sampling completion time: 1545

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1545	13.34	110	16.85	23.78	0.481	4.88	299.7	2.90	15.5

Sample Information

Sample ID: L0001-106

Sample collection date/time: 9/14/04 1545

Duplicate sample collected (Y/N): Y

Duplicate sample ID: L0001-106 QC

Split sample collected (Y/N): N

Split sample ID: NA

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC		3 vials (9)			
Perils		1 Plastic (2)			

Comments:

Very soft bottom; dedicated bailer in well.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35C-091504-MK

Location Code: **FIELDQC**

Sample Number: **091404-ER**

Sample Name: **FIELDQC-BW-091404-ER-ER**

Sampling Method: **GRAB**

Sample Type: **BW**

Sample Purpose: **ER**

Task:

Collection Date: **14-SEP-04**

Collection Time: **17:30**

Start Depth:

End Depth:

Sample Matrix: **WQ**

Sample Team: **KE**

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Containers					Units	Type
	Flt	Frtn	Qty	Size			
VOC-FULL	N	A	3	40		mL	VOA VIAL
PERC	N	B	1	250		ML	HDPE

Comments:

DI RINSATE THROUGH BLADDER PUMP AND TUBING

Associate w/ 106

Sketch Location:

Logged BY / Date: *[Signature]* 9/15/04

Reviewed BY / Date: *[Signature]* 9/15/04

Sample Collection Log

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35C-091504-MK

Location Code: FIELDQC

Sample Number: 091504-ER

Sample Name: FIELDQC-BW-091504-ER-ER

Sampling Method: GRAB

Sample Type: BW

Sample Purpose: ER

Task:

Collection Date: 15-SEP-04

Collection Time: 13:15

Start Depth:

End Depth:

Sample Matrix: WQ

Sample Team: WC

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Containers					Units	Type
	Flt	Frtn	Qty	Size			
VOC-FULL	N	A	3	40		mL	VOA VIAL
PERC	N	B	1	250		ML	HDPE

Comments:

DI RINSATE THROUGH BLADDER PUMP AND TUBING

ASSOC w/ LHS MW 69

Sketch Location:

Logged BY / Date: De H/11/ 9/15/04

Reviewed BY / Date: De H/11/ 9/15/04

Sample Collection Log

00045310

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35C-091504-MKLocation Code: **107**Sample Number: **L0001-107**Sample Name: **L0001-107-00**Sampling Method: **BA**Sample Type: **GW**Sample Purpose: **REG**Sampling Equip: QED Bladder Pump

QC Partners:

(TB) 091504-TB

(ER)

N/A

(FB)

N/ATask: **GW DATA GAPS AUG04**Collection Date: 9/15/04Collection Time: 1210Start Depth: 11.98End Depth: 12.10Sample Matrix: **WATER**Sample Team: K. Everett J. Rodriguez**Containers**

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:Measured Well Depth: 22.46Depth To Water: 10.22 (initial)**Comments:**

_____**Sketch Location:**

_____Logged BY / Date: K. Everett 9/15/04

Reviewed BY / Date: _____

Sample Collection Log

00045311

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 107

Sample Number: L0001-107

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<i>See GW Sampling Form K Everitt</i>									
Sample:	1215	12.10	49.7	5.49	0.943	18.5	0.72	24.98	5 gal

Logged BY / Date: K Everitt 9/15/04

Reviewed BY / Date: _____



GROUNDWATER SAMPLING FORM

00045312

Sheet 1 of 3

Operable Unit/Site ID: _____
Project Name/ #: LHAAP
Weather: hot sunny

Sampling location ID: SIL 35C (53) 107
Sample ID: _____
Collection Time/Date: _____

Pump Installation

Pump installation crew: K Everett J Rodriguez
PID/FID reading (well head/background): 30 / 4.5 - 5.7
Casing diameter (inches): 2" PVC
Total well Depth (ft. BTOC): 22.46 (TOC)
Initial (pre-installation) DTW/time: 10.22 9:38
Final (after pump priming) DTW/time: 11.98 10:05
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 30'

Installation date/beginning time: 9/15/04 0920
Installation date/completion time: 9/15/04 0945
Screen Interval (ft. BTOC): 12 (est.) to 22
Pump intake depth (ft BTOC): 17'
Post-installation DTW/time: _____
Max. sustainable pump rate (mL/min): _____
Appearance of product: NA
Discharge tube diameter (3/8" or 1/4"): 3/8
Inlet reducer used (Y/N): N

Shape
File
indicates
4-19.5'
Screen

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	20	17	10	10	10				
Refill Setting	10	11	12	12	12				
Discharge Setting	5	9	8	8	9				
Flow rate (mL/min)	—	280	95	100	120				

Purging

Purging/sampling crew: A/A
Purge date/beginning time: _____
Initial (pre-purging) DTW (ft. BTOC): _____
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
Purge date/completion time: _____
Final (post-purging) DTW (ft. BTOC): _____
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
10:00	12.70	280	1.4	22.65	1.140	5.64	16.4	1.50	71.8
10:05	11.98	100	1.9	23.10	1.141	5.63	19.9	1.41	123.7
10:10	11.98	100	2.4	23.44	1.140	5.62	21.6	1.36	103.2
10:15	11.90	100	2.9	23.58	1.138	5.61	23.9	1.35	98.3
10:20	11.87	100	3.4	23.79	1.133	5.60	25.7	1.15	84.7
10:25	11.87	100	3.9	23.83	1.126	5.60	26.5	1.04	85.7
10:30	11.60	100	4.4	23.93	1.114	5.58	26.1	1.03	89.7
10:35	11.60	100	4.9	23.94	1.101	5.58	24.6	1.00	92.4

280

5

1400



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) +/- 10%	Electrical Conductivity (uMhos/cm) ± 3%	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) ± 10%	Turbidity (NTU) ± 10%
1040	11.55	100	5.40	23.90	1.077	5.58	22.8	0.97	94.7
1045	11.55	100	6.9	23.98	1.064	5.58	21.8	0.96	94.8
1050	11.55	100	7.4	24.12	1.052	5.58	20.3	0.94	92.9
1055	11.57	100	8.9	24.34	1.042	5.58	21.6	0.93	91.6
1100	11.59	100	9.45	24.36	1.038	5.57	21.1	0.93	85.7
1105	11.62	120	10.05	24.21	1.008	5.56	23.1	0.85	40.7
1110	11.62	120	10.65	24.18	0.994	5.55	26.7	0.87	77.2
1115	11.92	120	11.25	23.98	0.983	5.53	29.7	0.85	60.0
1120	11.92	120	11.85	23.43	0.973	5.52	34.4	0.94	54.4
1125	11.92	120	12.45	23.75	0.969	5.52	36.9	0.81	48.7
1130	12.10	120	13.05	23.77	0.969	5.52	37.5	0.78	43.0
1135	12.10	120	13.65	23.68	0.968	5.51	37.9	0.73	40.9
1140	12.10	120	14.25	23.71	0.966	5.51	39.1	0.78	39.2
1145	12.10	120	14.85	23.71	0.964	5.51	39.4	0.75	34.2

Sampling

Sampling beginning time: _____

Sampling completion time: _____

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Sample Information

Sample ID: L0001-107

Sample collection date/time: _____

Duplicate sample collected (Y/N): N

Duplicate sample ID: _____

Split sample collected (Y/N): N

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC		3-VOA's			
Persch.		1-Plastic, unp.			

Comments: Soft obstruction @ 7'

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

110	120
5	5
530	600

Sheet 3 of 3

Site 35C (S3)
Well 107

[illegible]

Sampling

Sampling beginning time: 1210

Sampling completion time: ~~1215~~ 1215

[illegible]

Sample Information

Sample ID: _____

Sample collection date/time: _____

Duplicate sample collected (Y/N):

Duplicate sample ID: _____

Split sample collected (Y/N): _____

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers

Comments: soft obstruction @ 7' ~ moved water level around until slipped through

Sample Collection Log

00045315

Page 1 of 2

845714 - LONGHORN AAP

Manager: Praveen Srivastav

Site 35C

RFA / COC Number: 35C-091504-CO
35C-091504-MK

Location Code: LHSMW67

Task: GW DATA GAPS AUG04

Sample Number: L0001-LHSMW67

Collection Date: 9/15/04

Sample Name: L0001-LHSMW67-00

Collection Time: 12:30

Sampling Method: BA

Start Depth: 19.07

Sample Type: GW

Sample Purpose: REG

End Depth: 19.07

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners: (TB) 091504-TB

(ER) N/A

(FB) N/A

Sample Team: A. Willmore, B. Ansley

Containers

ERPIMS Values:

Scode:

Lot Control#:

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE
Dioxins-Furans	N	C	2	1	L	Amb. Glass

Groundwater Information:

Measured Well Depth: 22.69 Depth To Water: 17.11

Comments: 1.96 FEET OF WATER Purged before Stabilization

Sketch Location:

Logged BY / Date: M. Allen

Reviewed BY / Date: [Signature] 9/15/04

9/15/04



Shaw E & I, Inc.

Sample Collection Log

00045316

Page 2 of 2

845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: LHSMW67

Sample Number: L0001-LHSMW67

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal) L
Sample:	1315	19.00	96.6	5.93	0.893	58.3	1.90	31.10	17.36

Logged BY / Date:

M. M. C.
9/15/04

Reviewed BY / Date:

P. Srivastav 9/15/04



GROUNDWATER SAMPLING FORM

00045317

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
11:20	18.39	100	3.860	28.07	0.883	5.95	79.8	1.56	791.7
11:25	18.58	100	4.360	28.67	0.884	5.95	70.4	1.53	659.0
11:30	18.67	100	4.860	29.18	0.884	5.95	70.9	1.59	515.7
11:35	18.76	100	5.360	29.32	0.886	5.95	70.2	1.55	951.0
11:40	18.87	100	5.860	29.30	0.887	5.94	63.6	1.54	700.1
11:45	18.94	100	6.360	29.55	0.886	5.94	62.8	1.68	683.2
11:50	18.97	100	6.860	30.01	0.885	5.94	61.8	1.71	681.4
11:55	19.00	100	7.360	30.03	0.886	5.94	60.8	1.71	678.9
12:00	19.03	100	7.860	30.11	0.887	5.94	61.0	1.73	375.4
12:05	19.04	100	8.360	30.14	0.887	5.94	60.9	1.74	376.2
12:10	19.06	100	8.860	31.13	0.887	5.94	60.9	1.75	580.4
12:15	19.07	100	9.360	31.13	0.887	5.94	61.5	1.78	381.3

Sampling

Sampling beginning time: 12:30Sampling completion time: 13:00

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
13:15	19.00	100	17.36	31.10	0.893	5.93	96.6	1.90	58.3

Sample Information

Sample ID: 4HGM67Sample collection date/time: 9/15/04 12:30Duplicate sample collected (Y/N): No

Duplicate sample ID: _____

Split sample collected (Y/N): No

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate	314	1x HDPE			
VOCs	8260	2x VOC 1/16L			
Dioxins/furans		2x HL Amber			

Comments: Water became clear after flow-through cell was emptied and re-filled.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



GROUNDWATER SAMPLING FORM

00045318

Sheet 1 of 2

Operable Unit/Site ID: 3835C
Project Name/ID: LHAAP
Weather: Partly Cloudy 90s

Sampling location ID: LHSM67
Sample ID: LHSM67
Collection Time/Date: 9/15/04 12:30

Pump Installation

Pump installation crew: A. Willmore, B. Ansley
PID/FID reading (well head/background): 0.0
Casing diameter (inches): 4"
Total well Depth (ft. BTOC): 22.69
Initial (pre-installation) DTW/time: 13.11
Final (after pump priming) DTW/time: _____
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): _____

Installation date/beginning time: 9/15/04 9:40
Installation date/completion time: 9/15/04 9:41
Screen Interval (ft. BTOC): 12.69 to 22.69
Pump intake depth (ft BTOC): 19.9' 9:44
Post-installation DTW/time: 13.05
Max. sustainable pump rate (mL/min): _____
Appearance of product: ---
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 8.557 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, B. Ansley
Purge date/beginning time: 9/15/04 10:05
Initial (pre-purging) DTW (ft. BTOC): 17.11
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
Purge date/completion time: 9/15/04
Final (post-purging) DTW (ft. BTOC): _____
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 8.557 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>11</u>	<u>16</u>	<u>16</u>						
Refill Setting	<u>10</u>	<u>10</u>	<u>11.4</u>						
Discharge Setting	<u>5</u>	<u>5</u>	<u>3.4</u>						
Flow rate (mL/min)	<u>55</u>	<u>120</u>	<u>100</u>						

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
9040	12.11	55	0.110	30.4/4	0.842	5.95	72.5650	2.33	3374.7
1045	↓	55	2750.385	29.44	0.857	5.95	66.5	1.71	3351.8
1050	↓	55	0.660	29.32	0.848	5.94	70.8	1.97	3346.1
1055	↓	120	2812.60	29.61	0.861	5.95	76.6	2.05	3357.2
1100	17.83	120	18.60	26.93	0.870	5.95	78.0	1.73	3337.2
1105	18.01	100	2860	27.44	0.880	5.94	77.3	1.49	3380.8
1110	18.19	100	2860	28.14	0.882	5.94	77.2	1.46	1376.8
1115	18.25	100	3.360	28.09	0.885	5.95	78.9	1.49	909.8

Sample Collection Log

00045319

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35C-091504-MK

Location Code: LHSMW68

Sample Number: L0001-LHSMW6

Sample Name: L0001-LHSMW68-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip: 1" Disposable PVC bailer

QC Partners:

(TB) 091504-TB (ER)

(FB)

Task: GW DATA GAPS AUG04

Collection Date: 9/14/04

Collection Time: 16:30

Start Depth: 20.71

End Depth: - Bailed Dry

Sample Matrix: WATER

Sample Team: A. Willmore, B. Ansley

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 24.68

Depth To Water: 20.71

Comments: Bailed Dry due to low recharge characteristics of Site.

Sketch Location:

Logged BY / Date:

[Signature]
9/14/04

Reviewed BY / Date:

[Signature] 9/15/04

Sample Collection Log

00045320

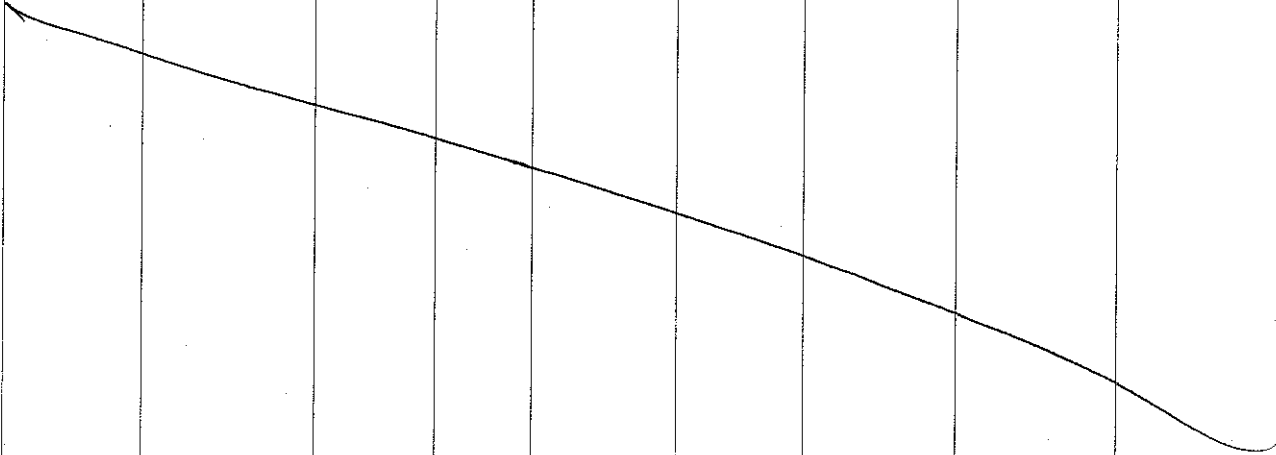
Page 2 of 2

845714 LONGHORN AAP
Manager: Praveen Srivastav


Location Code: LHSMW68

Sample Number: L0001-LHSMW6


PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	NA	NA	NA	NA	NA	NA	NA	NA	NA

Logged BY / Date:


9/14/04

Reviewed BY / Date:


9/15/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 35C
 Project Name/ID: LHMAP
 Weather: Partly Cloudy 96s

Sampling location ID: LHSM 68
 Sample ID: LHSM 68
 Collection Time/Date: 10:30 9/14/04

Pump Installation

Pump installation crew: A. Willmore, B. Ansley
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 24.68
 Initial (pre-installation) DTW/time: 20.71 12:41
 Final (after pump priming) DTW/time: NA
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): NA
 Discharge tube length (ft.): NA

Installation date/beginning time: NA
 Installation date/completion time: NA
 Screen Interval (ft. BTOC): 14.68 to 24.68
 Pump intake depth (ft BTOC): NA
 Post-installation DTW/time: NA
 Max. sustainable pump rate (mL/min): NA
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): NA
 Inlet reducer used (Y/N): NA

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = NA psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, B. Ansley
 Purge date/beginning time: 9/14/04 NA
 Initial (pre-purging) DTW (ft. BTOC): NA 20.71
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: NA
 Final (post-purging) DTW (ft. BTOC): NA
 No. of tubing + pump volumes purged: NA

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = NA psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)

Due to low recharge rate of well
 Bailed well Dry

Sample Collection Log

00045323

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35C-091504-MK

Location Code: **LHSMW69**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-LHSMW69**

Collection Date: 09-15-04

Sample Name: **L0001-LHSMW69-00**

Collection Time: 1151

Sampling Method: **BA**

Start Depth: 15.52

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 15.55

Sampling Equip: QED Pump Non-dedicated Teflon Badder

Sample Matrix: **WATER**

QC Partners:

(TB) 091504-TB (ER) 091504-ER (FB) N/A

Sample Team: M. Martine / U. Chitt

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 51.77

Depth To Water: 15.52

Comments:

Sketch Location:

Logged BY / Date: [Signature]

Reviewed BY / Date: [Signature] 9/15/04

Sample Collection Log

00045324

Page 2 of 2

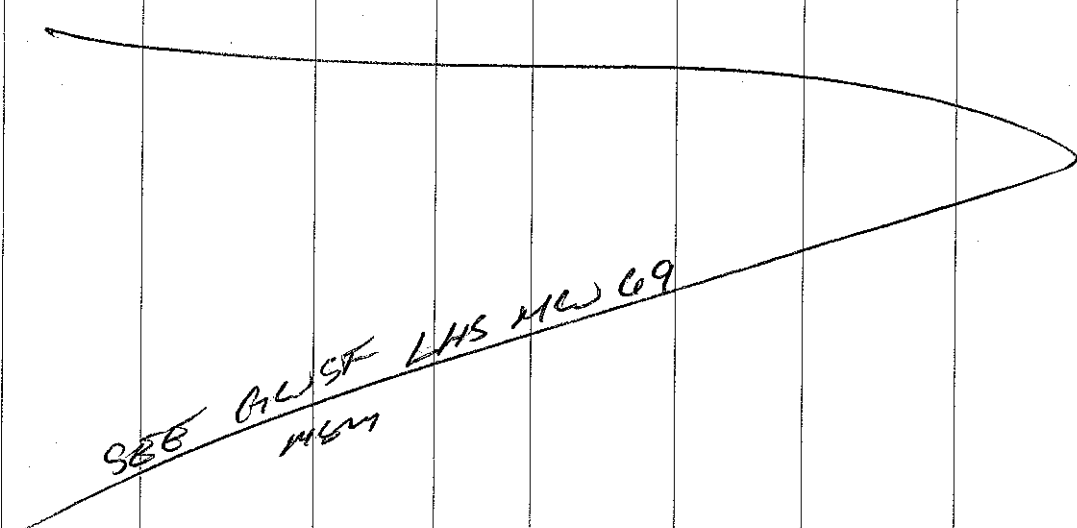
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: LHSMW69

Sample Number: L0001-LHSMW6

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	151/1200	15.55	57.0	5.73	0.931	139.0	0.29	22.90	

Logged BY / Date: Praveen Srivastav 9/15/07

Reviewed BY / Date: Praveen Srivastav 9/15/07



GROUNDWATER SAMPLING FORM

00045326

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1050	15.55	150	6.75	21.99	0.942	5.70	166.6	0.61	490.7
1055	15.55	150	7.50	22.50	0.945	5.73	92.1	0.46	428.0
1100	15.55	150	8.25	22.51	0.947	5.73	62.9	0.38	321.0
1105	15.55	150	9.00	22.50	0.945	5.74	60.1	0.37	300.8
1110	15.55	150	9.75	22.50	0.945	5.74	56.9	0.35	262.0
Circuit not used Repeat Readings									
1120	15.55	150	11.25	22.14	0.940	5.71	140.7	0.54	175.2
1125	15.55	150	12.00	22.37	0.934	5.74	79.7	0.36	165.7
1130	15.55	150	12.75	22.61	0.933	5.74	69.8	0.33	155.6
1135	15.55	150	13.50	22.55	0.935	5.74	59.0	0.31	151.5
1140	15.55	150	14.25	22.38	0.933	5.73	54.4	0.29	147.7
1145	15.55	150	15.00	22.22	0.933	5.73	51.4	0.28	142.7
1150	15.55	150	15.75	22.50	0.933	5.73	51.0	0.27	140.9
			1.50						

Sampling

Sampling beginning time: 1151

Sampling completion time: 1154

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1200	15.55	150	17.25	22.90	0.93	5.73	57.0	0.29	139.0

Sample Information

Sample ID: LHS MW 69

Sample collection date/time: 04-15-04/1151

Duplicate sample collected (Y/N): NO

Duplicate sample ID: NO

Split sample collected (Y/N): NO

Split sample ID: NO

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC-EU11	R200R	3 x 40mL VOA			
Perchloroeth	314	1 x 250mL HPLC			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045327

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 35C-091504-MR

Location Code: **LHSMW70**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-LHSMW7**

Collection Date: 9/14/04

Sample Name: **L0001-LHSMW70-00**

Collection Time: 1155

Sampling Method: **BA**

Start Depth: 14.95

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 16.01

Sampling Equip: Bladder Pump Sampled using

Sample Matrix: **WATER**

QC Partners:

(TB) 091504-TB (ER) N/A (FB) N/A

Sample Team: K. Evans J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 24.66

Depth To Water: 14.79

Comments:

well can't to draw down at lowest pump rate. Remove pump.
Bail well dry. 12 gallons total. Wait 30 min. & able to sample.

Sketch Location:

Logged BY / Date: Kent 9/14/04

Reviewed BY / Date: Dufford 9/15/04

Sample Collection Log

00045328

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: **LHSMW70**

Sample Number: **L0001-LHSMW7**

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<i>See Sample Log</i> <i>KEWTT</i>									
Sample:	1210	23.50	245.4	5.13	0.270	780.1	13.03	23.34	72+12gal

Logged BY / Date: KEWTT 9/14/04

Reviewed BY / Date: [Signature] 9/15/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Site 35C (53)

Operable Unit/Site ID: PIP 100292 Mini Pac / QED Bldg Sampling location ID: LH SMW 70
 Project Name/ID: LHAAP Sample ID: _____
 Weather: Sunny, hot Collection Time/Date: 9/14/04

Pump Installation

Pump installation crew: K Everett J. Rodriguez Installation date/beginning time: 9/14/04 0930
 PID/FID reading (well head/background): 40 / 3.8 ppm Installation date/completion time: 9/14/04 0945
 Casing diameter (inches): 4" PVC Screen Interval (ft. BTOC): 14 to 24
 Total well Depth (ft. BTOC): 24.66 Pump intake depth (ft. BTOC): 19'
 Initial (pre-installation) DTW/time: 14.79 14.62 Post-installation DTW/time: _____
 Final (after pump priming) DTW/time: 14.95 Max. sustainable pump rate (mL/min): _____
 Free product (circle): LNAPL / DNAPL Appearance of product: NA
 Volume of water removed during priming (mL): _____ Discharge tube diameter (3/8" or 1/4"): 3
 Discharge tube length (ft.): 30' Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A/A PID/FID reading (well head/background): _____
 Purge date/beginning time: _____ Purge date/completion time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____ Final (post-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>17</u>	<u>17</u>	<u>17</u>					
Refill Setting	<u>10</u>	<u>7</u>	<u>7</u>	<u>11</u>					
Discharge Setting	<u>5</u>	<u>3</u>	<u>3</u>	<u>9</u>					
Flow rate (mL/min)	<u>180</u>	<u>160</u>	<u>120</u>	<u>110</u>					

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1015</u>	<u>14.95</u>	<u>180</u>	<u>0.9</u>	<u>23.65</u>	<u>0.226</u>	<u>4.74</u>	<u>275.5</u>	<u>3.42</u>	<u>6.0</u>
<u>1020</u>	<u>15.18</u>	<u>160</u>	<u>1.7</u>	<u>23.10</u>	<u>0.226</u>	<u>4.72</u>	<u>296.9</u>	<u>2.90</u>	<u>6.8</u>
<u>1025</u>	<u>15.18</u>	<u>160</u>	<u>2.5</u>	<u>23.30</u>	<u>0.226</u>	<u>4.72</u>	<u>293.4</u>	<u>3.43</u>	<u>4.8</u>
<u>1030</u>	<u>15.29</u>	<u>120</u>	<u>3.1</u>	<u>23.65</u>	<u>0.226</u>	<u>4.72</u>	<u>299.2</u>	<u>2.89</u>	<u>3.0</u>
<u>1035</u>	<u>15.40</u>	<u>110</u>	<u>3.65</u>	<u>23.90</u>	<u>0.226</u>	<u>4.72</u>	<u>296.8</u>	<u>2.55</u>	<u>4.9</u>
<u>1040</u>	<u>15.46</u>	<u>110</u>	<u>4.20</u>	<u>23.88</u>	<u>0.227</u>	<u>4.72</u>	<u>300.1</u>	<u>2.26</u>	<u>1.2</u>
<u>1045</u>	<u>15.67</u>	<u>110</u>	<u>4.75</u>	<u>23.87</u>	<u>0.227</u>	<u>4.72</u>	<u>304.7</u>	<u>2.14</u>	<u>0.1</u>
<u>1050</u>	<u>15.72</u>	<u>110</u>	<u>5.30</u>	<u>23.97</u>	<u>0.226</u>	<u>4.72</u>	<u>308.1</u>	<u>2.05</u>	<u>-1.0</u>

180 160 120 110
 5 5 5 5
 900 800 600 550

15.18
 14.95
 .23

24.66

8.65' of water column

5.6 gallon per one well volume

17 gal 3 well volumes.

Sample Collection Log

00045331

Page 1 of 2

845714 - LONGHORN AAP

Manager: Praveen Srivastav

35C-091704-KF

RFA / COC Number:

35C-091704-MK

Location Code: LHSMW71

Sample Number: L0001-LHSMW71

Sample Name: L0001-LHSMW71-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip: PVC Bailer (1")

QC Partners:

(TB) _____

(ER) _____

(FB) _____

Task: GW DATA GAPS AUG04

Collection Date: 9/14/04, 9/15/04, 9/16/04, 9/17/04

Collection Time: 8:45 (Varying)

Start Depth: 19.30

End Depth: 19.50

Sample Matrix: WATER

Sample Team: A. Willmore, B. Ansley

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Containers						
Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE
METALS-6020	N	C	1	500	mL	HDPE
METALS-DIS	N	D	1	500	mL	HDPE
METALS-DIS-6020	N	E	1	500	mL	HDPE
METALS-W	N	F	1	500	mL	HDPE

Groundwater Information:

Measured Well Depth: 19.55

Depth To Water: 16.23

Comments: Bailed Dry due to slow recharge rate


Accumulated VOA Samples on 9/14/04. Metal preserved on 9/15/04. Metal non-preserved on 9/16/04, Perc on 9/17/04

Sketch Location:

Logged BY / Date:


9/14/04

Reviewed BY / Date:


9/17/04

Sample Collection Log

00045332

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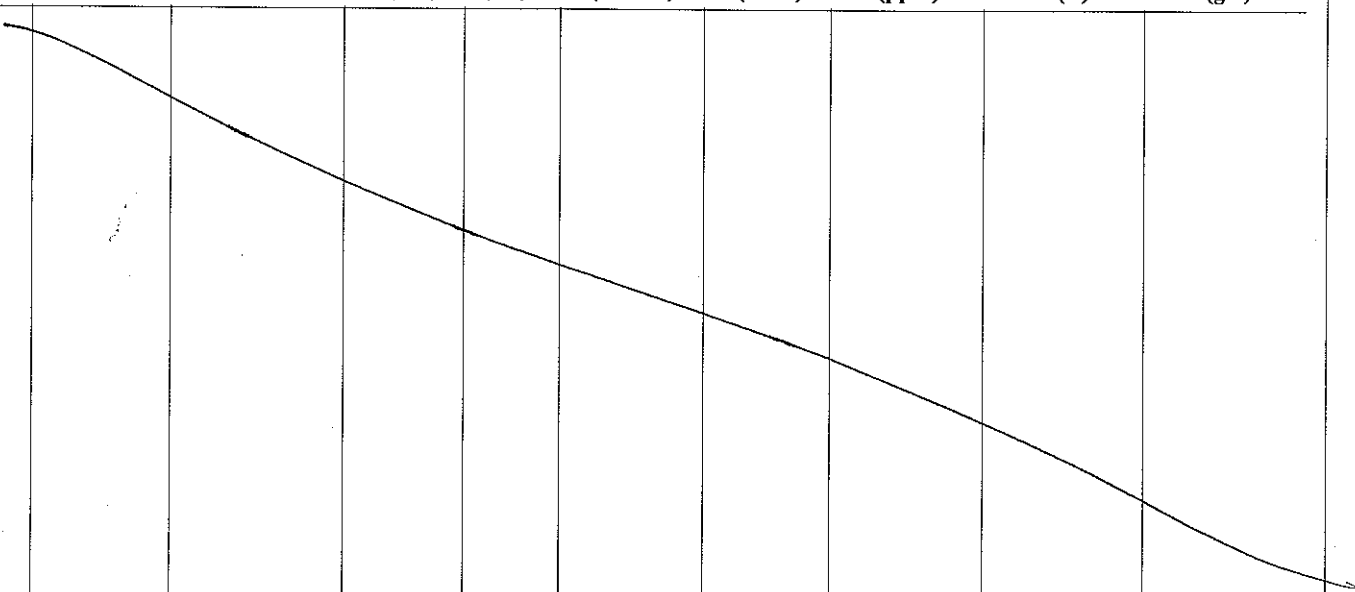
845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: **LHSMW71**

Sample Number: **L0001-LHSMW71**

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:									

Logged BY / Date:

M. Ill C
2/14/04

Reviewed BY / Date:

P. Srivastav 2/16/04

[illegible]

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

LHAAP-47

**GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS**

Sample Collection Log

00045336

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090104-Mk

Location Code: 47WW05

Task: GW DATA GAPS AUG04

Sample Number: L0001-47WW05

Collection Date: 9/1/04

Sample Name: L0001-47WW05-00

Collection Time: 10:25

Sampling Method: BA

Start Depth: 18.50

Sample Type: GW

Sample Purpose: REG

End Depth: 18.50

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

Sample Team: A. Willmore, C. Mabe

(TB) 083004-TB (ER) N/A (FB) N/A

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

Lot Control#:

Groundwater Information:

Measured Well Depth: 21.51

Depth To Water: 18.22

Comments:

Sketch Location:

Logged BY / Date:

H. Ill C. A.
9/1/04

Reviewed BY / Date:

Da. H. Ill C. A.
9/1/04

Sample Collection Log

00045337

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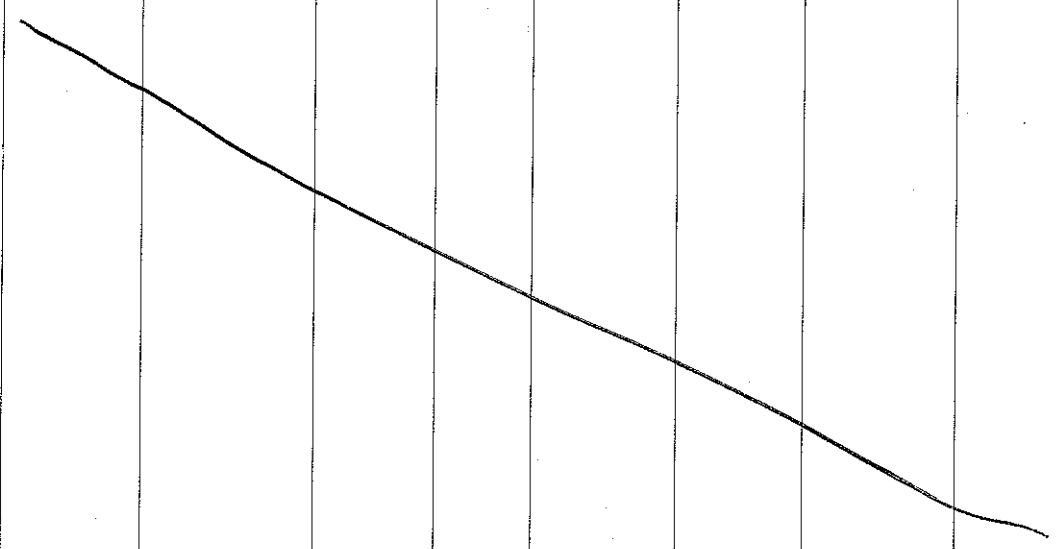
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW05

Sample Number: L0001-47WW05

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	10:15 10:50	18.50	30.3	6.57	3.625	2.1	1.50	21.98	2 gal.

Logged BY / Date:

[Signature]
9/1/04

Reviewed BY / Date:

[Signature] 9/1/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 47
 Project Name/ID: CHAP
 Weather: clear

Sampling location ID: 47 WW 05
 Sample ID: 47 WW 05
 Collection Time/Date: 10:20 / 9/1/04

Pump Installation

Pump installation crew: A. Williams, C. Mabe
 PID/FID reading (well head/background):
 Casing diameter (inches):
 Total well Depth (ft. BTOC): 86.42 21.51
 Initial (pre-installation) DTW/time: 18.40 / 9:01 18.22 / 9:03
 Final (after pump priming) DTW/time:
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 30'

Installation date/beginning time: 9/1/04
 Installation date/completion time: 9/1/04
 Screen Interval (ft. BTOC): 11.51 to 21.51
 Pump intake depth (ft BTOC): 48.1 19.70
 Post-installation DTW/time: 18.1 / 9:30
 Max. sustainable pump rate (mL/min): 130
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): no

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 8.471 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>9</u>								
Refill Setting	<u>10</u>								
Discharge Setting	<u>5</u>								
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Williams, C. Mabe
 Purge date/beginning time: 9/1/04 9:47
 Initial (pre-purging) DTW (ft. BTOC): 18.22
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 9/1/04
 Final (post-purging) DTW (ft. BTOC):
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 8.471 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>9</u>	<u>8</u>	<u>8.5</u>						<u>8.5</u>
Refill Setting	<u>10</u>	<u>11</u>	<u>12</u>						<u>12</u>
Discharge Setting	<u>5</u>	<u>4</u>	<u>3</u>						<u>3</u>
Flow rate (mL/min)	<u>130</u>	<u>65</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>9:47</u>	<u>18.35</u>	<u>130</u>	<u>0.1</u>	<u>21.07</u>	<u>3.547</u> <u>3574</u>	<u>6.56</u>	<u>101.1</u>	<u>3.41</u>	<u>81.2</u>
<u>9:52</u>	<u>18.41</u>	<u>100</u>	<u>0.2</u>	<u>21.09</u>	<u>3.583</u>	<u>6.57</u>	<u>90.1</u>	<u>2.70</u>	<u>68.8</u>
<u>9:57</u>	<u>18.43</u>	<u>115</u>	<u>0.4</u>	<u>21.22</u>	<u>3.587</u>	<u>6.58</u>	<u>72.4</u>	<u>2.53</u>	<u>62.5</u>
<u>10:02</u>	<u>18.45</u>	<u>100</u>	<u>0.5</u>	<u>21.26</u>	<u>3.599</u>	<u>6.57</u>	<u>53.50.9</u>	<u>2.08</u>	<u>50.5</u>
<u>10:07</u>	<u>18.48</u>	<u>100</u>	<u>0.6</u>	<u>21.32</u>	<u>3.601</u>	<u>6.57</u>	<u>42.2</u>	<u>2.15</u>	<u>46.9</u>
<u>10:12</u>	<u>18.49</u>	<u>100</u>	<u>0.7</u>	<u>21.35</u>	<u>3.605</u>	<u>6.57</u>	<u>39.9</u>	<u>2.07</u>	<u>45.5</u>
<u>10:17</u>	<u>18.50</u>	<u>100</u>	<u>0.8</u>	<u>21.36</u>	<u>3.605</u>	<u>6.57</u>	<u>39.2</u>	<u>2.13</u>	<u>45.6</u>

Sheet **2** of 2[illegible]

Sampling beginning time: 10:25

Sampling completion time: 1045

[illegible]

Sample ID: 294405

Sample collection date/time: 10:25

Duplicate sample collected (Y/N): No

Duplicate sample ID:

Split sample collected (Y/N): No

Split sample ID:

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate	314	HDPE			
VOCs	8060	40 mL vials			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045340

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090104 - MR

Location Code: **47WW06**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-47WW06**

Sample Name: **L0001-47WW06-00**

Collection Date: 9/1/04

Collection Time: 12:33

Sampling Method: **BA**

Start Depth: 19.16

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 19.16

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 083004-TB

(ER) N/A

(FB) N/A

Sample Team: A. W. Moore, C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 47.60

Depth To Water: 18.70

Comments:

Sketch Location:

Logged BY / Date: M. P. L. L. A.

Reviewed BY / Date: Praveen Srivastav

9/1/04

Sample Collection Log

00045341

Page 2 of 2


845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW06

Sample Number: L0001-47WW06

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	12:37	19.10	-9.4	6.68	1.557	51.2	1.27	24.53	2gallons

Logged BY / Date:

M. Jelle
9/1/04

Reviewed BY / Date:

P. Srivastav 9/1/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 47
 Project Name/ID: LHAPP
 Weather: Clear, 78°

Sampling location ID: 47W06
 Sample ID: 47W06
 Collection Time/Date: 9/1/04

Pump Installation

Pump installation crew: A. Willmore, C. Mabe
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 47.50
 Initial (pre-installation) DTW/time: 18.70 / 8:58
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 60'

Installation date/beginning time: 9/1/04 11:28
 Installation date/completion time: 9/1/04 11:29
 Screen Interval (ft. BTOC): 37.50 to 47.50
 Pump intake depth (ft BTOC): 42.5'
 Post-installation DTW/time: 18.54 / 11:30
 Max. sustainable pump rate (mL/min): 115
 Appearance of product: —
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 10.275 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, C. Mabe
 Purge date/beginning time: 9/1/04 11:30
 Initial (pre-purging) DTW (ft. BTOC): 47.50 18.70
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 9/1/04
 Final (post-purging) DTW (ft. BTOC): 18.16
 No. of tubing + pump volumes purged: —

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 10.275 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>12.5</u>	<u>10.5</u>	<u>10.2</u>						<u>10.2</u>
Refill Setting	<u>11</u>	<u>12.0</u>	<u>13</u>						<u>13</u>
Discharge Setting	<u>4</u>	<u>3.0</u>	<u>3.5</u>						<u>3.5</u>
Flow rate (mL/min)	<u>100</u>	<u>115</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>11:45</u>	<u>18.96</u>	<u>100</u>	<u>0.1</u>	<u>23.27</u>	<u>1.539</u>	<u>6.70</u>	<u>-7.3</u>	<u>2.12</u>	<u>81.4</u>
<u>11:50</u>	<u>19.06</u>	<u>100</u>	<u>0.2</u>	<u>22.81</u>	<u>1.549</u>	<u>6.88</u>	<u>-7.6</u>	<u>1.66</u>	<u>64.1</u>
<u>11:58</u>	<u>19.06</u>	<u>115</u>	<u>0.3</u>	<u>22.90</u>	<u>1.547</u>	<u>6.68</u>	<u>-8.2</u>	<u>1.50</u>	<u>55.8</u>
<u>12:00</u>	<u>19.07</u>	<u>115</u>	<u>0.5</u>	<u>23.12</u>	<u>1.547</u>	<u>6.68</u>	<u>-8.4</u>	<u>1.40</u>	<u>41.5</u>
<u>12:05</u>	<u>19.09</u>	<u>115</u>	<u>0.6</u>	<u>23.43</u>	<u>1.552</u>	<u>6.68</u>	<u>-9.7</u>	<u>1.29</u>	<u>47.3</u>
<u>12:10</u>	<u>19.11</u>	<u>115</u>	<u>0.7</u>	<u>24.10</u>	<u>1.552</u>	<u>6.68</u>	<u>-8.1</u>	<u>1.24</u>	<u>45.7</u>
<u>12:15</u>	<u>19.15</u>	<u>100</u>	<u>0.8</u>	<u>24.22</u>	<u>1.552</u>	<u>6.69</u>	<u>-8.2</u>	<u>1.25</u>	<u>44.7</u>
<u>12:20</u>	<u>19.16</u>	<u>100</u>	<u>0.9</u>	<u>24.69</u>	<u>1.554</u>	<u>6.68</u>	<u>-8.9</u>	<u>1.29</u>	<u>42.4</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
12:25	19.16	100	1.0	24.71	1.555	6.68	-9.1	1.29	40.1
12:30	19.16	100	1.1	24.69	1.558	6.67	-9.6	1.20	40.0
12:35	19.16	100	1.3	24.71	1.556	6.68	-9.3	1.25	40.2

Sampling

Sampling beginning time: 12:37Sampling completion time: 12:52

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
12:54	19.16	100	2 gal	24.53	1.557	6.68	-9.4	1.27	51.2

Sample Information

Sample ID: 29W006Sample collection date/time: 12:37 9/1/04Duplicate sample collected (Y/N): NoDuplicate sample ID: Split sample collected (Y/N): NoSplit sample ID: COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate	3/4	HDPc			
VOCs	BOBO	40ml VOA vial			

Comments:

Dropped but stayed steady @ 19.16 btoc.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045344

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090204-MK

Location Code: **47WW07**

Sample Number: **L0001-47WW07**

Sample Name: **L0001-47WW07-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Task: **GW DATA GAPS AUG04**

Collection Date: 9/1/04

Collection Time: 15:35

Start Depth: 19.46

End Depth: ~~19.46~~ 19.48

Sample Matrix: **WATER**

Sampling Equip: Bladder Pump

QC Partners:

(TB) 090204-TB

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore, C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 86.92

Depth To Water: ~~19.30~~ 19.30

Comments:

Sketch Location:

Logged BY / Date:

[Signature]
9/1/04

Reviewed BY / Date:

[Signature] 9/2/04

Sample Collection Log

00045345

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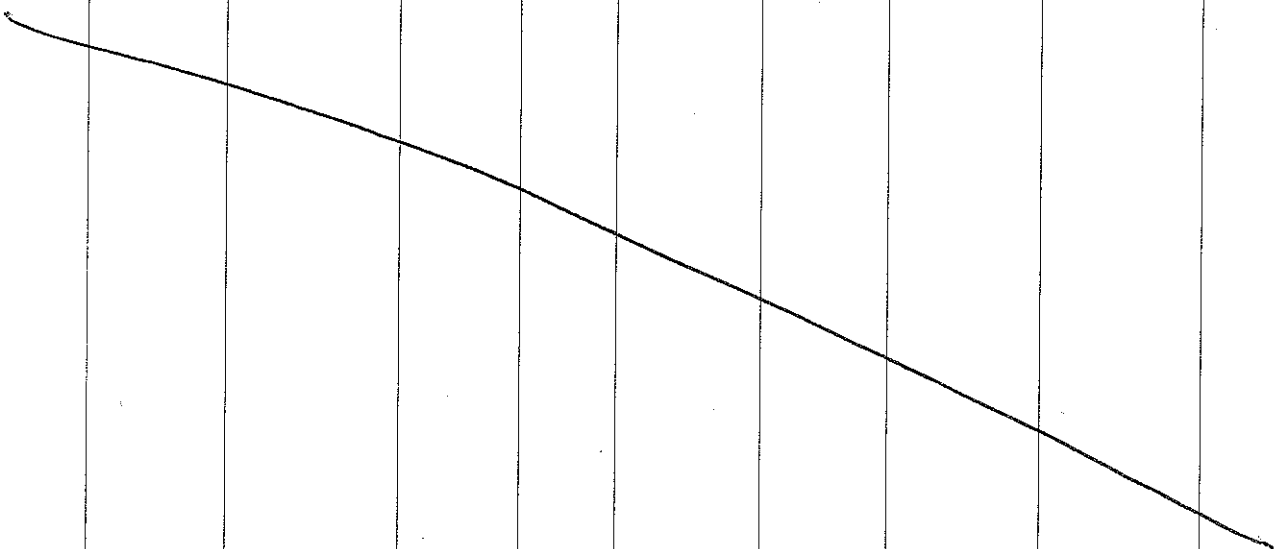
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW07

Sample Number: L0001-47WW07

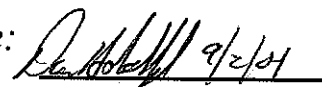
PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	15:55	19.50	160.7	8.39	1.687	13.3	2.86	31.12	2.5gal

Logged BY / Date:



Reviewed BY / Date:

 9/2/04

Sample Collection Log

00045346

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090204-MK

Location Code: **47WW07**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-47WW07**

Collection Date: 9/1/04

Sample Name: **L0001-47WW07-00-QC**

Collection Time: 15:35

Sampling Method: **BA**

Start Depth: 19.46

Sample Type: **GW**

Sample Purpose: **FD**

End Depth: 19.46

Sampling Equip: Bladder Pump

Sample Matrix: **WATER**

QC Partners:

(TB) 090204-TB

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmory, C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 86.92

Depth To Water: 19.30

Comments:

Sketch Location:

Logged BY / Date:

M. [Signature]
9/1/04

Reviewed BY / Date:

[Signature] 9/2/04

Sample Collection Log

00045347

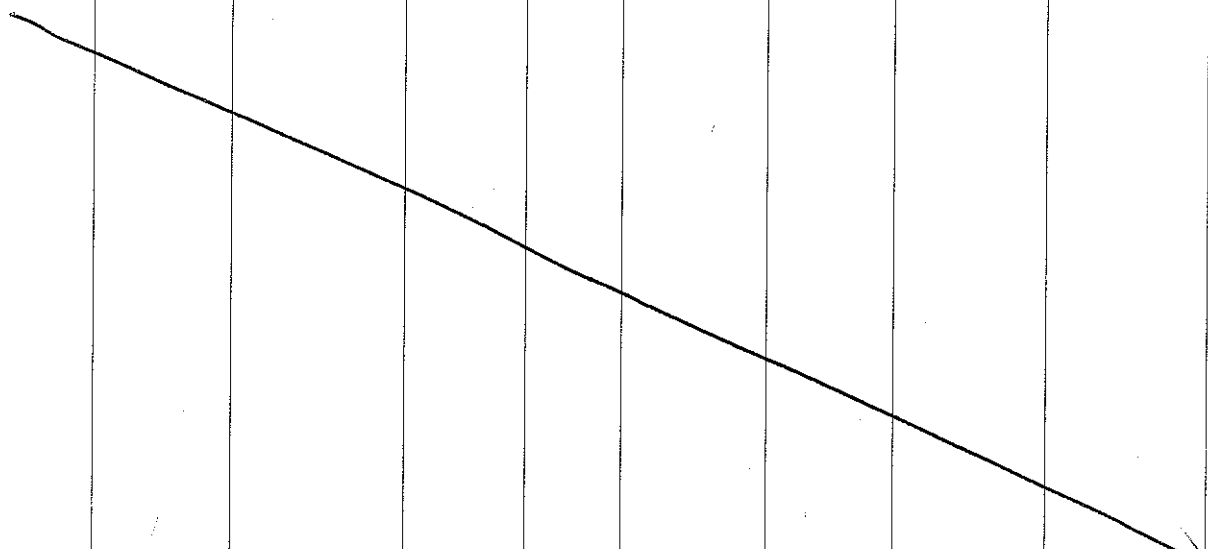
Page 2 of 2

845714 LONGHORN AAP
Manager: Praveen Srivastav

Location Code: 47WW07

Sample Number: L0001-47WW07

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	45:55	14.50	160.7	8.39	1.687	13.3	2.86	31.12	2.5 gal

Logged BY / Date:

M. Ad C n
9/1/04

Reviewed BY / Date:

Praveen Srivastav 9/2/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 7

Operable Unit/Site ID: <u>47</u>	Sampling location ID: <u>47 WW 07</u>
Project Name/ #: <u>LHAP</u>	Sample ID: <u>47 WW 07</u>
Weather: <u>CLEAR 80</u>	Collection Time/Date: <u>15:35 9/1/04</u>

Pump Installation

Pump installation crew: <u>A. Willmore, C. Mabe</u>	Installation date/beginning time: <u>9/1/04 14:08</u>
PID/FID reading (well head/background): <u>0.0</u>	Installation date/completion time: <u>9/1/04 14:10</u>
Casing diameter (inches): <u>4"</u>	Screen Interval (ft. BTOC): <u>76.92 to 86.92</u>
Total well Depth (ft. BTOC): <u>87.92 86.92</u>	Pump intake depth (ft. BTOC): <u>82'</u>
Initial (pre-installation) DTW/time: <u>19.30 / 14:01</u>	Post-installation DTW/time: <u>19.25 / 14:10</u>
Final (after pump priming) DTW/time: _____	Max. sustainable pump rate (mL/min): <u>195</u>
Free product (circle): <u>LNAPL / DNAPL</u>	Appearance of product: <u>—</u>
Volume of water removed during priming (mL): _____	Discharge tube diameter (3/8" or 1/4"): <u>3/8"</u>
Discharge tube length (ft.): <u>160'</u>	Inlet reducer used (Y/N): <u>No</u>

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 35.26 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: <u>A. Willmore, C. Mabe</u>	PID/FID reading (well head/background): <u>0.0</u>
Purge date/beginning time: <u>9/1/04 14:25</u>	Purge date/completion time: <u>9/1/04</u>
Initial (pre-purging) DTW (ft. BTOC): <u>19.30</u>	Final (post-purging) DTW (ft. BTOC): <u>19.40</u>
Calculated tubing + pump volume: <u>NA</u>	No. of tubing + pump volumes purged: <u>—</u>

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 35.26 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>50</u>	<u>50</u>	<u>42</u>	<u>50</u>					
Refill Setting	<u>12</u>	<u>11</u>	<u>11</u>	<u>13</u>					
Discharge Setting	<u>3</u>	<u>4</u>	<u>4</u>	<u>3</u>					
Flow rate (mL/min)	<u>190</u>	<u>120</u>	<u>115</u>	<u>115</u>					

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>14:40</u>	<u>19.32</u>	<u>120</u>	<u>0.2</u>	<u>38.5</u>	<u>0.074</u>	<u>7.58</u>	<u>146.1</u>	<u>6.22</u>	<u>10.8</u>
<u>14:45</u>	<u>19.41</u>	<u>120</u>	<u>0.3</u>	<u>32.58</u>	<u>1.617</u>	<u>8.28</u>	<u>151.5</u>	<u>4.46</u>	<u>14.8</u>
<u>14:50</u>	<u>19.43</u>	<u>120</u>	<u>0.4</u>	<u>31.54</u>	<u>1.683</u>	<u>8.33</u>	<u>160.9</u>	<u>3.13</u>	<u>14.5</u>
<u>14:55</u>	<u>19.45</u>	<u>100</u>	<u>0.5</u>	<u>30.92</u>	<u>1.686</u>	<u>8.36</u>	<u>165.1</u>	<u>3.03</u>	<u>14.4</u>
<u>15:00</u>	<u>19.45</u>	<u>115</u>	<u>0.7</u>	<u>30.91</u>	<u>1.685</u>	<u>8.36</u>	<u>165.0</u>	<u>3.03</u>	<u>14.4</u>
<u>15:05</u>	<u>19.45</u>	<u>115</u>	<u>0.8</u>	<u>30.99</u>	<u>1.684</u>	<u>8.36</u>	<u>165.1</u>	<u>2.98</u>	<u>14.1</u>
<u>15:10</u>	<u>19.46</u>	<u>115</u>	<u>0.9</u>	<u>30.90</u>	<u>1.683</u>	<u>8.39</u>	<u>162.9</u>	<u>2.96</u>	<u>14.3</u>
<u>15:15</u>	<u>19.45</u>	<u>115</u>	<u>1.1</u>	<u>30.92</u>	<u>1.684</u>	<u>8.39</u>	<u>161.8</u>	<u>2.88</u>	<u>14.2</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
15:20	19.46	115	1.2	30.91	1.684	8.39	160.4	2.88	14.3
15:25	19.46	115	1.4	30.92	1.685	8.39	161.3	2.86	14.4
15:30	19.46	115	1.5	30.91	1.684	8.39	161.4	2.86	14.3
				31.12	1.686	8.40	160.4	2.84	12.7

Sampling

Sampling beginning time: 15:35Sampling completion time: 15:50

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
15:55	19.50	115	2.5	30.91	1.687	8.39	160.7	2.86	13.3

Sample Information

Sample ID: 047WW07Sample collection date/time: 15:35 / 9-1-04Duplicate sample collected (Y/N): YDuplicate sample ID: 47WW07-Q6Split sample collected (Y/N): NoSplit sample ID: COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate	314	HDPE			
VOCs	8260	HDPE VOA Vials			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045350

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090204-M/R

Location Code: 47WW13

Task: GW DATA GAPS AUG04

Sample Number: L0001-47WW13

Sample Name: L0001-47WW13-00

Collection Date: 9/2/04

Collection Time: 14:25

Sampling Method: BA

Start Depth: 17.54

Sample Type: GW

Sample Purpose: REG

End Depth: 17.99

Sampling Equip: Baker

Sample Matrix: WATER

QC Partners:

(TB) 090204-TB

(ER)

N/A

(FB)

N/A

Sample Team: M. Martinez
W. Critz

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 19.87

Depth To Water: 16.91

Comments:

Had to bail dry b/cuz of slow recharge

Sketch Location:

Logged BY / Date:

9/2/04

Reviewed BY / Date:

9/2/04



Sample Collection Log

00045351

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW13

Sample Number: L0001-47WW13

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
Sample:	9:39 17:28	17.28	34.4	6.09	0.397	596.3	1.30	24.30	0.7

Logged BY / Date:

Reviewed BY / Date:

9/2/01



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 47WWB
 Project Name/ #: LHAAL
 Weather: Partly Cloudy

Sampling location ID: 47WWB
 Sample ID: 47WW13
 Collection Time/Date: 14:25 9/2/04

Pump Installation

Pump installation crew: A. Willmore, C. Mabe
 PID/FID reading (well head/background): 24.7
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 1987
 Initial (pre-installation) DTW/time: 16.91
 Final (after pump priming) DTW/time: 14.2
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 30'

Installation date/beginning time: 9/2/04 9:10
 Installation date/completion time: 9/2/04 9:10
 Screen Interval (ft. BTOC): 9.87 to 1987
 Pump intake depth (ft. BTOC): 18.4'
 Post-installation DTW/time: 16.84 9:11
 Max. sustainable pump rate (mL/min):
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 7.5 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, C. Mabe
 Purge date/beginning time: 9/2/04 9:25
 Initial (pre-purging) DTW (ft. BTOC): 16.84
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 24.7
 Purge date/completion time: 9/2/04 9:59
 Final (post-purging) DTW (ft. BTOC):
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 7.5 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>7.5</u>	<u>15</u>	<u>115</u>						<u>115</u>
Refill Setting	<u>10</u>	<u>11</u>	<u>12</u>						<u>12</u>
Discharge Setting	<u>5</u>	<u>4</u>	<u>3</u>						<u>3</u>
Flow rate (mL/min)	<u>100</u>	<u>150</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
9:29	16.99	1250	0.1	24.64	0.220	6.34	44.0	4.47	549.6
9:34	17.05	100	0.2	24.24	0.388	6.37	32.5	1.99	576.5
9:39	17.13	100	0.4	24.33	0.396	6.38	32.6	1.52	571.8
9:44	17.18	100	0.5	24.34	0.397	6.38	33.2	1.41	568.5
9:49	17.22	100	0.6	24.34	0.397	6.49	34.5	1.33	595.5
9:54	17.28	100	0.7	24.34	0.397	6.49	34.4	1.30	596.3
9:59									

MUST BAIL DRY



GROUNDWATER SAMPLING FORM

[illegible]

Sampling beginning time: _____ Sampling completion time: _____

[illegible]

Sample ID: 47WW13 Sample collection date/time: 47WW13 14:25
Duplicate sample collected (Y/N): No Duplicate sample ID: —
Split sample collected (Y/N): No Split sample ID: —
COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Petroleum	GC				
VOCs	GC				

Comments: Water is very cloudy.

Sample Collection Log

00045354

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090204-mk

Location Code: **47WW14**

Sample Number: **L0001-47WW14**

Sample Name: **L0001-47WW14-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: Bladder Pump

QC Partners:

(TB) 090204-TB

(ER) 090204-ER

(FB) N/A

Task: **GW DATA GAPS AUG04**

Collection Date: 9/2/04

Collection Time: 12:52

Start Depth: 20.14

End Depth: 20.14

Sample Matrix: **WATER**

Sample Team: A. Willmore, C. Mabe

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 51.61

Depth To Water: 19.93

Comments:

Sketch Location:

Logged BY / Date:

[Signature]
9/2/04

Reviewed BY / Date:

[Signature] 9/2/04

Sample Collection Log

00045355

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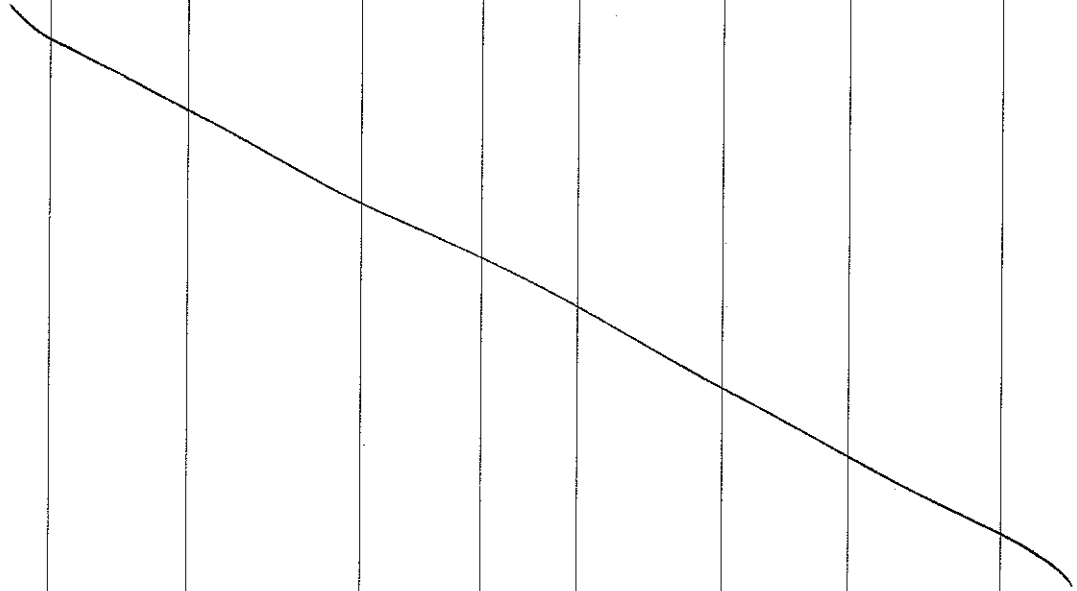
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW14

Sample Number: L0001-47WW14

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	13:00	20.10	62.4	62.4 6.87	2.074	30.1	0.99	27.31	1.8

Logged BY / Date:

M. LLC
9/2/04

Reviewed BY / Date:

P. Srivastav 9/2/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: <u>47</u>	Sampling location ID: <u>47WW14</u>
Project Name/ #: <u>LHMP</u>	Sample ID: <u>29WW14</u>
Weather: <u>Partly Cloudy</u>	Collection Time/Date: <u>12:52</u> <u>9/2/04</u>

Pump Installation

Pump installation crew: <u>A. Williams, C. Mohr</u>	Installation date/beginning time: <u>9/2/04</u> <u>10:51</u>
PID/FID reading (well head/background): <u>0.0</u>	Installation date/completion time: <u>9/2/04</u> <u>10:52</u>
Casing diameter (inches): <u>4"</u>	Screen Interval (ft. BTOC): <u>41.61</u> to <u>51.61</u>
Total well Depth (ft. BTOC): <u>51.61</u>	Pump intake depth (ft. BTOC): <u>46.61</u>
Initial (pre-installation) DTW/time: <u>19.98</u> <u>10:53</u>	Post-installation DTW/time: <u>19.83</u> <u>10:53</u>
Final (after pump priming) DTW/time: _____	Max. sustainable pump rate (mL/min): _____
Free product (circle): <u>LNAPL / DNAPL</u>	Appearance of product: _____
Volume of water removed during priming (mL): _____	Discharge tube diameter (3/8" or 1/4"): <u>3/8"</u>
Discharge tube length (ft.): <u>60'</u>	Inlet reducer used (Y/N): <u>No</u>

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = ~17 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: <u>A. Williams, C. Mohr</u>	PID/FID reading (well head/background): <u>0.0</u>
Purge date/beginning time: <u>9/2/04</u>	Purge date/completion time: <u>9/2/04</u> <u>12:45</u>
Initial (pre-purging) DTW (ft. BTOC): <u>19.98</u>	Final (post-purging) DTW (ft. BTOC): <u>20.10</u>
Calculated tubing + pump volume: <u>NA</u>	No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = ~17 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>22</u>	<u>20</u>							<u>20</u>
Refill Setting	<u>10</u>	<u>13.5</u>							<u>13.5</u>
Discharge Setting	<u>5</u>	<u>3.5</u>							<u>3.5</u>
Flow rate (mL/min)	<u>115</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>12:00</u>	<u>20.05</u>	<u>115</u>	<u>0.1</u>	<u>29.41</u>	<u>2.056</u>	<u>6.89</u>	<u>89.3</u>	<u>2.56</u>	<u>73.4</u>
<u>12:05</u>	<u>20.09</u>	<u>100</u>	<u>0.2</u>	<u>28.36</u>	<u>2.041</u>	<u>6.88</u>	<u>85.6</u>	<u>2.54</u>	<u>71.2</u>
<u>12:10</u>	<u>20.12</u>	<u>130</u>	<u>0.3</u>	<u>27.76</u>	<u>2.072</u>	<u>6.87</u>	<u>88.2</u>	<u>1.81</u>	<u>35.4</u>
<u>12:15</u>	<u>20.13</u>	<u>100</u>	<u>0.4</u>	<u>27.60</u>	<u>2.077</u>	<u>6.87</u>	<u>82.2</u>	<u>1.40</u>	<u>37.9</u>
<u>12:20</u>	<u>20.14</u>	<u>100</u>	<u>0.6</u>	<u>27.20</u>	<u>2.076</u>	<u>6.87</u>	<u>76.7</u>	<u>1.21</u>	<u>50.5</u>
<u>12:25</u>	<u>20.14</u>	<u>100</u>	<u>0.7</u>	<u>27.15</u>	<u>2.069</u>	<u>6.87</u>	<u>76.1</u>	<u>1.21</u>	<u>49.5</u>
<u>12:30</u>	<u>20.14</u>	<u>100</u>	<u>0.8</u>	<u>27.47</u>	<u>2.066</u>	<u>6.87</u>	<u>64.5</u>	<u>1.00</u>	<u>33.6</u>
<u>12:35</u>	<u>20.14</u>	<u>100</u>	<u>1.0</u>	<u>27.80</u>	<u>2.067</u>	<u>6.88</u>	<u>63.5</u>	<u>0.95</u>	<u>34.1</u>



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
12:40	10.14	100	1.2	27.7	2071	6.87	63.8	0.92	32.4
12:46	20.14	100	1.4	27.32	2069	6.87	61.6	0.95	33.1

Sampling

Sampling beginning time: 12:52Sampling completion time: 12:59

Water Quality Parameter Measurements									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
13:00	20.10	100	1.8	27.31	2074	6.87	62.4	0.99	30.1

Sample Information

Sample ID: 47WW14Sample collection date/time: 12:52 9/2/04Duplicate sample collected (Y/N): NoDuplicate sample ID: Split sample collected (Y/N): NoSplit sample ID: COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
<u>Perchlorate</u>	<u>314</u>	<u>HDPE</u>			
<u>Voc's</u>	<u>8060</u>	<u>Voa Vials</u>			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045358

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090204-MK

Location Code: 47WW15

Task: GW DATA GAPS AUG04

Sample Number: L0001-47WW15

Collection Date: 9/2/04

Sample Name: L0001-47WW15-00

Collection Time: 1505

Sampling Method: BA

Start Depth: 24.10

Sample Type: GW

Sample Purpose: REG

End Depth: 24.10

Sampling Equip: bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 090204-TB

(ER)

N/A

(FB) N/A

Sample Team: A. Willmore, C. Mabe

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

Lot Control#:

Groundwater Information:

Measured Well Depth: 91.91

Depth To Water: 23.63

Comments:

Sketch Location:

Logged BY / Date:

M. All 9/2/04

Reviewed BY / Date:

9/2/04

Sample Collection Log

00045359

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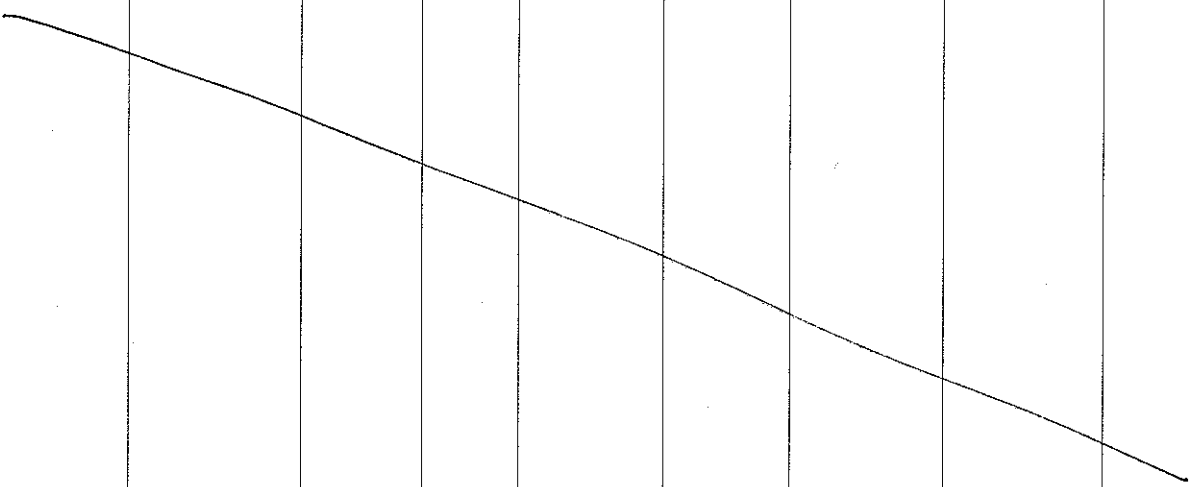
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW15

Sample Number: L0001-47WW15

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	10:15	24.10	150.3	7.98	1.079	71.4	1.20	25.58	3.0

Logged BY / Date:

M. Hill
9/2/04

Reviewed BY / Date:

De. H. Hill 9/2/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: <u>47</u>	Sampling location ID: <u>47ww15</u>
Project Name/ #: <u>LHAAP</u>	Sample ID: <u>47ww15</u>
Weather: <u>Cloudy</u> , <u>90s</u>	Collection Time/Date: <u>15:05</u> <u>9/2/04</u>

Pump Installation

Pump installation crew: <u>A. Willmore, C. Mabe</u>	Installation date/beginning time: <u>9/2/04 13:15</u>
PID/FID reading (well head/background): <u>0.0</u>	Installation date/completion time: <u>9/2/04 19:15</u>
Casing diameter (inches): <u>4"</u>	Screen Interval (ft. BTOC): <u>81.31</u> to <u>91.31</u>
Total well Depth (ft. BTOC): <u>91.31</u>	Pump intake depth (ft BTOC): <u>81.31</u>
Initial (pre-installation) DTW/time: <u>23.63</u>	Post-installation DTW/time: <u>23.44</u>
Final (after pump priming) DTW/time: _____	Max. sustainable pump rate (mL/min): <u>100</u>
Free product (circle): <u>LNAPL / DNAPL</u>	Appearance of product: <u>—</u>
Volume of water removed during priming (mL): _____	Discharge tube diameter (3/8" or 1/4"): <u>3/8"</u>
Discharge tube length (ft.): <u>100'</u>	Inlet reducer used (Y/N): <u>No</u>

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = ~40 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: <u>A. Willmore, C. Mabe</u>	PID/FID reading (well head/background): <u>0.0</u>
Purge date/beginning time: <u>9/2/04</u>	Purge date/completion time: <u>9/2/04 14:58</u>
Initial (pre-purging) DTW (ft. BTOC): <u>23.63</u>	Final (post-purging) DTW (ft. BTOC): <u>14.10</u>
Calculated tubing + pump volume: <u>NA</u>	No. of tubing + pump volumes purged: <u>—</u>

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = ~40 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>40</u>	<u>40</u>							<u>40</u>
Refill Setting	<u>13</u>	<u>13.5</u>							<u>13</u>
Discharge Setting	<u>3</u>	<u>3.5</u>							<u>3.5</u>
Flow rate (mL/min)	<u>75</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
14:13	23.70	75	0.1	31.17	0.014	6.43	190.1	6.77	0.1
14:18	23.72	100	0.2	26.84	1.029	8.00	150.3	3.95	55.0
14:23	23.78	100	0.4	26.84	1.030	8.00	150.2	3.92	59.3
14:28	23.88	100	0.6	25.91	1.061	7.98	152.3	2.41	62.3
14:33	24.99	100	0.6	25.64	1.070	7.98	154.1	2.01	71.4
14:38	24.09	100	0.8	25.60	1.079	7.97	156.9	1.62	76.5
14:43	24.09	100	1.0	25.58	1.079	7.98	153.3	1.34	79.1
14:48	24.09	100	1.2	25.59	1.079	7.99	153.3	1.34	79.3



GROUNDWATER SAMPLING FORM

[illegible]

Sampling beginning time: 13:05 Sampling completion time: 16:12

[illegible]

Sample ID: 47 MW 15
Duplicate sample collected (Y/N): N
Split sample collected (Y/N): N
COC No(s): _____

Sample collection date/time: 9/2/04 15:00
Duplicate sample ID: —
Split sample ID: —

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
Perchlorate	314	HIDPE			
VOCs	8060	via Vials			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090104-MK

Location Code: 47WW28

Task: GW DATA GAPS AUG04

Sample Number: L0001-47WW28

Collection Date: 9/1/04

Sample Name: L0001-47WW28-00

Collection Time: 1241

Sampling Method: BA

Start Depth: 15.87

Sample Type: GW

Sample Purpose: REG

End Depth: 15.96

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) 083004-TB

(ER)

v/A

(FB)

n/A

Sample Team: W. Critz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 25.10

Depth To Water: 15.87

Comments:

Sketch Location:

Logged BY / Date:

09-01-04

Reviewed BY / Date:

9/01/04

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW28

Sample Number: L0001-47WW28

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>see GW Sampling Log 47WW28 WC</p>									
Sample: 241 250		15-90	-12.9	6.41	3359	-3.6	0.83	25.44	1.5901

Logged BY / Date: [Signature]
09-01-04

Reviewed BY / Date: [Signature] 9/01/04



GROUNDWATER SAMPLING FORM

Sheet ___ of ___

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1230	15.96	100	4.0	24.58	3.336	6.40	-11.2	0.88	-2.7
1235	15.96	100	4.5	24.52	3.336	6.40	-11.6	0.85	-3.1
1240	15.96	100	5.0	24.60	3.336	6.40	-12.1	0.86	-3.3

Sampling

Sampling beginning time: 1241

Sampling completion time: 1246

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1250	15.96	100	6.0	25.44	3.359	6.41	-12.9	0.83	-3.6

Sample Information

Sample ID: 47WW28

Sample collection date/time: 9/1/04 1241

Duplicate sample collected (Y/N): N

Duplicate sample ID: N/A

Split sample collected (Y/N): N

Split sample ID: N/A

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC FULL	8260B	3-40mL v/ HCL			
Perchlorate	314	2-250mL HDPE			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045366

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-090104-MK

Location Code: 47WW29

Task: GW DATA GAPS AUG04

Sample Number: L0001-47WW29

Sample Name: L0001-47WW29-00

Collection Date: 09-01-04

Collection Time: 1021

Sampling Method: BA

Start Depth: 14.53

Sample Type: GW

Sample Purpose: REG

End Depth: 14.77

Sampling Equip: QED pump non dedicated Teflon Bladder

Sample Matrix: WATER

QC Partners:

(TB) 083004-TB (ER) N/A (FB) N/A

Sample Team: M. Martinez / W. Critz

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 64.83

Depth To Water: 14.53

Comments:

MS/MSD

Sketch Location:

Logged BY / Date:

09-01-04

Reviewed BY / Date:

9/1/04

Sample Collection Log

845714 LONGHORN AAP

Manager: Praveen Srivastav

47-090104-mk

RFA / COC Number: ~~No COC~~

Location Code: 47WW29

Task: GW DATA GAPS AUG0

Sample Number: L0001-47WW29-A

Collection Date: 01-SEP-04

Sample Name: 47WW29-GW-L0001-47WW29-MS-MS

Collection Time: 10:21

Sampling Method: BA

Start Depth: 14.53

Sample Type: GW

Sample Purpose: MS

End Depth: 14.77

Sample Matrix: WATER

Sample Team: WC

Analytical Suite	Containers					Units	Type
	Flt	Frtn	Qty	Size			
VOC-FULL	N	A	3	40	mL	VOA	VIAL
PERC	N	B	1	1	L	HDPE	

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date: Praveen Srivastav 9/1/04

Reviewed BY / Date: Praveen Srivastav 9/1/04

Sample Collection Log

845714 LONGHORN AAP

Manager: Praveen Srivastav

47-090104-MK
RFA / COC Number: ~~No COC~~

Location Code: 47WW29

Task: GW DATA GAPS AUG0

Sample Number: L0001-47WW29-N

Collection Date: 01-SEP-04

Sample Name: 47WW29-GW-L0001-47WW29-MSD-MSD

Collection Time: 10:21

Sampling Method: BA

Start Depth: 14.53

Sample Type: GW

Sample Purpose: MSD

End Depth: 14.77

Sample Matrix: WATER

Sample Team: WC

Analytical Suite	Containers					
	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date: Praveen Srivastav 9/1/04

Reviewed BY / Date: Praveen Srivastav 9/1/04

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW29

Sample Number: L0001-47WW29

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
SEE FLUSF 47WW29 (MSM)									
Sample:	1040	14.77	-28.5	6.31	1.448	-2.4	0.66 mg/l	20.83	1.98 gal.

Logged BY / Date:

[Signature]
01-01-04

Reviewed BY / Date:

[Signature] 9/1/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 47 Longhorn AAP
 Project Name/ID: Longhorn AAP
 Weather: Sunny

Sampling location ID: 47WW29
 Sample ID: 47WW29
 Collection Time/Date: 09-01-04

Pump Installation

Pump installation crew: M. Martinez
 PID/FID reading (well head/background): 3.3 / 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 64.83
 Initial (pre-installation) DTW/time: 14.53 / 0840
 Final (after pump priming) DTW/time: 14.59 / 0912
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 62'

Installation date/beginning time: 09-01-04 / 0855
 Installation date/completion time: 09-01-04 / 0856
 Screen Interval (ft. BTOC): 54 to 64
 Pump intake depth (ft. BTOC): 59
 Post-installation DTW/time: 14.13 / 0857
 Max. sustainable pump rate (mL/min): 100 - 4 in
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez
 Purge date/beginning time: 09-01-04 / 0908
 Initial (pre-purging) DTW (ft. BTOC): 14.53
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0 / 0.0
 Purge date/completion time: 9/1/04 1041
 Final (post-purging) DTW (ft. BTOC): 14.77
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>40</u>	<u>35</u>							<u>35</u>
Refill Setting	<u>25</u>	<u>27</u>							<u>27</u>
Discharge Setting	<u>5</u>	<u>3</u>							<u>3</u>
Flow rate (mL/min)	<u>150</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0925	14.77	100	0	19.81	1.391	6.40	-5.4	2.30	-1.7
0930	14.76	100	0.5	19.77	1.393	6.35	-7.6	1.38	-1.4
0935	14.77	100	1.0	19.76	1.397	6.34	-4.9	1.15	-1.8
0940	14.77	100	1.5	19.77	1.402	6.34	-10.9	1.06	-1.8
0945	14.77	100	2.0	19.79	1.410	6.34	-21.1	0.95	-2.2
0950	14.77	100	2.5	19.81	1.411	6.32	-24.8	0.92	-1.9
0955	14.77	100	3.0	19.87	1.420	6.32	-24.8	0.85	-1.7
1000	14.77	100	3.5	19.91	1.425	6.32	-25.7	0.77	-1.9



GROUNDWATER SAMPLING FORM

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1005	14.77	100	4.0	20.02	1.428	6.31	-26.9	0.69	-2.2
1010	14.77	100	4.5	20.10	1.431	6.32	-26.9	0.67	-1.9
1015	14.77	100	5.0	20.21	1.434	6.30	-26.9	0.65	-2.0
1020	14.77	100	5.5	20.20	1.436	6.31	-26.6	0.64	-1.9

Sampling

Sampling beginning time: 1021Sampling completion time: 1031

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1040	14.77	100	7.5	20.63	1.448	6.31	-28.5	0.66	-2.4

Sample Information

Sample ID: 47WW29Sample collection date/time: 9/1/04 1021Duplicate sample collected (Y/N): NDuplicate sample ID: N/ASplit sample collected (Y/N): NSplit sample ID: N/ACOC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC FULL	8260B	3-40mL VOA			
Perchlorate	314	1-250 mL HDPE			

Comments:

MS/MSD

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 47-096204-TB

Location Code: 47WW30

Task: GW DATA GAPS AUG04

Sample Number: L0001-47WW30

Collection Date: 9/1/04

Sample Name: L0001-47WW30-00

Collection Time: 1726

Sampling Method: BA

Start Depth: 18.90

Sample Type: GW

Sample Purpose: REG

End Depth: 19.10

Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) 09204-TB

(ER) N/A

(FB) N/A

Sample Team: W. Critz / M. Mathew

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 25.28

Depth To Water: 18.90

Comments:

Sketch Location:

Logged BY / Date: [Signature] 9/2/04

Reviewed BY / Date: [Signature] 9/2/04

Sample Collection Log

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 47WW30

Sample Number: L0001-47WW30

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>see GW Sample Form 47WW30 WC</p>									
Sample:	1735	19.10	-49.5	6.64	5.828	-2.4	0.93 $\frac{3}{4}$	22.68	1.406 gal

Logged BY / Date: W. Critz 9/1/04

Reviewed BY / Date: [Signature] 9/2/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 47WW30
 Project Name/#: Loughran AAP
 Weather: Mostly Sunny

Sampling location ID: 47WW30
 Sample ID: 47WW30
 Collection Time/Date: 1726 9/1/04

Pump Installation

Pump installation crew: W. Critz / M. Martinez
 PID/FID reading (well head/background): 9.7 / 0.0
 Casing diameter (inches): 4 in
 Total well Depth (ft. BTOC): 25.28
 Initial (pre-installation) DTW/time: 18.90 1614
 Final (after pump priming) DTW/time: 18.98 1640
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 48'

Installation date/beginning time: 9/1/04 1623
 Installation date/completion time: 9/1/04 1625
 Screen Interval (ft. BTOC): 15 to 25
 Pump intake depth (ft. BTOC): 23
 Post-installation DTW/time: 18.81 1626
 Max. sustainable pump rate (mL/min): 105
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz / M. Martinez
 Purge date/beginning time: 9/1/04 1650
 Initial (pre-purging) DTW (ft. BTOC): 18.90
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 9.7 / 0.0
 Purge date/completion time: 9/1/04 1735
 Final (post-purging) DTW (ft. BTOC): 19.10
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>20</u>	<u>21</u>						<u>21</u>
Refill Setting	<u>13.0</u>	<u>13.5</u>	<u>13.5</u>						<u>13.5</u>
Discharge Setting	<u>2.0</u>	<u>1.5</u>	<u>1.5</u>						<u>1.5</u>
Flow rate (mL/min)	<u>140</u>	<u>90</u>	<u>105</u>						<u>105</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>1650</u>	<u>19.06</u>	<u>140</u>	<u>0</u>	<u>24.06</u>	<u>5.801</u>	<u>6.65</u>	<u>-30.8</u>	<u>1.95</u>	<u>0.3</u>
<u>1655</u>	<u>19.09</u>	<u>105</u>	<u>1.275</u>	<u>22.99</u>	<u>5.823</u>	<u>6.62</u>	<u>-39.0</u>	<u>1.14</u>	<u>-0.4</u>
<u>1700</u>	<u>19.10</u>	<u>105</u>	<u>1.75</u>	<u>22.71</u>	<u>5.832</u>	<u>6.62</u>	<u>-40.3</u>	<u>1.07</u>	<u>-0.4</u>
<u>1705</u>	<u>19.10</u>	<u>105</u>	<u>2.275</u>	<u>22.43</u>	<u>5.829</u>	<u>6.62</u>	<u>-41.9</u>	<u>0.96</u>	<u>-0.3</u>
<u>1710</u>	<u>19.10</u>	<u>105</u>	<u>2.80</u>	<u>22.22</u>	<u>5.827</u>	<u>6.63</u>	<u>-43.3</u>	<u>0.92</u>	<u>-1.3</u>
<u>1715</u>	<u>19.11</u>	<u>105</u>	<u>3.325</u>	<u>22.20</u>	<u>5.822</u>	<u>6.63</u>	<u>-44.1</u>	<u>0.88</u>	<u>-1.8</u>
<u>1720</u>	<u>19.10</u>	<u>100</u>	<u>3.825</u>	<u>22.19</u>	<u>5.824</u>	<u>6.63</u>	<u>-44.9</u>	<u>0.85</u>	<u>-2.2</u>
<u>1725</u>	<u>19.10</u>	<u>100</u>	<u>4.325</u>	<u>22.36</u>	<u>5.818</u>	<u>6.63</u>	<u>-46.1</u>	<u>0.83</u>	<u>-2.0</u>



Sample Collection Log

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LONGHORN AAP

Manager:

Praveen Srivastav

RFA / COC Number: 47-090204-mk

Location Code: 47WW31

Task: GW DATA GAPS AUG04

Sample Number: L0001-47WW31

Collection Date: 09-01-04

Sample Name: L0001-47WW31-00

Collection Time: 1520

Sampling Method: BA

Start Depth: 18.72

Sample Type: GW

Sample Purpose: REG

End Depth: 18.90Sampling Equip: QED Pump nondescript Teflon bladder

Sample Matrix: WATER

QC Partners:

(TB) 090204-AB

(ER)

N/A

(FB)

N/ASample Team: M. Martinez / C. Ortiz

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 52Depth To Water: 18.72

Comments:

Sketch Location:

Logged BY / Date:

[Signature]
09-01-04

Reviewed BY / Date:

[Signature] 9/2/04

Sample Collection Log

00045377

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845714 LONGHORN AAP
Manager: Praveen Srivastav

Location Code: 47WW31

Sample Number: L0001-47WW31

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>SEE GWSF 47WW31 MSU</p>									
Sample: 1535	1526	18.90	42.9	6.70	4.509	4.8	0.84	21.01	1.74 gallons

Logged BY / Date: [Signature]
09-01-04

Reviewed BY / Date: [Signature] 9/2/14



GROUNDWATER SAMPLING FORM

Sheet 1 of

Operable Unit/Site ID: A-947 Longhorn AHP
 Project Name/ID: Longhorn AHP
 Weather:

Sampling location ID: 47WW31Sample ID: 47WW31Collection Time/Date: 09-01-04

Pump Installation

Pump installation crew: M. Martinez/W.C. 42
 PID/FID reading (well head/background): 5.5/0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 52.00
 Initial (pre-installation) DTW/time: 18.72/1354
 Final (after pump priming) DTW/time: 18.90/1435
 Free product (circle): LNAPL/DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 60

Installation date/beginning time: 09-01-04 / 1417Installation date/completion time: 09-01-04 / 1418Screen Interval (ft. BTOC): 42 to 52Pump intake depth (ft. BTOC): 48Post-installation DTW/time: 18.27/1419Max. sustainable pump rate (mL/min): 120Appearance of product: NADischarge tube diameter (3/8" or 1/4"): 3/8Inlet reducer used (Y/N): NO

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez/W.C. 42
 Purge date/beginning time: 09-01-04/1430
 Initial (pre-purging) DTW (ft. BTOC):
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 5.5/0.0Purge date/completion time: 09-01-04/1535Final (post-purging) DTW (ft. BTOC): 18.90No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>35</u>								<u>35</u>
Refill Setting	<u>27.0</u>								<u>27.0</u>
Discharge Setting	<u>3.0</u>								<u>3.0</u>
Flow rate (mL/min)	<u>120</u>								<u>120</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1440	18.93	120	0	22.87	3.935	6.66	207.4	3.51	5.2
1445	18.92	120	0.6	22.75	4.349	6.66	140.7	2.18	5.1
1450	18.91	120	1.2	22.61	4.507	6.66	95.1	1.58	4.0
1455	18.90	120	1.8	22.34	4.561	6.66	73.6	1.23	3.2
1500	18.90	120	2.4	22.22	4.579	6.66	56.7	1.01	3.5
1505	18.90	120	3.0	22.11	4.577	6.66	54.0	0.95	3.5
1510	18.90	120	3.5	21.99	4.573	6.67	48.1	0.88	3.8
1515	18.90	120	4.2	22.00	4.572	6.67	47.3	0.85	4.0

Sheet of

[illegible]

Sampling

Sampling beginning time: 1526

Sampling completion time: 1528

[illegible]

Sample Information

Sample ID: 47 WW31

Sample collection date/time: 09-04-1526

Duplicate sample collected (Y/N): *no*

Duplicate sample ID: WA

Split sample collected (Y/N): no

Split sample ID: NA

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC-Full	8260	3 VOA'S			
Perchlorate	314	230mL HDPE (1x)			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

LHAAP-48

**GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS**



Sample Collection Log

00045381

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 48-091304-CO
48-091304-KE

Location Code: 48WW01

Sample Number: L0001-48WW01

Sample Name: L0001-48WW01-00

Sampling Method: BA

Sample Type: GW

Sample Purpose: REG

Sampling Equip:

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: GW DATA GAPS AUG04

Collection Date: 9/13/04

Collection Time: 1345

Start Depth: 22.94

End Depth: 22.94

Sample Matrix: WATER

D. Holdenfield

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE	HNO ₃
PERC	N	B	1	1	L	HDPE	
Dioxins-Furans	N	C	2	1	L	Amb. Glass	

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 57.04

Depth To Water: 22.32

Comments:

Sketch Location:

Logged BY / Date: [Signature] 9/13/04

Reviewed BY / Date: [Signature] 9/13/04



Sample Collection Log

00045382

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 48WW01

Sample Number: L0001-48WW01

Sample Name: L0001-48WW01-00-QC

Sampling Method: BA

Sample Type: GW

Sample Purpose: FD

Sampling Equip:

Bladder pump

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

RFA / COC Number:

48-091304-CO

48 091304 -KE

Task: GW DATA GAPS AUG04

Collection Date:

9/13/04

Collection Time:

1345

Start Depth:

22.94

End Depth:

22.94

Sample Matrix:

WATER

Sample Team:

D. Holden Field
A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

Dioxins-Furans	N	A	2	1	L	Amb. Glass
METALS-W	N	B	1	500	mL	HDPE
PERC	N	C	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth:

57.04

Depth To Water:

22.32

Comments:

Sketch Location:

Logged BY / Date:

D. Holden 9/13/04

Reviewed BY / Date:

D. Holden 9/13/04

Sample Collection Log

00045383

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845714 LONGHORN AAP

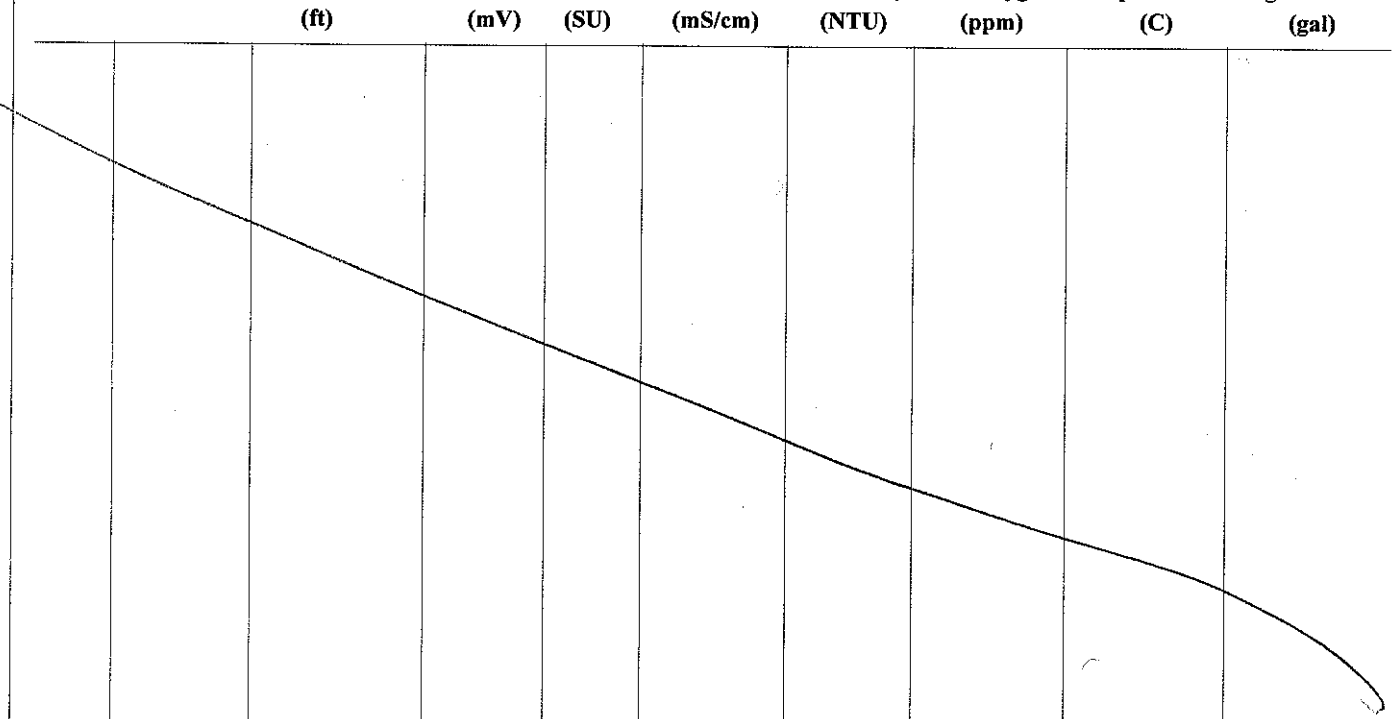
Manager: Praveen Srivastav

Location Code: 48WW01

Sample Number: L0001-48WW01

+ L0001-48WW01-QC
(FD)

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	1450 DA 9/13/04	22.94	4.5	6.51	1.031	9.7	0.84	22.90	3.3

Logged BY / Date: Santhosh 9/13/04

Reviewed BY / Date: Santhosh 9/13/04



GROUNDWATER SAMPLING FORM

00045384

Sheet 1 of 2

Operable Unit/Site ID: 98
Project Name/ #: CHAMP
Weather: CLOUDY 80s to 90s

Sampling location ID: 48WV01
Sample ID: 48WV01
Collection Time/Date: _____

Pump Installation

Pump installation crew: A. Willmore, D. Holterfield
PID/FID reading (well head/background): 0.0
Casing diameter (inches): 4"
Total well Depth (ft. BTOC): 57.14
Initial (pre-installation) DTW/time: 22.32
Final (after pump priming) DTW/time: _____
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 60'

Installation date/beginning time: 9/13/04 12:03
Installation date/completion time: 9/13/04 12:04
Screen Interval (ft. BTOC): 47.14 to 57.14
Pump intake depth (ft BTOC): 52.14
Post-installation DTW/time: 21.80 12:06
Max. sustainable pump rate (mL/min): _____
Appearance of product: —
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 22.42 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, D. Holterfield
Purge date/beginning time: 9/13/04 12:25
Initial (pre-purging) DTW (ft. BTOC): 22.32
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
Purge date/completion time: 9/13/04 12:35
Final (post-purging) DTW (ft. BTOC): 22.94
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 22.42 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>30</u>	<u>30.21</u>	<u>26</u>						<u>26</u>
Refill Setting	<u>10</u>	<u>14</u>	<u>15</u>						<u>15</u>
Discharge Setting	<u>5</u>	<u>6</u>	<u>5</u>						<u>5</u>
Flow rate (mL/min)	<u>—</u>	<u>50</u>	<u>110</u>						<u>110</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
12:25	22.41	50	0.1	27.44	0.380	6.48	131.1	6.23	9.4
12:30	22.49	110	0.3	22.47	1.016	6.56	138.2	5.53	21.4
12:35	22.69	110	0.4	22.42	1.053	6.51	139.7	2.26	19.9
12:40	22.91	110	0.6	22.03	1.050	6.61	138.5	1.71	19.4
12:45	22.93	110	0.8	22.42	1.048	6.51	122.0	1.53	19.7
12:50	22.94	110	1.0	22.85	1.050	6.52	56.0	1.49	19.8
12:55	22.94	110	1.2	22.56	1.046	6.52	50.0	1.15	19.3
13:00	22.94	110	1.3	22.63	1.046	6.52	34.4	1.01	19.1

Sample Collection Log

00045386

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 48-091404-KF
48-091404-CO

Location Code: **LHSMW62**

Sample Number: **L0001-LHSMW6**

Sample Name: **L0001-LHSMW62-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: 1" PVC Bailer

QC Partners:

(TB) (ER) (FB)

Task: **GW DATA GAPS AUG04**

Collection Date: 9/13/04

Collection Time: 16:52

Start Depth: 21.45

End Depth: 21.73

Sample Matrix: **WATER**

Sample Team: A. Willmore, B. Ansley

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE	HN23
PERC	N	B	1	1	L	HDPE	
Dioxins-Furans	N	C	2	1	L	Amb. Glass	

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 29.45

Depth To Water: 20.91

Comments:

Had to bail well due to slow recharge characteristics

Sketch Location:

Logged BY / Date: M. Hill

Reviewed BY / Date:

9/13/04

9/14/04

Sample Collection Log

00045387

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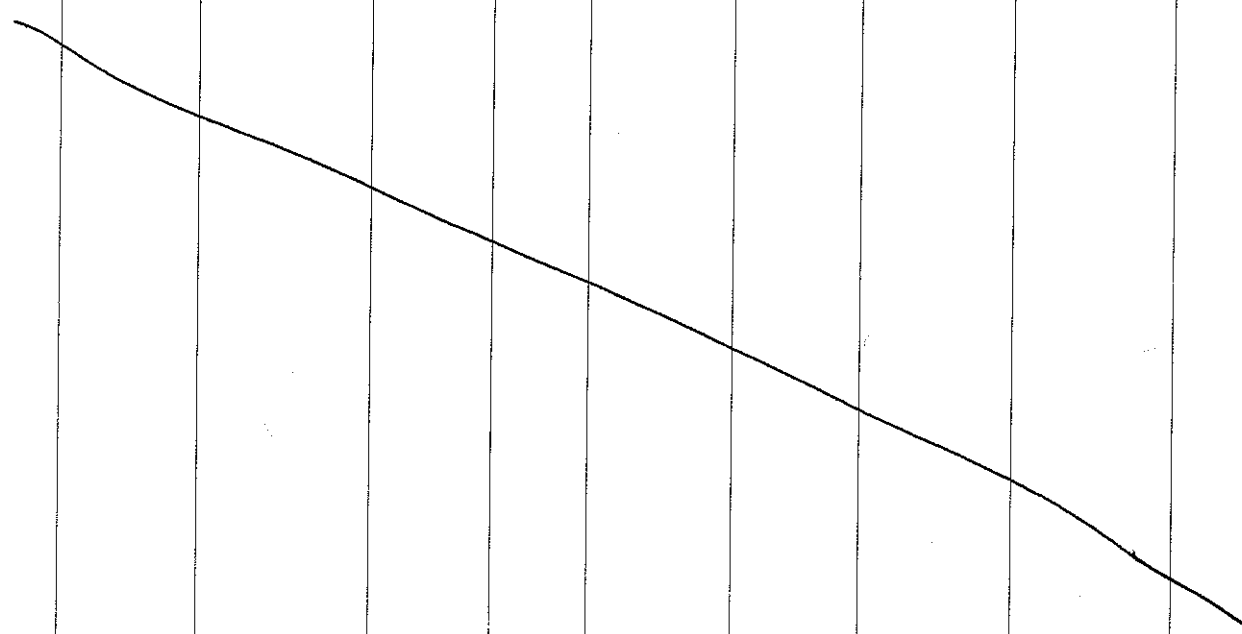
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: **LHSMW62**

Sample Number: **L0001-LHSMW6**

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	16:59	21.73	81.3	5.32	3.143	20.4	1.04	23.74	10 gal

Logged BY / Date:

M. [Signature]
9/13/04

Reviewed BY / Date:

[Signature] 9/14/04



GROUNDWATER SAMPLING FORM

00045388

Sheet 1 of 2

Operable Unit/Site ID: 48
Project Name/ #: LHAAP
Weather: CLEAR 80s to 90s

Sampling location ID: @ 48 in LHAAP
Sample ID: LHSM 62
Collection Time/Date: 9/13/04 16:53

Pump Installation

Pump installation crew: A. Williams, D. Holtorf
PID/FID reading (well head/background): 0.0
Casing diameter (inches): 4"
Total well Depth (ft. BTOC): 29.45
Initial (pre-installation) DTW/time: 20.91 9:02 8:48
Final (after pump priming) DTW/time: 9:01
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL):
Discharge tube length (ft.): 60'

Installation date/beginning time: 9/13/04 8:58
Installation date/completion time: 9/13/04 8:59
Screen Interval (ft. BTOC): 19.45 to 29.45
Pump intake depth (ft BTOC): 29.45 9:03
Post-installation DTW/time: 20.76
Max. sustainable pump rate (mL/min): 200
Appearance of product:
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 10.51 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Williams, D. Holtorf
Purge date/beginning time:
Initial (pre-purging) DTW (ft. BTOC):
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
Purge date/completion time: 9/13/04
Final (post-purging) DTW (ft. BTOC):
No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 10.51 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>17</u>	<u>17</u>							<u>17</u>
Refill Setting	<u>10</u>	<u>11.4</u>							<u>11.4</u>
Discharge Setting	<u>5</u>	<u>4.6</u>							<u>4.6</u>
Flow rate (mL/min)	<u>200</u>	<u>105</u>							<u>105</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume of Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>9:27</u>	<u>21.27</u>	<u>105</u>	<u>0.2</u>	<u>21.78</u>	<u>3.163</u>	<u>5.29</u>	<u>75.3</u>	<u>1.26</u>	<u>108.6</u>
<u>9:32</u>	<u>21.43</u>	<u>105</u>	<u>0.3</u>	<u>21.93</u>	<u>3.169</u>	<u>5.29</u>	<u>74.4</u>	<u>1.19</u>	<u>100.9</u>
<u>9:37</u>	<u>21.51</u>	<u>105</u>	<u>0.4</u>	<u>22.17</u>	<u>3.171</u>	<u>5.30</u>	<u>73.6</u>	<u>1.23</u>	<u>73.9</u>
<u>9:42</u>	<u>21.52</u>	<u>105</u>	<u>0.5</u>	<u>22.41</u>	<u>3.176</u>	<u>5.30</u>	<u>76.3</u>	<u>1.04</u>	<u>71.4</u>
<u>9:47</u>	<u>21.53</u>	<u>105</u>	<u>0.7</u>	<u>22.52</u>	<u>3.174</u>	<u>5.31</u>	<u>77.7</u>	<u>1.04</u>	<u>64.5</u>
<u>9:52</u>	<u>21.54</u>	<u>105</u>	<u>0.9</u>	<u>22.51</u>	<u>3.168</u>	<u>5.31</u>	<u>76.4</u>	<u>0.98</u>	<u>61.4</u>
<u>9:57</u>	<u>21.65</u>	<u>105</u>	<u>1.0</u>	<u>22.72</u>	<u>3.162</u>	<u>5.31</u>	<u>74.1</u>	<u>0.95</u>	<u>42.2</u>
<u>10:02</u>	<u>21.73</u>	<u>105</u>	<u>1.2</u>	<u>22.79</u>	<u>3.164</u>	<u>5.31</u>	<u>73.9</u>	<u>0.91</u>	<u>56.2</u>

Sample Collection Log

00045390

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: **LHSMW63**

Sample Number: **L0001-LHSMW6**

Sample Name: **L0001-LHSMW63-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: _____

QC Partners:

(TB) _____

(ER) _____

(FB) _____

Task: **GW DATA GAPS AUG04**

Collection Date: **9/13/04**

Collection Time: _____

Start Depth: _____

End Depth: _____

Sample Matrix: **WATER**

Sample Team: _____

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Analytical Suite	Containers				Units	Type
	Flt	Frtn	Qty	Size		
METALS-W	N	A	1	500	mL	HDPE HNO₃
PERC	N	B	1	1	L	HDPE
Dioxins-Furans	N	C	2	1	L	Amb. Glass

Groundwater Information:

Measured Well Depth: **22.12**

Depth To Water: **21.60**

Comments:

0845- well only 6 inches water Bailed Dry - ~1 quart reddish brown silty water in appearance
No sample Collected

Sketch Location: _____

Logged BY / Date: _____

Reviewed BY / Date: _____

Reviewed BY / Date:

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
		Bail	Dry	0850		~1 quart			
				Return @ 1030		DTW = 22.02			
				1340		DN = 22.00			
				1550		DTW = 22.00			
				9/14/04 0846		DTW = 21.99			
				No sample collected.					

Sample Collection Log

00045394

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 48-091404-KE
48-091404-CO

Location Code: **LHSMW64**

Sample Number: **L0001-LHSMW64**

Sample Name: **L0001-LHSMW64-00**

Sampling Method: **BA + MS, MSD**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: PVC Disposable bailer

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: **GW DATA GAPS AUG04**

Collection Date: 9/13/04

Collection Time: 1540

Start Depth: 21.33

End Depth: N/A

Sample Matrix: **WATER**

Sample Team: W. Critz / M. Martinez

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite Flt Frtn Qty Size Units Type

HNO3

METALS-W	N	A	1	500	mL	HDPE	<u>HNO3</u>
PERC	N	B	1	1	L	HDPE	
Dioxins-Furans	N	C	2	1	L	Amb. Glass	

Groundwater Information:

Measured Well Depth: 27.75 Depth To Water: 21.33

Comments:

Bailed well Dry (Approx 5 gal.) Returned and
sampled well. MS/MSD also collected from this
well

Sketch Location:

Logged BY / Date: W. Critz 9/13/04

Reviewed BY / Date: D. [Signature] 9/14/04

Sample Collection Log

00045395

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845714 LONGHORN AAP
Manager: Praveen Srivastav

Location Code: LHSMW64

Sample Number: L0001-LHSMW6

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See EW Sampling Form LHSMW64									
[Handwritten signature]									
[Handwritten signature]									
Sample:									

Bailed Dry and Sampled

Logged BY / Date:

[Signature] 9/13/04

Reviewed BY / Date:

[Signature] 9/14/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 48 Longhorn NW
 Project Name/ID: Longhorn AAP
 Weather: _____

Sampling location ID: LHS MLW 004
 Sample ID: LHS MLW 004
 Collection Time/Date: 9-13-04 / 1540

Pump Installation

Pump installation crew: M. Martinez / W. Chitt
 PID/FID reading (well head/background): 0.0/0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 27.75
 Initial (pre-installation) DTW/time: 21.33 / 0900
 Final (after pump priming) DTW/time: 21.15 / 0915 21.45
 Free product (circle): LNAPL / DNAPL 2940
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): _____

Installation date/beginning time: 9-13-04 / 0913
 Installation date/completion time: 9-13-04 / 0914
 Screen Interval (ft. BTOC): 17.75 to 27.75
 Pump intake depth (ft. BTOC): 25'
 Post-installation DTW/time: 21.15 / 0915
 Max. sustainable pump rate (mL/min): ~1A
 Appearance of product: 2A
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): no

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / W. Chitt
 Purge date/beginning time: 09-13-04 / 0930
 Initial (pre-purging) DTW (ft. BTOC): 21.33
 Calculated tubing + pump volume: _____ NA

PID/FID reading (well head/background): 0.0/0.0
 Purge date/completion time: 09-13-04 / 0930
 Final (post-purging) DTW (ft. BTOC): ~1A
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>20</u>							
Refill Setting	<u>12.0</u>	<u>13.0</u>							
Discharge Setting	<u>3.0</u>	<u>2.0</u>							
Flow rate (mL/min)	<u>180</u>	<u>100</u>							

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>0950</u>	<u>21.87</u>	<u>100</u>	<u>0</u>	<u>21.47</u>	<u>0.323</u>	<u>5.84</u>	<u>344.8</u>	<u>1.22</u>	<u>137.3</u>
<u>0955</u>	<u>22.01</u>	<u>100</u>	<u>0.5</u>	<u>21.55</u>	<u>0.324</u>	<u>5.87</u>	<u>322.0</u>	<u>1.11</u>	<u>124.8</u>
<u>1000</u>	<u>22.18</u>	<u>100</u>	<u>1.0</u>	<u>21.57</u>	<u>0.325</u>	<u>5.85</u>	<u>302.1</u>	<u>0.97</u>	<u>109.8</u>
<u>1005</u>	<u>22.26</u>	<u>100</u>	<u>1.5</u>	<u>21.75</u>	<u>0.325</u>	<u>5.89</u>	<u>288.0</u>	<u>0.88</u>	<u>96.6</u>
<u>1010</u>	<u>22.34</u>	<u>100</u>	<u>2.0</u>	<u>21.80</u>	<u>0.325</u>	<u>5.87</u>	<u>287.2</u>	<u>0.87</u>	<u>89.7</u>

Hand part

Sample Collection Log

00045398

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: **LHSMW65**

Sample Number: **L0001-LHSMW6**

Sample Name: **L0001-LHSMW65-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: _____

QC Partners:

(TB) _____

(ER) _____

(FB) _____

Task: **GW DATA GAPS AUG04**

Collection Date: _____

Collection Time: _____

Start Depth: _____

End Depth: _____

Sample Matrix: **WATER**

9/13/04 W. Critz M. Martinez
Sample Team: 9/14/04 Kenneth J. Rodriguez

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Analytical Suite	Containers					
	Flt	Frtn	Qty	Size	Units	Type
METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
Dioxins-Furans	N	C	2	1	L	Amb. Glass

Groundwater Information:

Measured Well Depth: _____

Depth To Water: _____

Comments:

Return 0835 9/14/04 DTW = 20.41 TD = 20.45
Not enough to sample - No sample collected.

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: _____

Reviewed BY / Date:

[illegible]

Sample Collection Log

00045402

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: **LHSMW66**

Sample Number: **L0001-LHSMW6**

Sample Name: **L0001-LHSMW66-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: _____

QC Partners:

(TB) _____

(ER) _____

(FB) _____

Task: **GW DATA GAPS AUG04**

Collection Date: _____

Collection Time: _____

Start Depth: _____

End Depth: _____

Sample Matrix: **WATER**

Sample Team: _____

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE	HNO ₃
PERC	N	B	1	1	L	HDPE	
Dioxins-Furans	N	C	2	1	L	Amb. Glass	

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 20.45

Depth To Water: 19.97

Comments:

Bailed well dry 0930 ~1 quart

No sample collected

Sketch Location: _____

Logged BY / Date:

K. Everett 9/13/04

Reviewed BY / Date: _____



845714 LONGHORN AAP
Manager: Praveen Srivastav

Page 2 of 2

Sample Number: **L0001-LHSMW6**

Initial Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
--------------------	----------------------	------------	------------	-------------------------	--------------------	---------------------	--------------------	-----------------------

[illegible]

Logged BY/ Date: K Everett 9/13/04 Reviewed BY/ Date: _____



GROUNDWATER SAMPLING FORM

00045404

Sheet 1 of 2*Needs Lock*

Operable Unit/Site ID: _____
Project Name/ #: LHAAP
Weather: hot clear

Sampling location ID: Site 48 LHSMN66
Sample ID: _____
Collection Time/Date: No sample - well Dry

Pump Installation

Pump installation crew: K. Everett, J. Rodriguez Installation date/beginning time: 9/13/04
PID/FID reading (well head/background): 0.1 / 3.4 (Bk, sd) Installation date/completion time: _____
Casing diameter (inches): 4" PVC Screen Interval (ft. BTOC): _____ to _____
Total well Depth (ft. BTOC): 20.45 Pump intake depth (ft BTOC): _____
Initial (pre-installation) DTW/time: 19.97 Post-installation DTW/time: _____
Final (after pump priming) DTW/time: NA Max. sustainable pump rate (mL/min): _____
Free product (circle): LNAPL / DNAPL Appearance of product: _____
Volume of water removed during priming (mL): _____ Discharge tube diameter (3/8" or 1/4"): 3/8
Discharge tube length (ft.): 30' Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: _____ PID/FID reading (well head/background): _____
Purge date/beginning time: _____ Purge date/completion time: _____
Initial (pre-purging) DTW (ft. BTOC): _____ Final (post-purging) DTW (ft. BTOC): _____
Calculated tubing + pump volume: NA No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
				0930	~1 quart				
				1035	DTW = 20.38'				
				1345	DTW = 20.33'				
				1600	DTW = 20.32'				
			9/14/04	0825	DTW = 20.32'				
No Samples Collected									

0.0211 qt
1 / 0.0845 gal

13

65

65

78

LHAAP-50

GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS

Sample Collection Log

00045407

Page 1 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number:

Location Code: **50WW01**

Sample Number: **L0001-50WW01**

Sample Name: **L0001-50WW01-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: Bladder Pump

QC Partners:

(TB) ~~AS~~ TB1 (ER) N/A (FB) N/A

Task: **GW DATA GAPS AUG04**

Collection Date: 8/31/04

Collection Time: 1446

Start Depth: 14.31

End Depth: 14.69

Sample Matrix: **WATER**

Sample Team: W. Critz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 23.20

Depth To Water: 14.31

Comments:

Sketch Location:

Logged BY / Date: W. Critz 8/31/04

Reviewed BY / Date: _____

Sample Collection Log

00045408

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 50WW01

Sample Number: L0001-50WW01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>See Gw Sampling Form 50WW01 WC</p>									
Sample:	1454	14.69	243.1	6.79	0.965	3.6	0.78	23.12	1.08 gal

Logged BY / Date:

W. A. [Signature] 8/31/04

Reviewed BY / Date:



GROUNDWATER SAMPLING FORM

00045409

Sheet 1 of 2

Operable Unit/Site ID: 50WW01
Project Name/ #: Loughorn Army Area Plant
Weather: Mostly Sunny

Sampling location ID: 50WW01
Sample ID: 50WW01
Collection Time/Date: _____

Pump Installation

Pump installation crew: W. Critz / M. Martinez
PID/FID reading (well head/background): 0.0 / 0.0
Casing diameter (inches): 4 in
Total well Depth (ft. BTOC): 23.20
Initial (pre-installation) DTW/time: 14.31' 1330
Final (after pump priming) DTW/time: 14.38' 1405
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 48 ft.

Installation date/beginning time: 8/31/04 1345
Installation date/completion time: 8/31/04 1347
Screen Interval (ft. BTOC): 13 to 23
Pump intake depth (ft BTOC): 19'
Post-installation DTW/time: 14.20 ft 1454
Max. sustainable pump rate (mL/min): 100 mL/min
Appearance of product: _____
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz / M. Martinez
Purge date/beginning time: 8/31/04 1402
Initial (pre-purging) DTW (ft. BTOC): 14.31
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0 / 0.0
Purge date/completion time: 8/31/04 1458
Final (post-purging) DTW (ft. BTOC): 14.69 ft
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>20</u>	<u>18</u>						<u>18</u>
Refill Setting	<u>12</u>	<u>13.5</u>	<u>13.5</u>						<u>13.5</u>
Discharge Setting	<u>3</u>	<u>1.5</u>	<u>1.5</u>						<u>1.5</u>
Flow rate (mL/min)	<u>300</u>	<u>120</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1405	14.46	120	0	22.09	0.916	6.78	218.7	1.90	2.3
1410	14.50	120	0.6	22.56	0.941	6.77	224.3	1.46	3.0
1415	14.53	100	1.1	22.53	0.951	6.81	226.9	1.18	3.2
1420	14.57	100	1.6	22.66	0.956	6.79	232.4	1.06	4.2
1425	14.60	100	2.1	22.82	0.963	6.81	236.5	0.91	4.1
1430	14.62	100	2.6	22.71	0.965	6.80	236.7	0.84	4.1
1435	14.64	100	3.1	22.74	0.965	6.80	236.7	0.80	4.1
1440	14.67	100	3.6	22.78	0.965	6.80	236.9	0.78	4.4



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1446	14.68	100	4.1	22.89	0.964	6.79	238.2	0.76	3.9

Sampling

Sampling beginning time: 1446Sampling completion time: 1452

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1454	14.69	100	5.0	23.12	0.965	6.79	243.1	0.78	3.6

Sample Information

Sample ID: 50CWW01Sample collection date/time: 8/31/04 1446Duplicate sample collected (Y/N): NDuplicate sample ID: N/ASplit sample collected (Y/N): NSplit sample ID: N/A

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC Full	8260B	Voa Vial 40ml			
Perchlorate	314	HDPE 250 ml			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

00045411

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-083004-MK

Location Code: **50WW02**

Sample Number: **L0001-50WW02**

Sample Name: **L0001-50WW02-00**

Sampling Method: **BA**

Sample Type: **GW**

Sample Purpose: **REG**

Sampling Equip: Bladder Pump

QC Partners:

(TB) 083004-TB1 (ER) N/A

(FB) N/A

Task: **GW DATA GAPS AUG04**

Collection Date: 8/30/04

Collection Time: 1331

Start Depth: 16.80

End Depth: 17.15

Sample Matrix: **WATER**

Sample Team: W. Critz / M. Martinez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 22.18 Depth To Water: 16.80

Comments:

Sketch Location:

Logged BY / Date: [Signature]
083004

Reviewed BY / Date: _____

Sample Collection Log

00045412

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 50WW02

Sample Number: L0001-50WW02

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p><i>See GW Sampling Form 50WW02 8/30/04 VC</i></p>									
Sample:	1340	17.14	310.1	6.25	1.953	4.9	2.46	25.91	1.585 gal.

Logged BY / Date: *[Signature]*
08-30-04

Reviewed BY / Date: _____



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 50WW02 Loughorn AAP Sampling location ID: 50WW02
 Project Name/ #: _____ Sample ID: 50WW02
 Weather: clear + sunny Collection Time/Date: 1331 8/30/04

Pump Installation

Pump installation crew: W. Critz M. Martinez Installation date/beginning time: 8/30/04
 PID/FID reading (well head/background): 26.2 Installation date/completion time: 8/30/04
 Casing diameter (inches): 4 in. Screen Interval (ft. BTOC): 12 to 22
 Total well Depth (ft. BTOC): 22.18 Pump intake depth (ft BTOC): 20
 Initial (pre-installation) DTW/time: 16.80 1217 Post-installation DTW/time: 16.67 1227
 Final (after pump priming) DTW/time: 16.84 1244 Max. sustainable pump rate (mL/min): _____
 Free product (circle): LNAPL / DNAPL Appearance of product: _____
 Volume of water removed during priming (mL): _____ Discharge tube diameter (3/8" or 1/4"): 3/8"
 Discharge tube length (ft.): 48' Inlet reducer used (Y/N): _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz M. Martinez PID/FID reading (well head/background): 26.2
 Purge date/beginning time: 8/30/04 1245 Purge date/completion time: 9/30/04
 Initial (pre-purging) DTW (ft. BTOC): 16.80 Final (post-purging) DTW (ft. BTOC): 17.15
 Calculated tubing + pump volume: NA No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>18</u>							<u>18</u>
Refill Setting	<u>13.5</u>	<u>13.5</u>							<u>13.5</u>
Discharge Setting	<u>1.5</u>	<u>1.5</u>							<u>1.5</u>
Flow rate (mL/min)	<u>150</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1245	16.94	150	0	24.20	1.846	6.17	289.6	2.97	25.4
1250	17.02	150	0.75	23.80	1.872	6.16	293.5	2.77	20.4
1255	17.02	100	1.5	23.80	1.878	6.16	298.0	2.69	18.0
1300	17.03	100	2.0	24.21	1.890	6.18	302.6	2.60	13.1
1305	17.05	100	2.5	24.44	1.896	6.18	304.9	2.53	11.9
1310	17.09	100	3.0	24.64	1.899	6.18	305.6	2.47	11.4
1315	17.12	100	3.5	24.97	1.903	6.19	307.4	2.43	6.4
1320	17.14	100	4.0	25.26	1.904	6.19	308.8	2.40	5.1

Sheet 2 of 2

[illegible]

Sampling

Sampling beginning time: 1331

Sampling completion time: 1336

[illegible]

Sample Information

Sample ID: 50WLW02

Sample collection date/time: 8/30/04 1331

Duplicate sample collected (Y/N): No

Duplicate sample ID: W1A

Split sample collected (Y/N): No

Split sample ID: 11/14

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC-Full	8260B	3 Vials (40mL)			
Perchlorate	314	2-250 mL plastic			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045415

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-083104-mk

Location Code: 50WW03

Task: GW DATA GAPS AUG04

Sample Number: L0001-50WW03

Collection Date: 08-30-04

Sample Name: L0001-50WW03-00

Collection Time: 1056

Sampling Method: BA

Start Depth: 17.74

Sample Type: GW

Sample Purpose: REG

End Depth: 18.05

Sampling Equip: GED pump per dedicated Teflon bladder

Sample Matrix: WATER

QC Partners:

(TB)

(ER)

(FB)

Sample Team: M. Martinez / L. Crick

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

Lot Control#:

Groundwater Information:

Measured Well Depth: 22.96

Depth To Water: 17.74

Comments:

Sketch Location:

Logged BY / Date:

08/30/04

Reviewed BY / Date:

Sample Collection Log

00045416

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 50WW03

Sample Number: L0001-50WW03

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
SEE GW SF 50WW03 msu									
Sample:	1056 1105 leading	18.05	1432	6.54	4.187	62.7	0.88	25.96	2.25 gallons

Logged BY / Date:

[Signature]
08-30-08

Reviewed BY / Date:



GROUNDWATER SAMPLING FORM

Sheet 1 of 2Operable Unit/Site ID: 50WW03 Longhorn AAPProject Name/ #: Longhorn AAP

Weather: _____

Sampling location ID: 50WW03Sample ID: 50WW03Collection Time/Date: 08-30-04 / 1656

Pump Installation

Pump installation crew: M. MartinezPID/FID reading (well head/background): 0.0 / 0.0Casing diameter (inches): 4"Total well Depth (ft. BTOC): 22.96Initial (pre-installation) DTW/time: 17.74 / 1453Final (after pump priming) DTW/time: 17.79 / 1522Free product (circle): LNAPL / DNAPL

Volume of water removed during priming (mL): _____

Discharge tube length (ft.): 48'Installation date/beginning time: 08-30-04 / 1506Installation date/completion time: 08-30-04 / 1507Screen Interval (ft. BTOC): 12 to 22Pump intake depth (ft BTOC): 20.75Post-installation DTW/time: 17.74 / 1509Max. sustainable pump rate (mL/min): 100

Appearance of product: _____

Discharge tube diameter (3/8" or 1/4"): 3/8Inlet reducer used (Y/N): NO

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / CritzPurge date/beginning time: 08-30-04 / 1520Initial (pre-purging) DTW (ft. BTOC): 17.74Calculated tubing + pump volume: NAPID/FID reading (well head/background): 0.0 / 0.0Purge date/completion time: 08-30-04

Final (post-purging) DTW (ft. BTOC): _____

No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>18.15</u>	<u>19</u>	<u>19</u>						<u>19</u>
Refill Setting	<u>13.5</u>	<u>13.5</u>	<u>13.5</u>						<u>13.5</u>
Discharge Setting	<u>1.5</u>	<u>1.5</u>	<u>1.5</u>						<u>1.5</u>
Flow rate (mL/min)	<u>50</u>	<u>110</u>	<u>100</u>						<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1540	17.88	110	0	28.19	4.171	6.61	123.1	3.66	233.4
1545	17.93	110	0.55	26.69	4.213	6.58	176.0	1.82	224.7
1550	17.96	100	1.05	26.04	4.224	6.56	160.7	1.51	195.3
1555	17.97	100	1.55	24.44	4.200	6.55	158.0	0.99	164.9
1600	17.98	100	2.05	24.51	4.187	6.54	144.1	0.95	161.7
1605	18.00	100	2.55	25.18	4.189	6.54	145.8	0.93	142.9
1610	18.00	100	3.05	25.89	4.194	6.55	146.5	0.91	53.6
1615	18.01	100	3.55	26.51	4.193	6.55	147.7	0.88	110.0

Sheet 2 of 2

[illegible]

Sampling

Sampling beginning time: 1650

Sampling completion time: 1700

[illegible]

Sample Information

Sample ID: 506603

Sample collection date/time: 0830-04 / 1656

Duplicate sample collected (Y/N): no

Duplicate sample ID: 2/4

Split sample collected (Y/N): ☒Split sample ID: 2/2

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOL	826606	3 VOA'S			
Perchlorate	3/4	200 mL HNO ₃ (1X)			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045419

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number:

Location Code: 50WW04

Task: GW DATA GAPS AUG04

Sample Number: L0001-50WW04

Collection Date: 08-31-04

Sample Name: L0001-50WW04-00

Collection Time: 1136

Sampling Method: BA

Start Depth: 20.25

Sample Type: GW

Sample Purpose: REG

End Depth: 20.75

Sampling Equip: QED non dedicated pump Teflon Bladder

Sample Matrix: WATER

QC Partners:

(TB)

(ER)

N/A

(FB)

N/A

Sample Team:

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 23.12

Depth To Water: 20.25

Comments:

Sketch Location:

Logged BY / Date: Praveen Srivastav 08-31-04

Reviewed BY / Date: _____

Sample Collection Log

00045420

Page 2 of 2

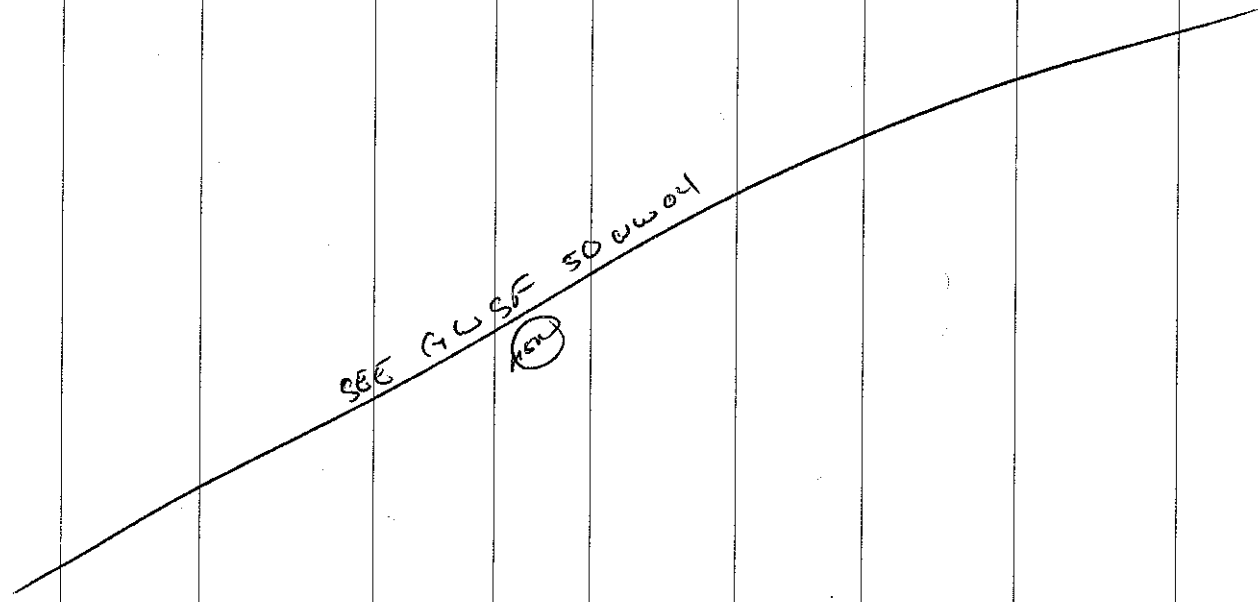
845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 50WW04

Sample Number: L0001-50WW04

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	1136 / 1145	20.75	-70.2	6.42	5.962	8.1	0.85	25.90	10.8 litres

Logged BY / Date:

[Signature] / 08-27-04

Reviewed BY / Date:



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 30 Longhorn AAP
 Project Name/ID: Longhorn AAP
 Weather: _____

Sampling location ID: 50 WW04
 Sample ID: 50 WW04
 Collection Time/Date: _____

Pump Installation

Pump installation crew: M. Martinez / B.W. Cline
 PID/FID reading (well head/background): 00/00
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 23.16
 Initial (pre-installation) DTW/time: 20.25 / 0925
 Final (after pump priming) DTW/time: 20.25 / 0930
 Free product (circle): LNAPL/DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 48

Installation date/beginning time: 08-31-04 / 0937
 Installation date/completion time: 08-31-04 / 0938
 Screen Interval (ft. BTOC): 13 to 23
 Pump intake depth (ft. BTOC): 22.0'
 Post-installation DTW/time: 20.16 / 0939
 Max. sustainable pump rate (mL/min): 100
 Appearance of product: oil
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / B.W. Cline
 Purge date/beginning time: 08-31-04 / 0948
 Initial (pre-purging) DTW (ft. BTOC): 20.25
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 00/00
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>22</u>	<u>20</u>							<u>20</u>
Refill Setting	<u>1</u>	<u>13.5</u>							<u>13.5</u>
Discharge Setting	<u>2.5</u>	<u>1.5</u>							<u>1.5</u>
Flow rate (mL/min)	<u>175</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1010	20.54	100	0	20.53	5.983	6.61	-53.7	1.33	100.9
1015	20.56	100	0.5	20.92	6.003	6.58	-54.6	1.07	86.3
1020	20.57	100	1.0	21.07	6.009	6.58	-55.1	1.05	83.6
1025	20.61	100	1.5	21.41	6.027	6.58	-57.4	0.97	59.9
1030	20.63	100	2.0	21.91	6.034	6.58	-58.1	0.92	54.6
1035	20.66	100	2.5	22.02	6.035	6.58	-58.8	0.92	53.9
1040	20.67	100	3.0	22.34	6.039	6.58	-60.4	0.87	42.6
1045	20.68	100	3.5	22.52	6.044	6.58	-61.2	0.85	37.5



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1050	20.70	100	4.0	22.90	6.044	6.58	-63.1	0.84	29.4
1055	20.71	100	4.5	23.23	6.041	6.58	-64.0	0.82	24.8
1100	20.73	100	5.0	23.70	6.040	6.59	-66.1	0.80	21.9
1105	20.74	100	5.5	24.12	6.032	6.59	-67.2	0.81	17.6
1110	20.74	100	6.0	24.50	6.026	6.60	-68.5	0.81	14.6
1115	20.74	100	6.5	24.63	6.020	6.60	-69.1	0.81	12.0
1120	20.75	100	7.0	25.29	6.0003	6.61	-70.6	0.81	10.0
1125	20.75	100	7.5	25.50	5.9997	6.61	-71.6	0.80	8.1
1130	20.75	100	8.0	25.73	5.990	6.62	-71.8	0.80	7.8
1135	20.75	100	8.5	25.88	5.980	6.62	-72.3	0.81	7.3

Sampling

Sampling beginning time: 1136Sampling completion time: 1141

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1145	20.75	100	10.0	25.90	5.962	6.62	-70.2	0.85	8.1

Sample Information

Sample ID: 50-66-04Sample collection date/time: 08-31-04 / 1136Duplicate sample collected (Y/N): NODuplicate sample ID: N/ASplit sample collected (Y/N): NOSplit sample ID: N/A

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC	8210	3 VOC'S			
Pesticide	314	250mL HDPE (x)			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter



Sample Collection Log

00045423

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-083004-MK

Location Code: 50WW06

Task: GW DATA GAPS AUG04

Sample Number: L0001-50WW06

Sample Name: L0001-50WW06-00

Collection Date: 08-30-04

Sampling Method: BA

Collection Time: 1031

Sample Type: GW

Sample Purpose: REG

Start Depth: 11.88

End Depth: 11.98

Sampling Equip: Bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 083004-781 (ER) N/A (FB) N/A

Sample Team: M. Martinez / W. C. Cite

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
PERC	N	B	1	1	L	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

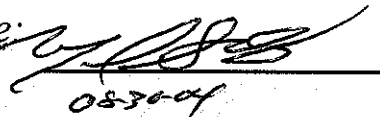
Groundwater Information:

Measured Well Depth: 58.49

Depth To Water: 11.88

Comments:

Sketch Location:

Logged BY / Date: 
083004

Reviewed BY / Date:

Sample Collection Log

00045424

Page 2 of 2

845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 50WW06

Sample Number: L0001-50WW06

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>See GW Sampling Form 50WW06 P/H 8/30/04</p>									
Sample:	1031 sample 1050 ready	11.98	-37.7	6.40	2.006	14.7	1.64	22.17	7.5 L

Logged BY / Date: [Signature]
08-30-04

Reviewed BY / Date: _____



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 50WW06 Longhorn AAP Sampling location ID: 50WW06
 Project Name/ID: Longhorn Army Amm. Plant Sample ID: 50WW06
 Weather: Clear/Partly Collection Time/Date: 1031 8/30/04

Pump Installation

Pump installation crew: W. Critz M. Martinez
 PID/FID reading (well head/background): 3.6
 Casing diameter (inches): 4
 Total well Depth (ft. BTOC): 58.49
 Initial (pre-installation) DTW/time: 11.88 / 0836
 Final (after pump priming) DTW/time: 11.98 / 0924
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): 60
 Discharge tube length (ft.): 60

Installation date/beginning time: 8/30/04 0835
 Installation date/completion time: 8/30/04 0840
 Screen Interval (ft. BTOC): 48 to 58
 Pump intake depth (ft BTOC): 53
 Post-installation DTW/time: 11.15 / 0909
 Max. sustainable pump rate (mL/min): 100 mL/min
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N):

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: W. Critz M. Martinez
 Purge date/beginning time: 8/30/04 / 0920
 Initial (pre-purging) DTW (ft. BTOC): 11.88
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 3.6
 Purge date/completion time: 8/30/04
 Final (post-purging) DTW (ft. BTOC): 11.98
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>30</u>	<u>30</u>							<u>30</u>
Refill Setting	<u>10.0</u>	<u>12.0</u>							<u>12.0</u>
Discharge Setting	<u>5.0</u>	<u>3.0</u>							<u>3.0</u>
Flow rate (mL/min)	<u>300</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
<u>0935</u>	<u>12.05</u>	<u>100</u>	<u>0</u>	<u>20.78</u>	<u>2.505</u>	<u>6.38</u>	<u>-16.7</u>	<u>1.93</u>	<u>11.5</u>
<u>0940</u>	<u>12.04</u>	<u>100</u>	<u>0.5</u>	<u>21.04</u>	<u>2.542</u>	<u>6.38</u>	<u>-22.5</u>	<u>1.32</u>	<u>11.6</u>
<u>0945</u>	<u>12.02</u>	<u>100</u>	<u>1.0</u>	<u>21.35</u>	<u>2.551</u>	<u>6.39</u>	<u>-30.2</u>	<u>1.20</u>	<u>14.0</u>
<u>0950</u>	<u>12.00</u>	<u>100</u>	<u>1.5</u>	<u>21.45</u>	<u>2.552</u>	<u>6.39</u>	<u>-34.5</u>	<u>1.13</u>	<u>14.2</u>
<u>0955</u>	<u>12.00</u>	<u>100</u>	<u>2.0</u>	<u>21.55</u>	<u>2.562</u>	<u>6.40</u>	<u>-37.5</u>	<u>1.00</u>	<u>14.7</u>
<u>1000</u>	<u>12.00</u>	<u>100</u>	<u>2.5</u>	<u>21.75</u>	<u>2.568</u>	<u>6.40</u>	<u>-41.5</u>	<u>1.02</u>	<u>16.3</u>
<u>1005</u>	<u>12.00</u>	<u>100</u>	<u>3.0</u>	<u>21.87</u>	<u>2.570</u>	<u>6.40</u>	<u>-42.6</u>	<u>0.99</u>	<u>17.7</u>
<u>1010</u>	<u>12.00</u>	<u>100</u>	<u>3.5</u>	<u>21.91</u>	<u>2.573</u>	<u>6.40</u>	<u>-43.3</u>	<u>1.00</u>	<u>16.7</u>

Sheet ~~2~~ of 2[illegible]

Sampling

Sampling beginning time: 1031

Sampling completion time: 1040

[illegible]

Sample Information

Sample ID: 50 w w o e

Sample collection date/time: 08-30-04 / 1031

Duplicate sample collected (Y/N): no

Duplicate sample ID: NA

Split sample collected (Y/N): no

Split sample ID: 1A

COC No(s):

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC - Full	8260B	3 vials			
Perchlorate	314	250 ml HOPE (1x)			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

LHAAP-67

**GROUNDWATER SAMPLING FORMS
SAMPLE COLLECTION LOGS**

Sample Collection Log

00045428

Page 1 of 2

845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 67-091304-MK

Location Code: **G4WW01**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-G4WW01**

Collection Date: 9/12/04

Sample Name: **G4WW01-GW-L0001-G4WW01-REG**

Collection Time: 1410

Sampling Method: **BA**

Start Depth: 21.37

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 21.73

Sampling Equip: Bladder Pump QED

Sample Matrix: **WATER**

QC Partners:

(TB) 091204-TB

(ER) N/A

(FB) N/A

Sample Team: K. Everett, J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
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ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 26.90'

Depth To Water: 21.16'

Comments:

Sketch Location:

Logged BY / Date: K. Everett 9/12/04

Reviewed BY / Date: [Signature] 9/13/04

Sample Collection Log

00045429

Page 2 of 2

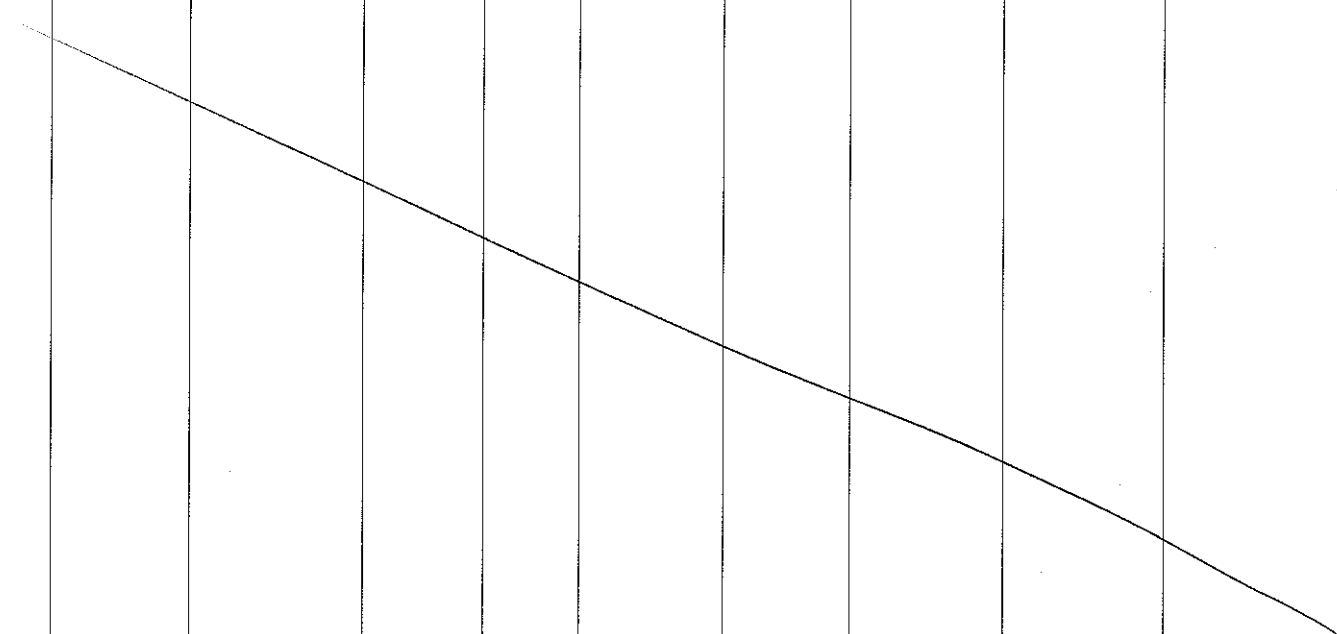
845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: G4WW01

Sample Number: L0001-G4WW01

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
									
Sample:	1420	21.73	-10.9	6.32	4.099	-2.4	0.68	20.78	6

Logged BY / Date:

Kend
9/12/04

Reviewed BY / Date:

Praveen 9/13/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: _____
 Project Name/ID: LHAAP
 Weather: hot humid

Sampling location ID: G4WW01 (67WW01)
 Sample ID: _____
 Collection Time/Date: _____

Pump Installation

Pump installation crew: K. Everett ; J. Rodriguez
 PID/FID reading (well head/background): 0 / 0
 Casing diameter (inches): 4" SS
 Total well Depth (ft. BTOC): 26.90
 Initial (pre-installation) DTW/time: 21.16
 Final (after pump priming) DTW/time: 21.21
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): 0.1
 Discharge tube length (ft.): 30

Installation date/beginning time: 9/12/04 1220
 Installation date/completion time: 9/12/04 1230
 Screen Interval (ft. BTOC): 16.4' to 26.4'
 Pump intake depth (ft BTOC): 23.5'
 Post-installation DTW/time: _____
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: NA
 Discharge tube diameter (3/8" or 1/4"): 3/8
 Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	20	15	15	15	15	20			
Refill Setting	10	10	7	11	11	11			
Discharge Setting	5	5	3	9	9	9			
Flow rate (mL/min)	—	170	200	160	180	170			

Purging

Purging/sampling crew: A/A
 Purge date/beginning time: _____
 Initial (pre-purging) DTW (ft. BTOC): _____
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
 Purge date/completion time: _____
 Final (post-purging) DTW (ft. BTOC): _____
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1235	21.37	170	0.85	22.27	4.130	6.26	6.6	1.41	9.3
1240	21.37	200	1.85	22.36	4.126	6.26	6.6	1.13	11.2
1245	21.42	160	2.65	22.15	4.130	6.27	3.8	1.05	9.9
1250	21.45	160	3.45	21.92	4.136	6.27	-2.8	0.89	8.4
1255	21.50	160	4.25	21.45	4.123	6.27	-6.2	0.86	9.0
1300	21.55	160	5.05	20.62	4.117	6.28	-11.5	0.74	7.1
1305	21.60	190	6.00	20.46	4.107	6.28	-15.3	0.83	6.1
1310	21.62	180	6.9	20.44	4.105	6.29	-17.5	0.82	5.1

$$\begin{array}{r} 170 \\ 5 \\ \hline 850 \end{array}$$

$$\begin{array}{r} 200 \\ 5 \\ \hline 1000 \end{array}$$

$$\begin{array}{r} 160 \\ 5 \\ \hline 800 \end{array}$$

$$\begin{array}{r} 160 \\ 5 \\ \hline 800 \end{array}$$

$$\begin{array}{r} 180 \\ 5 \\ \hline 900 \end{array}$$



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1315	21.63	180	7.8	20.60	4.092	6.30	-19.3	0.72	4.1
1320	21.66	180	8.7	20.49	4.095	6.30	-20.7	0.76	3.0
1325	21.67	180	9.6	20.51	4.087	6.30	-20.9	0.66	2.5
1330	21.67	170	10.45	20.57	4.086	6.30	-19.9	0.69	1.9
1335	21.69	170	11.35	20.36	4.085	6.30	-18.5	0.72	1.3
1340	21.73	150	12.05	20.26	4.085	6.31	-17.2	0.63	0.0
1345	21.73	170	12.95	20.56	4.077	6.31	-17.0	0.75	-0.2
1350	21.73	170	13.75	20.61	4.087	6.31	-15.6	0.53	-1.3
1355	21.73	150	14.00	21.45	4.078	6.31	-15.7	0.66	-0.5
1400	21.73	170	14.95	21.07	4.102	6.32	-14.4	0.90	-1.3
1405	21.73	170	15.70	20.83	4.097	6.31	-13.2	0.86	-1.5
1410	21.73	170	16.55	20.69	4.098	6.31	-12.2	0.86	-1.8

Sampling

Sampling beginning time: 1410Sampling completion time: 1415

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1420	21.73	170	25.05	20.78	4.099	6.32	-10.9	0.68	-2.4

Sample Information

Sample ID: _____

Sample collection date/time: _____

Duplicate sample collected (Y/N): _____

Duplicate sample ID: _____

Split sample collected (Y/N): _____

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC		3-VOLAS			

Comments:

Tried reducing pressure to 15 or 10 & flow rate dropped to 50 ml/min.
Difficult to regulate flow. Well seems to be stable at the 170 rate.

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

170 150 50
5 5 5
850 750 250

Sample Collection Log

00045432

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 67-091304-MK

Location Code: G4WW02

Task: GW DATA GAPS AUG04

Sample Number: L0001-G4WW02

Collection Date: 9/12/04

Sample Name: G4WW02-GW-L0001-G4WW02-REG

Collection Time: 1100

Sampling Method: BA

Start Depth: ~~19.89~~ 19.71

Sample Type: GW

Sample Purpose: REG

End Depth: 19.89

Sampling Equip: Bladder Pump QED

Sample Matrix: WATER

QC Partners:

(TB) 091204-TB

(ER)

N/A

(FB)

N/A

Sample Team: K. Everett, J. Rodriguez

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	3	40	mL	VOA VIAL
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Lot Control#:

Groundwater Information:

Measured Well Depth: 27.47

Depth To Water: 19.71

Comments: After adjusting pump rate, static level remained at 19.89
pumping 215 to 250 ml/min.

Sketch Location:

Logged BY / Date: Praveen Srivastav 9/12/04Reviewed BY / Date: Praveen Srivastav 9/12/04

Sample Collection Log

00045433

Page 2 of 2

845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: G4WW02

Sample Number: L0001-G4WW02

PURGE RECORD:

Initial	Time(24hr)	Depth to Water (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Sampling Form for G4WW02 (G4WW02)									
Sample:	1105	19.89	41.1	6.19	4.122	16.6	2.37	22.81	5

Logged BY / Date: Dr. [Signature] 9/12/04

Reviewed BY / Date: Dr. [Signature] 9/12/04



GROUNDWATER SAMPLING FORM

00045434

Sheet 1 of 2

Operable Unit/Site ID: _____
Project Name/#: LHAAP
Weather: hot, sunny-clear

Sampling location ID: 67WW02 (64WW02)
Sample ID: LD001-
Collection Time/Date: 9/12/04 1100

Pump Installation

Pump installation crew: K. Everett, J. Rodriguez
PID/FID reading (well head/background): 0 / 0
Casing diameter (inches): 4" SS
Total well Depth (ft. BTOC): 27.47
Initial (pre-installation) DTW/time: 19.71 / 19.68 ^{after pump install.}
Final (after pump priming) DTW/time: 19.89
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 30'

Installation date/beginning time: 9/12/04 0925
Installation date/completion time: 09/12/04 0940
Screen Interval (ft. BTOC): 17 to 27
Pump intake depth (ft BTOC): 22
Post-installation DTW/time: _____
Max. sustainable pump rate (mL/min): _____
Appearance of product: NA
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): N

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	30	15	15						10
Refill Setting	10	10	10						10
Discharge Setting	5	5	5						5
Flow rate (mL/min)	150	250	240						220

Purging

Purging/sampling crew: A/A
Purge date/beginning time: _____
Initial (pre-purging) DTW (ft. BTOC): _____
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): _____
Purge date/completion time: _____
Final (post-purging) DTW (ft. BTOC): _____
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
0950	19.89	150	0.75	22.44	3.845	6.21	89.3	5.90	93.6
0955	19.89	250	2.0	22.34	3.867	6.20	79.7	5.10	72.9
1000	19.89	250	3.25	22.36	3.912	6.20	75.6	5.20	58.7
1005	19.89	250	4.5	22.23	3.934	6.19	72.7	4.99	51.2
1010	19.89	240	5.7	22.23	3.968	6.19	69.1	3.94	43.4
1015	19.89	240	6.9	22.31	4.010	6.18	63.3	4.11	35.9
1020	19.89	220	8.0	22.37	4.046	6.18	58.7	3.80	29.0
1025	19.89	220	9.1	22.47	4.063	6.18	56.0	3.56	24.7

$$\begin{array}{r} 240 \\ 5 \\ \hline 1200 \end{array}$$
$$\begin{array}{r} 220 \\ 5 \\ \hline 1100 \end{array}$$

[illegible]

10 - esp
20

Sampling

Sampling beginning time: 10 11 00

Sampling completion time: 1105

Water Quality Parameter Measurements

[illegible]

Sample Information

Sample ID: _____

Sample collection date/time: _____

Duplicate sample collected (Y/N):

Duplicate sample ID: _____

Split sample collected (Y/N): _____

Split sample ID: _____

COC No(s): _____

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC		3-VOLs			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

$$\begin{array}{r} 215 \\ \underline{5} \\ 1075 \end{array} \quad \begin{array}{r} 220 \\ \underline{5} \\ 1100 \end{array} \quad \begin{array}{r} 230 \\ \underline{5} \\ 1150 \end{array}$$

Sample Collection Log

00045436

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 67-091304-mk

Location Code: G4WW03

Task: GW DATA GAPS AUG04

Sample Number: L0001-G4WW03

Collection Date: 8/12/04

Sample Name: G4WW03-GW-L0001-G4WW03-REG

Collection Time: 1355

Sampling Method: BA

Start Depth: 20.85

Sample Type: GW

Sample Purpose: REG

End Depth: 20.87

Sampling Equip: Bladder pump

Sample Matrix: WATER

QC Partners:

(TB) 091204-TB

(ER) N/A

(FB) N/A

Sample Team: A. Willmore
D. Holderfield

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL N A 3 40 mL VOA VIAL

ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 24.85

Depth To Water: 20.42

Comments:

Sketch Location:

Logged BY / Date: [Signature] 8/12/04

Reviewed BY / Date: [Signature] 8/12/04

Sample Collection Log

00045437

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: G4WW03

Sample Number: L0001-G4WW03

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
See GW Sampling Form G4WW03									
Sample:	1406	20.87	63.3	6.10	5.132	52.6	3.57	30.79	2.2

Logged BY / Date: Da [Signature] 9/12/04

Reviewed BY / Date: Da [Signature] 9/14/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 67
 Project Name/ID: CHAAI
 Weather: Clear 80s to 90s

Sampling location ID: 67WW03
 Sample ID: 67WW03
 Collection Time/Date: 9/12/04 13:55

Pump Installation

Pump installation crew: A. Williams, D. Holter-Fidel
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 24.70 24.15 24.85 24.30
 Initial (pre-installation) DTW/time: 24.15 24.35
 Final (after pump priming) DTW/time: 20.42
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL):
 Discharge tube length (ft.): 60'

Installation date/beginning time: 9/12/04 12:36
 Installation date/completion time: 9/12/04 12:37
 Screen Interval (ft. BTOC): 20.42 to 24.85
 Pump intake depth (ft BTOC): 22.4'
 Post-installation DTW/time: 20.27
 Max. sustainable pump rate (mL/min):
 Appearance of product:
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 8.78 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Williams, D. Holter-Fidel
 Purge date/beginning time: 9/13/04 12:40
 Initial (pre-purging) DTW (ft. BTOC): 20.42
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 9/12 1351
 Final (post-purging) DTW (ft. BTOC): 20.85
 No. of tubing + pump volumes purged:

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 8.78 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>19</u>								<u>19</u>
Refill Setting	<u>10</u>								<u>10</u>
Discharge Setting	<u>5</u>								<u>5</u>
Flow rate (mL/min)	<u>100</u>								<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (ft ³)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
12:49	20.67	106	0.1	31.40	9.277	5.93	74.5	1.77	262.1
12:54	20.67	100	0.2	31.58	9.242	5.93	79.7	1.71	262.1
12:59	20.69	100	0.4	30.92	9.277	5.92	80.6	1.45	228.4
13:04	20.70	100	0.8	31.56	9.277	5.92	79.5	1.45	179.0
13:09	20.72	100	0.7	31.76	9.277	5.93	75.6	1.63	132.0
13:11	20.74	Disconnected due to high temperature readings/reconnected @ 13:15							
13:21	20.75	100	0.9	31.84	9.227	5.93	73.1	1.62	131.9
13:26	20.75	100	1.1	31.31	9.290	5.92	72.6	1.64	119.3

Sample Collection Log

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: 67WW04

Task: GW DATA GAPS AUG04

Sample Number: L0001-67WW04

Collection Date: 9/12/04

Sample Name: 67WW04-GW-L0001-67WW04-REG

Collection Time: 1500

Sampling Method: BA

Start Depth: 24.59

Sample Type: GW

Sample Purpose: REG

End Depth: 24.13

Sampling Equip: _____

Sample Matrix: WATER

QC Partners:

(TB) _____ (ER) _____ (FB) _____

Sample Team: K Everett J Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL N A 3 40 mL VOA VIAL

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:

Measured Well Depth: 24.38 Depth To Water: 24.13

Comments: well had 0.28' water; bailed dry & resampled 6 hr. later
~~after~~ Bailed ~ 1 quart very brown water
Sampled water lighter in color - less solids.

Sketch Location:

Logged BY / Date: [Signature] 9/13/04Reviewed BY / Date: [Signature] 9/13/04

Reviewed BY / Date:

Sample Collection Log

00045444

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 67-091304-MKLocation Code: **67WW05**Task: **GW DATA GAPS AUG04**Sample Number: **L0001-67WW05**Collection Date: 9/12/04Sample Name: **67WW05-GW-L0001-67WW05-REG**Collection Time: 1025Sampling Method: **BA**Start Depth: 20.34Sample Type: **GW**Sample Purpose: **REG**End Depth: 20.37Sampling Equip: Bladder pumpSample Matrix: **WATER**

QC Partners:

(TB) 091204-TB

(ER)

N/A

(FB)

N/ASample Team: A. Willmore
D. Holderfield**Containers**

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
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ERPIMS Values:

Sacode: _____

Lot Control#: _____

Groundwater Information:Measured Well Depth: 28.86Depth To Water: 20.24**Comments:**

_____**Sketch Location:**Logged BY / Date: Pa. Holderfield 9/12/04Reviewed BY / Date: Pa. Holderfield 9/12/04

Sample Collection Log

00045445

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 67WW05

Sample Number: L0001-67WW05

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm) <i>mg/l</i>	Temperature (C)	Purge Volume (gal)
<i>See GW Sampling Form 67WW05</i>									
<i>DA</i> Sample:	1031	20.37	64.1	6.71	4.714	29.6	1.01	22.93	1.4

Logged BY / Date: *DA/10/04* 9/12/04

Reviewed BY / Date: *DA/10/04* 9/12/04



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: 63
 Project Name/ #: LHAAP
 Weather: cloudy, 70s to 90s (Afternoon)

Sampling location ID: 63WW05
 Sample ID: 63WW05
 Collection Time/Date: 9/12/04 10:25

Pump Installation

Pump installation crew: A. Willmore D. Holterfield
 PID/FID reading (well head/background): 0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 28.86
 Initial (pre-installation) DTW/time: 20.24 9:02
 Final (after pump priming) DTW/time: _____
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 40'

Installation date/beginning time: 9/12/04 9:00
 Installation date/completion time: 9/12/04 9:01
 Screen Interval (ft. BTOC): 18.86 to 28.86
 Pump intake depth (ft BTOC): 23'
 Post-installation DTW/time: 20.21
 Max. sustainable pump rate (mL/min): 120
 Appearance of product: _____
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): No

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 9.89 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: A. Willmore, D. Holterfield
 Purge date/beginning time: 9/12/04 9:30
 Initial (pre-purging) DTW (ft. BTOC): 28.86
 Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0
 Purge date/completion time: 9/12/04
 Final (post-purging) DTW (ft. BTOC): 20.34
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = 9.89 psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>16</u>	<u>19</u>							<u>19</u>
Refill Setting	<u>10</u>	<u>11.5</u>							<u>11.5</u>
Discharge Setting	<u>5</u>	<u>3.5</u>							<u>3.5</u>
Flow rate (mL/min)	<u>120</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
9:44	20.31	126	0.1	22.65	4.655	6.14	58.5	2.63	48.3
9:49	20.33	106	0.2	22.56	4.655	6.15	53.9	2.63	44.7
9:54	20.51	100	0.3	22.27	4.680	6.16	55.5	1.47	43.3
9:59	20.34	100	0.4	22.33	4.675	6.16	55.9	1.28	44.2
10:04	20.34	100	0.6	22.42	4.676	6.16	56.9	1.23	41.9
10:09	20.34	100	0.7	22.51	4.683	6.16	57.9	1.17	41.8
10:14	20.34	100	0.8	22.67	4.692	6.17	59.3	1.18	40.3
10:19	20.34	100	1.0	22.75	4.696	6.17	58.2	1.15	40.1

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

Sample Collection Log

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 67-091304-mk

Location Code: 67WW06

Task: GW DATA GAPS AUG04

Sample Number: L0001-67WW06

Collection Date: 9/12/04

Sample Name: 67WW06-GW-L0001-67WW06-REG

Collection Time: 1356

Sampling Method: BA

Start Depth: 21.21

Sample Type: GW

Sample Purpose: REG

End Depth: 21.51Sampling Equip: Bladder Pump

Sample Matrix: WATER

QC Partners:

(TB) 1791204-TB (ER) N/A (FB) N/ASample Team: W. C. Cite / M. Martinez**Containers**

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	3	40	mL	VOA VIAL
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Lot Control#:

Groundwater Information:Measured Well Depth: 50.00 Depth To Water: 21.21

Comments:

Sketch Location:

Logged BY / Date: Wes Cite 9/12/04 Reviewed BY / Date: Don H. H. 9/13/04

Sample Collection Log

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 67WW06

Sample Number: L0001-67WW06

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>See GW Sampling Form 67WW06</p>									
Sample:	1405	21.51	-24.1	5.87	8.413	4.6	0.75	23.31	1.48 gal

Logged BY / Date: NesCritz 9/12/04

Reviewed BY / Date: Praveen Srivastav 9/14/04



GROUNDWATER SAMPLING FORM

00045450

Sheet 1 of 2

Operable Unit/Site ID: Area C07 Coughlin
Project Name/ID: Coughlin ADP
Weather: _____

Sampling location ID: 67W2006 67W2006
Sample ID: 67W2006 67W2006
Collection Time/Date: 09-12-04 / 1350

Pump Installation

Pump installation crew: M. Martinez / W. C. H. C.
PID/FID reading (well head/background): 0.0
Casing diameter (inches): 4"
Total well Depth (ft. BTOC): 50.00'
Initial (pre-installation) DTW/time: 21.21 / 1245
Final (after pump priming) DTW/time: 21.35 / 1314
Free product (circle): LNAPL / DNAPL
Volume of water removed during priming (mL): _____
Discharge tube length (ft.): 48'

Installation date/beginning time: 09-12-04 / 1256
Installation date/completion time: 09-12-04 / 1258
Screen Interval (ft. BTOC): 40' to 50'
Pump intake depth (ft. BTOC): 45'
Post-installation DTW/time: 20.94 / 1259
Max. sustainable pump rate (mL/min): 100
Appearance of product: 1/1
Discharge tube diameter (3/8" or 1/4"): 3/8"
Inlet reducer used (Y/N): NO

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / W. C. H. C.
Purge date/beginning time: 09-12-04 / 1314
Initial (pre-purging) DTW (ft. BTOC): 21.21
Calculated tubing + pump volume: NA

PID/FID reading (well head/background): 0.0/0.0
Purge date/completion time: 09-12-04 / 1405
Final (post-purging) DTW (ft. BTOC): 21.51
No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>30</u>	<u>29</u>							<u>29</u>
Refill Setting	<u>12</u>	<u>13</u>							<u>13</u>
Discharge Setting	<u>3</u>	<u>2</u>							<u>2</u>
Flow rate (mL/min)	<u>220</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1320	21.60	220	1.1	22.03	7.788	5.84	50.4	2.88	11.1
1325	21.61	100	1.6	22.01	7.982	5.84	11.7	1.64	12.7
1330	21.58	100	2.1	21.98	8.269	5.84	-10.3	0.93	12.1
1335	21.55	100	2.6	22.58	8.357	5.86	-16.9	0.89	7.6
1340	21.55	100	3.1	22.72	8.372	5.86	-18.3	0.86	6.9
1345	21.55	100	3.6	22.85	8.390	5.86	-19.8	0.82	6.5
1350	21.53	100	4.1	22.94	8.406	5.86	-21.3	0.80	6.7
1355	21.51	100	4.6	23.17	8.400	5.86	-22.6	0.76	8.2

Sample Collection Log

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 67-691304-mk

Location Code: **67WW07**

Task: **GW DATA GAPS AUG04**

Sample Number: **L0001-67WW07**

Collection Date: 09-12-04

Sample Name: **67WW07-GW-L0001-67WW07-REG**

Collection Time: 1151

Sampling Method: **BA**

Start Depth: 21.21

Sample Type: **GW**

Sample Purpose: **REG**

End Depth: 21.48

Sampling Equip: non dedicated QED Pump Teflon Bubbles

Sample Matrix: **WATER**

QC Partners:

(TB) 091204-TB

(ER)

W/A

(FB)

W/A

Sample Team: m. martinez / w. orr

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	3	40	mL	VOA VIAL
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ERPIMS Values:

Sacode:

Lot Control#:

Groundwater Information:

Measured Well Depth: 27.79

Depth To Water: 21.21

Comments:

Sketch Location:

Logged BY / Date: [Signature] 12/9/04

Reviewed BY / Date: [Signature] 9/12/04

Sample Collection Log

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 67WW07

Sample Number: L0001-67WW07

PURGE RECORD:

Initial	Time(24hr)	DepthtoWater (ft)	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)	Purge Volume (gal)
<p>SEE GW SF 67WW07</p> <p>(New)</p>									
Sample:	11/5/1200	21.48	192.1	5.34	4.023	2.0	0.03	22.93	2.69 gallons

Logged BY / Date: [Signature] 9/12/01

Reviewed BY / Date: [Signature] 9/12/01



GROUNDWATER SAMPLING FORM

Sheet 1 of 2

Operable Unit/Site ID: Area 01 Longhorn
 Project Name/ID: Longhorn NAD
 Weather: _____

Sampling location ID: 67W07
 Sample ID: 67W07
 Collection Time/Date: 09-12-04 / 1151

Pump Installation

Pump installation crew: M. Martinez / J. C. Jett
 PID/FID reading (well head/background): 0.0/0.0
 Casing diameter (inches): 4"
 Total well Depth (ft. BTOC): 27.79
 Initial (pre-installation) DTW/time: 21.21 / 0945
 Final (after pump priming) DTW/time: 21.25 / 1010
 Free product (circle): LNAPL / DNAPL
 Volume of water removed during priming (mL): _____
 Discharge tube length (ft.): 4.8

Installation date/beginning time: 09-12-04 / 0939
 Installation date/completion time: 09-12-04 / 1000
 Screen Interval (ft. BTOC): 17.79 to 27.79
 Pump intake depth (ft. BTOC): 25.00
 Post-installation DTW/time: 21.13 / 1001
 Max. sustainable pump rate (mL/min): _____
 Appearance of product: Wt
 Discharge tube diameter (3/8" or 1/4"): 3/8"
 Inlet reducer used (Y/N): no

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)									
Refill Setting									
Discharge Setting									
Flow rate (mL/min)									

Purging

Purging/sampling crew: M. Martinez / J. C. Jett
 Purge date/beginning time: 09-12-04 / 1011
 Initial (pre-purging) DTW (ft. BTOC): 21.21
 Calculated tubing + pump volume: _____ NA

PID/FID reading (well head/background): 0.0/0.0
 Purge date/completion time: 09-12-04 / 1151
 Final (post-purging) DTW (ft. BTOC): 21.48
 No. of tubing + pump volumes purged: _____

Pneumatic Controller Tuning:

Initial air pressure = H (ft.) X 0.43 = _____ psi

	Initial	2	3	4	5	6	7	8	Final
Pressure (psi)	<u>20</u>	<u>19</u>							<u>19</u>
Refill Setting	<u>13.0</u>	<u>13.0</u>							<u>13.0</u>
Discharge Setting	<u>20</u>	<u>2.0</u>							<u>2.0</u>
Flow rate (mL/min)	<u>140</u>	<u>100</u>							<u>100</u>

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1020	21.38	140	0	22.20	2.1783	5.41	382.0	5.89	3.0
1025	21.42	100	0.7	20.91	3.827	5.39	354.9	2.14	3.8
1030	21.44	100	1.2	20.78	4.044	5.41	331.0	1.42	3.5
1035	21.45	100	1.7	20.93	4.111	5.42	313.6	1.20	2.6
1040	21.46	100	2.2	21.17	4.144	5.42	302.6	1.07	2.0
1045	21.47	100	2.7	21.34	4.185	5.42	292.0	0.97	1.7
1050	21.47	100	3.2	21.52	4.217	5.41	283.0	0.90	1.0
1055	21.47	100	3.7	21.69	4.274	5.40	276.0	0.81	0.6



GROUNDWATER SAMPLING FORM

Sheet 2 of 2

Water Quality Parameter Measurements (continued)									
Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C) $\pm 10\%$	Electrical Conductivity (uMhos/cm) $\pm 3\%$	pH ± 0.1	Eh (mv) ± 10	DO (mg/L) $\pm 10\%$	Turbidity (NTU) $\pm 10\%$
1100	21.47	100	4.2	21.75	4.307	5.39	204.1	0.77	0.8
1105	21.47	100	4.7	21.91	4.332	5.39	257.7	0.74	-0.2
1110	21.48	100	5.2	22.00	4.353	5.39	252.0	0.73	-0.3
1115	21.48	100	5.7	22.24	4.370	5.38	243.0	0.71	-0.7
1120	21.48	100	6.2	22.25	4.384	5.38	234.0	0.70	-0.6
1125	21.48	100	6.7	22.72	4.420	5.37	224.0	0.68	-0.9
1130	21.48	100	7.2	22.75	4.465	5.37	214.7	0.68	-1.1
1135	21.48	100	7.7	22.72	4.514	5.36	204.8	0.66	-1.1
1140	21.48	100	8.2	22.60	4.550	5.35	198.8	0.65	-1.4
1145	21.48	100	8.7	22.81	4.550	5.35	190.0	0.64	-1.2
1150	21.48	100	9.2	22.78	4.576	5.34	174.0	0.64	-1.9

10-esp
20

Sampling

Sampling beginning time: 1151Sampling completion time: 1153

Water Quality Parameter Measurements

Time	DTW (ft. BTOC)	Purge Rate (mL/min)	Cumulative Volume Purged (L)	Temp. (degree C)	Electrical Conductivity (uMhos/cm)	pH	Eh (mv)	DO (mg/L)	Turbidity (NTU)
1200	21.48	100	10.2	22.93	4.623	5.34	192.1	0.63	-2.0

Sample Information

Sample ID: 67 MW 07
 Duplicate sample collected (Y/N): NO
 Split sample collected (Y/N): NO
 COC No(s): _____

Sample collection date/time: 09-10-04
 Duplicate sample ID: N/A
 Split sample ID: N/A

Requested Analysis	Method	Containers	Requested Analysis	Method	Containers
VOC - Full	800016	3 Vot's			

Comments:

Abbreviations: BTOC - Below top of casing; DTW - Depth to water; H - head above pump intake; mL - milliliter; L - Liter

LHAAP-32

SAMPLE COLLECTION LOGS for SOIL BORINGS

Sample Collection Log

00045457

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081604-KE
32-081604-MK

Location Code: **32SB14**

Sample Number: **L0001-32SB14**

Sample Name: **L0001-32SB14-02**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: **SB DATA GAPS AUG04**

Collection Date: 8/16/04

Collection Time: 1230

Start Depth: 0'

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: A. Williams

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Containers
Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

CHANGE NAME TO 32SB1401

Sketch Location:

Logged BY / Date:

M. L. L. 8/16/04

Reviewed BY / Date:

D. Williams 8/16/04



Sample Collection Log

00045458

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081604-KE

RFA / COC Number: 32-081604-MK

Location Code: 32SB14

Task: SB DATA GAPS AUG04

Sample Number: L0002-32SB14

Sample Name: L0002-32SB14-15

Collection Date: 8/16/04

Sampling Method: HP

Collection Time: 1220

Sample Type: SO

Sample Purpose: REG

Start Depth: 12'

End Depth: 15'

Sampling Equip: Geoprobe

Sample Matrix: SOIL

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Change to 32 SB 14 to 17

Sketch Location:

Logged BY / Date:



8/16/04

Reviewed BY / Date:



8/16/04



Sample Collection Log

00045459

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081604-KE
32-081604-MK

Location Code: 32SB14

Sample Number: L0002-32SB14QC

Sample Name: L0002-32SB14-15-QC

Sampling Method: HP

Sample Type: SO

Sample Purpose: FD

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A

(ER) N/A

(FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/16/04

Collection Time: 1220

Start Depth: 12'

End Depth: 15'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Containers
Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

 8/16/04

Reviewed BY / Date:

 8/16/04

Sample Collection Log

00045460

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081604-KE
32-081604-MK

Location Code: **32SB14**

Sample Number: **L0003-32SB14**

Sample Name: **L0003-32SB14-20**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: **SB DATA GAPS AUG04**

Collection Date: 6/16/04

Collection Time: 1315

Start Depth: 27'

End Depth: 25'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Containers
Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

change name to 28

Sketch Location:

Logged BY / Date:

M. McC 6/16/04

Reviewed BY / Date:

David L. [Signature] 6/16/04



Sample Collection Log

00045461

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-FE
32-081704-MK

Location Code: 32SB15

Sample Number: L0001-32SB15

Sample Name: L0001-32SB15-02

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Gc probe

QC Partners:

(TB) N/A

(ER) N/A

(FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/16/04

Collection Time: 1405

Start Depth: 0'

End Depth: 1'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Containers
Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

M. J. [Signature] 8/16/04

Reviewed BY / Date:

D. [Signature] 8/16/04

Sample Collection Log

00045462

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-KE
32-081704-MK

Location Code: **32SB15**

Sample Number: **L0002-32SB15**

Sample Name: **L0002-32SB15-15**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geo Probe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: **SB DATA GAPS AUG04**

Collection Date: 8/16/04

Collection Time: 1445

Start Depth: 9'

End Depth: 12'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

Analytical Suite Containers
Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/16/04

Reviewed BY / Date:

[Signature] 8/17/04

Sample Collection Log

00045463

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number:

32-081704-KR
32-081704-mk

Location Code: 32SB15

Sample Number: L0003-32SB15

Sample Name: L0003-32SB15-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip:

Geo probe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date:

8/16/04

Collection Time:

1545

Start Depth:

15'

End Depth:

17'

Sample Matrix:

SOIL

Sample Team:

A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/16/04

Reviewed BY / Date:

[Signature] 8/17/04



Sample Collection Log

00045464

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081704-KE

RFA / COC Number: 32-081704-mk

Location Code: 32SB16

Sample Number: L0001-32SB16

Sample Name: L0001-32SB16-02

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Task: SB DATA GAPS AUG04

Collection Date: 8/16/04

Collection Time: 1605

Start Depth: 0'

End Depth: 1'

Sample Matrix: SOIL

Sample Team: A. Willmore

Sampling Equip: Geo probe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

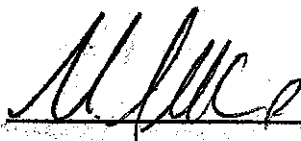
Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

 8/16/04

Reviewed BY / Date:

 8/16/04

Sample Collection Log

00045465

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-091704-KE
32-081704-MK

Location Code: 32SB16

Sample Number: L0002-32SB16

Sample Name: L0002-32SB16-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip:

Geo probe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/16/04

Collection Time: 1635

Start Depth: 3'

End Depth: 6'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Containers
Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

[Signature]

Reviewed BY / Date:

[Signature] 8/17/04



Sample Collection Log

00045466

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081704-KE

RFA / COC Number: 32-081704-mk

Location Code: 32SB16

Sample Number: L0003-32SB16

Sample Name: L0003-32SB16-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip:

Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Matrix: SOIL

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

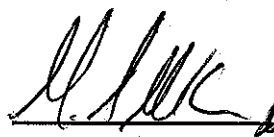
Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

 9/16/04

Reviewed BY / Date:

 9/17/04

Sample Collection Log

00045467

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-KE
32-081704-MK

Location Code: 32SB17

Sample Number: L0001-32SB17

Sample Name: L0001-32SB17-02

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 0817

Start Depth: 0'

End Depth: 1'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Containers
Flt Frtn Qty Size Units Type

METALS	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS 6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

U. Mc

8/17/04

Reviewed BY / Date:

Debbie 8/17/04



Sample Collection Log

00045468

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-091704-KE
32-091704-MK

Location Code: 32SB17

Sample Number: L0002-32SB17

Sample Name: L0002-32SB17-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 0940

Start Depth: 15' 9'

End Depth: 15' 12'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Containers
Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

M. All 8/17/04

Reviewed BY / Date:

D. Willmore 8/17/04

Sample Collection Log

00045469

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081704-KE

RFA / COC Number: 32-081704 - M/L

Location Code: 32SB17

Sample Number: L0003-32SB17

Sample Name: L0003-32SB17-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip:

Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 0845

Start Depth: 15'

End Depth: 16'

Sample Matrix: SOIL

Sample Team: A. Williams

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Containers
Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/16/04

Reviewed BY / Date:

[Signature] 8/17/04

Sample Collection Log

00045470

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081704-KE

RFA / COC Number: 32-081704-mk

Location Code: 32SB18

Sample Number: L0001-32SB18

Sample Name: L0001-32SB18-02

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Matrix: SOIL

Sample Team:

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1255

Start Depth: 0'

End Depth: 1'

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Containers
Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

plus MS, MSD

Sketch Location:

Logged BY / Date:

[Signature] 8/17/04

Reviewed BY / Date:

[Signature] 8/17/04



Sample Collection Log

00045471

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-KE
32-081704-mk

Location Code: 32SB18

Sample Number: L0002-32SB18

Sample Name: L0002-32SB18-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1310

Start Depth: 9'

End Depth: 12'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Containers
Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

8/17/04

Reviewed BY / Date:

8/17/04



Sample Collection Log

00045472

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081704-KE

RFA / COC Number: 32-081704-mk

Location Code: 32SB18

Sample Number: L0002-32SB18QC

Sample Name: L0002-32SB18-15-QC

Sampling Method: HP

Sample Type: SO

Sample Purpose: FD

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1310

Start Depth: 9'

End Depth: 12'

Sampling Equip: Geoprobe

Sample Matrix: SOIL

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date: M. [Signature] 8/17/04Reviewed BY / Date: [Signature] 8/17/04



Sample Collection Log

00045473

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081704-KE
32-081704-mk

RFA / COC Number:

Location Code: 32SB18

Sample Number: L0003-32SB18

Sample Name: L0003-32SB18-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip:

Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1320

Start Depth: 12'

End Depth: 15'

Sample Matrix: SOIL

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: [Signature] 8/17/04

Sample Collection Log

00045474

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081704-KE

RFA / COC Number: 32-081704-MK

Location Code: 32SB19

Sample Number: L0001-32SB19

Sample Name: L0001-32SB19-02

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1350

Start Depth: 0'

End Depth: 1'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Containers
Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: Dan Hoke 8/17/04

Sample Collection Log

00045475

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number:

32-081704-KIE
32-081704-mk

Location Code: 32SB19

Sample Number: L0002-32SB19

Sample Name: L0002-32SB19-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip:

Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date:

8/17/04

Collection Time:

1355

Start Depth:

6'

End Depth:

9'

Sample Matrix:

SOIL

Sample Team:

A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

[Signature] 8/17/04



Sample Collection Log

00045476

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-FE
32-081704-mk

Location Code: 32SB19

Sample Number: L0003-32SB19

Sample Name: L0003-32SB19-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip:

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1400

Start Depth: 12'

End Depth: 15'

Sample Matrix: SOIL

Sample Team: A. W. Wilmore

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

plus MS, MSD

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

J. Wilmore 8/17/04

De. Hoff 8/17/04

Sample Collection Log

00045478

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number:

32-081704-KE
32-081704-mk

Location Code: 32SB20

Sample Number: L0002-32SB20

Sample Name: L0002-32SB20-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: 6co probe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1030

Start Depth: 3'

End Depth: 6'

Sample Matrix: SOIL

Sample Team: A Williams

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/17/04

Reviewed BY / Date:

[Signature] 8/17/04



Sample Collection Log

00045479

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-KE
32-081704-MK

Location Code: 32SB20

Sample Number: L0003-32SB20

Sample Name: L0003-32SB20-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1040

Start Depth: 12'

End Depth: 15'

Sample Matrix: SOIL

Sample Team: A. Williams

ERPIMS Values:

Sacode:

Lot Control#:

Containers
Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

8/17/04

Reviewed BY / Date:

8/17/04

Sample Collection Log

00045480

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-KE
32-081704-MK

Location Code: **32SB21**

Sample Number: **L0001-32SB21**

Sample Name: **L0001-32SB21-02**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: **SB DATA GAPS AUG04**

Collection Date: 8/17/04

Collection Time: 1105

Start Depth: 0'

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/17/04

Reviewed BY / Date:

[Signature] 8/17/04



Sample Collection Log

00045481

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-RF
32-081704-MK

Location Code: 32SB21

Sample Number: L0001-32SB21QC

Sample Name: L0001-32SB21-02-QC

Sampling Method: HP

Sample Type: SO

Sample Purpose: FD

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Matrix: SOIL

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

 8/17/04

Reviewed BY / Date:





Sample Collection Log

00045482

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

32-081704-KE

RFA / COC Number: 32-081704-MK

Location Code: 32SB21

Sample Number: L0002-32SB21

Sample Name: L0002-32SB21-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1116

Start Depth: 9'

End Depth: 12'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:



Reviewed BY / Date:



Sample Collection Log

00045483

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-081704-KE
32-081704-MK

Location Code: 32SB21

Sample Number: L0003-32SB21

Sample Name: L0003-32SB21-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip:

Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/17/04

Collection Time: 1125

Start Depth: 12'

End Depth: 15'

Sample Matrix: SOIL

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
EXPLOSIVES	N	B	1	8	oz	CWM
METALS-6020	N	C	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/17/04

Reviewed BY / Date:

[Signature] 8/17/04

Sample Collection Log

00045484

Page 1 of 1

845714 - LONGHORN AAP

Manager: Praveen Srivastav

32-090804-KE

RFA / COC Number: 32-090804-M/K

Location Code: 32SB22

Sample Number: L0002-32SB22

Sample Name: L0002-32SB22-15 ⁰⁶

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: 6610 DJ

QC Partners:

(TB) — (ER) — (FB) —

Task: SB DATA GAPS AUG04

Collection Date: 9/9/04

Collection Time: 14:39

Start Depth: 6'

End Depth: 6'

Sample Matrix: SOIL

Sample Team: A. Williams

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
METALS-S	N	A	1	8 4	oz	CWM
EXPLOSIVES	N	B	1	8 4	oz	CWM
METALS-6020	N	C	1	8 4	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

M. Williams
9/9/04

Reviewed BY / Date:

P. Srivastav 9/8/04

Sample Collection Log

00045485

Page 1 of 1

845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-090804-MK

Location Code: **32SB22**

Sample Number: **L0001-32SB22**

Sample Name: **L0001-32SB22-02⁰¹**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: 6610 DT

QC Partners:

(TB) — (ER) — (FB) —

Task: **SB DATA GAPS AUG04**

Collection Date: 9/8/04

Collection Time: 14:31

Start Depth: 0

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

Analytical Suite	Containers				Units	Type
	Flt	Frtn	Qty	Size		
METALS-S	N	A	1	8.4	oz	CWM
EXPLOSIVES	N	B	1	8.4	oz	CWM
METALS-6020	N	C	1	8.4	oz	CWM

ERPIMS Values:

Scade:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

M. J. L. C. R.
9/8/04

Reviewed BY / Date:

P. J. L. C. R.
9/8/04



Sample Collection Log

00045486

Page 1 of 1

845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 32-090804-KE
32-090804-ME

Location Code: 32SB22

Sample Number: L0003-32SB22

Sample Name: L0003-32SB22-20⁷¹²

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: 6610 DT

QC Partners:

(TB) —

(ER) —

(FB) —

Task: SB DATA GAPS AUG04

Collection Date: 9/9/04

Collection Time: 14:48

Start Depth: 10'

End Depth: 12'

Sample Matrix: SOIL

Sample Team: A. Williams

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	84	oz	CWM
EXPLOSIVES	N	B	1	84	oz	CWM
METALS-6020	N	C	1	84	oz	CWM

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Comments: _____

Sketch Location: _____

Logged BY / Date: M. J. C.

9/9/04

Reviewed BY / Date: P. Srivastav 9/8/04

Reviewed BY / Date:

Reviewed BY / Date:

Sample Collection Log

00045489

Page 1 of 1

845714 - LONGHORN AAP

Manager: Praveen Srivastav

32-090804-KF

RFA / COC Number: 32-090804-MK

Location Code: 32SB23

Task: SB DATA GAPS AUG04

Sample Number: L0003-32SB23

Collection Date: 9/9/04

Sample Name: L0003-32SB23-28712

Collection Time: 15:00

Sampling Method: HP

Start Depth: 10'

Sample Type: SO

Sample Purpose: REG

End Depth: 12'

Sampling Equip: Geoprobe

Sample Matrix: SOIL

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Team: A. Williams

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	84	oz	CWM
EXPLOSIVES	N	B	1	84	oz	CWM
METALS-6020	N	C	1	84	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature]
9/9/04

Reviewed BY / Date:

[Signature] 9/8/04

LHAAP-50
SAMPLE COLLECTION LOGS for SOIL SORINGS

Sample Collection Log

00045491

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-MK

Task: **SB DATA GAPS AUG04**

Collection Date: 8/18/04

Collection Time: 15:15 16:00

Start Depth: 0'

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Location Code: **50SB11**

Sample Number: **L0001-50SB11**

Sample Name: **L0001-50SB11-02**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: beoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	I	12	oz	CWMG,SEP
PERC	N	B	I	84	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

U. McC 8/18/04

Reviewed BY / Date:

Paul Hoff 8/19/04

Sample Collection Log

00045492

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081904-mk

Location Code: **50SB11**

Sample Number: **L0002-50SB11**

Sample Name: **L0002-50SB11-15**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Task: **SB DATA GAPS AUG04**

Collection Date: 8/18/04

Collection Time: 15:22 16:45

Start Depth: 3'

End Depth: 6'

Sampling Equip: Geoprobe

Sample Matrix: **SOIL**

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	12	oz	CWMG:SEP
PERC	N	B	2	82	oz	CWM

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Comments:

Sketch Location:

Logged BY / Date:

M. J. McC... 8/18/04

Reviewed BY / Date:

Santhosh... 8/19/04



Sample Collection Log

00045493

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081904-mk

Location Code: 50SB11

Sample Number: L0003-50SB11

Sample Name: L0003-50SB11-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/18/04

Collection Time: 16:54

Start Depth: 9'

End Depth: 10'

Sample Matrix: SOIL

Sample Team: A. Will/more

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	12	oz	CWMG-SEP
PERC	N	B	2	12	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

M. Lee 8/18/04

Reviewed BY / Date:

Paul Will 8/19/04

Sample Collection Log

00045494

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081904-mk

Task: **SB DATA GAPS AUG04**

Collection Date: 8/18/04

Collection Time: 1715

Start Depth: 0'

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: A. Williams

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Location Code: **50SB12**

Sample Number: **L0001-50SB12**

Sample Name: **L0001-50SB12-02**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

M. McC 8/18/04

Reviewed BY / Date:

Santhosh 8/19/04

Sample Collection Log

00045495

Page 1 of 1

845714 LONGHORN AAP
 Manager: Praveen Srivastav

RFA / COC Number: 50-081904-MR

Task: **SB DATA GAPS AUG04**

Collection Date: 8/18/04

Collection Time: 1725

Start Depth: 3'

End Depth: 6'

Sample Matrix: **SOIL**

Sample Team: A. Williams

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Location Code: **50SB12**
 Sample Number: **L0002-50SB12**
 Sample Name: **L0002-50SB12-15**
 Sampling Method: **HP**
 Sample Type: **SO** Sample Purpose: **REG**
 Sampling Equip: Geoprobe
 QC Partners: (TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

M. H. C. 8/18/04

Reviewed BY / Date:

Praveen Srivastav 8/18/04

Sample Collection Log

00045496

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081904-mk

Location Code: **50SB12**

Task: **SB DATA GAPS AUG04**

Sample Number: **L0003-50SB12**

Sample Name: **L0003-50SB12-20**

Collection Date: 8/18/04

Collection Time: 1730

Sampling Method: **HP**

Start Depth: 9'

Sample Type: **SO**

Sample Purpose: **REG**

End Depth: 10'

Sampling Equip: Geoprobe

Sample Matrix: **SOIL**

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: _____

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Analytical Suite **Containers**
Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	82	oz	CWMG,SEP
PERC	N	B	12	82	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/18/04

Reviewed BY / Date:

[Signature] 8/19/04



Shaw E & I, Inc.

Sample Collection Log

00045497

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081904-MK

Location Code: 50SB17

Sample Number: L0001-50SB17

Sample Name: L0001-50SB17-02

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Task: SB DATA GAPS AUG04

Collection Date: 8/18/04

Collection Time: 14:31

Start Depth: 0'

End Depth: 1'

Sampling Equip:

Geoprobe

Sample Matrix: SOIL

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Team: A. Williams

Containers

Analytical Suite Flt Frtn Qty Size Units Type

ERPIMS Values:

Sacode:

Lot Control#:

VOC-FULL	N	A	1	17	oz	CWMG,SEP
PERC	N	B	1	84	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

M. Williams 8/18/04

Reviewed BY / Date:

P. Williams 8/18/04



Sample Collection Log

00045498

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081904-MK

Location Code: 50SB17

Sample Number: L0002-50SB17

Sample Name: L0002-50SB17-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Task: SB DATA GAPS AUG04

Collection Date: 8/8/04

Collection Time: 14:40

Start Depth: 6'

End Depth: 9'

Sample Matrix: SOIL

Sample Team: A. Willmore

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A

(ER) N/A

(FB) N/A

Containers

ERPIMS Values:

Sacode:

Lot Control#:

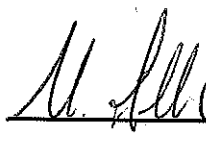
Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

 8/12/04

Reviewed BY / Date:

 8/14/04

Sample Collection Log

00045499

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50 - 081904 ~ Mk

Location Code: 50SB17

Task: SB DATA GAPS AUG04

Sample Number: L0003-50SB17

Collection Date: 8/18/04

Sample Name: L0003-50SB17-20

Collection Time: 15:00

Sampling Method: HP

Start Depth: 9'

Sample Type: SO

Sample Purpose: REG

End Depth: 11'

Sampling Equip: Geoprobe

Sample Matrix: SOIL

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: A. Willmore

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	1	4	oz	CWMG.SEP
PERC	N	B	1	8	oz	CWM


Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

 8/18/04

 8/19/04

Sample Collection Log

00045500

Page 1 of 1

845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: SO-081804-MK

Location Code: **50SB10**

Task: **SB DATA GAPS AUG04**

Sample Number: **L0001-50SB10**

Sample Name: **L0001-50SB10-02**

Collection Date: 8/19/04

Collection Time: 0840

Sampling Method: **HP**

Start Depth: 0'

Sample Type: **SO**

Sample Purpose: **REG**

End Depth: 1'

Sampling Equip: Geoprobe

Sample Matrix: **SOIL**

QC Partners:

(TB) N/A

(ER) N/A

(FB) N/A

Sample Team: A. Williams

Containers

ERPIMS Values:

Analytical Suite Flt Frta Qty Size Units Type

VOC-FULL N A 1 2.4 oz CWMG,SEP

PERC N B 1 4/8 oz CWM

Snacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: D. Williams 8/19/04



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Sample Collection Log

00045501

Page 1 of 1

845714 - LONGHORN AAP

Manager: Praveen Srivastava

RFA / COC Number: 50-081804-MK

Location Code: 50SB10

Sample Number: L0001-50SB10-QC

Sample Name: L0001-50SB10-02-QC

Sampling Method: HP

Sample Type: SO

Sample Purpose: FD

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: SB DATA GAPS ANALYSIS

Collection Date: 8/18/04

Collection Time: 0840

Start Depth: 0'

End Depth: 1'

Sample Matrix: SOIL

Sample Team: A. Willmore

Containers

Analytical Suite	Plt	Prtn	Qty	Size	Units	Type
VOC-FULL	N	A	51	52	8 ²	Encore CWM
PERC	N	B	1	84	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: D. Holcomb 8/18/04



Shaw E & I, Inc.

Sample Collection Log

00045502

Page 1 of 1

845714 - LONGHORN AAP

Manager: Praveen Srivastava

REA / COC Number: 50-081804-mk

Location Code: 50SB10

Sample Number: L0002-50SB10

Sample Name: L0002-50SB10-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip. Geoprobe

QC Partners:

(TB) N/A

(ER) N/A

(FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/18/04

Collection Time: 0850

Start Depth: 1-30" 1'

End Depth: 3'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPLMS Values:

Recorder:

Lot Control#:

Analytical Suite	Containers				Units	Type
	Flt	Frnt	Qty	Size		
VOC-FULL	N	A	1	2.4	oz	CWMG,SEP
PERC	N	B	1	4.8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: *Paul H. H. 8/18/04*



Shaw E & I, Inc.

Sample Collection Log

00045503

Page 1 of 1

845714 - LONGHORN AAF

Manager: Praveen Srinivasan

RFA / COC Number: 50-081804-MK

Location Code: 50SB10

Sample Number: T0003-50SB10

Sample Name: L0003-50SB10-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip. Geoprobe

QC Partners:

(TB) N/A

(ER) N/A

(FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/18/04

Collection Time: 0910

Start Depth: 6'

End Depth: 7'

Sample Matrix: SOIL

Sample Team: A. Willmore

EKFIMS Values:

Initial:

Lot Control#:

Containers

Analytical Suite	PN	Frequency	Size	Units	Type
VOC-FUEL	N A	1	12	oz	CWMG,SEP
PERC	N B	1	84	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: *Don Ho* / 8/18/04



Shaw E & I, Inc.

Sample Collection Log

845714 - LONGHORN AAP

Manager: Praveen Srivastav

00045504

Page 1 of 1

RFA / COC Number: 50-090804-mk

Location Code: 50SB11

Task: SB DATA GAPS AUG04

Sample Number: L0002-50SB11

Collection Date: 9/8/04

Sample Name: L0002-50SB11-15⁶

Collection Time: 12:51

Sampling Method: HP

Start Depth: 3'

Sample Type: SO

Sample Purpose: REG

End Depth: 6'

Sampling Equip: 6610 DT

Sample Matrix: SOIL

QC Partners:

(TB) (ER) (FB)

Sample Team: A. WILLMORE

Analytical Suite	Containers				Units	Type
	Flt	Frtn	Qty	Size		
VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	64	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature]
9/8/04

Reviewed BY / Date:

[Signature] 9/8/04



Shaw E & I, Inc.

Sample Collection Log

00045505

Page 1 of 1

845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-090804-mk

Location Code: 50SB11

Sample Number: L0003-50SB11

Sample Name: L0003-50SB11-26¹⁰

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: 6610 DT

QC Partners:

(TB)

(ER)

(FB)

Task: SB DATA GAPS AUG04

Collection Date: 9/8/04

Collection Time: 13:00

Start Depth: 9'

End Depth: 10'

Sample Matrix: SOIL

Sample Team: A. Wilmore

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Containers				Units	Type
	Flt	Frtn	Qty	Size		
VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	84	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

M. M. C.
9/8/04

Reviewed BY / Date:

P. M. C. 9/8/04



Shaw E & I, Inc.

Sample Collection Log

845714 - LONGHORN AAP

Manager: Praveen Srivastav

00045506

Page 1 of 1

RFA / COC Number: 50-090804-MK

Location Code: 50SB12

Sample Number: L0001-50SB12

Sample Name: L0001-50SB12-027⁰¹

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: 6610 DT

QC Partners:

(TB)

(ER)

(FB)

Task: SB DATA GAPS AUG04

Collection Date: 9/8/04

Collection Time: 12:10

Start Depth: 0'

End Depth: 1'

Sample Matrix: SOIL

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Containers				Units	Type
	Flt	Frtn	Qty	Size		
VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	84	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

M. All
9/8/04

Reviewed BY / Date:

D. Willmore 9/8/04



845714 - LONGHORN AAP

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Reviewed BY / Date:

9/8/07



845714 - LONGHORN AAP

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PERC	N	B	1	84	OZ	CWM
------	---	---	---	----	----	-----

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

9/8/04

Sample Collection Log

00045509

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-MK

Location Code: 50SB13

Task: SB DATA GAPS AUG04

Sample Number: L0001-50SB13

Sample Name: L0001-50SB13-02

Collection Date: 8/18/04

Collection Time: 15:15

Sampling Method: HP

Start Depth: 0'

Sample Type: SO

Sample Purpose: REG

End Depth: 1'

Sampling Equip: Geoprobe

Sample Matrix: SOIL

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: A.W. Mont

Containers

ERPIMS Values:

Analytical Suite Flt Frtn Qty Size Units Type

Sacode:

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	8	oz	CWM

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/18/04

Reviewed BY / Date:

[Signature] 8/18/04



Shaw E & I, Inc.

Sample Collection Log

00045510

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-MK

Location Code: 50SB13

Sample Number: L0002-50SB13

Sample Name: L0002-50SB13-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/18/04

Collection Time: 15:22

Start Depth: 3'

End Depth: 6'

Sample Matrix: SOIL

Sample Team: Awillmore

Containers

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	4	oz	CWMG.SEP
PERC	N	B	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

[Signature]

8/18/04

Reviewed BY / Date:

[Signature] 8/18/04

Sample Collection Log

00045511

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-MK

Task: **SB DATA GAPS AUG04**

Collection Date: 8/18/04

Collection Time: 15:30

Start Depth: 9'

End Depth: 10'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Location Code: **50SB13**

Sample Number: **L0003-50SB13**

Sample Name: **L0003-50SB13-20**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	I	4	oz	CWMG,SEP
PERC	N	B	I	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: M. [Signature]

8/18/04 Reviewed BY / Date: [Signature]

Sample Collection Log

00045512

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-mk

Location Code: 50SB14

Sample Number: L0002-50SB14QC

Sample Name: L0002-50SB14-15-QC

Sampling Method: HP

Sample Type: SO

Sample Purpose: FD

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/18/04

Collection Time: 11:50

Start Depth: 6'

End Depth: 9'

Sample Matrix: SOIL

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	5	5	g	Encore
PERC	N	B	1	8	oz	CWM

ERPIMS Values:


Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:  8/18/04

Sample Collection Log

00045513

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-mk

Location Code: **50SB14**

Task: **SB DATA GAPS AUG04**

Sample Number: **L0003-50SB14**

Sample Name: **L0003-50SB14-20**

Collection Date: 8/18/04

Collection Time: 12:17

Sampling Method: **HP**

Start Depth: 9'

Sample Type: **SO**

Sample Purpose: **REG**

End Depth: 11'

Sampling Equip: Geoprobe

Sample Matrix: **SOIL**

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	8	oz	CWM

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Comments:

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: Paul Holley 8/18/04



Shaw E & I, Inc.

Sample Collection Log

00045514

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-mk

Location Code: 50SB14

Sample Number: L0002-50SB14

Sample Name: L0002-50SB14-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Task: SB DATA GAPS AUG04

Collection Date: 8/18/04

Collection Time: 11:50

Start Depth: 6' N/A

End Depth: 9'

Sampling Equip:

Geoprobe

Sample Matrix: SOIL

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

ERPIMS Values:

Sacode:

Lot Control#:

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

Praveen Srivastav 8/18/04



Shaw E & I, Inc.

Sample Collection Log

845714 LONGHORN AAP

Manager: Praveen Srivastav

00045515
Page 1 of 1

50-081804-mk

RFA / COC Number: ~~No COC~~

Location Code: 50SB14

Task: SB DATA GAPS AUG04

Sample Number: L0002-50SB14-MS

Collection Date: 15-AUG-04

Sample Name: 50SB14-SO-L0002-50SB14-MS-MS

Collection Time: 11:50

Sampling Method: HP

Start Depth: 6

Sample Type: SO

End Depth: 9

Sample Purpose: MS

Sample Matrix: SOIL

Sample Team: AW

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
VOC-FULL	N	A	1	2	oz	CWMG,SEP
PERC	N	B	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: *Dan H. H. / 7/15/04*

Sample Collection Log

845714 LONGHORN AAP

Manager: Praveen Srivastav

SO-081804-mk

RFA / COC Number: ~~No~~ COC

Location Code: 50SR14

Task: SE DATA CAPS AUG04

Sample Number: L0002-50SB14-MSD

Collection Date: 18-AUG-04

Sample Name: 50SB14-SO-L0002-50SB14-MSD-MSD

Collection Time: 11:50

Sampling Method: HP

Start Depth: 6

Sample Type: SO

Sample Purpose: MSD

End Depth: 9

Sample Matrix: SOIL

Sample Team: AW

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite	Containers				Units	Type
	Flt	Frtn	Qty	Size		
VOC-FULL	N	A	1	2	oz	CWMG,SEP
PERC	N	B	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: *Da [Signature]* 8/18/04

Sample Collection Log

00045517

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50 - 081804-mk

Location Code: **50SB14**

Sample Number: **L0001-50SB14**

Sample Name: **L0001-50SB14-02**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Task: **SB DATA GAPS AUG04**

Collection Date: 8/18/04

Collection Time: 11:35

Start Depth: 0'

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

Sampling Equip: geoprobe

QC Partners:

(TB) N/A

(ER) N/A

(FB) N/A

Containers

ERPIMS Values:

Sacode:

Lot Control#:

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: _____

Praveen Srivastav 8/18/04

Sample Collection Log

00045518

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: SO-081804-mk

Task: **SB DATA GAPS AUG04**

Collection Date: 8/18/04

Collection Time: 10:50

Start Depth: 0

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Location Code: **50SB15**

Sample Number: **L0001-50SB15**

Sample Name: **L0001-50SB15-02**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	2	oz	CWMG,SEP
PERC	N	B	1	4	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: Praveen Srivastav 8/18/04

Sample Collection Log

00045519

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50 - 081804 - mk

Task: **SB DATA GAPS AUG04**

Collection Date: 8/18/04

Collection Time: 10:55

Start Depth: 3'

End Depth: 6'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Location Code: **50SB15**

Sample Number: **L0002-50SB15**

Sample Name: **L0002-50SB15-15**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	12	oz	CWMG,SEP
PERC	N	B	1	84	oz	CWM

Comments:

Sketch Location:

Logged BY / Date: _____

Reviewed BY / Date: _____

Quillo 8/18/04



Sample Collection Log

00045520

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-mk

Location Code: 50SB15

Task: SB DATA GAPS AUG04

Sample Number: L0003-50SB15

Sample Name: L0003-50SB15-20

Collection Date: 8/18/04

Collection Time: 10:59

Sampling Method: HP

Start Depth: 6'

Sample Type: SO

Sample Purpose: REG

End Depth: 7'

Sampling Equip: Geoprobe

Sample Matrix: SOIL

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	87	oz	CWMG,SEP
PERC	N	B	1	84	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

Dan Holm 8/18/04

Sample Collection Log

00045521

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-MK

Location Code: **50SB16**

Sample Number: **L0001-50SB16**

Sample Name: **L0001-50SB16-02**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: **SB DATA GAPS AUG04**

Collection Date: 9/18

Collection Time: 9:40

Start Depth: 0'

End Depth: 1'

Sample Matrix: **SOIL**

Sample Team: A. Willmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	8.2	oz	CWMG.SEP
PERC	N	B	1	8.4	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

Praveen Srivastav 8/18/04

Sample Collection Log

00045522

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-081804-mk

Location Code: 50SB16

Sample Number: L0002-50SB16

Sample Name: L0002-50SB16-15

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/18/04

Collection Time: 9:50

Start Depth: 1'

End Depth: 3'

Sample Matrix: SOIL

Sample Team: A. Willmer

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	82	oz	CWMG,SEP
PERC	N	B	1	84	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: Paul Hall / 8/18/04

Sample Collection Log

00045523

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50 - 081804 - Mk

Location Code: 50SB16

Sample Number: L0003-50SB16

Sample Name: L0003-50SB16-20

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Task: SB DATA GAPS AUG04

Collection Date: 8/19/04

Collection Time: 9:46

Start Depth: 6'

End Depth: 7'

Sample Matrix: SOIL

Sample Team: A. Williams

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	2	oz	CWMG,SEP
PERC	N	B	1	4	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

Da Silva 8/19/04

Sample Collection Log

00045524

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845714 - LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: 50-090804-mk

Location Code: **50SB17**

Sample Number: **L0003-50SB17**

Sample Name: **L0003-50SB17-20**

Sampling Method: **HP**

Sample Type: **SO**

Sample Purpose: **REG**

Sampling Equip: 6610D7

QC Partners:

(TB) _____

(ER) _____

(FB) _____

Task: **SB DATA GAPS AUG04**

Collection Date: 9/8/04

Collection Time: ~~10:00 AM~~ 10:40

Start Depth: ~~0'~~ 9'

End Depth: ~~11'~~ 11'

Sample Matrix: **SOIL**

Sample Team: A. Willmar

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	84	oz	CWM

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Comments: _____

Sketch Location:

Logged BY / Date: M. H. C.

9/8/04

Reviewed BY / Date: P. H. C. 9/8/04



845714 - LONGHORN AAP

Manager: Praveen Srivastav

Page 1 of 1

RFA / COC Number: 50-090804-mk

Task: SB DATA GAPS AUG04

Collection Date: 9/8/07

Sample Name: L0001-50SB17-92⁷⁰¹

Collection Time: 10:00

Start Depth: 0'

Sample Purpose: **REG**

End Depth: _____

Sampling Equip: 6610 DT

Sample Matrix: **SOIL**

(TB) — (ER) — (FB) —

Sample Team: A. Willmore

ERPIMS Values:

Sacode:

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	84	oz	CWM

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date: Don J. Hall 9/8/04

9/8/04

Reviewed BY / Date:

LHAAP-67
SAMPLE COLLECTION LOGS for SOIL BORINGS

Sample Collection Log

845714 LONGHORN AAP
Manager: Praveen Srivastav

RFA / COC Number: 67-090904-MK

Location Code: 67SB04
Sample Number: L0001-67SB04
Sample Name: 67SB04-SO-L0001-67SB04-REG
Sampling Method: CC
Sample Type: SO Sample Purpose: REG

Task:
Collection Date: 08-SEP-04
Collection Time: 16:20
Start Depth: 2'
End Depth: 3'
Sample Matrix: SOIL
Sample Team: AW

Containers					
Analytical Suite	Flt	Frtn	Qty	Size	Units Type
VOC-FULL	N	A	1	4	OZ CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:

Logged BY / Date: Santhosh 2/9/04

Reviewed BY / Date: Santhosh 2/9/04

Sample Collection Log

845714 LONGHORN AAP
Manager: Praveen Srivastav

RFA / COC Number: 67-090904-MK

Location Code: 67SB04
Sample Number: L0002-67SB04
Sample Name: 67SB04-SO-L0002-67SB04-REG
Sampling Method: CC
Sample Type: SO Sample Purpose: REG

Task:
Collection Date: 08-SEP-04
Collection Time: 16:25
Start Depth: 5'
End Depth: 6'
Sample Matrix: SOIL
Sample Team: AW

Containers					
Analytical Suite	Flt	Frtn	Qty	Size	Units Type
VOC-FULL	N	A	1	4	OZ CWM

ERPIMS Values:
Sacode:
Lot Control#:

Comments:

Sketch Location:

Logged BY / Date: 9/9/04

Reviewed BY / Date: 9/9/04



Sample Collection Log

00045530

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: 67SB04
50SB19RFA / COC Number: 67-081904-MKSample Number: **L0002-50SB19** 67SB04Task: **SB DATA GAPS AUG04**Sample Name: **L0002-50SB19-T5** 67SB04Collection Date: 8/19/04Sampling Method: **HP**Collection Time: 0915Sample Type: **SO**Start Depth: 3'Sample Purpose: **REG**End Depth: 6'Sampling Equip: GeoprobeSample Matrix: **SOIL**

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/ASample Team: A. Williams

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	4	oz	CWMG.SEP
PERC	N	B	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

M. Seltman 8/19/04

Reviewed BY / Date:

Praveen Srivastav 8/19/04



Sample Collection Log

00045531

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845714 LONGHORN AAP

Manager: Praveen Srivastav

Location Code: ~~50SB19~~ ⁶⁷³⁸⁰⁴Sample Number: L0001-~~50SB19~~ ⁶⁷³⁸⁰⁴Sample Name: L0001-~~50SB19-02~~ ⁶⁷³⁸⁰⁴

Sampling Method: HP

Sample Type: SO

Sample Purpose: REG

Sampling Equip: Geoprobe

QC Partners:

(TB)

N/A

(ER)

N/A

(FB)

N/ARFA / COC Number: 67-081904-mk

Task: SB DATA GAPS AUG04

Collection Date: 8/19/04Collection Time: 0900Start Depth: 2'End Depth: 3'

Sample Matrix: SOIL

Sample Team: A. Wilmore

Containers

Analytical Suite Flt Frtn Qty Size Units Type

VOC-FULL	N	A	1	4	oz	CWMG,SEP
PERC	N	B	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

[Signature] 8/19/04

Reviewed BY / Date:

[Signature] 8/19/04

INSTALLATION-WIDE SURFACE WATER AND SEDIMENT

SAMPLE COLLECTION LOGS for SURFACE WATER AND SEDIMENT



Sample Collection Log

00045533

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845714

LONGHORN AAP

Manager:

Praveen Srivastav

Location Code: IWSD02

Sample Number: IWSD02

Sample Name: IWSD02-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Sampling Equip:

Stainless shovel

QC Partners:

(TB)

(ER)

(FB)

RFA / COC Number:

IWSWSD-091704-KE
IWSWSD-091704-MF

Task: SW-SED_AUG04

Collection Date:

9/17/04

Collection Time:

13:20

Start Depth:

0.5

End Depth:

A. Wilmore, J. Rodriguez

Sample Matrix:

SE

B. Andley

Sample Team:

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

9/17/04

Reviewed BY / Date:

9/17/04

Sample Collection Log

00045534

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845714 LONGHORN AAP

Manager: Praveen Srivastav

IWSWSD-091604-KE

RFA / COC Number: IWSWSD-091604-MK

Location Code: IWSD02

Sample Number: IWSD02

Sample Name: IWSD02-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Task: SW-SED_AUG04

Collection Date: 9/16/04

Collection Time: 12:25

Start Depth: 0 feet

End Depth: 0.5 feet

Sample Matrix: SE

Sample Team: A. Willmore

Sampling Equip: Shovel Grab

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Long Prairie Creek

Logged BY / Date: DeHoff 9/16/04

Reviewed BY / Date: DeHoff 9/16/04

Sample Collection Log

00045535

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091604-KF
IWSWSD-091604-MK

Location Code: IWSD03 + QC Field Dnp

Sample Number: IWSD03

Sample Name: IWSD03-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Task: SW-SED AUG04

Collection Date: 9/16/04

Collection Time: 11:20

Start Depth: 0 feet

End Depth: 0.5 feet

Sample Matrix: SE

Sampling Equip: Shovel

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team:

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

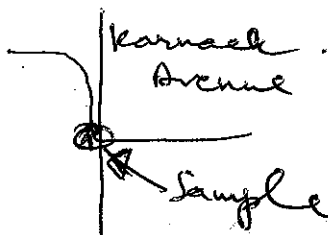
Lot Control#:

Comments:

By the road where creek goes under the road. manual from

* Duplicate taken IWSD03-QC *

Sketch Location:


Coordinates
N 32° 41' 41.8"
W 94° 8' 25.1"

variance 26 feet

Logged BY / Date: [Signature] 9/16/04

Reviewed BY / Date: [Signature] 9/16/04

Sample Collection Log

00045536

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845714 LONGHORN AAP

Manager: Praveen Srivastav

IWSWSD-091604-KE

RFA / COC Number: IWSWSD-091604-mk

Location Code: IWSD04

Sample Number: IWSD04

Sample Name: IWSD04-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Task: SW-SED AUG04

Collection Date: 9/15/04

Collection Time: 10:35

Start Depth: 0 feet

End Depth: 0.5 feet

Sample Matrix: SE

Sample Team: Praveen Srivastav
Randy Ansley

ERPIMS Values: Allen M. Evans

Sacode:

Lot Control#:

Sampling Equip: Shovel

QC Partners:

(TB) N/A

(ER) N/A

(FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

plus

Comments: Pond dry. found a pool of water.

Sketch Location:

SVOC
pest.
Herb.
PCB
Diox/Furan
5 402 jars
1 for each parameter

Coordinates

N 32° 41' 39.3"

W 94° 8' 2.9"

variance 16 feet

Logged BY / Date: [Signature] 9/16/04

Reviewed BY / Date: [Signature] 9/16/04

Sample Collection Log

00045537

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number:

IWSWSD-091704-KF
IWSWSD-091704-MK

Location Code: **IWSD05**

Sample Number: **IWSD05**

Sample Name: **IWSD05-00**

Sampling Method: **GRAB**

Sample Type: **SED**

Sample Purpose: **REG**

Sampling Equip:

stainless steel sample shovel

QC Partners:

(TB)

(ER)

(FB)

Task: **SW-SED_AUG04**

Collection Date: 9/16/04

Collection Time: 10:00

Start Depth: -0

End Depth: -5

Sample Matrix: **SE**

Sample Team: A. Williams, B. Anshy

ERPIMS Values:

Sacode:

Lot Control#:

Containers
Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

Comments:

No water samples!!

Sketch Location:

Logged BY / Date:

M. McC...

Reviewed BY / Date:

D. Williams 9/17/04

9/18/04

Sample Collection Log

00045538

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091704-KE
IWSWSD-091704-mk

Task: SW-SED_AUG04

Collection Date: 9/16/04

Collection Time: 3:55:30

Start Depth: - 0

End Depth: - .5

Sample Matrix: SE

Sample Team: A. Willmore, B. Anoley

Location Code: **IWSD06**

Sample Number: **IWSD06**

Sample Name: **IWSD06-00**

Sampling Method: **GRAB**

Sample Type: **SED**

Sample Purpose: **REG**

Sampling Equip: Sample Shovel

QC Partners:

(TB) (ER) (FB)

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments: NO WATER IN CREEK

Sketch Location:

Logged BY / Date: M. H. Mc

Reviewed BY / Date: 9/17/04

9/16/04

Sample Collection Log

00045539

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091704-KE
IWSWSD-091704-MK

Location Code: **IWSD07**

Sample Number: **IWSD07**

Sample Name: **IWSD07-00**

Sampling Method: **GRAB**

Sample Type: **SED**

Sample Purpose: **REG**

Task: **SW-SED_AUG04**

Collection Date: 9/17/04

Collection Time: 10:10

Start Depth: - 0

End Depth: - .5

Sampling Equip: sample shovel

Sample Matrix: **SE**

QC Partners:

(TB) (ER) (FB)

Sample Team: A. Williams, R. Andrey

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments: No surface water sample.

Sketch Location:

Logged BY / Date: M. Allen
9/17/04

Reviewed BY / Date: D. Hobbitt
9/17/04

Sample Collection Log

00045540

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845714 LONGHORN AAP
Manager: Praveen Srivastav

RFA / COC Number: IWSD08-091704-KB
IWSD08-091704-MK

Task: **SW-SED_AUG04**

Location Code: **IWSD08**

Sample Number: **IWSD08**

Sample Name: **IWSD08-00**

Sampling Method: **GRAB**

Sample Type: **SED**

Sample Purpose: **REG**

Collection Date: 9/17/04

Collection Time: 11:30

Start Depth: 0

End Depth: 0.5

Sample Matrix: **SE**

Sampling Equip: stainless steel shovel

QC Partners:

(TB) _____ (ER) _____ (FB) _____

Sample Team: A. Williams, B. Ansky

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Comments:

Sketch Location:

Logged BY / Date:

M. Williams
9/17/04

Reviewed BY / Date:

Reviewed BY / Date:

Sample Collection Log

00045542

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD - 091704 - KE
IWSWSP - 091704 - MK

Task: **SW-SED_AUG04**

Location Code: **IWSD10**

Sample Number: **IWSD10**

Sample Name: **IWSD10-00**

Sampling Method: **GRAB**

Sample Type: **SED**

Sample Purpose: **REG**

Collection Date: 9/17/04

Collection Time: 1145

Start Depth: 0.

End Depth: 5

Sampling Equip: Shovel

Sample Matrix: **SE**

QC Partners:

(TB) N/A (ER) 091704-KE (FB) N/A

Sample Team: R. Everett

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

R. Everett 9/17/04



Sample Collection Log

00045543

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091704-KE
IWSWSD-091704-MK

Location Code: IWSD11

Sample Number: IWSD11

Sample Name: IWSD11-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Task: SW-SED_AUG04

Collection Date: 9/16/04Collection Time: 1500Start Depth: 0End Depth: 5Sampling Equip: Shovel

QC Partners:

(TB)

(ER)

(FB)

Sample Matrix: SE

Sample Team: K. Everett
J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

9/17/04

Sample Collection Log

00045544

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845714 LONGHORN AAP

Manager: Praveen Srivastav

IWSWSD-091704-KE

RFA / COC Number: IWSWSD-091704-mk

Location Code: IWSD12

Sample Number: IWSD12

Sample Name: IWSD12-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Task: SW-SED_AUG04

Collection Date: 9/16/04

Collection Time: 1545

Start Depth: 0

End Depth: 5

Sampling Equip: Shovel

QC Partners:

(TB)

(ER)

(FB)

Sample Matrix: SE

C-Murray

Sample Team: K. Ewert, J. Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments: No surface water; bed dry

Sketch Location:

Logged BY / Date: K. Ewert 9/16/04

Reviewed BY / Date: J. Rodriguez 9/17/04



Sample Collection Log

00045545

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091704-KE
IWSWSD-091704-mk

Location Code: IWSD13

Sample Number: IWSD13

Sample Name: IWSD13-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Task: SW-SED_AUG04

Collection Date: 9/16/04Collection Time: 1630Start Depth: 0End Depth: -5Sampling Equip: Shovel

Sample Matrix: SE

QC Partners:

(TB) (ER) (FB) Sample Team: C. Murray, J. Rodriguez

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
------------------	-----	------	-----	------	-------	------

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode: Lot Control#: Comments: No water

Sketch Location:

Logged BY / Date: KEurt 9/16/04Reviewed BY / Date: La Helle 9/16/04



Sample Collection Log

00045546

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number:

IWSWSD 091704 - KE
IWSWSD - 091704 - mk

Location Code: IWSD14

Sample Number: IWSD14

Sample Name: IWSD14-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Task: SW-SED_AUG04

Collection Date:

Collection Time:

Start Depth:

End Depth:

Sample Matrix: SE

Sample Team:

QC Partners:

(TB)

(ER)

(FB)

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

Sample Collection Log

00045547

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSD15-091704-KE
IWSD15-091704-MR

Task: SW-SED_AUG04

Collection Date: 9/17/04

Collection Time: 0830

Start Depth: — 0

End Depth: — 5

Sample Matrix: SE

Sample Team: KE JR CM

Location Code: **IWSD15**

Sample Number: **IWSD15**

Sample Name: **IWSD15-00**

Sampling Method: **GRAB**

Sample Type: **SED**

Sample Purpose: **REG**

Sampling Equip: Shovel

QC Partners:

(TB) — (ER) — (FB) —

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

plus
S VOL
pest.
Herb.
PCB
Diox/Furan
5 4oz Sars
1 For each parameter

Logged BY / Date:

Reviewed BY / Date: 9/17/04

Sample Collection Log

00045548

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845714

Manager:

LONGHORN AAP

Praveen Srivastav

RFA / COC Number:

IWSWSD - 091704-K5
IWSWSD - 091704-mk

Location Code: IWSD16

Sample Number: IWSD16

Sample Name: IWSD16-00

Sampling Method: GRAB

Sample Type: SED

Sample Purpose: REG

Task: SW-SED_AUG04

Collection Date: 9/17/04

Collection Time: 0950

Start Depth: 0

End Depth: .5

Sampling Equip: Shovel

QC Partners:

(TB)

(ER)

(FB)

Sample Matrix: SE

Sample Team: C. Murray
J. Rodriguez, K. Brant

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

[Signature] 9/17/04

Sample Collection Log

00045549

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845714 LONGHORN AAP

Manager: Praveen Srivastav

IWSWSD - 091604-KE

RFA / COC Number: IWSWSD-091604-mk

Location Code: IWSD17

Task: SW-SED_AUG04

Sample Number: IWSD17

Sample Name: IWSD17-00

Collection Date: 9/16/04

Sampling Method: GRAB

Collection Time: 0930

Sample Type: SED

Sample Purpose: REG

Start Depth: 0

End Depth: 0.5

Sampling Equip: shovel

Sample Matrix: SE

QC Partners:

(TB) n/a (ER) n/a (FB) n/a

Sample Team: C. Murray, J. Rodriguez, K. Enright

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date: K. Enright 9/16/04

Reviewed BY / Date: [Signature] 9/16/04

Sample Collection Log

00045550

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091604-KE
IWSWSD-091604-mk

Task: **SW-SED_AUG04**

Location Code: **IWSD18**

Sample Number: **IWSD18**

Sample Name: **IWSD18-00**

Sampling Method: **GRAB**

Sample Type: **SED**

Sample Purpose: **REG**

Collection Date: 9/15/04

Collection Time: 3:00 PM

Start Depth: 0

End Depth: 0.5 ft

Sample Matrix: **SE**

Sampling Equip: Small Shovel

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: Praveen Srivastav
Serge Rodriguez

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

Comments:

Sketch Location:

Apply to SW at the same location
Temp - 26.7°C

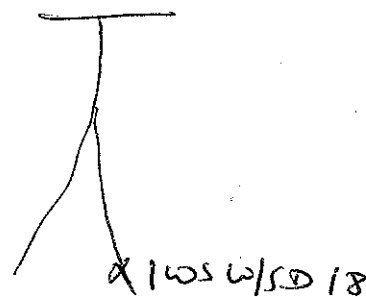
Turbidity - 131.7 NTU

DO 6.72 mg/L

Eh 15.1

Cond. - 0.138

pH - 6.92



X IWSW/SD 18

Logged BY / Date: Praveen Srivastav

Reviewed BY / Date: Praveen Srivastav 9/16/04

Sample Collection Log

00045551

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: *IWSDSD-091604-KES*
IWSDSD-091604-MK

Location Code: **IWSD19**

Sample Number: **IWSD19**

Sample Name: **IWSD19-00**

Sampling Method: **GRAB**

Sample Type: **SED**

Sample Purpose: **REG**

Task: **SW-SED_AUG04**

Collection Date: *9/15/04*

Collection Time: *3:50 PM*

Start Depth: *0 feet*

End Depth: *0.5 feet*

Sample Matrix: **SE**

Sample Team: *A. Willmore*

QC Partners:

(TB) *N/A*

(ER) *N/A*

(FB) *N/A*

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

ERPIMS Values:

Sacode:

Lot Control#:

Comments:

Sketch Location:

Logged BY / Date: *[Signature]* *9/16/04*

Reviewed BY / Date: *[Signature]* *9/16/04*

Sample Collection Log

00045552

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091604-KR
IWSWSD-091604-MR

Task: SW-SED_AUG04

Location Code: **IWSD20**
Sample Number: **IWSD20**
Sample Name: **IWSD20-00**
Sampling Method: **GRAB**
Sample Type: **SED**
Sampling Equip: Shovel

Collection Date: 9/15/04
Collection Time: 17:35
Start Depth: 0 foot
End Depth: 0.5 foot

Sample Purpose: **REG**

Sample Matrix: **SE**

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: Praveen Srivastav
Jaime Rodriguez

ERPIMS Values:

Sacode:

Lot Control#:

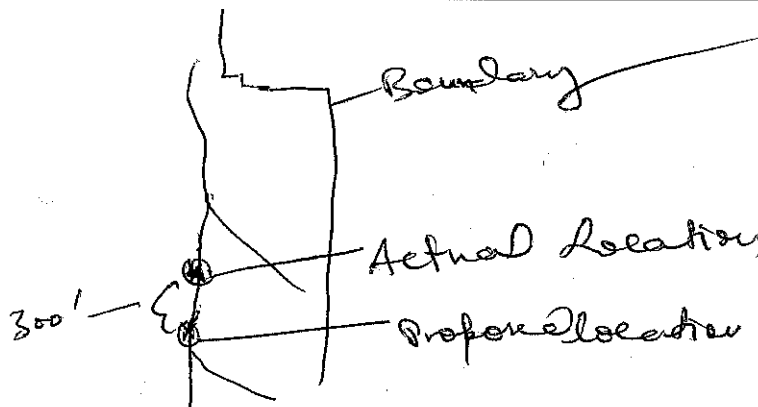
Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-S	N	A	1	8	oz	CWM
PERC	N	B	1	8	oz	CWM
EXPLOSIVES	N	C	1	8	oz	CWM
METALS-S	N	D	1	8	oz	CWM

Comments:

Sketch Location:



Logged BY / Date: Dr. [Signature] 9/16/04

Reviewed BY / Date: Dr. [Signature] 9/16/04

Sample Collection Log

00045553

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number:

IWSWSD - 091604 - JF
IWSWSD - 091604 - MP

Location Code: **IWSW02**

Sample Number: **IWSW02**

Sample Name: **IWSW02-00**

Sampling Method: **GRAB**

Sample Type: **SW**

Sample Purpose: **REG**

Task: **SW-SED_AUG04**

Collection Date: **9/16/04**

Collection Time: **1225**

Start Depth: **no water**

End Depth: **no water**

Sample Matrix: **WS**

Sample Team: **A. Willmore**

QC Partners:

(TB) *N/A* (ER) *N/A* (FB) *N/A*

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:						

Comments:

Sketch Location:

no sample collected no water.

Logged BY / Date: *Rafferty 9/16/04*

Reviewed BY / Date: *Rafferty 9/16/04*

Sample Collection Log

00045554

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091604-RE
IWSWSD-091604-MK

Task: **SW-SED AUG04**

Location Code: **IWSW03**

Sample Number: **IWSW03** + QC Field Dup

Sample Name: **IWSW03-00**

Sampling Method: **GRAB**

Sample Type: **SW**

Sample Purpose: **REG**

Collection Date: 9/16/04

Collection Time: 1120

Start Depth: Surface

End Depth: Surface

Sample Matrix: **WS**

Sample Team: A. Wellman

Sampling Equip: Grab

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

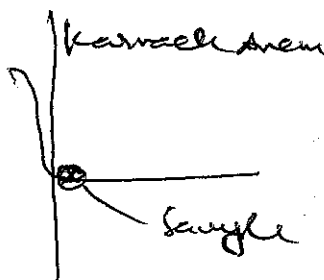
Sacode:

Lot Control#:

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:	332.5	6.7	300	251	3.84	25.9

Comments: Duplicate taken IWSW03-QC

Sketch Location:



Coordinates:
N 32° 41' 41.8"
W 94° 08' 25.1"

Logged BY / Date: P. Wellman 9/16/04

Reviewed BY / Date: P. Wellman 9/16/04

Sample Collection Log

00045555

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

IWSWSD - 091604 - KE

RFA / COC Number: IWSWSD - 091604 - MK

Location Code: IWSW04

Sample Number: IWSW04

Sample Name: IWSW04-00

Sampling Method: GRAB

Sample Type: SW

Sample Purpose: REG

Task: SW-SED AUG04

Collection Date: 9/15/04

Collection Time: 9:35

Start Depth: Surface grab

End Depth: surface grab

Sample Matrix: WS

Sample Team: Praveen Srivastav

ERPIMS Values: Brady Ansley

Sacode: Sherrill Williams

Lot Control#:

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

plus

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:	394	5.78	0.205	178	0.51	23.7

Comments:

Pond dry. found pooled water in one place.

Sketch Location:

SUOL
pest.
Herb.
PCB
Diox/Fur

2 Amber litre
for each parameter

Coordinates:

N 32° 41' 39.3"

W 94° 8' 2.9"

variance: within 16 feet

Logged BY / Date: [Signature] 9/16/04

Reviewed BY / Date: [Signature] 9/16/04

Sample Collection Log

00045556

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: **IWSW05**

Task: **SW-SED_AUG04**

Sample Number: **IWSW05**

Sample Name: **IWSW05-00**

Collection Date: _____

Sampling Method: **GRAB**

Collection Time: _____

Sample Type: **SW**

Sample Purpose: **REG**

Start Depth: _____

End Depth: _____

Sampling Equip: _____

Sample Matrix: **WS**

QC Partners: _____

(TB)

(ER)

(FB)

Sample Team: _____

Containers
Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)

Comments: _____

Sketch Location: _____

Logged BY / Date: _____

Reviewed BY / Date: _____

Sample Collection Log

00045557

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: **IWSW06**

Sample Number: **IWSW06**

Sample Name: **IWSW06-00**

Sampling Method: **GRAB**

Sample Type: **SW**

Sample Purpose: **REG**

Sampling Equip: _____

QC Partners: _____

(TB)

(ER)

(FB)

Task: **SW-SED_AUG04**

Collection Date: _____

Collection Time: _____

Start Depth: _____

End Depth: _____

Sample Matrix: **WS**

Sample Team: _____

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

	Eh	pH	Conductivity	Turbidity	DissOxygen	Temperature
Surface Water Parameters:	(mV)	(SU)	(mS/cm)	(NTU)	(ppm)	(C)

Comments: _____

Sketch Location: _____

Logged BY / Date: _____

Reviewed BY / Date: _____

Sample Collection Log

00045558

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845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: IWSW07

Sample Number: IWSW07

Sample Name: IWSW07-00

Sampling Method: GRAB

Sample Type: SW

Sample Purpose: REG

Sampling Equip: _____

QC Partners: _____

(TB)

(ER)

(FB)

Task: SW-SED_AUG04

Collection Date: _____

Collection Time: _____

Start Depth: _____

End Depth: _____

Sample Matrix: WS

Sample Team: _____

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:						

Comments: _____

Sketch Location: _____

Logged BY / Date: _____

Reviewed BY / Date: _____

Sample Collection Log

00045559

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091704-KR
IWSWSD-091704-MK

Task: SW-SED_AUG04

Collection Date: 9/17/04

Collection Time: 11:30

Start Depth: —

End Depth: —

Sample Matrix: WS

Sample Team: A. Willmore, B. Ansley

Location Code: IWSW08
Sample Number: IWSW08
Sample Name: IWSW08-00
Sampling Method: GRAB
Sample Type: SW
Sampling Equip: stainless steel shovel

Sample Purpose: REG

QC Partners:

(TB) — (ER) — (FB) —

Containers

Analytical Suite	Flt	Frtn	Qty	Size	Units	Type
METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)

Comments:

Sketch Location:

Water Quality Parameters

Temp 25.45°C

Cond 0.873 µ

D.O 2.97 mg/L

pH 7.08

ORP 301.2 mV

Turb. 17.4 NTU

Logged BY / Date:

M. J. [Signature]
9/17/04

Reviewed BY / Date:

Sample Collection Log

00045560

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091704-KF
IWSWSD-091704-MK

Task: SW-SED_AUG04

Location Code: **IWSW09**

Sample Number: **IWSW09**

Sample Name: **IWSW09-00**

Sampling Method: **GRAB**

Sample Type: **SW**

Sample Purpose: **REG**

Collection Date: 9/17/04

Collection Time: 10:46

Start Depth: —

End Depth: —

Sampling Equip: sample shovel

Sample Matrix: **WS**

QC Partners:

(TB) — (ER) — (FB) —

Sample Team: A. Willmore, B. Ansley

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: —

Lot Control#: —

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)

Comments:

Sketch Location:

WQ Parameters

Temp 24.4°C

cond. 0.494 γ

D.O. 3.48%

pH 6.98 pH

ORP 332.9

Turb. 16.0 NTU

Logged BY / Date:

M. M. C.
9/17/04

Reviewed BY / Date:

P. Ansley 9/17/04

Sample Collection Log

00045561

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091704-KR
IWSWSD-091704-mk

Task: SW-SED_AUG04

Location Code: IWSW10

Sample Number: IWSW10

Sample Name: IWSW10-00

Sampling Method: GRAB

Sample Type: SW

Sample Purpose: REG

Collection Date: 9/17/04

Collection Time: 1145

Start Depth:

End Depth:

Sample Matrix: WS

Sample Team: C. Murray
K. Everett, J. Rodriguez

QC Partners:

(TB) n/A (ER) n/A (FB) n/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode:

Lot Control#:

	Eh	pH	Conductivity	Turbidity	DissOxygen	Temperature
	(mV)	(SU)	(mS/cm)	(NTU)	(ppm)	(C)
Surface Water Parameters:	168.3	6.88	0.633	143.2	5.36	23.78

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

Sample Collection Log

00045562

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: **IWSW11**

Sample Number: **IWSW11**

Sample Name: **IWSW11-00**

Sampling Method: **GRAB**

Sample Type: **SW**

Sample Purpose: **REG**

Sampling Equip: _____

QC Partners: _____

(TB)

(ER)

(FB)

Task: **SW-SED_AUG04**

Collection Date: _____

Collection Time: _____

Start Depth: _____

End Depth: _____

Sample Matrix: **WS**

Sample Team: _____

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

Surface Water Parameters:	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)

Comments: _____

Sketch Location: _____

Logged BY / Date: _____

Reviewed BY / Date: _____

Sample Collection Log

00045563

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: IWSW12

Sample Number: IWSW12

Sample Name: IWSW12-00

Sampling Method: GRAB

Sample Type: SW

Sample Purpose: REG

Sampling Equip: _____

QC Partners: _____

(TB)

(ER)

(FB)

Task: SW-SED_AUG04

Collection Date: 9/16/04

Collection Time: _____

Start Depth: _____

End Depth: _____

Sample Matrix: WS

Sample Team: _____

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:						

Comments: No surface water sample collected

Sketch Location: _____

Logged BY / Date: KEN 9/16/04

Reviewed BY / Date: _____

Reviewed BY / Date:

Sample Collection Log

00045565

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: _____

Location Code: **IWSW14**

Task: **SW-SED_AUG04**

Sample Number: **IWSW14**

Sample Name: **IWSW14-00**

Collection Date: _____

Sampling Method: **GRAB**

Collection Time: _____

Sample Type: **SW**

Sample Purpose: **REG**

Start Depth: _____

End Depth: _____

Sampling Equip: _____

Sample Matrix: **WS**

QC Partners: _____

(TB) _____

(ER) _____

(FB) _____

Sample Team: _____

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:						

Comments: No water collected

Sketch Location: _____

Logged BY / Date: KG 9/16/04

Reviewed BY / Date: _____

Sample Collection Log

00045566

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845714 LONGHORN AAP

Manager: Praveen Srivastav

IWSWSD-091704-CE

IWSWSD-091704-KE

RFA / COC Number: IWSWSD-091704-MK

Location Code: IWSW15

Sample Number: IWSW15

Sample Name: IWSW15-00

Sampling Method: GRAB

Sample Type: SW

Sample Purpose: REG

Sampling Equip: _____

QC Partners:

(TB) _____ (ER) _____ (FB) _____

Task: SW-SED_AUG04

Collection Date: 9/17/04

Collection Time: 0830

Start Depth: _____

End Depth: _____

Sample Matrix: WS

Sample Team: KE JR CM

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: _____

Lot Control#: _____

plus

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:	1506	6.87	0.440	147.1	7.88	24.23

Comments:

Sketch Location:

SVOC
pest.
Herb.
PCB
Diox/Furan

} 2 Amber litres
For each parameter

Logged BY / Date: _____

Reviewed BY / Date: Praveen 9/17/04

Sample Collection Log

00045567

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091704-KF
IWSWSD-091704-mk

Task: **SW-SED_AUG04**

Collection Date: 9/17/04

Collection Time: 0950

Start Depth:

End Depth:

Sample Matrix: **WS**

Sample Team: C. Muran
J. Rodriguez, K. Evans

ERPIMS Values:

Sacode:

Lot Control#:

Location Code: **IWSW16**
Sample Number: **IWSW16**
Sample Name: **IWSW16-00**
Sampling Method: **GRAB**
Sample Type: **SW**
Sampling Equip:

Sample Purpose: **REG**

QC Partners:

(TB) (ER) (FB)

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:	<u>53.9</u>	<u>6.84</u>	<u>0.348</u>	<u>411.0</u>	<u>9.05</u>	<u>23.27</u>

Comments:

Sketch Location:

Logged BY / Date:

Reviewed BY / Date:

Sample Collection Log

00045568

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: *IWSWSD -091604 - KB*
IWSWSD -091604 - MR

Task: **SW-SED_AUG04**

Location Code: **IWSW17**

Sample Number: **IWSW17**

Sample Name: **IWSW17-00**

Sampling Method: **GRAB**

Sample Type: **SW**

Sample Purpose: **REG**

Collection Date: *9/16/04*

Collection Time: *0930*

Start Depth: *—*

End Depth: *—*

Sampling Equip: *Grab*

QC Partners:

(TB) *n/a* (ER) *n/a* (FB) *n/a*

Sample Matrix: **WS**

Sample Team: *C. Murray*
J. Rodriguez, K. Everett

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

Sacode: *—*

Lot Control#: *—*

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:	<i>-1683</i>	<i>6.86</i>	<i>0.633</i>	<i>143.2</i>	<i>5.36</i>	<i>23.78</i>

Comments:

Sketch Location:

Logged BY / Date: *KEnd 9/16/04*

Reviewed BY / Date: *Praveen 9/16/04*

Sample Collection Log

00045569

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845714 LONGHORN AAP

Manager: Praveen Srivastav

IWSWSD -091604-MK

RFA / COC Number: IWSWSD -091604-MK

Location Code: IWSW18

Sample Number: IWSW18

Sample Name: IWSW18-00

Sampling Method: GRAB

Sample Type: SW

Sample Purpose: REG

Task: SW-SED_AUG04

Collection Date: 9/15/04

Collection Time: 3:00 PM

Start Depth: Surface

End Depth: Surface

Sampling Equip:

Direct fill

Sample Matrix: WS

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: Praveen Srivastav
Jorge Rodriguez

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

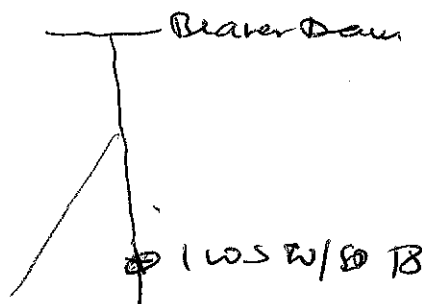
Sacode:

Lot Control#:

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:	15.1	6.92	0.138	131.7	6.72 mg/L	26.7°C

Comments:

Sketch Location:

Temp 26.7°C
Turbidity 131.7 NTU
DO 6.72 mg/L
Eh 15.1
Conductivity 0.138
pH 6.92


Logged BY / Date: R. H. H. 9/16/04

Reviewed BY / Date: R. H. H. 9/16/04

Sample Collection Log

00045570

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091604-KE
IWSWSD-091604-MK

Location Code: **IWSW19**

Sample Number: **IWSW19**

Sample Name: **IWSW19-00**

Sampling Method: **GRAB**

Sample Type: **SW**

Sample Purpose: **REG**

Task: **SW-SED_AUG04**

Collection Date: 9/15/04

Collection Time: 3:50 PM

Start Depth: Surface grab

End Depth: Surface grab

Sample Matrix: **WS**

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Sample Team: Praveen Srivastava
Jorge Rodriguez

ERPIMS Values:

Sacode:

Lot Control#:

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:	<u>286.655</u>	<u>6.55</u>	<u>0.186</u>	<u>590</u>	<u>5.11</u> mg/L	<u>26.2</u>

Comments:

Sketch Location:

Logged BY / Date: [Signature] 9/16/04

Reviewed BY / Date: [Signature] 9/16/04

Sample Collection Log

00045571

Page 1 of 1

845714 LONGHORN AAP

Manager: Praveen Srivastav

RFA / COC Number: IWSWSD-091604-KB
IWSWSD-091604-MK

Task: **SW-SED_AUG04**

Location Code: **IWSW20**

Sample Number: **IWSW20**

Sample Name: **IWSW20-00**

Sampling Method: **GRAB**

Sample Type: **SW**

Sample Purpose: **REG**

Collection Date: 9/15/04

Collection Time: 5:35 PM (1735)

Start Depth: Surface

End Depth: Surface

Sample Matrix: **WS**

Sample Team: Praveen Srivastav
Felipe Rodriguez

Sampling Equip: Grab

QC Partners:

(TB) N/A (ER) N/A (FB) N/A

Containers

Analytical Suite Flt Frtn Qty Size Units Type

METALS-W	N	A	1	500	mL	HDPE
PERC	N	B	1	1	L	HDPE
EXPLOSIVES	N	C	2	1	L	Amb. Glass
METALS-W	N	D	1	500	mL	HDPE

ERPIMS Values:

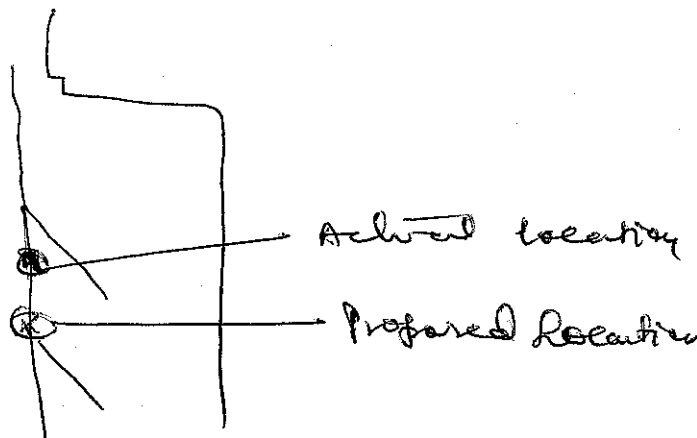
Sacode:

Lot Control#:

	Eh (mV)	pH (SU)	Conductivity (mS/cm)	Turbidity (NTU)	DissOxygen (ppm)	Temperature (C)
Surface Water Parameters:	<u>-0.1</u>	<u>6.69</u>	<u>0.14</u>	<u>8194</u>	<u>7.46</u> <u>mg/L</u>	<u>29.87</u>

Comments:

Sketch Location:


Logged BY / Date: [Signature] 9/16/04

Reviewed BY / Date: [Signature] 9/16/04

Appendix D
Data Gaps Investigation Historical
Groundwater Results (data on compact disk)

LHAAP-04
GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	04WW01 12/19/2000	04WW01 3/17/2002	04WW01 3/17/2002	04WW01 9/18/2002	04WW01 9/9/2004
		04WW01 REG	4WW01-020317 REG	4WW01QC-0203-FD FD	04WW01-020918 REG	L0001-04WW01 REG
		SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L N	6.9 J	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L N	<2.2	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L N	6.9 J	NA	NA	NA	NA
Heptachlorodibenzofuran	pg/L N	25 J	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L N	5.8 J	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	45 J	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L N	28 J	NA	NA	NA	NA
Tetrachlorodibenzofuran, Total	pg/L N	<3.4	NA	NA	NA	NA
Aluminum	µg/L N	122	NA	NA	NA	NA
Barium	µg/L N	90.2	NA	NA	NA	NA
Calcium	µg/L N	196000	NA	NA	NA	NA
Copper	µg/L N	<10	NA	NA	NA	NA
Iron	µg/L N	501 J	NA	NA	NA	NA
Magnesium	µg/L N	105000	NA	NA	NA	NA
Manganese	µg/L N	493	NA	NA	NA	NA
Nickel	µg/L N	15.9	NA	NA	NA	NA
Potassium	µg/L N	4580 J	NA	NA	NA	NA
Sodium	µg/L N	240000	NA	NA	NA	NA
Strontium	µg/L N	5080	NA	NA	NA	NA
Zinc	µg/L N	10 UJ	NA	NA	NA	NA
Perchlorate	µg/L N	<0.3	3.98 J	<4.00	<4.00	<1.0

Notes on last page

LHAAP-04
GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	04WW02 12/19/2000	04WW02 12/19/2000	04WW02 3/10/2002	04WW02 9/18/2002	04WW02 9/9/2004	04WW03 12/19/2000	04WW03 9/9/2004
			04WW02 REG SHALLOW	04WW02QC FD SHALLOW	04WW02-020310 REG SHALLOW	04WW02-020918 REG SHALLOW	L0001-04WW02 REG SHALLOW	04WW03 REG SHALLOW	L0001-04WW03 REG SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L	N	8.4 J	9.2 J	NA	NA	NA	5.2 J	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L	N	<1.7	2.8 J	NA	NA	NA	<1.4	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	8.4 J	9.2 J	NA	NA	NA	5.2 J	NA
Heptachlorodibenzofuran	pg/L	N	17 J	6.6 J	NA	NA	NA	15 J	NA
Hexachlorodibenzofuran	pg/L	N	<1.9	6.8 J	NA	NA	NA	<1.9	NA
Octachlorodibenzo-p-dioxin	pg/L	N	94 J	62 J	NA	NA	NA	20 J	NA
Octachlorodibenzofuran	pg/L	N	110	21 J	NA	NA	NA	24 J	NA
Tetrachlorodibenzofuran, Total	pg/L	N	4.4 J	<5.8	NA	NA	NA	<2.6	NA
Aluminum	µg/L	N	110	95.1 J	NA	NA	NA	<50	NA
Barium	µg/L	N	88	90.9	NA	NA	NA	58.6	NA
Calcium	µg/L	N	23800	24400	NA	NA	NA	187000	NA
Copper	µg/L	N	49.7	46.3	NA	NA	NA	<10	NA
Iron	µg/L	N	124 J	124 J	NA	NA	NA	100 UJ	NA
Magnesium	µg/L	N	7620	7650	NA	NA	NA	120000	NA
Manganese	µg/L	N	120	121	NA	NA	NA	405	NA
Nickel	µg/L	N	<10	<10	NA	NA	NA	10.2	NA
Potassium	µg/L	N	<1000	<1000	NA	NA	NA	4250 J	NA
Sodium	µg/L	N	64300	62300	NA	NA	NA	384000	NA
Strontium	µg/L	N	337	345	NA	NA	NA	4190	NA
Zinc	µg/L	N	10 UJ	10 UJ	NA	NA	NA	10 J	NA
Perchlorate	µg/L	N	<0.3	<0.3	<4.00	<4.00	<1.0	<0.3	<1.0

Notes:

J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

NA Not analyzed

pg/L picograms per liter

µg/L micrograms per liter

LHAAP-17
GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	17WW01 6/13/1993 17WW01-930613	17WW01 5/23/1995 17WW01(WATER)	17WW01 5/23/1995 17WW01(WATER)QC	17WW01 7/22/1998 17WW01-980722	17WW01 5/17/2000 17WW01-000517	17WW01 9/19/2000 17WW01-000919	17WW01 1/31/2001 17WW01-010131	17WW01 3/14/2002 17WW01-020314
			REG SHALLOW	REG SHALLOW	FD SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	5.771	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	10.404	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	72.514 B	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	4.774	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	<1.005	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	<0.25	<0.4	<0.4	<0.26	NA	NA	NA	NA
Chloride	mg/L	N	1091.3	NA	NA	868	NA	NA	NA	NA
Nitrite	mg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
pH	STD UNIT	N	6.12	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	umhos	N	4400	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	80.3	NA	NA	38	NA	NA	NA	NA
Temperature	Deg C	N	18.9	NA	NA	NA	NA	NA	NA	NA
Aluminum	ug/L	N	NA	NA	NA	2600 J	NA	NA	NA	NA
Antimony	ug/L	N	<30	<10	<10	<5	NA	NA	NA	NA
Barium	ug/L	N	333	266	269	280	NA	NA	NA	NA
Calcium	ug/L	N	NA	NA	NA	81000	NA	NA	NA	NA
Chromium	ug/L	N	10 UJ	<10	<10	<10	NA	NA	NA	NA
Copper	ug/L	N	NA	NA	NA	<25	NA	NA	NA	NA
Iron	ug/L	N	NA	NA	NA	86000	NA	NA	NA	NA
Lead	ug/L	N	<2	<10	<10	6	NA	NA	NA	NA
Magnesium	ug/L	N	NA	NA	NA	53000	NA	NA	NA	NA
Manganese	ug/L	N	NA	NA	NA	3490	NA	NA	NA	NA
Nickel	ug/L	N	<50	<40	<40	<40	NA	NA	NA	NA
Selenium	ug/L	N	<10	<10	<10	<5	NA	NA	NA	NA
Sodium	ug/L	N	NA	NA	NA	210000	NA	NA	NA	NA
Strontium	ug/L	N	NA	NA	NA	2100	NA	NA	NA	NA
Thallium	ug/L	N	<10	<10000	<10000	2.5 J	NA	NA	NA	NA
Zinc	ug/L	N	NA	NA	NA	30	NA	NA	NA	NA
Perchlorate	ug/L	N	NA	NA	NA	NA	100000	88000	17000	161000
1,1,2-Trichloroethane	ug/L	N	<5	<5	<5	<2.5	NA	NA	NA	NA
1,1-Dichloroethane	ug/L	N	8	8	8	<2.5	NA	NA	NA	NA
1,1-Dichloroethene	ug/L	N	51	28	27	<2.5	NA	NA	NA	NA
1,2-Dichloroethane	ug/L	N	29	62	63	<2.5	NA	NA	NA	NA
1,2-Dichloroethene	ug/L	N	NA	17	16	NA	NA	NA	NA	NA
Acetone	ug/L	N	<10	<10	<10	<12	NA	NA	NA	NA
Benzene	ug/L	N	<5	<5	<5	<2.5	NA	NA	NA	NA
Carbon disulfide	ug/L	N	<5	<5	<5	<2.5	NA	NA	NA	NA
Chloroform	ug/L	N	6	<5	<5	<2.5	NA	NA	NA	NA
cis-1,2-Dichloroethene	ug/L	N	6	NA	NA	<2.5	NA	NA	NA	NA
Methylene chloride	ug/L	N	<5	<10	<10	<2.5	NA	NA	NA	NA
trans-1,2-Dichloroethene	ug/L	N	11	NA	NA	<2.5	NA	NA	NA	NA
Trichloroethene	ug/L	N	4000	5320	4340	160	NA	NA	NA	NA

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LHAAP-17
GROUNDWATER RESULTS

00045576

PARAMETER	UNITS	FILTERED	17WW01 9/20/2002	17WW01 9/20/2002	17WW01 9/7/2004	17WW05 5/25/1995	17WW05 7/22/1998	17WW05 7/22/1998	17WW05 7/22/1998	17WW05 9/28/2000
			17WW01-020920	17WW01D-0209-FD	L0001-17WW01	17WW05(WATER)	17WW05-980722	17WW05QC	17WW05QCRE	17WW05-000928
			REG	FD	REG	REG	REG	FD	FD	REG
			SHALLOW	SHALLOW	SHALLOW	DEEP	DEEP	DEEP	DEEP	DEEP
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	NA	NA	<0.2	<0.4	<0.26	<0.26	NA	NA
Chloride	mg/L	N	NA	NA	NA	158	220	207	NA	NA
Nitrite	mg/L	N	NA	NA	NA	0.05	NA	NA	NA	NA
pH	STD UNIT	N	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	umhos	N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	NA	NA	NA	4.6	7	7.6	NA	NA
Temperature	Deg C	N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	ug/L	N	NA	NA	NA	NA	980	1800	NA	NA
Antimony	ug/L	N	NA	NA	NA	<10	<5	<5	NA	NA
Barium	ug/L	N	NA	NA	NA	44	<200	<200	NA	NA
Calcium	ug/L	N	NA	NA	NA	NA	<5000	<5000	NA	NA
Chromium	ug/L	N	NA	NA	NA	16	20	30	NA	NA
Copper	ug/L	N	NA	NA	NA	NA	<25	<25	NA	NA
Iron	ug/L	N	NA	NA	NA	NA	730	1300	NA	NA
Lead	ug/L	N	NA	NA	NA	7	10	8	NA	NA
Magnesium	ug/L	N	NA	NA	NA	NA	<5000	<5000	NA	NA
Manganese	ug/L	N	NA	NA	NA	NA	49	60	NA	NA
Nickel	ug/L	N	NA	NA	NA	<40	<40	<40	NA	NA
Selenium	ug/L	N	NA	NA	NA	<10	<5	<5	NA	NA
Sodium	ug/L	N	NA	NA	NA	NA	200000	200000	NA	NA
Strontium	ug/L	N	NA	NA	NA	NA	140	150	NA	NA
Thallium	ug/L	N	NA	NA	NA	<1000	1.9 J	2.1 J	NA	NA
Zinc	ug/L	N	NA	NA	NA	NA	20	40	NA	NA
Perchlorate	ug/L	N	194000	198000	840000 J	NA	NA	NA	NA	<4
1,1,2-Trichloroethane	ug/L	N	NA	NA	2 J	<5	<1	<1	<1	NA
1,1-Dichloroethane	ug/L	N	NA	NA	10	<5	<1	<1	<1	NA
1,1-Dichloroethene	ug/L	N	NA	NA	38	<5	<1	<1	<1	NA
1,2-Dichloroethane	ug/L	N	NA	NA	89 JH	<5	<1	<1	<1	NA
1,2-Dichloroethene	ug/L	N	NA	NA	NA	<5	NA	NA	NA	NA
Acetone	ug/L	N	NA	NA	5 UJ	<10	4.6 J	<5	<5	NA
Benzene	ug/L	N	NA	NA	2 J	<5	<1	<1	<1	NA
Carbon disulfide	ug/L	N	NA	NA	<5	<5	<1	<1	<1	NA
Chloroform	ug/L	N	NA	NA	1 J	<5	<1	<1	<1	NA
cis-1,2-Dichloroethene	ug/L	N	NA	NA	27	NA	<1	<1	<1	NA
Methylene chloride	ug/L	N	NA	NA	<5	<10	<1	<1	<1	NA
trans-1,2-Dichloroethene	ug/L	N	NA	NA	7	NA	<1	<1	<1	NA
Trichloroethene	ug/L	N	NA	NA	7000	<5	<1	<1	<1	NA

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LHAAP-17
GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	17WW05 3/16/2002 17WW05-020316	17WW05 9/23/2002 17WW05-020923	17WW05 9/7/2004 L0001-17WW05	17WW07 7/22/1998 17WW07-980722	17WW07 3/11/1999 17WW07-990311	17WW07 9/21/2000 17WW07-000921	17WW07 2/1/2001 17WW07-010201	17WW07 3/14/2002 17WW07-020314
			REG	REG	REG	REG	REG	REG	REG	REG
			DEEP	DEEP	DEEP	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	NA	NA	<0.2	<0.26	NA	NA	NA	NA
Chloride	mg/L	N	NA	NA	NA	229	NA	NA	NA	NA
Nitrite	mg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
pH	STD UNIT	N	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	umhos	N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	NA	NA	NA	17	NA	NA	NA	NA
Temperature	Deg C	N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	ug/L	N	NA	NA	NA	<200	NA	NA	NA	NA
Antimony	ug/L	N	NA	NA	NA	<5	NA	NA	NA	NA
Barium	ug/L	N	NA	NA	NA	240	NA	NA	NA	NA
Calcium	ug/L	N	NA	NA	NA	41000	NA	NA	NA	NA
Chromium	ug/L	N	NA	NA	NA	<10	NA	NA	NA	NA
Copper	ug/L	N	NA	NA	NA	<25	NA	NA	NA	NA
Iron	ug/L	N	NA	NA	NA	8600	NA	NA	NA	NA
Lead	ug/L	N	NA	NA	NA	8	NA	NA	NA	NA
Magnesium	ug/L	N	NA	NA	NA	12000	NA	NA	NA	NA
Manganese	ug/L	N	NA	NA	NA	732	NA	NA	NA	NA
Nickel	ug/L	N	NA	NA	NA	<40	NA	NA	NA	NA
Selenium	ug/L	N	NA	NA	NA	<5	NA	NA	NA	NA
Sodium	ug/L	N	NA	NA	NA	110000	NA	NA	NA	NA
Strontium	ug/L	N	NA	NA	NA	820	NA	NA	NA	NA
Thallium	ug/L	N	NA	NA	NA	2.4 J	NA	NA	NA	NA
Zinc	ug/L	N	NA	NA	NA	<20	NA	NA	NA	NA
Perchlorate	ug/L	N	<4.00	65.0	1200	NA	NA	160	<0.85	<4.00
1,1,2-Trichloroethane	ug/L	N	NA	NA	<5	<2	<1	NA	NA	NA
1,1-Dichloroethane	ug/L	N	NA	NA	<5	<2	<1	NA	NA	NA
1,1-Dichloroethene	ug/L	N	NA	NA	<5	<2	<1	NA	NA	NA
1,2-Dichloroethane	ug/L	N	NA	NA	5 UJ	<2	<1	NA	NA	NA
1,2-Dichloroethene	ug/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/L	N	NA	NA	5 UJ	<10	<5	NA	NA	NA
Benzene	ug/L	N	NA	NA	<5	<2	<1	NA	NA	NA
Carbon disulfide	ug/L	N	NA	NA	<5	2	<1	NA	NA	NA
Chloroform	ug/L	N	NA	NA	<5	5	<1	NA	NA	NA
cis-1,2-Dichloroethene	ug/L	N	NA	NA	<5	<2	<1	NA	NA	NA
Methylene chloride	ug/L	N	NA	NA	<5	150	<1	NA	NA	NA
trans-1,2-Dichloroethene	ug/L	N	NA	NA	<5	<2	<1	NA	NA	NA
Trichloroethene	ug/L	N	NA	NA	<5	1.7 J	<1	NA	NA	NA

Notes on last page

LHAAP-17
GROUNDWATER RESULTS

00045578

PARAMETER	UNITS	FILTERED	17WW07 9/20/2002	17WW07 9/3/2004	17WW08 7/21/1998	17WW08 3/11/1999	17WW08 9/21/2000	17WW08 2/1/2001	17WW08 3/14/2002	17WW08 9/20/2002
			17WW07-020920	L0001-17WW07	17WW08-980721	17WW08-990311	17WW08-000921	17WW08-010201	17WW08-020314	17WW08-020920
			REG	REG	REG	REG	REG	REG	REG	REG
			INTERMEDIATE	INTERMEDIATE	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	NA	<0.26	<0.26	NA	NA	NA	NA	NA
Chloride	mg/L	N	NA	NA	653	NA	NA	NA	NA	NA
Nitrite	mg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
pH	STD UNIT	N	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	umhos	N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	NA	NA	90	NA	NA	NA	NA	NA
Temperature	Deg C	N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	ug/L	N	NA	NA	<200	NA	NA	NA	NA	NA
Antimony	ug/L	N	NA	NA	<5	NA	NA	NA	NA	NA
Barium	ug/L	N	NA	NA	250	NA	NA	NA	NA	NA
Calcium	ug/L	N	NA	NA	59000	NA	NA	NA	NA	NA
Chromium	ug/L	N	NA	NA	20	NA	NA	NA	NA	NA
Copper	ug/L	N	NA	NA	<25	NA	NA	NA	NA	NA
Iron	ug/L	N	NA	NA	1200	NA	NA	NA	NA	NA
Lead	ug/L	N	NA	NA	<3	NA	NA	NA	NA	NA
Magnesium	ug/L	N	NA	NA	43000	NA	NA	NA	NA	NA
Manganese	ug/L	N	NA	NA	543	NA	NA	NA	NA	NA
Nickel	ug/L	N	NA	NA	<40	NA	NA	NA	NA	NA
Selenium	ug/L	N	NA	NA	<5	NA	NA	NA	NA	NA
Sodium	ug/L	N	NA	NA	210000	NA	NA	NA	NA	NA
Strontium	ug/L	N	NA	NA	1400	NA	NA	NA	NA	NA
Thallium	ug/L	N	NA	NA	1 UJ	NA	NA	NA	NA	NA
Zinc	ug/L	N	NA	NA	30	NA	NA	NA	NA	NA
Perchlorate	ug/L	N	<4.00	<1.0	NA	NA	170	110	159	<4.00
1,1,2-Trichloroethane	ug/L	N	NA	<5	<2	<1	NA	NA	NA	NA
1,1-Dichloroethane	ug/L	N	NA	<5	<2	<1	NA	NA	NA	NA
1,1-Dichloroethene	ug/L	N	NA	<5	<2	<1	NA	NA	NA	NA
1,2-Dichloroethane	ug/L	N	NA	5 UJ	<2	<1	NA	NA	NA	NA
1,2-Dichloroethene	ug/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/L	N	NA	5 UJ	<10	<5	NA	NA	NA	NA
Benzene	ug/L	N	NA	<5	<2	<1	NA	NA	NA	NA
Carbon disulfide	ug/L	N	NA	<5	<2	<1	NA	NA	NA	NA
Chloroform	ug/L	N	NA	<5	<2	<1	NA	NA	NA	NA
cis-1,2-Dichloroethene	ug/L	N	NA	<5	<2	<1	NA	NA	NA	NA
Methylene chloride	ug/L	N	NA	<5	150	<1	NA	NA	NA	NA
trans-1,2-Dichloroethene	ug/L	N	NA	<5	<2	<1	NA	NA	NA	NA
Trichloroethene	ug/L	N	NA	<5	1.3 J	<1	NA	NA	NA	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	17WW08 9/3/2004	17WW08 9/3/2004	17WW09 7/21/1998	17WW09 9/19/2000	17WW09 3/13/2002	17WW09 9/18/2002	17WW09 9/2/2004	17WW10 7/21/1998
			L0001-17WW08	L0001-17WW08QC	17WW09-980721	17WW09-000919	17WW09-020313	17WW09-020918	L0001-17WW09	17WW10-980721
			REG	FD	REG	REG	REG	REG	REG	REG
			SHALLOW	SHALLOW	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	<0.26	0.2 UJ	<0.26	NA	NA	NA	0.2 UJ	<0.26
Chloride	mg/L	N	NA	NA	118	NA	NA	NA	NA	1050
Nitrite	mg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
pH	STD UNIT	N	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	umhos	N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	NA	NA	500	NA	NA	NA	NA	130
Temperature	Deg C	N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	ug/L	N	NA	NA	<200	NA	NA	NA	NA	510
Antimony	ug/L	N	NA	NA	7	NA	NA	NA	NA	5
Barium	ug/L	N	NA	NA	<200	NA	NA	NA	NA	<200
Calcium	ug/L	N	NA	NA	33000	NA	NA	NA	NA	37000
Chromium	ug/L	N	NA	NA	<10	NA	NA	NA	NA	10
Copper	ug/L	N	NA	NA	<25	NA	NA	NA	NA	<25
Iron	ug/L	N	NA	NA	4600	NA	NA	NA	NA	1800
Lead	ug/L	N	NA	NA	4	NA	NA	NA	NA	4
Magnesium	ug/L	N	NA	NA	6100	NA	NA	NA	NA	28000
Manganese	ug/L	N	NA	NA	246	NA	NA	NA	NA	1190
Nickel	ug/L	N	NA	NA	60	NA	NA	NA	NA	40
Selenium	ug/L	N	NA	NA	<5	NA	NA	NA	NA	6
Sodium	ug/L	N	NA	NA	48000	NA	NA	NA	NA	520000
Strontium	ug/L	N	NA	NA	460	NA	NA	NA	NA	1100
Thallium	ug/L	N	NA	NA	2.1 J	NA	NA	NA	NA	1.7 J
Zinc	ug/L	N	NA	NA	40	NA	NA	NA	NA	<20
Perchlorate	ug/L	N	<1.0	<1.0	NA	<4	83.6	<4.00	<1.0	NA
1,1,2-Trichloroethane	ug/L	N	<5	<5	<1	NA	NA	NA	<5	<1
1,1-Dichloroethane	ug/L	N	<5	<5	<1	NA	NA	NA	<5	<1
1,1-Dichloroethene	ug/L	N	<5	<5	<1	NA	NA	NA	<5	<1
1,2-Dichloroethane	ug/L	N	5 UJ	5 UJ	<1	NA	NA	NA	5 UJ	<1
1,2-Dichloroethene	ug/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/L	N	5 UJ	5 UJ	<5	NA	NA	NA	5 UJ	<5
Benzene	ug/L	N	<5	<5	<1	NA	NA	NA	<5	<1
Carbon disulfide	ug/L	N	<5	<5	1.2	NA	NA	NA	<5	<1
Chloroform	ug/L	N	<5	<5	2.2	NA	NA	NA	<5	<1
cis-1,2-Dichloroethene	ug/L	N	<5	<5	<1	NA	NA	NA	<5	<1
Methylene chloride	ug/L	N	<5	<5	1.4	NA	NA	NA	<5	<1
trans-1,2-Dichloroethene	ug/L	N	<5	<5	<1	NA	NA	NA	<5	<1
Trichloroethene	ug/L	N	<5	<5	<1	NA	NA	NA	<5	<1

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GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	17WW10 9/19/2000 17WW10-000919	17WW10 1/31/2001 17WW10-010131	17WW10 3/13/2002 17WW10-020313	17WW10 9/18/2002 17WW10-020918	17WW10 9/2/2004 L0001-17WW10	17WW11 7/21/1998 17WW11-980721	17WW11 9/19/2000 17WW11-000919	17WW11 3/15/2002 17WW11-020315
			REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW	REG INTERMEDIATE	REG INTERMEDIATE	REG INTERMEDIATE
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	NA	NA	NA	NA	0.2 UJ	<0.26	NA	NA
Chloride	mg/L	N	NA	NA	NA	NA	NA	1160	NA	NA
Nitrite	mg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
pH	STD UNIT	N	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	µmhos	N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	NA	NA	NA	NA	NA	110	NA	NA
Temperature	Deg C	N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	µg/L	N	NA	NA	NA	NA	NA	940	NA	NA
Antimony	µg/L	N	NA	NA	NA	NA	NA	<5	NA	NA
Barium	µg/L	N	NA	NA	NA	NA	NA	<200	NA	NA
Calcium	µg/L	N	NA	NA	NA	NA	NA	29000	NA	NA
Chromium	µg/L	N	NA	NA	NA	NA	NA	60	NA	NA
Copper	µg/L	N	NA	NA	NA	NA	NA	<25	NA	NA
Iron	µg/L	N	NA	NA	NA	NA	NA	1900	NA	NA
Lead	µg/L	N	NA	NA	NA	NA	NA	4	NA	NA
Magnesium	µg/L	N	NA	NA	NA	NA	NA	26000	NA	NA
Manganese	µg/L	N	NA	NA	NA	NA	NA	641	NA	NA
Nickel	µg/L	N	NA	NA	NA	NA	NA	210	NA	NA
Selenium	µg/L	N	NA	NA	NA	NA	NA	<5	NA	NA
Sodium	µg/L	N	NA	NA	NA	NA	NA	520000	NA	NA
Strontium	µg/L	N	NA	NA	NA	NA	NA	780	NA	NA
Thallium	µg/L	N	NA	NA	NA	NA	NA	1.9 J	NA	NA
Zinc	µg/L	N	NA	NA	NA	NA	NA	40	NA	NA
Perchlorate	µg/L	N	310	620	259	3.86 J	2000	NA	<8	<4.00
1,1,2-Trichloroethane	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA
1,1-Dichloroethane	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA
1,1-Dichloroethene	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA
1,2-Dichloroethane	µg/L	N	NA	NA	NA	NA	5 UJ	<1	NA	NA
1,2-Dichloroethene	µg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	µg/L	N	NA	NA	NA	NA	5 UJ	<5	NA	NA
Benzene	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA
Carbon disulfide	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA
Chloroform	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA
cis-1,2-Dichloroethene	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA
Methylene chloride	µg/L	N	NA	NA	NA	NA	<5	1.1	NA	NA
trans-1,2-Dichloroethene	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA
Trichloroethene	µg/L	N	NA	NA	NA	NA	<5	<1	NA	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	17WW11 9/19/2002 17WW11-020919 REG INTERMEDIATE	17WW11 9/3/2004 L0001-17WW11 REG INTERMEDIATE	17WW12 7/21/1998 17WW12-980721 REG SHALLOW	17WW12 9/19/2000 17WW12-000919 REG SHALLOW	17WW12 3/15/2002 17WW12-020315 REG SHALLOW	17WW12 9/19/2002 17WW12-020919 REG SHALLOW	17WW12 9/19/2002 17WW12OD-0209-FD FD SHALLOW	17WW12 9/3/2004 L0001-17WW12 REG SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	NA	0.2 UJ	<0.26	NA	NA	NA	NA	0.2 UJ
Chloride	mg/L	N	NA	NA	324	NA	NA	NA	NA	NA
Nitrite	mg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
pH	STD UNIT	N	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	umhos	N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	NA	NA	16	NA	NA	NA	NA	NA
Temperature	Deg C	N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	ug/L	N	NA	NA	<200	NA	NA	NA	NA	NA
Antimony	ug/L	N	NA	NA	<5	NA	NA	NA	NA	NA
Barium	ug/L	N	NA	NA	520	NA	NA	NA	NA	NA
Calcium	ug/L	N	NA	NA	49000	NA	NA	NA	NA	NA
Chromium	ug/L	N	NA	NA	<10	NA	NA	NA	NA	NA
Copper	ug/L	N	NA	NA	<25	NA	NA	NA	NA	NA
Iron	ug/L	N	NA	NA	47000	NA	NA	NA	NA	NA
Lead	ug/L	N	NA	NA	5	NA	NA	NA	NA	NA
Magnesium	ug/L	N	NA	NA	24000	NA	NA	NA	NA	NA
Manganese	ug/L	N	NA	NA	2000	NA	NA	NA	NA	NA
Nickel	ug/L	N	NA	NA	<40	NA	NA	NA	NA	NA
Selenium	ug/L	N	NA	NA	<5	NA	NA	NA	NA	NA
Sodium	ug/L	N	NA	NA	52000	NA	NA	NA	NA	NA
Strontium	ug/L	N	NA	NA	1000	NA	NA	NA	NA	NA
Thallium	ug/L	N	NA	NA	2.7 J	NA	NA	NA	NA	NA
Zinc	ug/L	N	NA	NA	30	NA	NA	NA	NA	NA
Perchlorate	ug/L	N	<4.00	<1.0	NA	<4	119	<4.00	<4.00	7.0
1,1,2-Trichloroethane	ug/L	N	NA	<5	<1	NA	NA	NA	NA	<5
1,1-Dichloroethane	ug/L	N	NA	<5	<1	NA	NA	NA	NA	<5
1,1-Dichloroethene	ug/L	N	NA	<5	<1	NA	NA	NA	NA	<5
1,2-Dichloroethane	ug/L	N	NA	5 UJ	<1	NA	NA	NA	NA	5 UJ
1,2-Dichloroethene	ug/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/L	N	NA	5 UJ	<5	NA	NA	NA	NA	5 UJ
Benzene	ug/L	N	NA	<5	<1	NA	NA	NA	NA	<5
Carbon disulfide	ug/L	N	NA	<5	3.2	NA	NA	NA	NA	<5
Chloroform	ug/L	N	NA	<5	1.6	NA	NA	NA	NA	<5
cis-1,2-Dichloroethene	ug/L	N	NA	<5	<1	NA	NA	NA	NA	<5
Methylene chloride	ug/L	N	NA	<5	<1	NA	NA	NA	NA	<5
trans-1,2-Dichloroethene	ug/L	N	NA	<5	<1	NA	NA	NA	NA	<5
Trichloroethene	ug/L	N	NA	1 J	<1	NA	NA	NA	NA	<5

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GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	17WW13 7/22/1998 17WW13-980722 REG SHALLOW	17WW13 3/11/1999 17WW13-990311 REG SHALLOW	17WW13 9/21/2000 17WW13-000921 REG SHALLOW	17WW13 2/1/2001 17WW13-010201 REG SHALLOW	17WW13 2/1/2001 17WW13QC FD SHALLOW	17WW13 3/14/2002 17WW13-020314 REG SHALLOW	17WW13 9/20/2002 17WW13-020920 REG SHALLOW	17WW13 9/2/2004 L0001-17WW13 REG SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L	N	3.257	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	3.257	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	52.139	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	<0.902	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	32.115	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	<0.26	NA	NA	NA	NA	NA	NA	0.2 UJ
Chloride	mg/L	N	1040	NA	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	N	NA	NA	NA	NA	NA	NA	NA	NA
pH	STD UNIT	N	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	umhos	N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	130	NA	NA	NA	NA	NA	NA	NA
Temperature	Deg C	N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	ug/L	N	500	NA	NA	NA	NA	NA	NA	NA
Antimony	ug/L	N	6	NA	NA	NA	NA	NA	NA	NA
Barium	ug/L	N	230	NA	NA	NA	NA	NA	NA	NA
Calcium	ug/L	N	59000	NA	NA	NA	NA	NA	NA	NA
Chromium	ug/L	N	50	NA	NA	NA	NA	NA	NA	NA
Copper	ug/L	N	<25	NA	NA	NA	NA	NA	NA	NA
Iron	ug/L	N	27000	NA	NA	NA	NA	NA	NA	NA
Lead	ug/L	N	3	NA	NA	NA	NA	NA	NA	NA
Magnesium	ug/L	N	28000	NA	NA	NA	NA	NA	NA	NA
Manganese	ug/L	N	886	NA	NA	NA	NA	NA	NA	NA
Nickel	ug/L	N	40	NA	NA	NA	NA	NA	NA	NA
Selenium	ug/L	N	6	NA	NA	NA	NA	NA	NA	NA
Sodium	ug/L	N	450000	NA	NA	NA	NA	NA	NA	NA
Strontium	ug/L	N	1100	NA	NA	NA	NA	NA	NA	NA
Thallium	ug/L	N	4.3 J	NA	NA	NA	NA	NA	NA	NA
Zinc	ug/L	N	<20	NA	NA	NA	NA	NA	NA	NA
Perchlorate	ug/L	N	NA	NA	20	<1.7	<1.7	<4.00	<4.00	<1
1,1,2-Trichloroethane	ug/L	N	<1	<1	NA	NA	NA	NA	NA	<5
1,1-Dichloroethane	ug/L	N	<1	<1	NA	NA	NA	NA	NA	<5
1,1-Dichloroethene	ug/L	N	<1	<1	NA	NA	NA	NA	NA	<5
1,2-Dichloroethane	ug/L	N	<1	<1	NA	NA	NA	NA	NA	5 UJ
1,2-Dichloroethene	ug/L	N	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/L	N	<5	<5	NA	NA	NA	NA	NA	5 UJ
Benzene	ug/L	N	<1	<1	NA	NA	NA	NA	NA	<5
Carbon disulfide	ug/L	N	<1	<1	NA	NA	NA	NA	NA	<5
Chloroform	ug/L	N	<1	<1	NA	NA	NA	NA	NA	<5
cis-1,2-Dichloroethene	ug/L	N	<1	<1	NA	NA	NA	NA	NA	<5
Methylene chloride	ug/L	N	110	<1	NA	NA	NA	NA	NA	<5
trans-1,2-Dichloroethene	ug/L	N	<1	<1	NA	NA	NA	NA	NA	<5
Trichloroethene	ug/L	N	1.5	<1	NA	NA	NA	NA	NA	<5

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GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	17WW14 7/22/1998 17WW14-980722	17WW14 9/19/2000 17WW14-000919	17WW14 3/14/2002 17WW14-020314	17WW14 9/18/2002 17WW14-020918	17WW14 9/3/2004 L0001-17WW14	17WW15 9/2/2004 L0001-17WW15	17WW16 9/14/2004 L0001-17WW16
			REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	ug/L	N	<0.26	NA	NA	NA	0.2 UJ	0.2 UJ	0.25 J
Chloride	mg/L	N	1160	NA	NA	NA	NA	NA	NA
Nitrite	mg/L	N	NA	NA	NA	NA	NA	NA	NA
pH	STD UNIT	N	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity	umhos	N	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L	N	130	NA	NA	NA	NA	NA	NA
Temperature	Deg C	N	NA	NA	NA	NA	NA	NA	NA
Aluminum	ug/L	N	1300	NA	NA	NA	NA	NA	NA
Antimony	ug/L	N	<5	NA	NA	NA	NA	NA	NA
Barium	ug/L	N	320	NA	NA	NA	NA	NA	NA
Calcium	ug/L	N	98000	NA	NA	NA	NA	NA	NA
Chromium	ug/L	N	50	NA	NA	NA	NA	NA	NA
Copper	ug/L	N	31	NA	NA	NA	NA	NA	NA
Iron	ug/L	N	1900	NA	NA	NA	NA	NA	NA
Lead	ug/L	N	<3	NA	NA	NA	NA	NA	NA
Magnesium	ug/L	N	77000	NA	NA	NA	NA	NA	NA
Manganese	ug/L	N	2300	NA	NA	NA	NA	NA	NA
Nickel	ug/L	N	40	NA	NA	NA	NA	NA	NA
Selenium	ug/L	N	<5	NA	NA	NA	NA	NA	NA
Sodium	ug/L	N	500000	NA	NA	NA	NA	NA	NA
Strontium	ug/L	N	2700	NA	NA	NA	NA	NA	NA
Thallium	ug/L	N	3 J	NA	NA	NA	NA	NA	NA
Zinc	ug/L	N	<20	NA	NA	NA	NA	NA	NA
Perchlorate	ug/L	N	NA	<4	1.01 J	<4.00	<1.0	<1	1.0 UJ
1,1,2-Trichloroethane	ug/L	N	<1	NA	NA	NA	<5	<5	<5
1,1-Dichloroethane	ug/L	N	<1	NA	NA	NA	<5	<5	<5
1,1-Dichloroethene	ug/L	N	<1	NA	NA	NA	<5	<5	<5
1,2-Dichloroethane	ug/L	N	<1	NA	NA	NA	5 UJ	5 UJ	<5
1,2-Dichloroethene	ug/L	N	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/L	N	15	NA	NA	NA	5 UJ	5 UJ	<5
Benzene	ug/L	N	<1	NA	NA	NA	<5	<5	<5
Carbon disulfide	ug/L	N	<1	NA	NA	NA	<5	<5	5 UJ
Chloroform	ug/L	N	<1	NA	NA	NA	<5	<5	<5
cis-1,2-Dichloroethene	ug/L	N	<1	NA	NA	NA	<5	<5	<5
Methylene chloride	ug/L	N	<1	NA	NA	NA	<5	<5	<5
trans-1,2-Dichloroethene	ug/L	N	<1	NA	NA	NA	<5	<5	<5
Trichloroethene	ug/L	N	0.58 J	NA	NA	NA	<5	<5	<5

Notes:

B Concentration reported was detected significantly above levels reported in associated equipment rinse samples and/or laboratory method and trip blanks.

C Degrees Celsius

J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

NA Not analyzed

pg/L picograms per liter

mg/L milligrams per liter

ug/L micrograms per liter

LHAAP-18/24
GROUNDWATER RESULTS

TEST_GROUP	PARAMETER	UNITS	FILTERED	18WW21
			9/3/2004	
			L0001-18WW21	
			REG	
			N/A	
VOLATILES	2-Butanone	µg/L	N	8
VOLATILES	Carbon disulfide	µg/L	N	2 J

Notes:

J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.
µg/L micrograms per liter

LHAAP-29
GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW02 5/1/1995	29WW02 7/14/1998	29WW02 3/15/1999	29WW02 8/31/2004	29WW03 5/4/1995	29WW03 7/14/1998	29WW03 7/14/1998	29WW03 7/14/1998	29WW03 8/30/2004	29WW04 5/4/1995	29WW04 7/14/1998
		29WW02(WATER SHALLOW)	29WW02-98071 SHALLOW	29WW02-99031 SHALLOW	L0001-29WW03 SHALLOW	29WW03(WATER SHALLOW)	29WW03-98071 SHALLOW	29WW03QC SHALLOW	29WW03QC DI SHALLOW	L0001-29WW03 SHALLOW	29WW04(WATER DEEP)	29WW04-98071 DEEP
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	NA	NA	NA	NA	NA	4.689 UJ	<2.363	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	9.862 UJ	<11.546	NA	NA	NA	NA
1,3,5-Trinitrobenzene	µg/L N	0.5 UJ	<0.39	NA	0.2 UJ	25 UJ	1.7	<0.39	<9.7	<0.2	0.5 UJ	<0.39
2,4,6-Trinitrotoluene	µg/L N	0.7 UJ	<0.26	NA	0.2 UJ	35 UJ	<0.26	<0.26	<6.5	<0.2	0.7 UJ	<0.26
2,4-Dinitrotoluene	µg/L N	0.5 UJ	<0.26	NA	0.2 UJ	25 UJ	30	55	52	<0.2	0.5 UJ	8.7
2,6-Dinitrotoluene	µg/L N	0.5 UJ	<0.26	NA	0.2 UJ	79.6 J	30	55	52	17	0.5 UJ	8.7
2-Amino-4,6-dinitrotoluene	µg/L N	0.5 UJ	<0.13	NA	0.2 UJ	25 UJ	<0.13	<0.13	<3.2	<0.2	0.5 UJ	<0.13
4-Amino-2,6-dinitrotoluene	µg/L N	0.6 UJ	<0.13	NA	0.2 UJ	30 UJ	<0.13	<0.13	<3.2	0.21 J	0.6 UJ	<0.13
m-Nitrotoluene	µg/L N	0.4 UJ	<0.26	NA	0.2 UJ	20 UJ	98	35	74	12 J	0.4 UJ	<0.26
o-Nitrotoluene	µg/L N	0.6 UJ	<0.26	NA	0.2 UJ	300 J	1700	1100 E	510	120	0.6 UJ	<0.26
p-Nitrotoluene	µg/L N	0.4 UJ	<0.26	NA	0.2 UJ	20 UJ	1900	1200 E	560	<0.2	0.4 UJ	<0.26
RDX	µg/L N	0.6 UJ	<0.26	NA	0.2 UJ	30 UJ	<0.26	<0.26	<6.5	<0.2	0.6 UJ	<0.26
Tetryl	µg/L N	0.4 UJ	<0.26	NA	0.2 UJ	20 UJ	<0.26	<0.26	<6.5	<0.2	0.4 UJ	<0.26
Chloride	µg/L N	NA	926	NA	NA	NA	40.4	42.9	NA	NA	NA	45.9
Nitrate / Nitrite	µg/L N	NA	<0.1	NA	NA	NA	1.36	1.37	NA	NA	NA	<0.1
Sulfate	µg/L N	NA	1300	NA	NA	NA	93	95	NA	NA	NA	4.2
Aluminum	µg/L N	NA	<200	NA	NA	NA	12000	8900	NA	NA	NA	<200
Antimony	µg/L N	<10	18	NA	NA	<10	11	9	NA	NA	<10	12
Arsenic	µg/L N	<5	<10	NA	NA	8	<10	<10	NA	NA	<5	<10
Barium	µg/L N	63	<200	NA	NA	532	240	<200	NA	NA	37	<200
Beryllium	µg/L N	NA	<.5	NA	NA	NA	.6	<.5	NA	NA	NA	<.5
Calcium	µg/L N	NA	480000	NA	NA	NA	33000	33000	NA	NA	NA	<5000
Chromium	µg/L N	24	<10	NA	NA	116	110	<10	NA	NA	<10	<10
Copper	µg/L N	NA	<25	NA	NA	NA	<25	<25	NA	NA	NA	<25
Iron	µg/L N	NA	2100	NA	NA	NA	19000	12000	NA	NA	NA	220
Lead	µg/L N	4	<3	NA	NA	10	12	8	NA	NA	<20	<3
Magnesium	µg/L N	NA	280000	NA	NA	NA	22000	21000	NA	NA	NA	<5000
Manganese	µg/L N	NA	1270	NA	NA	NA	431	290	NA	NA	NA	<15
Nickel	µg/L N	<40	<40	NA	NA	130	130	110	NA	NA	<4	<40
Silver	µg/L N	<10	<10	NA	NA	10	<10	<10	NA	NA	18	<10
Sodium	µg/L N	NA	160000	NA	NA	NA	63000	64000	NA	NA	NA	130000
Strontium	µg/L N	NA	17000	NA	NA	NA	720	690	NA	NA	NA	200
Thallium	µg/L N	<1000	1.9 J	NA	NA	<200	1.8 J	3 J	NA	NA	<1000	1 UJ
Vanadium	µg/L N	NA	<50	NA	NA	NA	<50	<50	NA	NA	NA	<50
Zinc	µg/L N	NA	<20	NA	NA	NA	90	60	NA	NA	NA	20
Perchlorate	µg/L N	NA	NA	NA	<1.0	NA	NA	NA	NA	<1.0	NA	NA
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	<10	<10	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	110	110	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	NA	NA	NA	<10	<10	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	<5	<5	<1	<5	<5	<1	<1	NA	<5	<5	<1
1,1-Dichloroethane	µg/L N	<5	<5	<1	<5	<5	<1	<1	NA	<5	<5	<1
1,1-Dichloroethene	µg/L N	<5	<5	<1	<5	<5	<1	<1	NA	<5	<5	<1
1,2,3-Trichlorobenzene	µg/L N	NA	<5	<1	<5	NA	<1	<1	NA	<5	NA	<1
1,2,4-Trichlorobenzene	µg/L N	NA	<5	<1	<5	NA	<1	<1	NA	<5	NA	<1
1,2-Dichloroethane	µg/L N	<5	<5	<1	<5	<5	<1	<1	NA	5 UJ	<5	<1
Bromochloromethane	µg/L N	NA	<5	<1	5 UJL	NA	<1	<1	NA	<5	NA	<1
Bromodichloromethane	µg/L N	<5	<5	<1	<5	<5	<1	<1	NA	<5	<5	<1
Bromoform	µg/L N	<5	<5	<1	5 UJL	<5	<1	<1	NA	<5	<5	<1
Chloroform	µg/L N	<5	<5	<1	<5	<5	<1	<1	NA	<5	<5	1.2
cis-1,2-Dichloroethene	µg/L N	NA	<5	<1	5 UJL	NA	<1	<1	NA	<5	NA	<1
Dibromochloromethane	µg/L N	<5	<25	<5	<5	<5	<5	<5	NA	<5	<5	<5
Hexachlorobutadiene	µg/L N	NA	<5	<1	<5	NA	<1	<1	NA	<5	NA	<1
Methylene chloride	µg/L N	<10	270	0.69 UJ	<5	<10	<1	<1	NA	<5	<10	<1
Naphthalene	µg/L N	NA	<5	<1	<5	NA	<1	<1	NA	<5	NA	<1
p-ISOPROPYLTOLUENE	µg/L N	NA	<5	<1	<5	NA	<1	<1	NA	<5	NA	<1
trans-1,2-Dichloroethene	µg/L N	NA	<5	<1	<5	NA	<1	<1	NA	<5	NA	<1
Trichloroethene	µg/L N	<5	3.6 J	<1	5 UJ	<5	<1	<1	NA	<5	<5	<1

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW04 8/29/2004	29WW05 3/19/1995	29WW05 4/29/1995	29WW05 7/9/1998	29WW05 9/16/2000	29WW05 2/8/2001	29WW05 3/12/2002	29WW05 9/21/2002	29WW05 8/26/2004	29WW07 5/1/1995	29WW07 7/13/1998	29WW07 5/22/2000
		L0001-29WW04	29WW05-95031	29WW05(WATER	29WW05-98070	29WW05-00091	29WW05-01020	29WW05-02031	29WW05-02092	L0001-29WW04	29WW07(WATER	29WW07-98071	29WW07-00052
		DEEP	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofure	pg/L N	NA	NA	NA	<1.995	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	14.995 J	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trinitrobenzene	ug/L N	<0.2	<2	250 UJ	<0.39	NA	NA	NA	NA	<4	0.5 UJ	<0.39	NA
2,4,6-Trinitrotoluene	ug/L N	<0.2	10	350 UJ	<0.26	NA	NA	NA	NA	<4	0.7 UJ	<0.26	NA
2,4-Dinitrotoluene	ug/L N	<0.2	3000	165 J	110	NA	NA	NA	NA	160 J	0.5 UJ	<0.26	NA
2,6-Dinitrotoluene	ug/L N	<0.2	NA	250 UJ	110	NA	NA	NA	NA	280 J	0.5 UJ	<0.26	NA
2-Amino-4,6-dinitrotoluene	ug/L N	<0.2	11	250 UJ	5.9	NA	NA	NA	NA	<4	0.5 UJ	<0.13	NA
4-Amino-2,6-dinitrotoluene	ug/L N	<0.2	24	300 UJ	5.9	NA	NA	NA	NA	15 J	0.6 UJ	<0.13	NA
m-Nitrotoluene	ug/L N	<0.2	730	200 UJ	240	NA	NA	NA	NA	400 J	0.4 UJ	<0.26	NA
o-Nitrotoluene	ug/L N	<0.2	18000	1900 J	3700	NA	NA	NA	NA	3100	0.6 UJ	<0.26	NA
p-Nitrotoluene	ug/L N	<0.2	2900	200 UJ	900	NA	NA	NA	NA	16 J	0.4 UJ	<0.26	NA
RDX	ug/L N	<0.2	29	300 UJ	<0.26	NA	NA	NA	NA	<4	0.6 UJ	<0.26	NA
Tetryl	ug/L N	<0.2	490	200 UJ	<0.26	NA	NA	NA	NA	4 R	0.4 UJ	<0.26	NA
Chloride	ug/L N	NA	NA	NA	87.3	NA	NA	NA	NA	NA	NA	570	NA
Nitrate / Nitrite	ug/L N	NA	NA	NA	<0.1	NA	NA	NA	NA	NA	NA	<0.1	NA
Sulfate	ug/L N	NA	NA	NA	200	NA	NA	NA	NA	NA	NA	910	NA
Aluminum	ug/L N	NA	NA	NA	410	NA	NA	NA	NA	NA	NA	<200	NA
Antimony	ug/L N	NA	NA	10 J	<5	NA	NA	NA	NA	NA	<10	10	NA
Arsenic	ug/L N	NA	NA	<5	<10	NA	NA	NA	NA	NA	<5	<10	NA
Barium	ug/L N	NA	NA	24	<200	NA	NA	NA	NA	NA	37	<200	NA
Beryllium	ug/L N	NA	NA	NA	<.5	NA	NA	NA	NA	NA	NA	<.5	NA
Calcium	ug/L N	NA	NA	NA	36000	NA	NA	NA	NA	NA	NA	410000	NA
Chromium	ug/L N	NA	NA	11	<10	NA	NA	NA	NA	NA	11	20	NA
Copper	ug/L N	NA	NA	NA	<25	NA	NA	NA	NA	NA	NA	<25	NA
Iron	ug/L N	NA	NA	NA	1600	NA	NA	NA	NA	NA	NA	3800	NA
Lead	ug/L N	NA	NA	<4	<3	NA	NA	NA	NA	NA	<2	<3	NA
Magnesium	ug/L N	NA	NA	NA	23000	NA	NA	NA	NA	NA	NA	180000	NA
Manganese	ug/L N	NA	NA	NA	51	NA	NA	NA	NA	NA	NA	311	NA
Nickel	ug/L N	NA	NA	<40	<40	NA	NA	NA	NA	NA	<40	600	NA
Silver	ug/L N	NA	NA	<10	<10	NA	NA	NA	NA	NA	<10	<10	NA
Sodium	ug/L N	NA	NA	NA	120000	NA	NA	NA	NA	NA	NA	180000	NA
Strontium	ug/L N	NA	NA	NA	990 J	NA	NA	NA	NA	NA	NA	12000 J	NA
Thallium	ug/L N	NA	NA	<1000	<1	NA	NA	NA	NA	NA	<1000	1.1	NA
Vanadium	ug/L N	NA	NA	NA	<50	NA	NA	NA	NA	NA	NA	<50	NA
Zinc	ug/L N	NA	NA	NA	<20	NA	NA	NA	NA	NA	NA	20	NA
Perchlorate	ug/L N	12	NA	NA	NA	130	130	77.1	65.7	42	NA	NA	<1
2,4-Dinitrotoluene	ug/L N	NA	NA	NA	74	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	ug/L N	NA	NA	NA	210	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	ug/L N	NA	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ug/L N	<5	NA	<5	<1	NA	NA	NA	NA	<5	<5	<1	NA
1,1-Dichloroethane	ug/L N	<5	NA	<5	<1	NA	NA	NA	NA	<5	<5	<1	NA
1,1-Dichloroethene	ug/L N	<5	NA	<5	<1	NA	NA	NA	NA	<5	<5	<1	NA
1,2,3-Trichlorobenzene	ug/L N	<5	NA	NA	<1	NA	NA	NA	NA	<5	NA	<1	NA
1,2,4-Trichlorobenzene	ug/L N	<5	NA	NA	<1	NA	NA	NA	NA	<5	NA	<1	NA
1,2-Dichloroethane	ug/L N	<5	NA	<5	<1	NA	NA	NA	NA	<5	<5	<1	NA
Bromochloromethane	ug/L N	<5	NA	NA	<1	NA	NA	NA	NA	<5	<5	<1	NA
Bromodichloromethane	ug/L N	<5	NA	<5	<1	NA	NA	NA	NA	<5	<5	<1	NA
Bromoform	ug/L N	<5	NA	<5	<1	NA	NA	NA	NA	<5	<5	<1	NA
Chloroform	ug/L N	<5	NA	<5	<1	NA	NA	NA	NA	<5	<5	<1	NA
cis-1,2-Dichloroethene	ug/L N	<5	NA	NA	<1	NA	NA	NA	NA	<5	NA	<1	NA
Dibromochloromethane	ug/L N	<5	NA	<5	<5	NA	NA	NA	NA	<5	<5	<5	NA
Hexachlorobutadiene	ug/L N	<5	NA	NA	<1	NA	NA	NA	NA	<5	NA	<1	NA
Methylene chloride	ug/L N	<5	NA	<10	<1	NA	NA	NA	NA	<5	<10	<1	NA
Naphthalene	ug/L N	<5	NA	NA	<1	NA	NA	NA	NA	<5	NA	<1	NA
p-ISOPROPYLTOLUENE	ug/L N	<5	NA	NA	<1	NA	NA	NA	NA	<5	NA	<1	NA
trans-1,2-Dichloroethene	ug/L N	<5	NA	NA	<1	NA	NA	NA	NA	<5	NA	<1	NA
Trichloroethene	ug/L N	<5	NA	<5	<1	NA	NA	NA	NA	<5	<5	<1	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW07 9/18/2000	29WW07 3/13/2002	29WW07 9/23/2002	29WW07 8/25/2004	29WW08 4/30/1995	29WW08 7/13/1998	29WW08 3/16/1999	29WW08 3/15/2002	29WW08 9/24/2002	29WW08 8/25/2004	29WW11 4/30/1995	29WW11 7/13/1998	29WW11 5/22/2000
		29WW07-00091	29WW07-02031	29WW07-02092	L0001-29WW07	29WW08(WATER	29WW08-98071	29WW08-99031	29WW08-02031	29WW08-02092	L0001-29WW08	29WW11(WATER	29WW11-98071	29WW11-00052
		SHALLOW	SHALLOW	SHALLOW	SHALLOW	DEEP	DEEP	DEEP	DEEP	DEEP	DEEP	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trinitrobenzene	µg/L N	NA	NA	NA	<0.2	0.5 UJ	<0.39	NA	NA	NA	<0.2	0.5 UJ	<0.39	NA
2,4,6-Trinitrotoluene	µg/L N	NA	NA	NA	<0.2	0.7 UJ	<0.26	NA	NA	NA	<0.2	0.7 UJ	<0.26	NA
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	<0.2	0.5 UJ	<0.26	NA	NA	NA	<0.2	0.5 UJ	<0.26	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	<0.2	0.5 UJ	<0.26	NA	NA	NA	<0.2	0.5 UJ	<0.26	NA
2-Amino-4,6-dinitrotoluene	µg/L N	NA	NA	NA	<0.2	0.5 UJ	<0.13	NA	NA	NA	<0.2	0.5 UJ	<0.13	NA
4-Amino-2,6-dinitrotoluene	µg/L N	NA	NA	NA	<0.2	0.6 UJ	<0.13	NA	NA	NA	<0.2	0.6 UJ	<0.13	NA
m-Nitrotoluene	µg/L N	NA	NA	NA	<0.2	0.4 UJ	<0.26	NA	NA	NA	<0.2	0.4 UJ	<0.26	NA
o-Nitrotoluene	µg/L N	NA	NA	NA	<0.2	0.6 UJ	<0.26	NA	NA	NA	<0.2	0.6 UJ	<0.26	NA
p-Nitrotoluene	µg/L N	NA	NA	NA	<0.2	0.4 UJ	<0.26	NA	NA	NA	<0.2	0.4 UJ	<0.26	NA
RDX	µg/L N	NA	NA	NA	<0.2	0.6 UJ	<0.26	NA	NA	NA	<0.2	0.6 UJ	<0.26	NA
Tetryl	µg/L N	NA	NA	NA	0.2 R	0.4 UJ	<0.26	NA	NA	NA	0.2 R	0.4 UJ	<0.26	NA
Chloride	µg/L N	NA	NA	NA	NA	NA	149	NA	NA	NA	NA	NA	1070	NA
Nitrate / Nitrite	µg/L N	NA	NA	NA	NA	NA	<0.1	NA	NA	NA	NA	NA	<0.1	NA
Sulfate	µg/L N	NA	NA	NA	NA	NA	8.4	NA	NA	NA	NA	NA	1700	NA
Aluminum	µg/L N	NA	NA	NA	NA	NA	4100	NA	NA	NA	NA	NA	320	NA
Antimony	µg/L N	NA	NA	NA	NA	10 UJ	12	NA	NA	NA	NA	20 J	<5	NA
Arsenic	µg/L N	NA	NA	NA	NA	<5	<10	NA	NA	NA	NA	8	<10	NA
Barium	µg/L N	NA	NA	NA	NA	90	<200	NA	NA	NA	NA	309	<200	NA
Beryllium	µg/L N	NA	NA	NA	NA	NA	.5	NA	NA	NA	NA	NA	<5	NA
Calcium	µg/L N	NA	NA	NA	NA	NA	9800	NA	NA	NA	NA	NA	490000	NA
Chromium	µg/L N	NA	NA	NA	NA	16	<10	NA	NA	NA	NA	7600	20	NA
Copper	µg/L N	NA	NA	NA	NA	NA	<25	NA	NA	NA	NA	NA	<25	NA
Iron	µg/L N	NA	NA	NA	NA	NA	3600	NA	NA	NA	NA	NA	4100	NA
Lead	µg/L N	NA	NA	NA	NA	<20	6	NA	NA	NA	NA	26	<3	NA
Magnesium	µg/L N	NA	NA	NA	NA	NA	<5000	NA	NA	NA	NA	NA	330000	NA
Manganese	µg/L N	NA	NA	NA	NA	NA	192	NA	NA	NA	NA	NA	997	NA
Nickel	µg/L N	NA	NA	NA	NA	<40	<40	NA	NA	NA	NA	8400	40	NA
Silver	µg/L N	NA	NA	NA	NA	13	<10	NA	NA	NA	NA	NA	<10	NA
Sodium	µg/L N	NA	NA	NA	NA	NA	180000	NA	NA	NA	NA	NA	590000	NA
Strontium	µg/L N	NA	NA	NA	NA	NA	350 J	NA	NA	NA	NA	NA	16000	NA
Thallium	µg/L N	NA	NA	NA	NA	<1000	<1	NA	NA	NA	NA	<1000	<1	NA
Vanadium	µg/L N	NA	NA	NA	NA	NA	<50	NA	NA	NA	NA	NA	<50	NA
Zinc	µg/L N	NA	NA	NA	NA	NA	20	NA	NA	NA	NA	NA	30	NA
Perchlorate	µg/L N	<8	<4.00	<4.00	<1.0	NA	NA	NA	<4.00	<200	<1.0	NA	NA	16.6 J
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	NA	NA	NA	<5	<5	<40	<1	NA	NA	<5	<5	<1	NA
1,1-Dichloroethane	µg/L N	NA	NA	NA	<5	<5	<40	<1	NA	NA	<5	<5	<1	NA
1,1-Dichloroethene	µg/L N	NA	NA	NA	<5	<5	<40	<1	NA	NA	<5	<5	<1	NA
1,2,3-Trichlorobenzene	µg/L N	NA	NA	NA	<5	NA	<40	<1	NA	NA	<5	NA	<1	NA
1,2,4-Trichlorobenzene	µg/L N	NA	NA	NA	<5	NA	<40	<1	NA	NA	<5	NA	<1	NA
1,2-Dichloroethane	µg/L N	NA	NA	NA	<5	<5	<40	<1	NA	NA	<5	<5	<1	NA
Bromochloromethane	µg/L N	NA	NA	NA	<5	NA	<40	<1	NA	NA	<5	NA	<1	NA
Bromodichloromethane	µg/L N	NA	NA	NA	<5	<5	<40	<1	NA	NA	<5	<5	<1	NA
Bromoform	µg/L N	NA	NA	NA	<5	<5	<40	<1	NA	NA	<5	<5	<1	NA
Chloroform	µg/L N	NA	NA	NA	<5	<5	<40	<1	NA	NA	<5	<5	<1	NA
cis-1,2-Dichloroethene	µg/L N	NA	NA	NA	<5	NA	<40	<1	NA	NA	<5	NA	<1	NA
Dibromochloromethane	µg/L N	NA	NA	NA	<5	<5	<200	<5	NA	NA	<5	<5	<5	NA
Hexachlorobutadiene	µg/L N	NA	NA	NA	<5	NA	<40	<1	NA	NA	<5	NA	<1	NA
Methylene chloride	µg/L N	NA	NA	NA	<5	<10	2300	<1	NA	NA	<5	<10	<1	NA
Naphthalene	µg/L N	NA	NA	NA	<5	NA	<40	<1	NA	NA	<5	NA	<1	NA
p-ISOPROPYLTOLUENE	µg/L N	NA	NA	NA	<5	NA	<40	0.84 J	NA	NA	<5	NA	<1	NA
trans-1,2-Dichloroethene	µg/L N	NA	NA	NA	<5	NA	<40	<1	NA	NA	<5	NA	<1	NA
Trichloroethene	µg/L N	NA	NA	NA	<5	<5	<40	<1	NA	NA	2 J	<5	<1	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW11 9/17/2000	29WW11 2/10/2001	29WW11 3/13/2002	29WW11 9/22/2002	29WW11 8/27/2004	29WW11 8/27/2004	29WW12 7/10/1998	29WW12 5/22/2000	29WW12 9/18/2000	29WW12 3/14/2002	29WW12 9/23/2002	29WW12 8/27/2004	29WW13 7/10/1998	29WW13 9/17/2000
		29WW11-00091	29WW11-01021	29WW11-02031	29WW11-02092	L0001-29WW11	L0001-29WW11	29WW12-98071	29WW12-00052	29WW12-00091	29WW12-02031	29WW12-02092	L0001-29WW11	29WW13-98071	29WW13-00091
		SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	INTERMEDIATE	INTERMEDIATE
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trinitrobenzene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.39 UJ	NA	NA	NA	NA	<0.2	0.39 UJ	NA
2,4,6-Trinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.26 UJ	NA	NA	NA	NA	<0.2	0.26 UJ	NA
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.26 UJ	NA	NA	NA	NA	<0.2	0.26 UJ	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.26 UJ	NA	NA	NA	NA	<0.2	0.26 UJ	NA
2-Amino-4,6-dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.13 UJ	NA	NA	NA	NA	<0.2	0.13 UJ	NA
4-Amino-2,6-dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.13 UJ	NA	NA	NA	NA	<0.2	0.13 UJ	NA
m-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.26 UJ	NA	NA	NA	NA	<0.2	0.26 UJ	NA
o-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.26 UJ	NA	NA	NA	NA	<0.2	0.26 UJ	NA
p-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.26 UJ	NA	NA	NA	NA	<0.2	0.26 UJ	NA
RDX	µg/L N	NA	NA	NA	NA	<0.2	<0.2	0.26 UJ	NA	NA	NA	NA	<0.2	0.26 UJ	NA
Tetryl	µg/L N	NA	NA	NA	NA	0.2 R	0.2 R	0.26 R	NA	NA	NA	NA	0.2 R	0.26 R	NA
Chloride	µg/L N	NA	NA	NA	NA	NA	NA	268	NA	NA	NA	NA	NA	37	NA
Nitrate / Nitrite	µg/L N	NA	NA	NA	NA	NA	NA	<0.1	NA	NA	NA	NA	NA	<0.1	NA
Sulfate	µg/L N	NA	NA	NA	NA	NA	NA	330	NA	NA	NA	NA	NA	25	NA
Aluminum	µg/L N	NA	NA	NA	NA	NA	NA	2600	NA	NA	NA	NA	NA	2800	NA
Antimony	µg/L N	NA	NA	NA	NA	NA	NA	10	NA	NA	NA	NA	NA	13	NA
Arsenic	µg/L N	NA	NA	NA	NA	NA	NA	<10	NA	NA	NA	NA	NA	<10	NA
Barium	µg/L N	NA	NA	NA	NA	NA	NA	<200	NA	NA	NA	NA	NA	650	NA
Beryllium	µg/L N	NA	NA	NA	NA	NA	NA	<5	NA	NA	NA	NA	NA	<5	NA
Calcium	µg/L N	NA	NA	NA	NA	NA	NA	120000	NA	NA	NA	NA	NA	84000	NA
Chromium	µg/L N	NA	NA	NA	NA	NA	NA	20	NA	NA	NA	NA	NA	40	NA
Copper	µg/L N	NA	NA	NA	NA	NA	NA	26	NA	NA	NA	NA	NA	<25	NA
Iron	µg/L N	NA	NA	NA	NA	NA	NA	3200	NA	NA	NA	NA	NA	6600	NA
Lead	µg/L N	NA	NA	NA	NA	NA	NA	<3	NA	NA	NA	NA	NA	<3	NA
Magnesium	µg/L N	NA	NA	NA	NA	NA	NA	56000	NA	NA	NA	NA	NA	37000	NA
Manganese	µg/L N	NA	NA	NA	NA	NA	NA	592	NA	NA	NA	NA	NA	184	NA
Nickel	µg/L N	NA	NA	NA	NA	NA	NA	<40	NA	NA	NA	NA	NA	<40	NA
Silver	µg/L N	NA	NA	NA	NA	NA	NA	<10	NA	NA	NA	NA	NA	<10	NA
Sodium	µg/L N	NA	NA	NA	NA	NA	NA	200000	NA	NA	NA	NA	NA	73000	NA
Strontium	µg/L N	NA	NA	NA	NA	NA	NA	2600	NA	NA	NA	NA	NA	2500	NA
Thallium	µg/L N	NA	NA	NA	NA	NA	NA	2.1	NA	NA	NA	NA	NA	<1	NA
Vanadium	µg/L N	NA	NA	NA	NA	NA	NA	<50	NA	NA	NA	NA	NA	<50	NA
Zinc	µg/L N	NA	NA	NA	NA	NA	NA	30	NA	NA	NA	NA	NA	50	NA
Perchlorate	µg/L N	<20	<1.4	<40.0	<80.0	<1.0	<1.0	NA	<1	<8	<4.00	<4.00	<1.0	NA	30
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
1,1-Dichloroethane	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
1,1-Dichloroethane	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
1,2,3-Trichlorobenzene	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
1,2,4-Trichlorobenzene	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
1,2-Dichloroethane	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
Bromochloromethane	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
Bromodichloromethane	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
Bromoform	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
Chloroform	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	0.71 J	NA
cis-1,2-Dichloroethane	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
Dibromochloromethane	µg/L N	NA	NA	NA	NA	<5	<5	<5	NA	NA	NA	NA	<5	<5	NA
Hexachlorobutadiene	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
Methylene chloride	µg/L N	NA	NA	NA	NA	5 UJ	5 UJ	36	NA	NA	NA	NA	5 UJ	<1.5	NA
Naphthalene	µg/L N	NA	NA	NA	NA	5 UJ	5 UJ	<1	NA	NA	NA	NA	5 UJ	<1	NA
p-ISOPROPYLTOLUENE	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
trans-1,2-Dichloroethane	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA
Trichloroethene	µg/L N	NA	NA	NA	NA	<5	<5	<1	NA	NA	NA	NA	<5	<1	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW13 9/17/2000	29WW13 2/8/2001	29WW13 3/16/2002	29WW13 9/23/2002	29WW13 8/26/2004	29WW14 7/13/1998	29WW14 7/13/1998	29WW14 9/17/2000	29WW14 3/13/2002	29WW14 9/22/2002	29WW14 8/24/2004	29WW15 7/10/1998	29WW15 9/17/2000
		29WW13QC	29WW13-01020	29WW13-02031	29WW13-02092	L0001-29WW13	29WW14-98071	29WW14QC	29WW14-00091	29WW14-02031	29WW14-02092	L0001-29WW14	29WW15-98071	29WW15-00091
		INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	SHALLOW	SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.494	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.63 UJ	NA
1,3,5-Trinitrobenzene	µg/L N	NA	NA	NA	NA	<0.2	<0.39	<0.39	NA	NA	NA	<0.2	0.39 UJ	NA
2,4,6-Trinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.26	<0.26	NA	NA	NA	<0.2	0.26 UJ	NA
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.26	<0.26	NA	NA	NA	<0.2	0.26 UJ	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.26	<0.26	NA	NA	NA	<0.2	0.26 UJ	NA
2-Amino-4,6-dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.13	<0.13	NA	NA	NA	<0.2	0.13 UJ	NA
4-Amino-2,6-dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.13	<0.13	NA	NA	NA	<0.2	0.13 UJ	NA
m-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.26	<0.26	NA	NA	NA	<0.2	0.26 UJ	NA
o-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.26	<0.26	NA	NA	NA	<0.2	0.26 UJ	NA
p-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	<0.26	<0.26	NA	NA	NA	<0.2	0.26 UJ	NA
RDX	µg/L N	NA	NA	NA	NA	<0.2	<0.26	<0.26	NA	NA	NA	<0.2	0.26 UJ	NA
Tetryl	µg/L N	NA	NA	NA	NA	0.2 R	<0.26	<0.26	NA	NA	NA	0.2 R	0.26 R	NA
Chloride	µg/L N	NA	NA	NA	NA	102	98.4	98.4	NA	NA	NA	NA	763	NA
Nitrate / Nitrite	µg/L N	NA	NA	NA	NA	<0.1	<0.1	<0.1	NA	NA	NA	NA	0.407	NA
Sulfate	µg/L N	NA	NA	NA	NA	100	110	110	NA	NA	NA	NA	240	NA
Aluminum	µg/L N	NA	NA	NA	NA	<200	<200	<200	NA	NA	NA	NA	970	NA
Antimony	µg/L N	NA	NA	NA	NA	<5	<5	<5	NA	NA	NA	NA	24	NA
Arsenic	µg/L N	NA	NA	NA	NA	<10	<10	<10	NA	NA	NA	NA	<10	NA
Barium	µg/L N	NA	NA	NA	NA	<200	<200	<200	NA	NA	NA	NA	<200	NA
Beryllium	µg/L N	NA	NA	NA	NA	<5	<5	<5	NA	NA	NA	NA	<5	NA
Calcium	µg/L N	NA	NA	NA	NA	80000	82000	82000	NA	NA	NA	NA	220000	NA
Chromium	µg/L N	NA	NA	NA	NA	<10	<10	<10	NA	NA	NA	NA	70	NA
Copper	µg/L N	NA	NA	NA	NA	<25	<25	<25	NA	NA	NA	NA	<25	NA
Iron	µg/L N	NA	NA	NA	NA	370	430	430	NA	NA	NA	NA	3000	NA
Lead	µg/L N	NA	NA	NA	NA	<3	<3	<3	NA	NA	NA	NA	<3	NA
Magnesium	µg/L N	NA	NA	NA	NA	30000	31000	31000	NA	NA	NA	NA	130000	NA
Manganese	µg/L N	NA	NA	NA	NA	131	131	131	NA	NA	NA	NA	2270	NA
Nickel	µg/L N	NA	NA	NA	NA	<40	<40	<40	NA	NA	NA	NA	50	NA
Silver	µg/L N	NA	NA	NA	NA	<10	<10	<10	NA	NA	NA	NA	<10	NA
Sodium	µg/L N	NA	NA	NA	NA	49000	50000	50000	NA	NA	NA	NA	280000	NA
Strontium	µg/L N	NA	NA	NA	NA	1800 J	1900 J	1900 J	NA	NA	NA	NA	6700	NA
Thallium	µg/L N	NA	NA	NA	NA	<1	<1	<1	NA	NA	NA	NA	<1	NA
Vanadium	µg/L N	NA	NA	NA	NA	<50	<50	<50	NA	NA	NA	NA	<50	NA
Zinc	µg/L N	NA	NA	NA	NA	260	270	270	NA	NA	NA	NA	20	NA
Perchlorate	µg/L N	64	<0.71	<4.00	<4.00	<1.0	NA	NA	<4	<4.00	<4.00	<1.0	NA	88000
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<10	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<10	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6 J	NA
1,1,2-Trichloroethane	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
1,1-Dichloroethane	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
1,1-Dichloroethene	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
1,2,3-Trichlorobenzene	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	5 UJ	<200	NA
1,2,4-Trichlorobenzene	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
1,2-Dichloroethane	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	14000	NA
Bromochloromethane	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
Bromodichloromethane	µg/L N	NA	NA	NA	NA	<5	<1	0.52 J	NA	NA	NA	<5	<200	NA
Bromoform	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
Chloroform	µg/L N	NA	NA	NA	NA	<5	3.9	4	NA	NA	NA	<5	<200	NA
cis-1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
Dibromochloromethane	µg/L N	NA	NA	NA	NA	<5	<5	<5	NA	NA	NA	<5	<1000	NA
Hexachlorobutadiene	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
Methylene chloride	µg/L N	NA	NA	NA	NA	<5	<1.1	<1.2	NA	NA	NA	<5	<200	NA
Naphthalene	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	5 UJ	<200	NA
p-ISOPROPYLTOLUENE	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
trans-1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	<200	NA
Trichloroethene	µg/L N	NA	NA	NA	NA	<5	<1	<1	NA	NA	NA	<5	1200	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW15 2/7/2001	29WW15 2/7/2001	29WW15 3/14/2002	29WW15 9/24/2002	29WW15 8/25/2004	29WW16 7/10/1998	29WW16 3/16/1999	29WW16 5/24/2000	29WW16 5/24/2000	29WW16 9/16/2000	29WW16 2/7/2001	29WW16 3/14/2002	29WW16 3/14/2002	29WW16 9/24/2002
		29WW15-01020	29WW15QC	29WW15-02031	29WW15-02092	L0001-29WW11	29WW16-98071	29WW16-99031	29WW16-00052	29WW16QC	29WW16-00091	29WW16-01020	29WW16-02031	29WW16QC-0203-FI	29WW16-02092
		SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trinitrobenzene	µg/L N	NA	NA	NA	NA	<0.2	0.39 UJ	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	0.26 UJ	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	0.26 UJ	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	0.26 UJ	NA	NA	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA
m-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	0.26 UJ	NA	NA	NA	NA	NA	NA	NA	NA
o-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	0.26 UJ	NA	NA	NA	NA	NA	NA	NA	NA
p-Nitrotoluene	µg/L N	NA	NA	NA	NA	<0.2	0.26 UJ	NA	NA	NA	NA	NA	NA	NA	NA
RDX	µg/L N	NA	NA	NA	NA	<0.2	0.26 UJ	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	µg/L N	NA	NA	NA	NA	0.2 R	0.26 R	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	µg/L N	NA	NA	NA	NA	NA	190	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate / Nitrite	µg/L N	NA	NA	NA	NA	NA	<0.1	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	µg/L N	NA	NA	NA	NA	NA	27	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	µg/L N	NA	NA	NA	NA	NA	<200	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	µg/L N	NA	NA	NA	NA	NA	6	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	µg/L N	NA	NA	NA	NA	NA	44	NA	NA	NA	NA	NA	NA	NA	NA
Barium	µg/L N	NA	NA	NA	NA	NA	400	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	µg/L N	NA	NA	NA	NA	NA	<5	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	µg/L N	NA	NA	NA	NA	NA	72000	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	µg/L N	NA	NA	NA	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA	NA
Copper	µg/L N	NA	NA	NA	NA	NA	<25	NA	NA	NA	NA	NA	NA	NA	NA
Iron	µg/L N	NA	NA	NA	NA	NA	750	NA	NA	NA	NA	NA	NA	NA	NA
Lead	µg/L N	NA	NA	NA	NA	NA	<3	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	µg/L N	NA	NA	NA	NA	NA	28000	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	µg/L N	NA	NA	NA	NA	NA	124	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	µg/L N	NA	NA	NA	NA	NA	<40	NA	NA	NA	NA	NA	NA	NA	NA
Silver	µg/L N	NA	NA	NA	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	µg/L N	NA	NA	NA	NA	NA	87000	NA	NA	NA	NA	NA	NA	NA	NA
Strontium	µg/L N	NA	NA	NA	NA	NA	3300	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	µg/L N	NA	NA	NA	NA	NA	<1	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	µg/L N	NA	NA	NA	NA	NA	<50	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	µg/L N	NA	NA	NA	NA	NA	<20	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	µg/L N	47000	44000	61400	46400	24000	NA	NA	35.8 J	1 UJ	<4	<0.71	<4.00	<4.00	<4.00
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	NA	NA	NA	NA	4 J	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	µg/L N	NA	NA	NA	NA	3 J	2100	<100000	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	µg/L N	NA	NA	NA	NA	4 J	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	µg/L N	NA	NA	NA	NA	<5	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	µg/L N	NA	NA	NA	NA	<5	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	µg/L N	NA	NA	NA	NA	6400	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
Bromochloromethane	µg/L N	NA	NA	NA	NA	<5	2100	<100000	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	µg/L N	NA	NA	NA	NA	<5	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
Bromoform	µg/L N	NA	NA	NA	NA	<5	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
Chloroform	µg/L N	NA	NA	NA	NA	6	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	3 J	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	µg/L N	NA	NA	NA	NA	<5	<10000	<500000	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	µg/L N	NA	NA	NA	NA	<5	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	µg/L N	NA	NA	NA	NA	100	5700000	6600000	NA	NA	NA	NA	NA	NA	NA
Naphthalene	µg/L N	NA	NA	NA	NA	<5	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
p-ISOPROPYLTOLUENE	µg/L N	NA	NA	NA	NA	<5	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	12	<2000	<100000	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	µg/L N	NA	NA	NA	NA	160 J	8800	<100000	NA	NA	NA	NA	NA	NA	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW16 8/24/2004	29WW16 8/24/2004	29WW20 7/14/1998	29WW20 3/15/1999	29WW20 9/16/2000	29WW20 9/16/2000	29WW20 2/10/2001	29WW20 3/15/2002	29WW20 3/15/2002	29WW20 9/23/2002	29WW20 8/26/2004	29WW21 7/13/1998	29WW21 3/12/2002
		L0001-29WW16	L0001-29WW16Q	29WW20-98071	29WW20-99031	29WW20-00091	29WW20QC	29WW20-01021	29WW20-02031	29WW20QC-0203-FI	29WW20-02092	L0001-29WW21	29WW21-98071	29W21QC-0203-FI
		INTERMEDIATE	INTERMEDIATE	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trinitrobenzene	µg/L N	<0.2	<0.2	<0.39	NA	NA	NA	NA	NA	NA	NA	<4	<0.39	NA
2,4,6-Trinitrotoluene	µg/L N	<0.2	<0.2	<0.26	NA	NA	NA	NA	NA	NA	NA	<4	<0.26	NA
2,4-Dinitrotoluene	µg/L N	<0.2	<0.2	530	NA	NA	NA	NA	NA	NA	NA	13	<0.26	NA
2,6-Dinitrotoluene	µg/L N	<0.2	<0.2	530	NA	NA	NA	NA	NA	NA	NA	45	<0.26	NA
2-Amino-4,6-dinitrotoluene	µg/L N	<0.2	<0.2	<0.13	NA	NA	NA	NA	NA	NA	NA	<4	<0.13	NA
4-Amino-2,6-dinitrotoluene	µg/L N	<0.2	<0.2	<0.13	NA	NA	NA	NA	NA	NA	NA	<4	<0.13	NA
m-Nitrotoluene	µg/L N	<0.2	<0.2	80	NA	NA	NA	NA	NA	NA	NA	27 J	<0.26	NA
o-Nitrotoluene	µg/L N	<0.2	<0.2	3200	NA	NA	NA	NA	NA	NA	NA	290	<0.26	NA
p-Nitrotoluene	µg/L N	<0.2	<0.2	2100	NA	NA	NA	NA	NA	NA	NA	<4	<0.26	NA
RDX	µg/L N	<0.2	<0.2	<0.26	NA	NA	NA	NA	NA	NA	NA	<4	<0.26	NA
Tetryl	µg/L N	0.2 R	0.2 R	<0.26	NA	NA	NA	NA	NA	NA	NA	4 R	<0.26	NA
Chloride	µg/L N	NA	NA	113	NA	NA	NA	NA	NA	NA	NA	NA	21.4	NA
Nitrate / Nitrite	µg/L N	NA	NA	0.825	NA	NA	NA	NA	NA	NA	NA	NA	0.243	NA
Sulfate	µg/L N	NA	NA	380	NA	NA	NA	NA	NA	NA	NA	NA	85	NA
Aluminum	µg/L N	NA	NA	41000	NA	NA	NA	NA	NA	NA	NA	NA	210	NA
Antimony	µg/L N	NA	NA	13	NA	NA	NA	NA	NA	NA	NA	NA	<5	NA
Arsenic	µg/L N	NA	NA	12	NA	NA	NA	NA	NA	NA	NA	NA	<10	NA
Barium	µg/L N	NA	NA	350	NA	NA	NA	NA	NA	NA	NA	NA	<200	NA
Beryllium	µg/L N	NA	NA	4.5	NA	NA	NA	NA	NA	NA	NA	NA	<5	NA
Calcium	µg/L N	NA	NA	100000	NA	NA	NA	NA	NA	NA	NA	NA	61000	NA
Chromium	µg/L N	NA	NA	160	NA	NA	NA	NA	NA	NA	NA	NA	<10	NA
Copper	µg/L N	NA	NA	170	NA	NA	NA	NA	NA	NA	NA	NA	<25	NA
Iron	µg/L N	NA	NA	58000	NA	NA	NA	NA	NA	NA	NA	NA	590	NA
Lead	µg/L N	NA	NA	35	NA	NA	NA	NA	NA	NA	NA	NA	<3	NA
Magnesium	µg/L N	NA	NA	71000	NA	NA	NA	NA	NA	NA	NA	NA	21000	NA
Manganese	µg/L N	NA	NA	1480	NA	NA	NA	NA	NA	NA	NA	NA	129	NA
Nickel	µg/L N	NA	NA	170	NA	NA	NA	NA	NA	NA	NA	NA	<40	NA
Silver	µg/L N	NA	NA	<10	NA	NA	NA	NA	NA	NA	NA	NA	<10	NA
Sodium	µg/L N	NA	NA	170000	NA	NA	NA	NA	NA	NA	NA	NA	47000	NA
Strontium	µg/L N	NA	NA	3100	NA	NA	NA	NA	NA	NA	NA	NA	2100 J	NA
Thallium	µg/L N	NA	NA	2.5 J	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA
Vanadium	µg/L N	NA	NA	120	NA	NA	NA	NA	NA	NA	NA	NA	<50	NA
Zinc	µg/L N	NA	NA	350	NA	NA	NA	NA	NA	NA	NA	NA	<20	NA
Perchlorate	µg/L N	<1.0	<1.0	NA	NA	8	<4	<0.71	<4.00	<4.00	<4.00	<1.0	NA	<4.00
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
1,1-Dichloroethane	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
1,1-Dichloroethene	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
1,2,3-Trichlorobenzene	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
1,2,4-Trichlorobenzene	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
1,2-Dichloroethane	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
Bromochloromethane	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
Bromodichloromethane	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	0.69 J	NA
Bromoform	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
Chloroform	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	14	NA
cis-1,2-Dichloroethene	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
Dibromochloromethane	µg/L N	<200000	<100000	<100	<5	NA	NA	NA	NA	NA	NA	<5	<5	NA
Hexachlorobutadiene	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
Methylene chloride	µg/L N	7300000	6600000 J	1400	<1	NA	NA	NA	NA	NA	NA	4 BJ	<5.7	NA
Naphthalene	µg/L N	200000 UJ	100000 UJ	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
p-ISOPROPYLTOLUENE	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
trans-1,2-Dichloroethene	µg/L N	<200000	<100000	<20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA
Trichloroethene	µg/L N	<200000	<100000	20	<1	NA	NA	NA	NA	NA	NA	<5	<1	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW21 3/12/2002 29WW21-02031 SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/L N	NA
Octachlorodibenzo-p-dioxin	µg/L N	NA
1,3,5-Trinitrobenzene	µg/L N	NA
2,4,6-Trinitrotoluene	µg/L N	NA
2,4-Dinitrotoluene	µg/L N	NA
2,6-Dinitrotoluene	µg/L N	NA
2-Amino-4,6-dinitrotoluene	µg/L N	NA
4-Amino-2,6-dinitrotoluene	µg/L N	NA
m-Nitrotoluene	µg/L N	NA
o-Nitrotoluene	µg/L N	NA
p-Nitrotoluene	µg/L N	NA
RDX	µg/L N	NA
Tetryl	µg/L N	NA
Chloride	µg/L N	NA
Nitrate / Nitrite	µg/L N	NA
Sulfate	µg/L N	NA
Aluminum	µg/L N	NA
Antimony	µg/L N	NA
Arsenic	µg/L N	NA
Barium	µg/L N	NA
Beryllium	µg/L N	NA
Calcium	µg/L N	NA
Chromium	µg/L N	NA
Copper	µg/L N	NA
Iron	µg/L N	NA
Lead	µg/L N	NA
Magnesium	µg/L N	NA
Manganese	µg/L N	NA
Nickel	µg/L N	NA
Silver	µg/L N	NA
Sodium	µg/L N	NA
Strontium	µg/L N	NA
Thallium	µg/L N	NA
Vanadium	µg/L N	NA
Zinc	µg/L N	NA
Perchlorate	µg/L N	<4.00
2,4-Dinitrotoluene	µg/L N	NA
2,6-Dinitrotoluene	µg/L N	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA
1,1,2-Trichloroethane	µg/L N	NA
1,1-Dichloroethane	µg/L N	NA
1,1-Dichloroethene	µg/L N	NA
1,2,3-Trichlorobenzene	µg/L N	NA
1,2,4-Trichlorobenzene	µg/L N	NA
1,2-Dichloroethane	µg/L N	NA
Bromochloromethane	µg/L N	NA
Bromodichloromethane	µg/L N	NA
Bromoform	µg/L N	NA
Chloroform	µg/L N	NA
cis-1,2-Dichloroethene	µg/L N	NA
Dibromochloromethane	µg/L N	NA
Hexachlorobutadiene	µg/L N	NA
Methylene chloride	µg/L N	NA
Naphthalene	µg/L N	NA
p-ISOPROPYLTOLUENE	µg/L N	NA
trans-1,2-Dichloroethene	µg/L N	NA
Trichloroethene	µg/L N	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	29WW21 9/24/2002	29WW21 8/25/2004	29WW22 7/13/1998	29WW22 3/12/2002	29WW22 9/23/2002	29WW22 8/27/2004	29WW23 7/13/1998	29WW23 3/15/1999	29WW23 8/30/2004	29WW24 7/13/1998	29WW24 7/13/1998	29WW24 3/16/1999	29WW24 8/27/2004
		29WW21-02092	L0001-29WW2	29WW22-98071	29WW22-02031	29WW22-02092	L0001-29WW2	29WW23-98071	29WW23-99031	L0001-29WW23	29WW24-98071	29WW24QC	29WW24-99031	L0001-29WW2
		SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trinitrobenzene	µg/L N	NA	<0.2	<0.39	NA	NA	<0.2	<0.39	NA	<0.2	<0.39	<0.39	NA	<0.2
2,4,6-Trinitrotoluene	µg/L N	NA	<0.2	<0.26	NA	NA	<0.2	<0.26	NA	<0.2	<0.26	<0.26	NA	<0.2
2,4-Dinitrotoluene	µg/L N	NA	<0.2	<0.26	NA	NA	<0.2	<0.26	NA	<0.2	<0.26	<0.26	NA	<0.2
2,6-Dinitrotoluene	µg/L N	NA	<0.2	<0.26	NA	NA	<0.2	<0.26	NA	<0.2	<0.26	<0.26	NA	<0.2
2-Amino-4,6-dinitrotoluene	µg/L N	NA	<0.2	<0.13	NA	NA	<0.2	<0.13	NA	<0.2	<0.13	<0.13	NA	<0.2
4-Amino-2,6-dinitrotoluene	µg/L N	NA	<0.2	<0.13	NA	NA	<0.2	<0.13	NA	<0.2	<0.13	<0.13	NA	<0.2
m-Nitrotoluene	µg/L N	NA	<0.2	<0.26	NA	NA	<0.2	<0.26	NA	<0.2	<0.26	<0.26	NA	<0.2
o-Nitrotoluene	µg/L N	NA	<0.2	<0.26	NA	NA	<0.2	<0.26	NA	<0.2	<0.26	<0.26	NA	<0.2
p-Nitrotoluene	µg/L N	NA	<0.2	<0.26	NA	NA	<0.2	<0.26	NA	<0.2	<0.26	<0.26	NA	<0.2
RDX	µg/L N	NA	<0.2	<0.26	NA	NA	<0.2	<0.26	NA	<0.2	<0.26	<0.26	NA	<0.2
Tetryl	µg/L N	NA	0.2 R	<0.26	NA	NA	0.2 R	<0.26	NA	<0.2	<0.26	<0.26	NA	0.2 R
Chloride	µg/L N	NA	NA	106	NA	NA	NA	867	NA	NA	105	103	NA	NA
Nitrate / Nitrite	µg/L N	NA	NA	<0.1	NA	NA	NA	<0.1	NA	NA	<0.1	<0.1	NA	NA
Sulfate	µg/L N	NA	NA	240	NA	NA	NA	1300	NA	NA	64	66	NA	NA
Aluminum	µg/L N	NA	NA	2300	NA	NA	NA	<200	NA	NA	<200	<200	NA	NA
Antimony	µg/L N	NA	NA	8	NA	NA	NA	<5	NA	NA	<5	8	NA	NA
Arsenic	µg/L N	NA	NA	<10	NA	NA	NA	<10	NA	NA	<10	<10	NA	NA
Barium	µg/L N	NA	NA	<200	NA	NA	NA	<200	NA	NA	290	290	NA	NA
Beryllium	µg/L N	NA	NA	<5	NA	NA	NA	<5	NA	NA	<5	<5	NA	NA
Calcium	µg/L N	NA	NA	110000	NA	NA	NA	330000	NA	NA	79000	79000	NA	NA
Chromium	µg/L N	NA	NA	80	NA	NA	NA	<10	NA	NA	50	60	NA	NA
Copper	µg/L N	NA	NA	112	NA	NA	NA	<25	NA	NA	<25	<25	NA	NA
Iron	µg/L N	NA	NA	3700	NA	NA	NA	3000	NA	NA	1300	1300	NA	NA
Lead	µg/L N	NA	NA	<3	NA	NA	NA	<3	NA	NA	<3	<3	NA	NA
Magnesium	µg/L N	NA	NA	52000	NA	NA	NA	280000	NA	NA	30000	29000	NA	NA
Manganese	µg/L N	NA	NA	526	NA	NA	NA	258	NA	NA	258	255	NA	NA
Nickel	µg/L N	NA	NA	50	NA	NA	NA	90	NA	NA	120	120	NA	NA
Silver	µg/L N	NA	NA	<10	NA	NA	NA	<10	NA	NA	<10	<10	NA	NA
Sodium	µg/L N	NA	NA	110000	NA	NA	NA	290000	NA	NA	58000	57000	NA	NA
Strontium	µg/L N	NA	NA	3300 J	NA	NA	NA	12000 J	NA	NA	1400 J	1400 J	NA	NA
Thallium	µg/L N	NA	NA	<1	NA	NA	NA	<1	NA	NA	<1	<1	NA	NA
Vanadium	µg/L N	NA	NA	<50	NA	NA	NA	<50	NA	NA	<50	<50	NA	NA
Zinc	µg/L N	NA	NA	40	NA	NA	NA	50	NA	NA	60	60	NA	NA
Perchlorate	µg/L N	<4.00	<1.0	NA	<4.00	<4.00	4.0	NA	NA	2.6	NA	NA	NA	<1.0
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
1,1-Dichloroethane	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
1,1-Dichloroethene	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
1,2,3-Trichlorobenzene	µg/L N	NA	4 BJ	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
1,2,4-Trichlorobenzene	µg/L N	NA	2 BJ	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
1,2-Dichloroethane	µg/L N	NA	<5	0.65 J	NA	NA	<5	<20	<1	5 UJ	20 R	20 R	<1	<5
Bromochloromethane	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
Bromodichloromethane	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
Bromoform	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
Chloroform	µg/L N	NA	<5	0.68 J	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
cis-1,2-Dichloroethene	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
Dibromochloromethane	µg/L N	NA	<5	<5	NA	NA	<5	<100	<5	<5	100 R	100 R	<5	<5
Hexachlorobutadiene	µg/L N	NA	1 BJ	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
Methylene chloride	µg/L N	NA	120	46	NA	NA	2 BJ	1700	<1	<5	1200 R	1300 R	<1	26 J
Naphthalene	µg/L N	NA	3 BJ	<1	NA	NA	5 UJ	<20	<1	<5	20 R	20 R	<1	5 UJ
p-ISOPROPYLTOLUENE	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
trans-1,2-Dichloroethene	µg/L N	NA	<5	<1	NA	NA	<5	<20	<1	<5	20 R	20 R	<1	<5
Trichloroethene	µg/L N	NA	8	1.1	NA	NA	<5	17 J	<1	<5	20 R	20 R	0.66 J	<5

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GROUNDWATER RESULTS

PARAMETER	UNITS	29WW28 7/14/1998	29WW28 7/14/1998	29WW28 3/16/1999	29WW28 3/16/1999	29WW28 8/26/2004	29WW33 7/14/1998	29WW33 8/29/2004	29WW34 8/26/2004
	FILTERED	29WW28-980714 INTERMEDIATE	29WW28QC INTERMEDIATE	29WW28-990316 INTERMEDIATE	C-29WW28-990316 INTERMEDIATE	L0001-29WW28 INTERMEDIATE	29WW33-980714 INTERMEDIATE	L0001-29WW33 INTERMEDIATE	L0001-29WW34
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trinitrobenzene	µg/L N	<0.39	<0.39	NA	NA	<0.2	<0.39	<0.2	<0.2
2,4,6-Trinitrotoluene	µg/L N	<0.26	<0.26	NA	NA	<0.2	<0.26	<0.2	<0.2
2,4-Dinitrotoluene	µg/L N	<0.26	<0.26	NA	NA	<0.2	<0.26	<0.2	<0.2
2,6-Dinitrotoluene	µg/L N	<0.26	<0.26	NA	NA	<0.2	<0.26	<0.2	<0.2
2-Amino-4,6-dinitrotoluene	µg/L N	<0.13	<0.13	NA	NA	<0.2	<0.13	<0.2	<0.2
4-Amino-2,6-dinitrotoluene	µg/L N	<0.13	<0.13	NA	NA	<0.2	<0.13	<0.2	<0.2
m-Nitrotoluene	µg/L N	<0.26	<0.26	NA	NA	<0.2	<0.26	<0.2	<0.2
o-Nitrotoluene	µg/L N	2 J	0.26 UJ	NA	NA	<0.2	<0.26	<0.2	<0.2
p-Nitrotoluene	µg/L N	<0.26	<0.26	NA	NA	<0.2	<0.26	<0.2	<0.2
RDX	µg/L N	<0.26	<0.26	NA	NA	<0.2	<0.26	<0.2	<0.2
Tetryl	µg/L N	<0.26	<0.26	NA	NA	0.2 R	<0.26	<0.2	0.2 R
Chloride	µg/L N	33	29.9	NA	NA	NA	614	NA	NA
Nitrate / Nitrite	µg/L N	<0.1	<0.1	NA	NA	NA	<0.1	NA	NA
Sulfate	µg/L N	61	58	NA	NA	NA	540	NA	NA
Aluminum	µg/L N	<200	<200	NA	NA	NA	490	NA	NA
Antimony	µg/L N	6	5	NA	NA	NA	21	NA	NA
Arsenic	µg/L N	<10	<10	NA	NA	NA	<10	NA	NA
Barium	µg/L N	410	410	NA	NA	NA	<200	NA	NA
Beryllium	µg/L N	<.5	<.5	NA	NA	NA	<.5	NA	NA
Calcium	µg/L N	94000	94000	NA	NA	NA	310000	NA	NA
Chromium	µg/L N	<10	<10	NA	NA	NA	40	NA	NA
Copper	µg/L N	<25	<25	NA	NA	NA	<25	NA	NA
Iron	µg/L N	780	890	NA	NA	NA	1500	NA	NA
Lead	µg/L N	<3	<3	NA	NA	NA	<3	NA	NA
Magnesium	µg/L N	37000	37000	NA	NA	NA	140000	NA	NA
Manganese	µg/L N	162	160	NA	NA	NA	421	NA	NA
Nickel	µg/L N	<40	<40	NA	NA	NA	<40	NA	NA
Silver	µg/L N	<10	<10	NA	NA	NA	<10	NA	NA
Sodium	µg/L N	46000	45000	NA	NA	NA	130000	NA	NA
Strontium	µg/L N	2400	2400	NA	NA	NA	11000	NA	NA
Thallium	µg/L N	1 UJ	1 UJ	NA	NA	NA	1.2 J	NA	NA
Vanadium	µg/L N	<50	<50	NA	NA	NA	<50	NA	NA
Zinc	µg/L N	20	30	NA	NA	NA	20	NA	NA
Perchlorate	µg/L N	NA	NA	NA	NA	<1.0	NA	3.7	<1.0
2,4-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
1,1-Dichloroethane	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
1,1-Dichloroethene	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
1,2,3-Trichlorobenzene	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
1,2,4-Trichlorobenzene	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
1,2-Dichloroethane	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
Bromochloromethane	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
Bromodichloromethane	µg/L N	5 R	5 R	<1	<1	<5	1.1	<5	2 J
Bromoform	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	12
Chloroform	µg/L N	5.3 R	5.4 R	0.69 J	0.72 J	<5	6.7	<5	2 J
cis-1,2-Dichloroethene	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
Dibromochloromethane	µg/L N	25 R	25 R	<5	<5	<5	<5	<5	9
Hexachlorobutadiene	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
Methylene chloride	µg/L N	300 R	300 R	<1	<1	36	<65 J	<5	<5
Naphthalene	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
p-ISOPROPYLTOLUENE	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
trans-1,2-Dichloroethene	µg/L N	5 R	5 R	<1	<1	<5	<1	<5	<5
Trichloroethene	µg/L N	5 R	5 R	<1	<1	3 J	<1	<5	<5

Notes:

J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

L Result may be biased low.

R Rejected.

NA Not analyzed

pg/L picograms per liter

µg/L micrograms per liter

LHAAP-32
GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	113 5/17/1993 C-113-930517 REG SHALLOW	113 2/14/1996 MW-113-QC FD SHALLOW	113 2/14/1996 MW-113 REG SHALLOW	32WW01 8/25/1998 32WW01-980825 REG SHALLOW	32WW01 8/25/1998 32WW01QC FD SHALLOW	32WW02 8/25/1998 32WW02-980825 REG SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	N	NA	NA	NA	7.025 B	7.709	9.208
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L	N	NA	NA	NA	2.638 UJ	7.353 J	4.278 UJ
Heptachlorodibenzofuran	pg/L	N	NA	NA	NA	8.026	<2.001	9.208
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	24.1 UJ	10.175 J	14.227 J
Chloride	mg/L	N	359	NA	NA	39.9	38.3	68.8
Nitrate / Nitrite	mg/L	N	NA	NA	NA	0.138	0.125	<0.1
pH	STD UNIT	N	6.78	NA	NA	NA	NA	NA
Specific Conductivity	µmhos	N	2600	NA	NA	NA	NA	NA
Sulfate	mg/L	N	618	NA	NA	21	21	110
Temperature	Deg C	N	19.4	NA	NA	NA	NA	NA
Aluminum	µg/L	N	NA	NA	NA	540	380	1400
Antimony	µg/L	N	<30	NA	NA	18	34	27
Arsenic	µg/L	N	<10	NA	NA	15	<10	<10
Barium	µg/L	N	414	NA	NA	350	340	300
Calcium	µg/L	N	NA	NA	NA	39000	38000	65000
Chromium	µg/L	N	58.8	NA	NA	30	20	20
Iron	µg/L	N	NA	NA	NA	1600	1300	2300
Lead	µg/L	N	18.6	NA	NA	5	4	6
Magnesium	µg/L	N	NA	NA	NA	28000	28000	37000
Manganese	µg/L	N	NA	NA	NA	218	211	191
Nickel	µg/L	N	75	NA	NA	<40	<40	<40
Potassium	µg/L	N	NA	NA	NA	<5000	<5000	6500
Selenium	µg/L	N	<10	NA	NA	<5	6	<5
Silver	µg/L	N	<70	NA	NA	<10	<10	10
Sodium	µg/L	N	NA	NA	NA	60000	59000	80000
Strontium	µg/L	N	NA	NA	NA	1200	1100	2800
Zinc	µg/L	N	NA	NA	NA	50	40	40
bis(2-Ethylhexyl)phthalate	µg/L	N	<10	1.3	0.92 J	<10	<10	<10
di-n-Butyl phthalate	µg/L	N	<10	<0.63	<0.63	<10	<10	13
di-n-Octyl phthalate	µg/L	N	<10	1.7	1.4	<10	<10	<10

Notes:

J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

NA Not analyzed

pg/L picograms per liter

mg/L milligrams per liter

µg/L micrograms per liter

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GROUNDWATER RESULTS

00045596

PARAMETER	UNITS FILTERED	35AWW01 11/8/1998 35AWW01-981108 INTERMEDIATE	35AWW01 11/8/1998 35AWW01QC INTERMEDIATE	35AWW01 9/9/2004 L0001-35AWW01 INTERMEDIATE	35AWW02 11/8/1998 35AWW02-981108 DEEP	35AWW02 9/10/2004 L0001-35AWW02 DEEP	35AWW03 11/8/1998 35AWW03-981108 SHALLOW	35AWW03 9/8/2004 L0001-35AWW03 SHALLOW	35AWW04 9/30/1998 35AWW04-980930 SHALLOW
1,3-Dinitrobenzene	µg/L N	<0.13	<0.13	NA	<0.13	NA	<0.13	NA	<0.13
m-Nitrotoluene	µg/L N	<0.26	<0.26	NA	<0.26	NA	<0.26	NA	<0.26
RDX	µg/L N	<0.26	<0.26	NA	<0.26	NA	<0.26	NA	<0.26
Tetryl	µg/L N	<0.26	<0.26	NA	<0.26	NA	<0.26	NA	<0.26
Chloride	mg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	mg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	µg/L N	<200	<200	NA	740	NA	4800	NA	5300 J
Antimony	µg/L N	<5	<5	NA	<5	NA	13	NA	10
Arsenic	µg/L N	<10	<10	NA	<10	NA	<10	NA	<10
Barium	µg/L N	<200	<200	NA	<200	NA	210	NA	<200
Beryllium	µg/L N	<.5	<.5	NA	<.5	NA	.7	NA	.6
Cadmium	µg/L N	<.8	<.8	NA	<.8	NA	<.8	NA	<.8
Calcium	µg/L N	48000	47000	NA	6300	NA	28000	NA	230000
Chromium	µg/L N	140 J	90 J	NA	600 J	NA	30 J	NA	70
Cobalt	µg/L N	<50	<50	NA	<50	NA	<50	NA	<50
Copper	µg/L N	<25	<25	NA	41	NA	<25	NA	<25
Iron	µg/L N	1200 J	990 J	NA	3400 J	NA	8500 J	NA	9700
Lead	µg/L N	<3	<3	NA	<3	NA	<3	NA	7
Magnesium	µg/L N	27000	27000	NA	<5000	NA	19000	NA	190000
Manganese	µg/L N	202	192	NA	85	NA	255	NA	218
Mercury	µg/L N	<.2	<.2	NA	<.2	NA	<.2	NA	<.2
Nickel	µg/L N	70	40	NA	340	NA	50	NA	230
Potassium	µg/L N	<5000	<5000	NA	6700	NA	<5000	NA	<5000
Selenium	µg/L N	<5	<5	NA	<5	NA	<5	NA	<5
Silver	µg/L N	<10	<10	NA	<10	NA	<10	NA	<10
Sodium	µg/L N	57000	56000	NA	93000	NA	120000	NA	640000
Strontium	µg/L N	1600	1600	NA	330	NA	640	NA	8000
Thallium	µg/L N	1 UJ	1.1 J	NA	1.8 J	NA	1.6 J	NA	<1
Tin	µg/L N	<100	<100	NA	<100	NA	530	NA	<100
Vanadium	µg/L N	<50	<50	NA	<50	NA	<50	NA	<50
Zinc	µg/L N	30	20	NA	40	NA	50	NA	40
Perchlorate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	<10	<10	NA	12 J	NA	<10	NA	<10
Phenol	µg/L N	<10	<10	NA	6.8 J	NA	<10	NA	<10
Hydrocarbons as Gasoline	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	<1	<1	<5	<1	<5	<1	<5	<1
1,1-Dichloroethane	µg/L N	<1	<1	<5	<1	<5	<1	<5	<1
1,1-Dichloroethene	µg/L N	<1	<1	<5	<1	<5	<1	<5	<1
1,2,4-Trichlorobenzene	µg/L N	<1	<1	<5	<1	5 UJ	<1	<5	<1
1,2-Dichloroethane	µg/L N	<1	<1	5 UJ	<1	<5	<1	5 UJ	<1
1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	µg/L N	<5	<5	5 UJ	5.3	5 UJ	<5	5 UJ	<5
Benzene	µg/L N	<1	<1	<5	<1	<5	<1	<5	<1
Carbon disulfide	µg/L N	<1	<1	<5	<1	<5	0.54	<5	<1
Chloroform	µg/L N	0.8 J	0.8 J	<5	32	<5	<1	<5	<1
cis-1,2-Dichloroethene	µg/L N	<1	<1	<5	<1	<5	<1	<5	<1
Methylene chloride	µg/L N	<1	<1	<5	0.97 J	1 BJ	<1	<5	<1
Tetrachloroethene	µg/L N	<1	<1	<5	<1	<5	<1	<5	<1
trans-1,2-Dichloroethene	µg/L N	<1	<1	<5	<1	<5	<1	<5	<1
Trichloroethene	µg/L N	<1	<1	<5	<1	<5	<1	<5	3.6
Vinyl chloride	µg/L N	<1	<1	<5	<1	<5	<1	<5	<1

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GROUNDWATER RESULTS

00045597

PARAMETER	UNITS FILTERED	35AWW04 11/8/1998	35AWW04 9/8/2004	35AWW04 9/8/2004	35AWW05 9/8/2004	LHSMW01 11/29/1994	LHSMW01 1/31/1996	LHSMW01 8/12/1996
		35AWW04-981108	L0001-35AWW04	L0001-35AWW04QC	L0001-35AWW05	LHS-MW-01-941129	MW-1	LHS-MW-1-960812
		SHALLOW	SHALLOW	SHALLOW	N/A	SHALLOW	SHALLOW	SHALLOW
1,3-Dinitrobenzene	µg/L N	<0.13	NA	NA	NA	<0.12	<0.13	<0.13
m-Nitrotoluene	µg/L N	<0.26	NA	NA	NA	<0.5	<0.26	<0.26
RDX	µg/L N	<0.26	NA	NA	NA	<0.54	<0.26	<0.26
Tetryl	µg/L N	<0.26	NA	NA	NA	<0.37	<0.13	<0.13
Chloride	mg/L N	NA	NA	NA	NA	NA	2020	1460 J
Nitrate	mg/L N	NA	NA	NA	NA	NA	0.5 UJ	<0.5
Sulfate	mg/L N	NA	NA	NA	NA	NA	454	1580 J
Aluminum	µg/L N	1200	NA	NA	NA	23300	400 B	256
Antimony	µg/L N	<5	NA	NA	NA	<100	<25	<60
Arsenic	µg/L N	<10	NA	NA	NA	8	<2	<2
Barium	µg/L N	<200	NA	NA	NA	280	18	19
Beryllium	µg/L N	<.5	NA	NA	NA	NA	.56	<10
Cadmium	µg/L N	<.8	NA	NA	NA	<10	<.2	<10
Calcium	µg/L N	240000	NA	NA	NA	329000	345000	397000
Chromium	µg/L N	20 J	NA	NA	NA	1300	16	55
Cobalt	µg/L N	<50	NA	NA	NA	26	3.1	<20
Copper	µg/L N	<25	NA	NA	NA	49	5.9	<10
Iron	µg/L N	2800 J	NA	NA	NA	28100	240	537
Lead	µg/L N	<3	NA	NA	NA	15	1 UJ	<90
Magnesium	µg/L N	180000	NA	NA	NA	175000	187000	208000
Manganese	µg/L N	114	NA	NA	NA	1100	1500	1450 J
Mercury	µg/L N	<.2	NA	NA	NA	<.2	<.2	<.1
Nickel	µg/L N	80	NA	NA	NA	NA	120	87
Potassium	µg/L N	<5000	NA	NA	NA	4100	1400	3930 J
Selenium	µg/L N	<5	NA	NA	NA	<4	<2	5
Silver	µg/L N	<10	NA	NA	NA	<10	<.4	<10
Sodium	µg/L N	610000	NA	NA	NA	NA	NA	NA
Strontium	µg/L N	9600	NA	NA	NA	7200	7400	357
Thallium	µg/L N	1.1 J	NA	NA	NA	<500	<1.7	<90
Tin	µg/L N	<100	NA	NA	NA	NA	NA	NA
Vanadium	µg/L N	<50	NA	NA	NA	NA	<1.7	<20
Zinc	µg/L N	30	NA	NA	NA	NA	480	<20
Perchlorate	µg/L N	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	<10	NA	NA	NA	<10	<0.92	<0.92
Phenol	µg/L N	<10	NA	NA	NA	<10	<0.89	<0.89
Hydrocarbons as Gasoline	µg/L N	NA	NA	NA	NA	NA	<50	NA
1,1,2-Trichloroethane	µg/L N	<1	<5	<5	<5	<5	NA	<0.65
1,1-Dichloroethane	µg/L N	<1	<5	<5	<5	<5	NA	<0.2
1,1-Dichloroethene	µg/L N	<1	<5	<5	<5	<5	NA	<0.2
1,2,4-Trichlorobenzene	µg/L N	<1	<5	5 UJ	<5	NA	NA	<0.32
1,2-Dichloroethane	µg/L N	<1	5 UJ	5 UJ	5 UJ	<5	NA	<0.31
1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	<5	NA	NA
Acetone	µg/L N	<5	5 UJ	5 UJ	5 UJ	<10	NA	NA
Benzene	µg/L N	<1	<5	<5	<5	<5	NA	<0.2
Carbon disulfide	µg/L N	<1	<5	<5	<5	<5	NA	NA
Chloroform	µg/L N	<1	<5	<5	<5	<5	NA	<0.2
cis-1,2-Dichloroethene	µg/L N	<1	<5	<5	<5	NA	NA	<0.2
Methylene chloride	µg/L N	<1	<5	<5	<5	<5	NA	<0.22
Tetrachloroethene	µg/L N	<1	<5	<5	<5	<5	NA	<0.25
trans-1,2-Dichloroethene	µg/L N	<1	<5	<5	<5	NA	NA	<0.29
Trichloroethene	µg/L N	<1	<5	<5	<5	<5	NA	<0.25
Vinyl chloride	µg/L N	<1	<5	<5	<5	NA	NA	<0.24

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GROUNDWATER RESULTS

00045598

PARAMETER	UNITS FILTERED	LHSMW01 5/13/1998 LHS-MW-01-980513 SHALLOW	LHSMW01 5/24/2000 LHSMW01-000524 SHALLOW	LHSMW01 10/3/2000 LHSMW01-001003 SHALLOW	LHSMW01 2/8/2001 LHSMW01-010208 SHALLOW	LHSMW01 9/18/2002 LHSMW1-020918 SHALLOW	LHSMW01 9/9/2004 L0001-LHSMW01 SHALLOW	LHSMW04 12/1/1994 LHS-MW-04-941201 SHALLOW
1,3-Dinitrobenzene	µg/L N	<1.3	NA	NA	NA	NA	NA	<0.12
m-Nitrotoluene	µg/L N	<2.6	NA	NA	NA	NA	NA	<0.5
RDX	µg/L N	<1.3	NA	NA	NA	NA	NA	<0.54
Tetryl	µg/L N	<2.6	NA	NA	NA	NA	NA	<0.37
Chloride	mg/L N	NA	NA	NA	NA	NA	NA	NA
Nitrate	mg/L N	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L N	NA	NA	NA	NA	NA	NA	NA
Aluminum	µg/L N	<200	NA	NA	NA	NA	NA	8200
Antimony	µg/L N	<5	NA	NA	NA	NA	NA	<100
Arsenic	µg/L N	<10	NA	NA	NA	NA	NA	5.3
Barium	µg/L N	<200	NA	NA	NA	NA	NA	220
Beryllium	µg/L N	1.1	NA	NA	NA	NA	NA	NA
Cadmium	µg/L N	<.8	NA	NA	NA	NA	NA	<10
Calcium	µg/L N	350000	NA	NA	NA	NA	NA	28900
Chromium	µg/L N	120	NA	NA	NA	NA	NA	58
Cobalt	µg/L N	<50	NA	NA	NA	NA	NA	22
Copper	µg/L N	<25	NA	NA	NA	NA	NA	<20
Iron	µg/L N	1300	NA	NA	NA	NA	NA	19900
Lead	µg/L N	<3	NA	NA	NA	NA	NA	13
Magnesium	µg/L N	210000	NA	NA	NA	NA	NA	16600
Manganese	µg/L N	1990	NA	NA	NA	NA	NA	460
Mercury	µg/L N	<.2	NA	NA	NA	NA	NA	<.2
Nickel	µg/L N	120	NA	NA	NA	NA	NA	NA
Potassium	µg/L N	<5000	NA	NA	NA	NA	NA	2100
Selenium	µg/L N	<5	NA	NA	NA	NA	NA	<2
Silver	µg/L N	<10	NA	NA	NA	NA	NA	<10
Sodium	µg/L N	1100000	NA	NA	NA	NA	NA	NA
Strontium	µg/L N	10000	NA	NA	NA	NA	NA	790
Thallium	µg/L N	<1	NA	NA	NA	NA	NA	<500
Tin	µg/L N	<100	NA	NA	NA	NA	NA	NA
Vanadium	µg/L N	<50	NA	NA	NA	NA	NA	NA
Zinc	µg/L N	60	NA	NA	NA	NA	NA	NA
Perchlorate	µg/L N	NA	36.9	<16	81	<4.00	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	<10	NA	NA	NA	NA	NA	<10
Phenol	µg/L N	<10	NA	NA	NA	NA	NA	<10
Hydrocarbons as Gasoline	µg/L N	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	<1	NA	NA	NA	NA	<5	<5
1,1-Dichloroethane	µg/L N	<1	NA	NA	NA	NA	<5	<5
1,1-Dichloroethene	µg/L N	<1	NA	NA	NA	NA	<5	<5
1,2,4-Trichlorobenzene	µg/L N	<1	NA	NA	NA	NA	<5	NA
1,2-Dichloroethane	µg/L N	<1	NA	NA	NA	NA	5 UJ	<5
1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	NA	NA	<5
Acetone	µg/L N	<5	NA	NA	NA	NA	5 UJ	<10
Benzene	µg/L N	<1	NA	NA	NA	NA	<5	<5
Carbon disulfide	µg/L N	<1	NA	NA	NA	NA	<5	<5
Chloroform	µg/L N	<1	NA	NA	NA	NA	<5	<5
cis-1,2-Dichloroethene	µg/L N	<1	NA	NA	NA	NA	<5	NA
Methylene chloride	µg/L N	<1	NA	NA	NA	NA	<5	<5
Tetrachloroethene	µg/L N	<1	NA	NA	NA	NA	<5	<5
trans-1,2-Dichloroethene	µg/L N	<1	NA	NA	NA	NA	<5	NA
Trichloroethene	µg/L N	<1	NA	NA	NA	NA	<5	<5
Vinyl chloride	µg/L N	<1	NA	NA	NA	NA	<5	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	LHSMW04 1/31/1996	LHSMW04 1/31/1996	LHSMW04 8/12/1996	LHSMW04 5/13/1998	LHSMW04 9/9/2004	LHSMW05 12/1/1994	LHSMW05 1/31/1996
		LHS-MW-4-960131 SHALLOW	MW-4 SHALLOW	LHS-MW-4-960812 SHALLOW	LHS-MW-04-980513 SHALLOW	L0001-LHSMW04 SHALLOW	LHS-MW-05-941201 SHALLOW	MW-5 SHALLOW
1,3-Dinitrobenzene	µg/L N	NA	0.16	<0.13	<1.3	NA	<0.12	<0.13
m-Nitrotoluene	µg/L N	NA	0.77	0.68	<2.6	NA	<0.5	<0.26
RDX	µg/L N	NA	<0.26	1.8	<1.3	NA	<0.54	<0.26
Tetryl	µg/L N	NA	0.17	0.19	<2.6	NA	<0.37	<0.13
Chloride	mg/L N	280	NA	275	NA	NA	NA	1390
Nitrate	mg/L N	<0.5	NA	<0.5	NA	NA	NA	0.5 UJ
Sulfate	mg/L N	31	NA	34	NA	NA	NA	1422
Aluminum	µg/L N	12500 J	NA	1310 J	740	NA	35400	1900 B
Antimony	µg/L N	<60	NA	<60	<5	NA	<100	<25
Arsenic	µg/L N	<2	NA	<2	<10	NA	7.3	<2
Barium	µg/L N	244	NA	273	<200	NA	400	69
Beryllium	µg/L N	<5	NA	<10	<5	NA	NA	1.9
Cadmium	µg/L N	<10	NA	<10	<8	NA	<10	2
Calcium	µg/L N	24800 J	NA	33400 J	23000	NA	310000	283000
Chromium	µg/L N	348	NA	65	230	NA	2800	40
Cobalt	µg/L N	14	NA	<20	<50	NA	240	230
Copper	µg/L N	27	NA	<10	<25	NA	59	15
Iron	µg/L N	20800 J	NA	2900 J	1900	NA	62700	3300
Lead	µg/L N	<30	NA	<90	<3	NA	29	1 UJ
Magnesium	µg/L N	14800 J	NA	16500 J	11000	NA	200000	182000
Manganese	µg/L N	330	NA	160	165	NA	5800	4600
Mercury	µg/L N	<.2	NA	<.1	<.2	NA	.36	<.2
Nickel	µg/L N	74.8	NA	73	150	NA	NA	340
Potassium	µg/L N	2640 J	NA	1410 J	<5000	NA	3300	1200
Selenium	µg/L N	<2	NA	<2	<5	NA	<10	<2
Silver	µg/L N	<10	NA	<10	<10	NA	<10	.7
Sodium	µg/L N	NA	NA	NA	110000	NA	NA	NA
Strontium	µg/L N	729	NA	1080 J	750	NA	6200	5400
Thallium	µg/L N	<90	NA	<90	<1	NA	<500	<1.7
Tin	µg/L N	NA	NA	NA	<100	NA	NA	NA
Vanadium	µg/L N	30	NA	<20	<50	NA	NA	<1.7
Zinc	µg/L N	NA	NA	27	20	NA	NA	45
Perchlorate	µg/L N	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	NA	<0.92	<0.92	<10	NA	<10	<0.92
Phenol	µg/L N	NA	<0.89	<0.89	<10	NA	<10	<0.89
Hydrocarbons as Gasoline	µg/L N	NA	NA	NA	NA	NA	NA	960
1,1,2-Trichloroethane	µg/L N	NA	NA	<0.65	<1	<5	<5	NA
1,1-Dichloroethane	µg/L N	NA	NA	<0.2	<1	<5	<5	NA
1,1-Dichloroethene	µg/L N	NA	NA	<0.2	<1	<5	<5	NA
1,2,4-Trichlorobenzene	µg/L N	NA	NA	<0.32	<1	<5	NA	NA
1,2-Dichloroethane	µg/L N	NA	NA	<0.31	<1	5 UJ	<5	NA
1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	NA	<5	NA
Acetone	µg/L N	NA	NA	NA	<5	5 UJ	<10	NA
Benzene	µg/L N	NA	NA	<0.2	<1	<5	<5	NA
Carbon disulfide	µg/L N	NA	NA	NA	<1	<5	<5	NA
Chloroform	µg/L N	NA	NA	<0.2	<1	<5	<5	NA
cis-1,2-Dichloroethene	µg/L N	NA	NA	<0.2	<1	<5	NA	NA
Methylene chloride	µg/L N	NA	NA	<0.22	<1	<5	<5	NA
Tetrachloroethene	µg/L N	NA	NA	<0.25	<1	<5	870	NA
trans-1,2-Dichloroethene	µg/L N	NA	NA	<0.29	<1	<5	NA	NA
Trichloroethene	µg/L N	NA	NA	<0.25	<1	<5	49	NA
Vinyl chloride	µg/L N	NA	NA	<0.24	<1	<5	NA	NA

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GROUNDWATER RESULTS

00045600

PARAMETER	UNITS FILTERED	LHSMW05 8/12/1996	LHSMW05 5/13/1998	LHSMW05 9/9/2004	LHSMW06 12/1/1994	LHSMW06 2/1/1996	LHSMW06 8/13/1996	LHSMW06 5/13/1998	LHSMW06 9/8/2004
		LHS-MW-5 SHALLOW	LHS-MW-05-980513 SHALLOW	L0001-LHSMW05 SHALLOW	LHS-MW-06-941201 SHALLOW	LHS-MW-6-960201 SHALLOW	LHS-MW-6-960813 SHALLOW	LHS-MW-06-980513 SHALLOW	L0001-LHSMW06 SHALLOW
1,3-Dinitrobenzene	µg/L N	<0.13	<1.3	NA	<0.12	NA	<0.13	<1.3	NA
m-Nitrotoluene	µg/L N	<0.26	<2.6	NA	<0.5	NA	<0.26	<2.6	NA
RDX	µg/L N	<0.26	<1.3	NA	<0.54	NA	0.26	<1.3	NA
Tetryl	µg/L N	<0.13	<2.6	NA	<0.37	NA	<0.13	<2.6	NA
Chloride	mg/L N	165	NA	NA	NA	635	584	NA	NA
Nitrate	mg/L N	2	NA	NA	NA	<0.5	<0.5	NA	NA
Sulfate	mg/L N	485	NA	NA	NA	473	462	NA	NA
Aluminum	µg/L N	4930 J	2400	NA	17300	NA	3950 J	1800	NA
Antimony	µg/L N	<60	<5	NA	<100	<60	<60	<5	NA
Arsenic	µg/L N	3.5	<10	NA	4.2	<2	3.3	<10	NA
Barium	µg/L N	74	<200	NA	340	49	84	<200	NA
Beryllium	µg/L N	<10	3.7	NA	NA	<5	<10	.5	NA
Cadmium	µg/L N	<10	<.8	NA	<10	<10	<10	<.8	NA
Calcium	µg/L N	247000	220000	NA	192000	134000 J	137000 J	130000	NA
Chromium	µg/L N	1180 J	160	NA	120	16	55	260	NA
Cobalt	µg/L N	230	250	NA	<20	<10	<20	<50	NA
Copper	µg/L N	21	29	NA	25	<10	<10	<25	NA
Iron	µg/L N	11100 J	3300	NA	39300	2240 J	7570 J	3300	NA
Lead	µg/L N	<90	<3	NA	16	<30	<90	<3	NA
Magnesium	µg/L N	132000	150000	NA	98400	70600 J	69500 J	67000	NA
Manganese	µg/L N	3190 J	4070	NA	1600	1040 J	1110 J	751	NA
Mercury	µg/L N	.222	.9	NA	.22	<.2	<.1	<.2	NA
Nickel	µg/L N	1100 J	240	NA	NA	51	106	130	NA
Potassium	µg/L N	1410 J	<5000	NA	2600	1160 J	1490 J	<5000	NA
Selenium	µg/L N	6	<5	NA	<2	8.4	5	<5	NA
Silver	µg/L N	10	<10	NA	<10	<10	<10	<10	NA
Sodium	µg/L N	NA	670000	NA	NA	NA	NA	380000	NA
Strontium	µg/L N	4060 J	4900	NA	4400	2790 J	3120 J	3200	NA
Thallium	µg/L N	<90	3.2	NA	<500	<90	<90	<1	NA
Tin	µg/L N	NA	<100	NA	NA	NA	NA	<100	NA
Vanadium	µg/L N	<20	<50	NA	NA	<10	<20	<50	NA
Zinc	µg/L N	63	40	NA	NA	39	54	20	NA
Perchlorate	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	<0.92	<10	NA	<10	NA	<0.92	<10	NA
Phenol	µg/L N	<0.89	<10	NA	<10	NA	<0.89	<10	NA
Hydrocarbons as Gasoline	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	<0.65	<40	<5	<5	NA	<0.65	<1	<5
1,1-Dichloroethane	µg/L N	0.27	<40	<5	3 J	NA	4.2	3.6	2 J
1,1-Dichloroethene	µg/L N	<0.2	<40	<5	<5	NA	2	1.3	<5
1,2,4-Trichlorobenzene	µg/L N	0.73	<40	<5	NA	NA	<0.32	<1	<5
1,2-Dichloroethane	µg/L N	<0.31	<40	5 UJ	<5	NA	<0.31	<1	5 UJ
1,2-Dichloroethene	µg/L N	NA	NA	NA	<5	NA	NA	NA	NA
Acetone	µg/L N	NA	<200	5 UJ	<10	NA	NA	<5	5 UJ
Benzene	µg/L N	<0.2	<40	<5	<5	NA	<0.2	<1	<5
Carbon disulfide	µg/L N	NA	<40	<5	<5	NA	NA	<1	<5
Chloroform	µg/L N	0.38	<40	1 J	<5	NA	<0.2	<1	<5
cis-1,2-Dichloroethene	µg/L N	0.21	<40	<5	NA	NA	0.98	1.4	<5
Methylene chloride	µg/L N	<0.22	<40	<5	<5	NA	<0.22	<1	<5
Tetrachloroethene	µg/L N	2700	4900	5100	<5	NA	0.27	0.69 J	2 J
trans-1,2-Dichloroethene	µg/L N	<0.29	<40	<5	NA	NA	<0.29	<1	<5
Trichloroethene	µg/L N	39.7	160	230	<5	NA	0.43	0.53 J	<5
Vinyl chloride	µg/L N	<0.24	<40	<5	NA	NA	0.62	<1	<5

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GROUNDWATER RESULTS

00045601

PARAMETER	UNITS FILTERED	LHSMW07 12/1/1994	LHSMW07 12/1/1994	LHSMW07 1/31/1996	LHSMW07 1/31/1996	LHSMW07 8/12/1996	LHSMW07 5/13/1998	LHSMW07 9/8/2004
		LHS-MW-07-941201 SHALLOW	LHS-MW-07QC SHALLOW	LHS-MW-7-960131 SHALLOW	MW-7 SHALLOW	LHS-MW-7-960812 SHALLOW	LHS-MW-07-980513 SHALLOW	L0001-LHSMW07 SHALLOW
1,3-Dinitrobenzene	µg/L N	<0.12	<0.12	NA	<0.13	<0.13	<1.3	NA
m-Nitrotoluene	µg/L N	<0.5	<0.5	NA	<0.26	<0.26	<2.6	NA
RDX	µg/L N	<0.54	<0.54	NA	<0.26	<0.26	<1.3	NA
Tetryl	µg/L N	<0.37	<0.37	NA	<0.13	<0.13	<2.6	NA
Chloride	mg/L N	NA	NA	2605	NA	196	NA	NA
Nitrate	mg/L N	NA	NA	<0.5	NA	<0.5	NA	NA
Sulfate	mg/L N	NA	NA	2550	NA	301	NA	NA
Aluminum	µg/L N	23600	21100	1720 J	NA	NA	<200	NA
Antimony	µg/L N	<100	<100	<60	NA	<60	<5	NA
Arsenic	µg/L N	10	9.7	<2	NA	<2	<10	NA
Barium	µg/L N	140	130	30	NA	20	<200	NA
Beryllium	µg/L N	NA	NA	<5	NA	<10	.7	NA
Cadmium	µg/L N	<10	<10	<10	NA	<100	<.8	NA
Calcium	µg/L N	799000	771000	714000	NA	733000	710000	NA
Chromium	µg/L N	83	83	39	NA	<100	20	NA
Cobalt	µg/L N	<20	<20	<10	NA	<200	<50	NA
Copper	µg/L N	61	53	<10	NA	<10	<25	NA
Iron	µg/L N	35600	31000	1590 J	NA	1670 J	1400	NA
Lead	µg/L N	21	17	<30	NA	<90	<3	NA
Magnesium	µg/L N	537000	529000	124000	NA	453000	480000	NA
Manganese	µg/L N	560	500	134	NA	<100	92	NA
Mercury	µg/L N	<.2	<.2	<.2	NA	.384	<.2	NA
Nickel	µg/L N	NA	NA	50	NA	<200	<40	NA
Potassium	µg/L N	7700	7500	7500 J	NA	4930 J	<5000	NA
Selenium	µg/L N	<10	<10	65.8	NA	56	<5	NA
Silver	µg/L N	<10	<10	<10	NA	<10	<10	NA
Sodium	µg/L N	NA	NA	NA	NA	NA	1200000	NA
Strontium	µg/L N	22400	21900	19200	NA	17500 J	23000	NA
Thallium	µg/L N	<500	<500	<90	NA	<900	3.6	NA
Tin	µg/L N	NA	NA	NA	NA	NA	<100	NA
Vanadium	µg/L N	NA	NA	<10	NA	<20	<50	NA
Zinc	µg/L N	NA	NA	42	NA	70	<20	NA
Perchlorate	µg/L N	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	<10	1 JB	NA	<0.92	2.3	<10	NA
Phenol	µg/L N	<10	<10	NA	<0.89	<0.89	<10	NA
Hydrocarbons as Gasoline	µg/L N	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	µg/L N	4 J	5 J	NA	NA	1.6	7.1	2 J
1,1-Dichloroethane	µg/L N	65	76	NA	NA	23.9	87	51
1,1-Dichloroethene	µg/L N	750	660	NA	NA	311	950	590
1,2,4-Trichlorobenzene	µg/L N	NA	NA	NA	NA	<0.32	<1	<5
1,2-Dichloroethane	µg/L N	<5	2 J	NA	NA	0.51	2	5 UJ
1,2-Dichloroethene	µg/L N	10	11	NA	NA	NA	NA	NA
Acetone	µg/L N	<10	<10	NA	NA	NA	<5	5 UJ
Benzene	µg/L N	<5	<5	NA	NA	0.22	0.8 J	<5
Carbon disulfide	µg/L N	<5	<5	NA	NA	NA	<1	<5
Chloroform	µg/L N	<5	<5	NA	NA	<0.2	<1	<5
cis-1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	2.5	11	6
Methylene chloride	µg/L N	<5	<5	NA	NA	<0.22	<1	<5
Tetrachloroethene	µg/L N	<5	<5	NA	NA	2.7	<1	<5
trans-1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	<0.29	0.73 J	<5
Trichloroethene	µg/L N	16	19	NA	NA	5.9	25	24
Vinyl chloride	µg/L N	NA	NA	NA	NA	1.1	7.2	9

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GROUNDWATER RESULTS

Notes:

- B Concentration reported was detected significantly above levels reported in associated equipment rinse samples and/or laboratory method and trip blanks.
- J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.
- UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.
- L Result may be biased low.
- R Rejected.
- NA Not analyzed
- pg/L picograms per liter
- mg/L milligrams per liter
- µg/L micrograms per liter

LHAAP-35B(37)
GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	35BWW01 11/8/1998 35BWW01RE SHALLOW	35BWW01 9/10/2004 L0001-35BWW01 SHALLOW	35BWW03 9/10/2004 L0001-35BWW03	LHSMW58 12/11/1994 LHS-MW-58-941211 SHALLOW	LHSMW58 12/11/1994 LHS-MW-58QC SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	ug/L N	<0.13	NA	NA	<0.12	<0.12
Tetryl	ug/L N	<0.26	NA	NA	<0.37	<0.37
Chloride	mg/L N	NA	NA	NA	NA	NA
Nitrate	mg/L N	NA	NA	NA	NA	NA
Nitrite	mg/L N	NA	NA	NA	NA	NA
Sulfate	mg/L N	NA	NA	NA	NA	NA
Aluminum	ug/L N	2300	NA	NA	3900	3400
Antimony	ug/L N	<5	NA	NA	<100	<100
Barium	ug/L N	<200	NA	NA	110	120
Cadmium	ug/L N	<.8	NA	NA	<10	<10
Calcium	ug/L N	<5000	NA	NA	9700	10500
Chromium	ug/L N	10 J	NA	NA	25	<20
Copper	ug/L N	<25	NA	NA	<20	<20
Iron	ug/L N	2600 J	NA	NA	7300	8800
Lead	ug/L N	<3	NA	NA	3.7	3.9
Magnesium	ug/L N	<5000	NA	NA	4600	5000
Manganese	ug/L N	72	NA	NA	180	200
Mercury	ug/L N	<.2	NA	NA	<.2	<.2
Nickel	ug/L N	<40	NA	NA	NA	NA
Potassium	ug/L N	<5000	NA	NA	<2000	<2000
Selenium	ug/L N	<5	NA	NA	<2	<2
Sodium	ug/L N	7900	NA	NA	NA	NA
Strontium	ug/L N	<50	NA	NA	280	300
Thallium	ug/L N	1.8 J	NA	NA	<500	<500
Vanadium	ug/L N	<50	NA	NA	NA	NA
Zinc	ug/L N	30	NA	NA	40	42
bis(2-Ethylhexyl)phthalate	ug/L N	<10	NA	NA	<10	<10
di-n-Octyl phthalate	ug/L N	<10	NA	NA	<10	<10
1,1,1-Trichloroethane	ug/L N	<1	<5	<5	37	25
1,1-Dichloroethane	ug/L N	<1	<5	<5	<5	<5
1,1-Dichloroethene	ug/L N	<1	<5	<5	58	53
1,2,4-Trichlorobenzene	ug/L N	<1	<5	<5	NA	NA
1,2-Dichloroethene	ug/L N	NA	NA	NA	7	<5
Benzene	ug/L N	<1	<5	<5	3 J	<5
Carbon disulfide	ug/L N	<1	<5	8	<5	<5
Chlorobenzene	ug/L N	<1	<5	<5	2 J	<5
Chloroform	ug/L N	<1	<5	<5	<5	<5
cis-1,2-Dichloroethene	ug/L N	<1	<5	<5	NA	NA
Tetrachloroethene	ug/L N	<1	<5	<5	21	34
Trichloroethene	ug/L N	<1	<5	<5	NA	NA
Trichlorofluoromethane	ug/L N	<2	<5	<5	NA	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	LHSMW58 2/10/1996	LHSMW58 2/10/1996	LHSMW58 8/21/1996	LHSMW58 5/20/1998	LHSMW58 9/10/2004	LHSMW59 12/11/1994	LHSMW59 12/11/1994
		MW-58 SHALLOW	MW58 SHALLOW	LHS-MW-58-960821 SHALLOW	LHS-MW-58-980520 SHALLOW	L0001-LHSMW58 SHALLOW	LHS-MW-59-941211 INTERMEDIATE	LHS-MW-59QC-941211 INTERMEDIATE
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	ug/L N	NA	<0.13	<0.13	<1.3	NA	<0.12	<0.12
Tetryl	ug/L N	NA	0.41	<0.13	<2.6	NA	<0.37	<0.37
Chloride	mg/L N	3	NA	5	NA	NA	NA	NA
Nitrate	mg/L N	<0.5	NA	<0.5	NA	NA	NA	NA
Nitrite	mg/L N	0.6	NA	<0.5	NA	NA	NA	NA
Sulfate	mg/L N	17	NA	24	NA	NA	NA	NA
Aluminum	ug/L N	NA	490	219 J	<200	NA	4700	4300
Antimony	ug/L N	NA	<25	80 J	5 R	NA	<100	<100
Barium	ug/L N	NA	83	70 J	<200	NA	130	130
Cadmium	ug/L N	NA	.3	<6	NA	NA	<10	<10
Calcium	ug/L N	NA	3300	4360 J	7300	NA	35500	35900
Chromium	ug/L N	NA	4.3	<10	<10	NA	21	24
Copper	ug/L N	NA	3.3	19 J	<25	NA	<20	<20
Iron	ug/L N	NA	1200	139 J	150	NA	7000	6700
Lead	ug/L N	NA	<1	<90	<3	NA	3.9	3.8
Magnesium	ug/L N	NA	1400	1870 J	<5000	NA	18800	19100
Manganese	ug/L N	NA	67	55 J	16	NA	380	380
Mercury	ug/L N	NA	<.2	.04 J	<.2	NA	<.2	<.2
Nickel	ug/L N	NA	<7.6	23 J	<40	NA	NA	NA
Potassium	ug/L N	NA	670	736 J	<5000	NA	2500	2400
Selenium	ug/L N	NA	<2	<1	<5	NA	<2	<2
Sodium	ug/L N	NA	NA	NA	35000	NA	NA	NA
Strontium	ug/L N	NA	96	116 J	230	NA	1300	1300
Thallium	ug/L N	NA	<1.7	98 J	1 R	NA	<500	<500
Vanadium	ug/L N	NA	3.2	<20	<50	NA	NA	NA
Zinc	ug/L N	NA	35	34 J	<20	NA	37	33
bis(2-Ethylhexyl)phthalate	ug/L N	NA	1	<0.92	<10	NA	1 J	1 J
di-n-Octyl phthalate	ug/L N	NA	1.6	3.6	<10	NA	<10	<10
1,1,1-Trichloroethane	ug/L N	NA	NA	26.5	0.96 J	<5	<5	<5
1,1-Dichloroethane	ug/L N	NA	NA	2.1	<1	<5	<5	<5
1,1-Dichloroethene	ug/L N	NA	NA	25.4	4.2	4 J	<5	<5
1,2,4-Trichlorobenzene	ug/L N	NA	NA	<0.32	<1	5 UJ	NA	NA
1,2-Dichloroethene	ug/L N	NA	NA	NA	NA	NA	<5	<5
Benzene	ug/L N	NA	NA	<0.2	<1	<5	<5	<5
Carbon disulfide	ug/L N	NA	NA	NA	<1	<5	<5	<5
Chlorobenzene	ug/L N	NA	NA	2.6	<1	2 J	<5	<5
Chloroform	ug/L N	NA	NA	0.38	<1	<5	<5	<5
cis-1,2-Dichloroethene	ug/L N	NA	NA	2.1	0.53 J	<5	NA	NA
Tetrachloroethene	ug/L N	NA	NA	7.9	9.5	20	11	11
Trichloroethene	ug/L N	NA	NA	11.5	9.4	33	NA	NA
Trichlorofluoromethane	ug/L N	NA	NA	2.3	<2	<5	NA	NA

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LHAAP-35B(37)
GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	LHSMW59 2/10/1996	LHSMW59 8/21/1996	LHSMW59 5/20/1998	LHSMW59 8/26/1998	LHSMW59 8/26/1998	LHSMW59 9/10/2004
			MW-59	LHS-MW-59-960821	LHS-MW-59-980520	LHS-MW-59-980826	LHS-MW-59QC-980826	L0001-LHSMW59
			INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE
1,2,3,4,6,7,8-Heptachlorodi	pg/L	N	NA	NA	NA	<5.157	<12.122	NA
1,2,3,4,7,8-Hexachlorodibe	pg/L	N	NA	NA	NA	5.225 J	<2.779	NA
Heptachlorodibenzofuran	pg/L	N	NA	NA	NA	<1.546	12.122	NA
Hexachlorodibenzofuran	pg/L	N	NA	NA	NA	10.051	11.339	NA
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	<20.87	45.477	NA
1,3-Dinitrobenzene	ug/L	N	0.1 J	<0.13	<1.3	NA	NA	NA
Tetryl	ug/L	N	0.072 J	<0.13	<2.6	NA	NA	NA
Chloride	mg/L	N	57	<2	NA	NA	NA	NA
Nitrate	mg/L	N	2	<0.5	NA	NA	NA	NA
Nitrite	mg/L	N	<0.5	<0.5	NA	NA	NA	NA
Sulfate	mg/L	N	89	103	NA	NA	NA	NA
Aluminum	ug/L	N	NA	106 J	<200	NA	NA	NA
Antimony	ug/L	N	<60	55 J	5 R	NA	NA	NA
Barium	ug/L	N	299	207	<200	NA	NA	NA
Cadmium	ug/L	N	<10	<6	NA	NA	NA	NA
Calcium	ug/L	N	40700 J	43100 J	41000	NA	NA	NA
Chromium	ug/L	N	<10	<10	<10	NA	NA	NA
Copper	ug/L	N	23	8 J	<25	NA	NA	NA
Iron	ug/L	N	343 B	45 J	280	NA	NA	NA
Lead	ug/L	N	<30	<90	<3	NA	NA	NA
Magnesium	ug/L	N	17700 J	16800 J	19000	NA	NA	NA
Manganese	ug/L	N	201	158	237	NA	NA	NA
Mercury	ug/L	N	<2	<.02	<.2	NA	NA	NA
Nickel	ug/L	N	68	25 J	<40	NA	NA	NA
Potassium	ug/L	N	1850 J	1650 J	<5000	NA	NA	NA
Selenium	ug/L	N	2.4	<1	<5	NA	NA	NA
Sodium	ug/L	N	NA	NA	92000	NA	NA	NA
Strontium	ug/L	N	1570 J	1450 J	1900	NA	NA	NA
Thallium	ug/L	N	<90	<90	1 R	NA	NA	NA
Vanadium	ug/L	N	<10	<20	<50	NA	NA	NA
Zinc	ug/L	N	21	<20	<20	NA	NA	NA
bis(2-Ethylhexyl)phthalate	ug/L	N	1.4 B	<0.92	<10	NA	NA	NA
di-n-Octyl phthalate	ug/L	N	3.4 B	<1.2	<10	NA	NA	NA
1,1,1-Trichloroethane	ug/L	N	NA	9.7	<1	NA	NA	<5
1,1-Dichloroethane	ug/L	N	NA	<0.2	<1	NA	NA	<5
1,1-Dichloroethene	ug/L	N	NA	2.2	<1	NA	NA	<5
1,2,4-Trichlorobenzene	ug/L	N	NA	1.5	<1	NA	NA	<10
1,2-Dichloroethene	ug/L	N	NA	NA	NA	NA	NA	NA
Benzene	ug/L	N	NA	<0.2	<1	NA	NA	<5
Carbon disulfide	ug/L	N	NA	NA	<1	NA	NA	<5
Chlorobenzene	ug/L	N	NA	<0.5	<1	NA	NA	<5
Chloroform	ug/L	N	NA	<0.2	<1	NA	NA	<5
cis-1,2-Dichloroethene	ug/L	N	NA	<0.2	<1	NA	NA	<5
Tetrachloroethene	ug/L	N	NA	16.9	7	NA	NA	3 J
Trichloroethene	ug/L	N	NA	327	330	NA	NA	180
Trichlorofluoromethane	ug/L	N	NA	2.7	<2	NA	NA	<5

Notes:

J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

R Rejected.

NA Not analyzed

pg/L picograms per liter

mg/L milligrams per liter

ug/L micrograms per liter

LHAAP-35C(53)
GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	106	106	106	106	106	106	106	106	107	107
		2/13/1996	2/13/1996	8/15/1996	8/15/1997	5/28/1998	9/14/2004	9/14/2004	9/14/2004	2/13/1996	2/13/1996
		MW-106 SHALLOW	MW106 SHALLOW	LHS-MW-106-960815 SHALLOW	LHS-MW-106-970815 SHALLOW	C-106-980528 SHALLOW	L0001-106 SHALLOW	L0001-106QC SHALLOW	L0001-106QC SHALLOW	MW-107 SHALLOW	MW107 SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofura	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	ug/L N	NA	<0.13	NA	<0.13	<2.6	NA	NA	NA	NA	<0.13
2-Amino-4,6-dinitrotoluene	ug/L N	NA	<0.13	NA	<0.13	<2.6	NA	NA	NA	NA	<0.13
m-Nitrotoluene	ug/L N	NA	<0.26	NA	<0.26	<2.6	NA	NA	NA	NA	0.14 J
o-Nitrotoluene	ug/L N	NA	<0.26	NA	<0.26	<2.6	NA	NA	NA	NA	<0.26
RDX	ug/L N	NA	<0.26	NA	<0.26	<1.3	NA	NA	NA	NA	<0.26
Chloride	mg/L N	22	NA	<2	NA	NA	NA	NA	NA	198	NA
Nitrate	mg/L N	<0.5	NA	<0.5	NA	NA	NA	NA	NA	<0.5	NA
Sulfate	mg/L N	94	NA	<2	NA	NA	NA	NA	NA	23	NA
Aluminum	ug/L N	5270 J	NA	3350 J	NA	1000	NA	NA	NA	915	NA
Aluminum	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	ug/L N	<60	NA	<60	NA	<5	NA	NA	NA	<60	NA
Antimony	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	ug/L N	<2	NA	<2	NA	<10	NA	NA	NA	<2	NA
Arsenic	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	ug/L N	44	NA	41	NA	<200	NA	NA	NA	104	NA
Barium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	ug/L N	<5	NA	<10	NA	1.6	NA	NA	NA	<5	NA
Beryllium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	ug/L N	2920 J	NA	1590 J	NA	<5000	NA	NA	NA	11100 J	NA
Calcium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	ug/L N	<10	NA	<10	NA	<10	NA	NA	NA	<10	NA
Chromium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	ug/L N	<10	NA	<20	NA	<50	NA	NA	NA	15	NA
Cobalt	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	ug/L N	18	NA	<10	NA	<25	NA	NA	NA	22	NA
Copper	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	ug/L N	3480 J	NA	3110 J	NA	1200	NA	NA	NA	2230 J	NA
Iron	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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GROUNDWATER RESULTS

00045607

PARAMETER	UNITS	107 8/15/1996 LHS-MW-107 SHALLOW	107 5/28/1998 C-107-980528 SHALLOW	107 9/15/2004 L0001-107 SHALLOW	LHSMW67 12/10/1994 LHS-MW-67-941210 SHALLOW	LHSMW67 2/9/1996 MW-67 SHALLOW	LHSMW67 8/14/1996 LHS-MW-67-980814 SHALLOW	LHSMW67 5/27/1998 LHS-MW-67-980527 SHALLOW	LHSMW67 8/25/1998 LHS-MW-67-980825 SHALLOW	LHSMW67 5/18/2000 LHSMW67-000518 SHALLOW	LHSMW67 10/3/2000 LHSMW67-001003 SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofura	pg/L N	NA	NA	NA	NA	NA	NA	NA	17.367	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L N	NA	NA	NA	NA	NA	NA	NA	<3.058	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	<5.077	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	7.304	NA	NA
Heptachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	17.367	NA	NA
Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	<3.383	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	97.192	NA	NA
Octachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	<4.77	NA	NA
2,8-Dinitrotoluene	ug/L N	<0.13	<2.8	NA	<0.13	<0.13	<0.13	<2.8	NA	NA	NA
2-Amino-4,6-dinitrotoluene	ug/L N	<0.13	<2.8	NA	NA	<0.13	<0.13	<2.8	NA	NA	NA
m-Nitrotoluene	ug/L N	<0.26	<2.8	NA	<0.5	<0.26	<0.26	<2.8	NA	NA	NA
o-Nitrotoluene	ug/L N	<0.26	<2.8	NA	<0.5	<0.26	<0.26	<2.8	NA	NA	NA
RDX	ug/L N	<0.26	<1.3	NA	<0.54	<0.26	<0.26	<1.3	NA	NA	NA
Chloride	mg/L N	215	NA	NA	NA	62	NA	<2	NA	NA	NA
Nitrate	mg/L N	<0.5	NA	NA	NA	<0.5	NA	NA	NA	NA	NA
Sulfate	mg/L N	23	NA	NA	NA	37	40	NA	NA	NA	NA
Aluminum	ug/L N	1140 J	320	NA	55400	19000 J	18100 J	27000	NA	NA	NA
Aluminum	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	ug/L N	<60	<5	NA	<100	<60	<60	<5	NA	NA	NA
Antimony	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	ug/L N	<2	<10	NA	7.8	5	3	<10	NA	NA	NA
Arsenic	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	ug/L N	117	<200	NA	480	126	139	200	NA	NA	NA
Barium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	ug/L N	<10	.7	NA	NA	<5	<10	1.2	NA	NA	NA
Beryllium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	ug/L N	19000 J	12000	NA	18100	6510 J	5410 J	5100	NA	NA	NA
Calcium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	ug/L N	<100	<10	NA	98	549	1340 J	780	NA	NA	NA
Chromium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	ug/L N	<20	<50	NA	41	21	26	<50	NA	NA	NA
Cobalt	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	ug/L N	<10	<25	NA	45	29	17	<25	NA	NA	NA
Copper	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	ug/L N	3270 J	3500	NA	78100	20200 J	21900 J	33000	NA	NA	NA
Iron	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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GROUNDWATER RESULTS

00045608

PARAMETER	UNITS FILTERED	LHSMW67 2/9/2001	LHSMW67 9/15/2004	LHSMW68 12/10/1994	LHSMW68 2/9/1996	LHSMW68 8/15/1996	LHSMW68 5/27/1998	LHSMW68 5/18/2000	LHSMW68 10/3/2000	LHSMW68 9/14/2004	LHSMW68 12/10/1994
		LHSMW67-010209 SHALLOW	L0001-LHSMW67 SHALLOW	LHS-MW-68-941210 SHALLOW	MW-68 SHALLOW	LHS-MW-68-960815 SHALLOW	LHS-MW-68-980527 SHALLOW	LHSMW68-000518 SHALLOW	LHSMW68-001003 SHALLOW	L0001-LHSMW68 SHALLOW	LHS-MW-68-941210 INTERMEDIATE
1,2,3,4,6,7,8-Heptachlorodibenzofura	pg/L N	NA	<26.315	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L N	NA	5.104 J	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L N	NA	0.934 J	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L N	NA	9.668	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	pg/L N	NA	<26.315	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L N	NA	0.934	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	67.19 B	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L N	NA	5.005 J	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	ug/L N	NA	NA	<0.13	<0.13	<0.13	<2.6	NA	NA	NA	<0.13
2-Amino-4,6-dinitrotoluene	ug/L N	NA	NA	NA	<0.13	<0.13	<2.6	NA	NA	NA	NA
m-Nitrotoluene	ug/L N	NA	NA	<0.5	<0.26	<0.26	<2.6	NA	NA	NA	<0.5
o-Nitrotoluene	ug/L N	NA	NA	<0.5	<0.26	<0.26	<2.6	NA	NA	NA	<0.5
RDX	ug/L N	NA	NA	<0.54	<0.26	<0.26	<1.3	NA	NA	NA	<0.54
Chloride	mg/L N	NA	NA	NA	7	15.8	NA	NA	NA	NA	NA
Nitrate	mg/L N	NA	NA	NA	<0.5	<0.5	NA	NA	NA	NA	NA
Sulfate	mg/L N	NA	NA	NA	9.8	7.88	NA	NA	NA	NA	NA
Aluminum	ug/L N	NA	NA	47100	2500 J	2640 J	790	NA	NA	NA	9400
Aluminum	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	ug/L N	NA	NA	<100	<60	<60	<5	NA	NA	NA	<100
Antimony	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	ug/L N	NA	NA	3.6	<2	<2	<10	NA	NA	NA	7
Arsenic	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	ug/L N	NA	NA	610	41	60	<200	NA	NA	NA	180
Barium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	ug/L N	NA	NA	NA	<5	<10	<5	NA	NA	NA	NA
Beryllium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	ug/L N	NA	NA	6500	1060 J	906	<5000	NA	NA	NA	17500
Calcium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	ug/L N	NA	NA	280	33	258	370	NA	NA	NA	56
Chromium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	ug/L N	NA	NA	82	<10	<20	<50	NA	NA	NA	<20
Cobalt	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	ug/L N	NA	NA	56	<10	<10	<25	NA	NA	NA	<20
Copper	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	ug/L N	NA	NA	93600	2930 J	6470 J	3900	NA	NA	NA	44400
Iron	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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GROUNDWATER RESULTS

00045609

PARAMETER	UNITS FILTERED	LHSMW69 12/10/1994 LHS-MW-69QC-9412	LHSMW69 2/9/1996 MW-69 INTERMEDIATE	LHSMW69 2/9/1996 MW69 INTERMEDIATE	LHSMW69 8/15/1996 LHS-MW-69-960615 INTERMEDIATE	LHSMW69 8/15/1996 LHS-MW-69-QC INTERMEDIATE	LHSMW69 8/15/1996 LHS-MW-69QC-9608 INTERMEDIATE	LHSMW69 5/27/1998 LHS-MW-69-980527 INTERMEDIATE	LHSMW69 9/15/2004 L0001-LHSMW69 INTERMEDIATE	LHSMW70 12/12/1994 LHS-MW-70-941212 SHALLOW	LHSMW70 2/9/1996 MW-70 SHALLOW	LHSMW70 8/14/1996 LHS-MW-70-960814 SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofura	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	ug/L N	<0.13	NA	<0.13	<0.13	<0.13	NA	<2.6	NA	<0.13	<0.13	<0.13
2-Amino-4,6-dinitrotoluene	ug/L N	NA	NA	<0.13	<0.13	<0.13	NA	<2.6	NA	NA	<0.13	<0.13
m-Nitrotoluene	ug/L N	<0.5	NA	<0.26	<0.26	<0.26	NA	<2.6	NA	<0.5	<0.26	<0.26
o-Nitrotoluene	ug/L N	<0.5	NA	0.26	<0.26	<0.26	NA	<2.6	NA	<0.5	<0.26	<0.26
RDX	ug/L N	<0.54	NA	<0.26	0.49	0.36	NA	<1.3	NA	<0.54	<0.26	<0.26
Chloride	mg/L N	NA	79	NA	40.1	NA	40.4	NA	NA	NA	36	33
Nitrate	mg/L N	NA	<0.5	NA	<0.5	NA	0.5	NA	NA	NA	<0.5	<0.5
Sulfate	mg/L N	NA	81	NA	48.5	NA	48.4	NA	NA	NA	23	18
Aluminum	ug/L N	9900	NA	390	<200	NA	<200	200	NA	36600	670	322
Aluminum	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	ug/L N	<100	NA	<25	<60	NA	<60	<5	NA	<100	<60	<60
Antimony	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	ug/L N	6.2	NA	3.5	6.1	NA	8.7	16	NA	8.2	<2	<2
Arsenic	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	ug/L N	170	NA	86	50	NA	49	<200	NA	200	36	30
Barium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	ug/L N	NA	NA	<21	<10	NA	<10	<5	NA	NA	<5	<10
Beryllium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	ug/L N	16800	NA	9200	4530 J	NA	4420 J	11000	NA	5800	1420 J	542
Calcium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	ug/L N	54	NA	5.5	<10	NA	11	10	NA	83	101	16
Chromium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	ug/L N	<20	NA	4.1	<20	NA	<20	<50	NA	45	38	35
Cobalt	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	ug/L N	<20	NA	5.5	<10	NA	17	<25	NA	26	80	16
Copper	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	ug/L N	41100	NA	7000	6190 J	NA	8080 J	19000	NA	29800	2270 J	1120 J
Iron	ug/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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GROUNDWATER RESULTS

00045610

PARAMETER	UNITS FILTERED	LHSMW70 5/28/1998 LHS-MW-70-980528 SHALLOW	LHSMW70 5/28/1998 LHS-MW-70QC SHALLOW	LHSMW70 9/14/2004 L0001-LHSMW70 SHALLOW	LHSMW71 12/12/1994 LHS-MW-71-941212 SHALLOW	LHSMW71 2/10/1996 MW-71 SHALLOW	LHSMW71 8/14/1996 LHS-MW-71-960814 SHALLOW	LHSMW71 5/28/1998 LHS-MW-71-980528 SHALLOW	LHSMW71 9/14/2004 L0001-LHSMW71 SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofura	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	ug/L N	<2.6	<2.6	NA	<0.13	0.62 JL	<0.13	<2.6	NA
2-Amino-4,6-dinitrotoluene	ug/L N	<2.6	<2.6	NA	NA	0.95 JL	<0.13	<2.6	NA
m-Nitrotoluene	ug/L N	<2.6	<2.6	NA	<0.5	0.26 JL	<0.26	<2.6	NA
o-Nitrotoluene	ug/L N	<2.6	<2.6	NA	<0.5	0.26 UJ, L	<0.26	<2.6	NA
RDX	ug/L N	<1.3	<1.3	NA	<0.54	0.26 UJ, L	<0.26	<1.3	NA
Chloride	mg/L N	NA	NA	NA	NA	752	971	NA	NA
Nitrate	mg/L N	NA	NA	NA	NA	<0.5	<0.5	NA	NA
Sulfate	mg/L N	NA	NA	NA	NA	163	173	NA	NA
Aluminum	ug/L N	710	480	NA	108000	2800 J	5830 J	8300	4220
Aluminum	ug/L Y	NA	NA	NA	NA	NA	NA	NA	<200
Antimony	ug/L N	5 UJ	<5	NA	<100	<60	<60	<5	151
Antimony	ug/L Y	NA	NA	NA	NA	NA	NA	NA	<20
Arsenic	ug/L N	<10	<10	NA	6.9	<2	<2	<10	<20
Arsenic	ug/L Y	NA	NA	NA	NA	NA	NA	NA	<20
Barium	ug/L N	<200	<200	NA	470	143	143	200	202
Barium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	35.6 J
Beryllium	ug/L N	1.2	.8	NA	NA	<5	<10	<.5	<5
Beryllium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	<5
Calcium	ug/L N	<5000	<5000	NA	37400	23400 J	35300 J	8700	16600
Calcium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	12900
Chromium	ug/L N	50	40	NA	560	3630 J	7550 J	43000	83300
Chromium	ug/L Y	NA	NA	NA	NA	NA	NA	NA	16.0 J
Cobalt	ug/L N	<50	<50	NA	150	52	78	<50	53.5
Cobalt	ug/L Y	NA	NA	NA	NA	NA	NA	NA	5.5 J
Copper	ug/L N	<25	<25	NA	140	59	41	244	383
Copper	ug/L Y	NA	NA	NA	NA	NA	NA	NA	<30
Iron	ug/L N	3900	3300	NA	115000	16000 J	29700 J	170000	247000
Iron	ug/L Y	NA	NA	NA	NA	NA	NA	NA	106 J

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	106 2/13/1996	106 2/13/1996	106 8/15/1996	106 8/15/1997	106 5/29/1998	106 9/14/2004	106 9/14/2004	107 2/13/1996	107 2/13/1996
		MW-106 SHALLOW	MW106 SHALLOW	LHS-MW-106-860815 SHALLOW	LHS-MW-106-970815 SHALLOW	C-106-980528 SHALLOW	L0001-106 SHALLOW	L0001-106QC SHALLOW	MW-107 SHALLOW	MW107 SHALLOW
Lead	µg/L N	<30	NA	<90	NA	<3	NA	NA	<30	NA
Lead	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	µg/L N	2980 J	NA	2220 J	NA	<5000	NA	NA	8110 J	NA
Magnesium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	µg/L N	52	NA	42	NA	85	NA	NA	267	NA
Manganese	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	µg/L N	<2	NA	<1	NA	<2	NA	NA	.2	NA
Mercury	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	µg/L N	<15	NA	<20	NA	<40	NA	NA	<15	NA
Nickel	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	µg/L N	923	NA	802	NA	<5000	NA	NA	1810 J	NA
Potassium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	µg/L N	<2	NA	<2	NA	<5	NA	NA	<2	NA
Selenium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	µg/L N	<10	NA	<10	NA	<10	NA	NA	<10	NA
Silver	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	µg/L N	NA	NA	NA	NA	58000	NA	NA	NA	NA
Sodium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Strontium	µg/L N	62	NA	41	NA	80	NA	NA	197	NA
Thallium	µg/L N	<90	NA	<90	NA	1 UJ	NA	NA	<90	NA
Thallium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	µg/L N	<10	NA	<20	NA	<50	NA	NA	<10	NA
Vanadium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	µg/L N	51	NA	80	NA	30	NA	NA	34	NA
Zinc	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	µg/L N	NA	NA	NA	NA	NA	1.0 UJ	1.0 UJ	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	<1.1	NA	<1.1	<10	NA	NA	NA	<1.1
bis(2-Ethylhexyl)phthalate	µg/L N	NA	<0.92	NA	<0.92	7.6 J	NA	NA	NA	<0.92
di-n-Octyl phthalate	µg/L N	NA	<1.2	NA	<1.2	<10	NA	NA	NA	<1.2
Diethyl phthalate	µg/L N	NA	<1	NA	<1	<10	NA	NA	NA	<1
Phenol	µg/L N	NA	<0.89	NA	<0.89	<10	NA	NA	NA	<0.89
1,2,4-Trichlorobenzene	µg/L N	NA	NA	NA	<0.32	<1	<5	5 UJL	NA	NA
1,2-Dichloroethane	µg/L N	NA	NA	NA	<0.31	<1	<5	<5	NA	NA
Trichloroethene	µg/L N	NA	NA	NA	<0.25	<1	<5	<5	NA	NA

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GROUNDWATER RESULTS

00045612

PARAMETER	UNITS FILTERED	107 8/15/1996 LHS-MW-107 SHALLOW	107 5/28/1998 C-107-980528 SHALLOW	107 9/15/2004 L0001-107 SHALLOW	LHSMW67 12/10/1994 LHS-MW-67-941210 SHALLOW	LHSMW67 2/9/1996 MW-67 SHALLOW	LHSMW67 8/14/1996 LHS-MW-67-960814 SHALLOW	LHSMW67 5/27/1998 LHS-MW-67-980527 SHALLOW	LHSMW67 8/25/1998 LHS-MW-67-980825 SHALLOW	LHSMW67 5/18/2000 LHSMW67-000518 SHALLOW	LHSMW67 10/3/2000 LHSMW67-001003 SHALLOW
Lead	µg/L N	<90	<3	NA	40	49	<90	4	NA	NA	NA
Lead	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	µg/L N	14000 J	9300	NA	10400	39900 J	3450 J	5400	NA	NA	NA
Magnesium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	µg/L N	322	327	NA	740	286	488	545	NA	NA	NA
Manganese	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	µg/L N	<.1	<.2	NA	<.2	.3	<.1	.3	NA	NA	NA
Mercury	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	µg/L N	<20	<40	NA	NA	248	576	400	NA	NA	NA
Nickel	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	µg/L N	2010 J	<5000	NA	3600	1520 J	1440 J	<5000	NA	NA	NA
Potassium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	µg/L N	<2	<5	NA	<10	<2	<2	<5	NA	NA	NA
Selenium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	µg/L N	<10	<10	NA	<10	<10	<10	10	NA	NA	NA
Silver	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	µg/L N	NA	100000	NA	NA	NA	NA	110000	NA	NA	NA
Sodium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Strontium	µg/L N	293	250	NA	190	121	60	90	NA	NA	NA
Thallium	µg/L N	<90	1 UJ	NA	<500	<90	<90	1 UJ	NA	NA	NA
Thallium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	µg/L N	<20	<50	NA	NA	<10	27	<50	NA	NA	NA
Vanadium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	µg/L N	43	30	NA	210	65	78	100	NA	NA	NA
Zinc	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	µg/L N	NA	NA	1.0 UJ	NA	NA	NA	NA	NA	2.8	<4
2,6-Dinitrotoluene	µg/L N	<1.1	<10	NA	<10	<1.1	<1.1	<10	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L N	<0.92	<10	NA	<10	<0.92	<0.92	8.7 J	NA	NA	NA
di-n-Octyl phthalate	µg/L N	<1.2	<10	NA	<10	<1.2	<1.2	<10	NA	NA	NA
Diethyl phthalate	µg/L N	<1	<10	NA	<10	<1	<1	<10	NA	NA	NA
Phenol	µg/L N	<0.89	<10	NA	<10	<0.89	<0.89	<10	NA	NA	NA
1,2,4-Trichlorobenzene	µg/L N	<0.32	<1	<5	NA	NA	<0.32	<1	NA	NA	NA
1,2-Dichloroethane	µg/L N	<0.31	<1	<5	<5	NA	<0.31	<1	NA	NA	NA
Trichloroethene	µg/L N	<0.25	<1	<5	NA	NA	<0.25	<1	NA	NA	NA

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GROUNDWATER RESULTS

00045613

PARAMETER	UNITS FILTERED	LHSMW67 2/8/2001 LHSMW67-010209 SHALLOW	LHSMW67 9/15/2004 L0001-LHSMW67 SHALLOW	LHSMW68 12/10/1994 LHS-MW-68-941210 SHALLOW	LHSMW68 2/8/1998 MW-68 SHALLOW	LHSMW68 8/15/1998 LHS-MW-68-980815 SHALLOW	LHSMW68 5/27/1998 LHS-MW-68-980527 SHALLOW	LHSMW68 5/18/2000 LHSMW68-000518 SHALLOW	LHSMW68 10/3/2000 LHSMW68-001003 SHALLOW	LHSMW68 9/14/2004 L0001-LHSMW68 SHALLOW	LHSMW69 12/10/1994 LHS-MW-69-941210 INTERMEDIATE
Lead	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA	16
Lead	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	µg/L N	NA	NA	12600	1240 J	1890 J	<5000	NA	NA	NA	7400
Magnesium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	µg/L N	NA	NA	960	21	48	34	NA	NA	NA	960
Manganese	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	µg/L N	NA	NA	<2	<2	<1	<2	NA	NA	NA	<2
Mercury	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	µg/L N	NA	NA	NA	19	25	<40	NA	NA	NA	NA
Nickel	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	µg/L N	NA	NA	5400	880	1070 J	<5000	NA	NA	NA	2500
Potassium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	µg/L N	NA	NA	<10	<2	<2	<5	NA	NA	NA	<2
Selenium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	µg/L N	NA	NA	<10	<10	<10	<10	NA	NA	NA	<10
Silver	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	µg/L N	NA	NA	NA	NA	NA	14000	NA	NA	NA	NA
Sodium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Strontium	µg/L N	NA	NA	140	18	23	<50	NA	NA	NA	240
Thallium	µg/L N	NA	NA	<500	<90	<90	1 UJ	NA	NA	NA	<500
Thallium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	µg/L N	NA	NA	NA	<10	<20	<50	NA	NA	NA	NA
Vanadium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	µg/L N	NA	NA	270	30	38	<20	NA	NA	NA	170
Zinc	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	µg/L N	<0.71	1.0 UJ	NA	NA	NA	<1	<4	1.0 UJ	NA	NA
2,6-Dinitrotoluene	µg/L N	NA	NA	<10	<1.1	<1.1	<10	NA	NA	NA	<10
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	21	<0.92	<0.92	<10	NA	NA	NA	<10
di-n-Octyl phthalate	µg/L N	NA	NA	<10	<1.2	<1.2	<10	NA	NA	NA	<10
Diethyl phthalate	µg/L N	NA	NA	<10	<1	<1	<10	NA	NA	NA	<10
Phenol	µg/L N	NA	NA	<10	<0.89	<0.89	<10	NA	NA	NA	<10
1,2,4-Trichlorobenzene	µg/L N	NA	<5	NA	NA	<0.32	<1	NA	NA	5 UJ	NA
1,2-Dichloroethane	µg/L N	NA	<5	NA	NA	<0.31	<1	NA	NA	<5	3 J
Trichloroethene	µg/L N	NA	<5	NA	NA	<0.25	<1	NA	NA	<5	NA

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GROUNDWATER RESULTS

00045614

PARAMETER	UNITS FILTERED	LHSMW69 12/10/1994 LHS-MW-69QC-0412	LHSMW69 2/9/1996 MW-69	LHSMW69 2/9/1996 MW69	LHSMW69 8/15/1996 LHS-MW-69-960815	LHSMW69 8/15/1996 LHS-MW-69-QC	LHSMW69 8/15/1996 LHS-MW-69QC-9608	LHSMW69 5/27/1998 LHS-MW-69-980527	LHSMW69 9/15/2004 L0001-LHSMW69	LHSMW70 12/12/1994 LHS-MW-70-941212	LHSMW70 2/9/1996 MW-70	LHSMW70 8/14/1996 LHS-MW-70-960814
		INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	SHALLOW	SHALLOW	SHALLOW
Lead	µg/L N	13	NA	1.8	298	NA	268	<3	NA	13	56	<90
Lead	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	µg/L N	7100	NA	4300	1650 J	NA	265	6100	NA	4700	674	489
Magnesium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	µg/L N	940	NA	550	270	NA	NA	552	NA	920	563	597
Manganese	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	µg/L N	<2	NA	<2	<1	NA	<1	<2	NA	<2	<2	<1
Mercury	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	µg/L N	NA	NA	<7.6	<20	NA	<20	<40	NA	NA	38	<20
Nickel	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	µg/L N	2400	NA	990	683	NA	654	<5000	NA	3200	479	691
Potassium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	µg/L N	<2	NA	<2	<2	NA	<2	<5	NA	<2	<2	<2
Selenium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	µg/L N	<10	NA	.8	<10	NA	<10	<10	NA	<10	<10	<10
Silver	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	µg/L N	NA	NA	NA	NA	NA	NA	100000	NA	NA	NA	NA
Sodium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Strontium	µg/L N	230	NA	120	53	NA	51	260	NA	<100	15	12
Thallium	µg/L N	<500	NA	<1.7	<90	NA	<90	1 UJ	NA	<500	<90	<90
Thallium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	µg/L N	NA	NA	2.3	<20	NA	<20	<50	NA	NA	<10	<20
Vanadium	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	µg/L N	170	NA	54	66	NA	62	50	NA	150	44	33
Zinc	µg/L Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	µg/L N	NA	NA	NA	NA	NA	NA	1.0 UJ	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L N	<10	NA	<1.1	<1.1	<1.1	NA	<10	NA	<10	<1.1	<1.1
bis(2-Ethylhexyl)phthalate	µg/L N	2 J	NA	<0.92	<0.92	<0.92	NA	<10	NA	2 J	<0.92	<0.92
di-n-Octyl phthalate	µg/L N	<10	NA	0.6 J	2.7	NA	<10	<10	NA	<10	<1.2	<1.2
Diethyl phthalate	µg/L N	<10	NA	0.57 J	<1	<1	NA	<10	NA	<10	<1	<1
Phenol	µg/L N	<10	NA	3.9	<0.89	<0.89	NA	<10	NA	<10	<0.89	<0.89
1,2,4-Trichlorobenzene	µg/L N	NA	NA	NA	<0.32	0.62	NA	<1	5 UJ	NA	NA	<0.32
1,2-Dichloroethane	µg/L N	<5	NA	NA	0.53	0.56	NA	<1	<5	<5	NA	<0.31
Trichloroethene	µg/L N	NA	NA	NA	<0.25	<0.25	NA	0.85 J	<5	NA	NA	<0.25

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LHAAP-35C(53)
GROUNDWATER RESULTS

PARAMETER	UNITS	FILTEREC	LHSMW70 5/28/1998	LHSMW70 5/28/1998	LHSMW70 9/14/2004	LHSMW71 12/12/1994	LHSMW71 2/10/1996	LHSMW71 8/14/1996	LHSMW71 5/28/1998	LHSMW71 9/14/2004
			LHS-MW-70-980528	LHS-MW-70QC	L0001-LHSMW70	LHS-MW-71-941212	MW-71	LHS-MW-71-960814	LHS-MW-71-980528	L0001-LHSMW71
			SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
Lead	µg/L	N	<3	NA	NA	65	69	<90	NA	<10
Lead	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	<10
Magnesium	µg/L	N	<5000	<5000	NA	33200	20100 J	27500 J	9100	14200
Magnesium	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	13800
Manganese	µg/L	N	659	659	NA	1400	546	718	390	781
Manganese	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	104
Mercury	µg/L	N	<2	<2	NA	<2	<2	<1	.6	0.21 J
Mercury	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	0.09 J
Nickel	µg/L	N	<40	<40	NA	NA	1150 J	1010 J	2500	788
Nickel	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	251
Potassium	µg/L	N	<5000	<5000	NA	7800	1830 J	2370 J	<5000	1380
Potassium	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	855 J
Selenium	µg/L	N	<5	<5	NA	7.6	<2	<2	5	<30
Selenium	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	<30
Silver	µg/L	N	<10	<10	NA	<10	<10	<10	1200	12.4 J
Silver	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	<30
Sodium	µg/L	N	24000	24000	NA	NA	NA	NA	220000	390000
Sodium	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	390000
Strontium	µg/L	N	<50	<50	NA	630	429	642	180	NA
Thallium	µg/L	N	1 UJ	1 UJ	NA	<500	<90	134	1 UJ	.276
Thallium	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	.224
Vanadium	µg/L	N	<50	<50	NA	NA	<10	<20	<50	<50
Vanadium	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	<50
Zinc	µg/L	N	20	20	NA	560	67	107	<20	<50
Zinc	µg/L	Y	NA	NA	NA	NA	NA	NA	NA	<50
Perchlorate	µg/L	N	NA	NA	1.0 UJ	NA	NA	NA	NA	1 UJ
2,6-Dinitrotoluene	µg/L	N	<10	<10	NA	<10	<1.1	<1.1	<10	NA
bis(2-Ethylhexyl)phthalate	µg/L	N	<10	<10	NA	1 J	0.62 JB	<0.92	<10	NA
di-n-Octyl phthalate	µg/L	N	<10	<10	NA	<10	<1.2	<1.2	<10	NA
Diethyl phthalate	µg/L	N	<10	<10	NA	<10	<1	<1	<10	NA
Phenol	µg/L	N	<10	<10	NA	<10	<0.89	<0.89	<10	NA
1,2,4-Trichlorobenzene	µg/L	N	<1	<1	<5	NA	NA	<0.32	<1	<5
1,2-Dichloroethane	µg/L	N	<1	<1	<5	<5	NA	<0.31	<1	<5
Trichloroethene	µg/L	N	<1	<1	<5	NA	NA	<0.25	<1	<5

Notes:

B Concentration reported was detected significantly above the levels reported in associated equipment rinse sampling and/or laboratory method and trip blanks.

J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.

UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

NA Not analyzed

µg/L micrograms per liter

mg/L milligrams per liter

pg/L picograms per liter

LHAAP-47
GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	47WW05 11/9/1998 47WW05-981109 REG SHALLOW	47WW05 9/1/2004 L0001-47WW05 REG SHALLOW	47WW06 11/6/1998 47WW06-981106 REG INTERMEDIATE	47WW06 9/1/2004 L0001-47WW06 REG INTERMEDIATE	47WW07 11/6/1998 47WW07-981106 REG DEEP	47WW07 9/1/2004 L0001-47WW07 REG DEEP
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	<18.224	NA	NA	NA
Aluminum	µg/L N	1300	NA	430 J	NA	9600	NA
Antimony	µg/L N	<5	NA	<5	NA	<5	NA
Arsenic	µg/L N	<10	NA	37 J	NA	28	NA
Cadmium	µg/L N	<.8	NA	.8 J	NA	1	NA
Calcium	µg/L N	89000	NA	35000 J	NA	14000	NA
Chromium	µg/L N	450 J	NA	20 J	NA	150	NA
Cobalt	µg/L N	<50	NA	<50	NA	<50	NA
Copper	µg/L N	29	NA	<25	NA	<25	NA
Iron	µg/L N	3200 J	NA	1400 J	NA	9700	NA
Lead	µg/L N	<3	NA	<3	NA	5	NA
Magnesium	µg/L N	54000	NA	18000 J	NA	7200	NA
Manganese	µg/L N	677	NA	175 J	NA	222	NA
Nickel	µg/L N	330	NA	40 J	NA	120	NA
Potassium	µg/L N	<5000	NA	10000 J	NA	12000	NA
Silver	µg/L N	<10	NA	10 R	NA	10 R	NA
Sodium	µg/L N	630000	NA	260000 J	NA	280000	NA
Strontium	µg/L N	3100	NA	920 J	NA	730	NA
Thallium	µg/L N	1.2 J	NA	<1	NA	<1	NA
Tin	µg/L N	100	NA	<100	NA	<100	NA
Zinc	µg/L N	40	NA	20 J	NA	50	NA
1,1-Dichloroethane	µg/L N	<40	<5	<1	<5	<1	<5
1,1-Dichloroethene	µg/L N	<40	<5	<1	<5	<1	<5
Bromodichloromethane	µg/L N	<40	<5	<1	<5	<1	<5
Chloroform	µg/L N	<40	<5	4.6	<5	0.93	<5
cis-1,2-Dichloroethene	µg/L N	<40	15 JL	<1	5 UJL	<1	5 UJL
trans-1,2-Dichloroethene	µg/L N	<40	<5	<1	<5	<1	<5
Trichloroethene	µg/L N	2300	3200	1.8	5 UJ	<1	5 UJ
Vinyl chloride	µg/L N	<40	<5	<1	<5	<1	<5

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	47WW07	47WW13	47WW13	47WW14	47WW14	47WW15
		9/1/2004	11/4/1998	9/2/2004	11/4/1998	9/2/2004	11/4/1998
		L0001-47WW07QC	47WW13-981104	L0001-47WW13	47WW14-981104	L0001-47WW14	47WW15-981104
		FD	REG	REG	REG	REG	REG
		DEEP	SHALLOW	SHALLOW	INTERMEDIATE	INTERMEDIATE	DEEP
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA
Aluminum	µg/L N	NA	3300	NA	<200	NA	1900
Antimony	µg/L N	NA	32	NA	<5	NA	<5
Arsenic	µg/L N	NA	<10	NA	<10	NA	<10
Cadmium	µg/L N	NA	<.8	NA	<.8	NA	<.8
Calcium	µg/L N	NA	53000	NA	43000	NA	17000
Chromium	µg/L N	NA	2300	NA	<10	NA	40
Cobalt	µg/L N	NA	110	NA	<50	NA	<50
Copper	µg/L N	NA	<25	NA	<25	NA	<25
Iron	µg/L N	NA	16000	NA	550	NA	2900
Lead	µg/L N	NA	<3	NA	4	NA	4
Magnesium	µg/L N	NA	41000	NA	29000	NA	<5000
Manganese	µg/L N	NA	4560	NA	141	NA	69
Nickel	µg/L N	NA	1800	NA	50	NA	70
Potassium	µg/L N	NA	5600	NA	5100	NA	7600
Silver	µg/L N	NA	40	NA	<10	NA	<10
Sodium	µg/L N	NA	380000	NA	210000	NA	70000
Strontium	µg/L N	NA	1400	NA	1600	NA	380
Thallium	µg/L N	NA	1.1	NA	<1	NA	1.4
Tin	µg/L N	NA	<100	NA	<100	NA	110
Zinc	µg/L N	NA	40	NA	30	NA	50
1,1-Dichloroethane	µg/L N	<5	2	<5	6.4	<5	<1
1,1-Dichloroethene	µg/L N	<5	7.9	2 J	6.3	3 J	<1
Bromodichloromethane	µg/L N	<5	<1	5 UJL	0.73 J	<5	16
Chloroform	µg/L N	<5	<1	<5	4.1	<5	62
cis-1,2-Dichloroethene	µg/L N	5 UJL	890	1600	730	120	<1
trans-1,2-Dichloroethene	µg/L N	<5	21	18	2.4	<5	<1
Trichloroethene	µg/L N	5 UJ	740	720	610	280	<1
Vinyl chloride	µg/L N	<5	42	6	<1	18	<1

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GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	47WW15 9/2/2004 L0001-47WW15	47WW28 9/1/2004 L0001-47WW28	47WW29 9/1/2004 L0001-47WW29	47WW30 9/1/2004 L0001-47WW30	47WW31 9/2/2004 L0001-47WW31
			REG DEEP	REG N/A	REG N/A	REG N/A	REG N/A
Octachlorodibenzo-p-diox	pg/L	N	NA	NA	NA	NA	NA
Aluminum	µg/L	N	NA	NA	NA	NA	NA
Antimony	µg/L	N	NA	NA	NA	NA	NA
Arsenic	µg/L	N	NA	NA	NA	NA	NA
Cadmium	µg/L	N	NA	NA	NA	NA	NA
Calcium	µg/L	N	NA	NA	NA	NA	NA
Chromium	µg/L	N	NA	NA	NA	NA	NA
Cobalt	µg/L	N	NA	NA	NA	NA	NA
Copper	µg/L	N	NA	NA	NA	NA	NA
Iron	µg/L	N	NA	NA	NA	NA	NA
Lead	µg/L	N	NA	NA	NA	NA	NA
Magnesium	µg/L	N	NA	NA	NA	NA	NA
Manganese	µg/L	N	NA	NA	NA	NA	NA
Nickel	µg/L	N	NA	NA	NA	NA	NA
Potassium	µg/L	N	NA	NA	NA	NA	NA
Silver	µg/L	N	NA	NA	NA	NA	NA
Sodium	µg/L	N	NA	NA	NA	NA	NA
Strontium	µg/L	N	NA	NA	NA	NA	NA
Thallium	µg/L	N	NA	NA	NA	NA	NA
Tin	µg/L	N	NA	NA	NA	NA	NA
Zinc	µg/L	N	NA	NA	NA	NA	NA
1,1-Dichloroethane	µg/L	N	<5	<5	<5	<5	<5
1,1-Dichloroethene	µg/L	N	<5	<5	<5	2 J	<5
Bromodichloromethane	µg/L	N	<5	<5	<5	<5	<5
Chloroform	µg/L	N	<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	µg/L	N	<5	5 UJL	5 UJL	9	<5
trans-1,2-Dichloroethene	µg/L	N	<5	<5	<5	<5	<5
Trichloroethene	µg/L	N	<5	5 UJ	5 UJ	1100	<5
Vinyl chloride	µg/L	N	<5	<5	<5	<5	<5

Notes:

- J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.
- UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.
- L Result may be biased low.
- NA Not analyzed
- pg/L picograms per liter
- µg/L micrograms per liter

LHAAP-48
GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	48WW01 9/13/2004	48WW01 9/13/2004	LHSMW62 12/10/1994	LHSMW62 2/11/1996	LHSMW62 2/11/1996	LHSMW62 8/15/1996	LHSMW62 5/20/1998
		L0001-48WW01	L0001-48WW01QC	LHS-MW-62-941210	MW-62	MW62	LHS-MW-62-960815	LHS-MW-62-980520
		REG	FD	REG	REG	REG	REG	REG
		INTERMEDIATE	INTERMEDIATE	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofur	pg/L N	<10	<9.9	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L N	2.178 J	<9.9	NA	NA	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L N	<10	<9.9	NA	NA	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/L N	<10	<9.9	NA	NA	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L N	<10	<9.9	NA	NA	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	pg/L N	<10	<9.9	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L N	2.178	<24.752	NA	NA	NA	NA	NA
Heptachlorodibenzofuran	pg/L N	<25	<24.752	NA	NA	NA	NA	NA
Hexachloridibenzo-p-dioxin	pg/L N	<25	<24.752	NA	NA	NA	NA	NA
Hexachlorodibenzofuran	pg/L N	<25	<24.752	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	36.101 J	29.705 J	NA	NA	NA	NA	NA
Octachlorodibenzofuran	pg/L N	<50	<49.504	NA	NA	NA	NA	NA
Pentachlorodibenzo-p-dioxin	pg/L N	<25	<24.752	NA	NA	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L N	<10	<9.9	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	µg/L N	NA	NA	<0.12	NA	0.094 J	<0.13	<1.3
2,6-Dinitrotoluene	µg/L N	NA	NA	<0.13	NA	0.26	<0.13	<2.6
2-Amino-4,6-dinitrotoluene	µg/L N	NA	NA	NA	NA	0.44	<0.13	<2.6
m-Nitrotoluene	µg/L N	NA	NA	<0.5	NA	0.15 J	0.7	<2.6
o-Nitrotoluene	µg/L N	NA	NA	<0.5	NA	<0.26	<0.26	<2.6
Chloride	µg/L N	NA	NA	NA	130	NA	67.3	NA
Sulfate	µg/L N	NA	NA	NA	132	NA	160	NA
Aluminum	µg/L N	NA	NA	161000	NA	1300	1440 J	7900
Arsenic	µg/L N	NA	NA	6.2	NA	<2	<2	<10
Barium	µg/L N	NA	NA	1600	NA	53	35	<200
Calcium	µg/L N	NA	NA	60400	NA	12300	6740 J	14000
Chromium	µg/L N	NA	NA	430	NA	13	10	130
Cobalt	µg/L N	NA	NA	120	NA	4	<20	<50
Copper	µg/L N	NA	NA	210	NA	80	19	<25
Iron	µg/L N	NA	NA	256000	NA	2200	2460 J	9300
Lead	µg/L N	NA	NA	150	NA	1.6	<90	<3
Magnesium	µg/L N	NA	NA	55200	NA	7200	3760 J	9700
Manganese	µg/L N	NA	NA	1900	NA	320	163	295
Mercury	µg/L N	NA	NA	1.5	NA	<.2	.325	<.2
Nickel	µg/L N	NA	NA	NA	NA	170	80	170
Potassium	µg/L N	NA	NA	10600	NA	600	668	<5000
Sodium	µg/L N	NA	NA	NA	NA	NA	NA	150000
Strontium	µg/L N	NA	NA	980	NA	160	87	310
Thallium	µg/L N	.246	.243	<500	NA	<1.7	<90	1 R
Vanadium	µg/L N	NA	NA	NA	NA	2.7	<20	<50
Zinc	µg/L N	NA	NA	940	NA	26	34	40
Perchlorate	µg/L N	<1.00	<1.00	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	µg/L N	NA	NA	<10	NA	<1.1	<1.1	<10
2,6-Dinitrotoluene	µg/L N	NA	NA	<10	NA	<1.1	<1.1	<10
2-Methylnaphthalene	µg/L N	NA	NA	<10	NA	<0.67	<0.67	<10
Acenaphthene	µg/L N	NA	NA	<10	NA	<0.75	<0.75	<10
Benzoic Acid	µg/L N	NA	NA	<50	NA	NA	NA	50 R
bis(2-Ethylhexyl)phthalate	µg/L N	NA	NA	<10	NA	<0.92	<0.92	<10
Dibenzofuran	µg/L N	NA	NA	<10	NA	<0.83	<0.83	<10
Fluorene	µg/L N	NA	NA	<10	NA	<0.8	<0.8	<10
sec-BUTYLBENZENE	µg/L N	NA	NA	NA	NA	NA	<0.2	<1
tert-BUTYLBENZENE	µg/L N	NA	NA	NA	NA	NA	<0.2	<1

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GROUNDWATER RESULTS

PARAMETER	UNITS	LHSMW62 8/25/1998	LHSMW62 5/20/2000	LHSMW62 10/1/2000	LHSMW62 2/13/2001	LHSMW62 9/13/2004	LHSMW64 12/10/1994	LHSMW64 2/11/1996	LHSMW64 2/11/1996
		LHS-MW-62-980825	LHSMW62-000520	LHSMW62QC	LHSMW62-010213	L0001-LHSMW62	LHS-MW-64-941210	LHS-MW-64-QC	LHS-MW-64QC
		REG	REG	FD	REG	REG	REG	FD	FD
		SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	12.468	NA	NA	NA	<26.315	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L	<3.706	NA	NA	NA	2.59 J	NA	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L	<3.322	NA	NA	NA	0.82 J	NA	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/L	<2.214	NA	NA	NA	<26.315	NA	NA	NA
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L	<3.243	NA	NA	NA	<26.315	NA	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	pg/L	3.07 UJ	NA	NA	NA	<26.315	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L	<3.706	NA	NA	NA	4.902	NA	NA	NA
Heptachlorodibenzofuran	pg/L	12.468	NA	NA	NA	<26.315	NA	NA	NA
Hexachloridibenzo-p-dioxin	pg/L	<3.529	NA	NA	NA	<26.315	NA	NA	NA
Hexachlorodibenzofuran	pg/L	13.675	NA	NA	NA	<26.315	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L	73.945	NA	NA	NA	35.034 B	NA	NA	NA
Octachlorodibenzofuran	pg/L	<4.234	NA	NA	NA	3.211 J	NA	NA	NA
Pentachlorodibenzo-p-dioxin	pg/L	<4.526	NA	NA	NA	<26.315	NA	NA	NA
Tetrachlorodibenzo-p-dioxin	pg/L	<6.263	NA	NA	NA	<10.526	NA	NA	NA
2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	<0.12	NA	NA
2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	<0.13	NA	NA
2-Amino-4,6-dinitrotoluene	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
m-Nitrotoluene	ug/L	NA	NA	NA	NA	NA	<0.5	NA	NA
o-Nitrotoluene	ug/L	NA	NA	NA	NA	NA	<0.5	NA	NA
Chloride	ug/L	NA	NA	NA	NA	NA	NA	NA	17
Sulfate	ug/L	NA	NA	NA	NA	NA	NA	NA	<2
Aluminum	ug/L	NA	NA	NA	NA	NA	139000	641	NA
Arsenic	ug/L	NA	NA	NA	NA	NA	6	5.6	NA
Barium	ug/L	NA	NA	NA	NA	NA	1400	258	NA
Calcium	ug/L	NA	NA	NA	NA	NA	22500	9360 J	NA
Chromium	ug/L	NA	NA	NA	NA	NA	260	<10	NA
Cobalt	ug/L	NA	NA	NA	NA	NA	84	<10	NA
Copper	ug/L	NA	NA	NA	NA	NA	130	24	NA
Iron	ug/L	NA	NA	NA	NA	NA	195000	24500 J	NA
Lead	ug/L	NA	NA	NA	NA	NA	97	63	NA
Magnesium	ug/L	NA	NA	NA	NA	NA	28200	8670 J	NA
Manganese	ug/L	NA	NA	NA	NA	NA	1400	446	NA
Mercury	ug/L	NA	NA	NA	NA	NA	.38	<2	NA
Nickel	ug/L	NA	NA	NA	NA	NA	NA	<15	NA
Potassium	ug/L	NA	NA	NA	NA	NA	10600	478	NA
Sodium	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
Strontium	ug/L	NA	NA	NA	NA	NA	520	214	NA
Thallium	ug/L	NA	NA	NA	NA	.465	<500	102	NA
Vanadium	ug/L	NA	NA	NA	NA	NA	NA	<10	NA
Zinc	ug/L	NA	NA	NA	NA	NA	610	20	NA
Perchlorate	ug/L	NA	160	<4	<0.71	<2.00	NA	NA	NA
2,4-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	<10	NA	NA
2,6-Dinitrotoluene	ug/L	NA	NA	NA	NA	NA	<10	NA	NA
2-Methylnaphthalene	ug/L	NA	NA	NA	NA	NA	<10	NA	NA
Acenaphthene	ug/L	NA	NA	NA	NA	NA	<10	NA	NA
Benzoic Acid	ug/L	NA	NA	NA	NA	NA	<50	NA	NA
bis(2-Ethylhexyl)phthalate	ug/L	NA	NA	NA	NA	NA	1 J	NA	NA
Dibenzofuran	ug/L	NA	NA	NA	NA	NA	<10	NA	NA
Fluorene	ug/L	NA	NA	NA	NA	NA	<10	NA	NA
sec-BUTYLBENZENE	ug/L	NA	NA	NA	NA	NA	NA	NA	NA
tert-BUTYLBENZENE	ug/L	NA	NA	NA	NA	NA	NA	NA	NA

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GROUNDWATER RESULTS

00045621

PARAMETER	UNITS	FILTERED	LHSMW64 2/11/1996	LHSMW64 2/11/1996	LHSMW64 8/15/1996	LHSMW64 5/27/1998	LHSMW64 5/20/2000	LHSMW64 10/1/2000	LHSMW64 2/12/2001	LHSMW64 2/12/2001	LHSMW64 9/13/2004
			MW-64-QC SHALLOW	MW-64 SHALLOW	LHS-MW-64-960815 SHALLOW	LHS-MW-64-980527 SHALLOW	LHSMW64-000520 SHALLOW	LHSMW64-001001 SHALLOW	LHSMW64-010212 SHALLOW	LHSMW64QC SHALLOW	L0001-LHSMW64 SHALLOW
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3,4,6,7,8-HpCDD	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	0.297 BJ
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	1.547 BJ
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	0.618 J
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	0.173 J
2,3,4,7,8-Pentachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	0.258 J
Heptachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	0.153 J
Heptachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	3.769
Hexachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	<26.315
Hexachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	1.876
Octachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	0.876
Octachlorodibenzofuran	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	26.257 BJ
Pentachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	1.783 BJ
Tetrachlorodibenzo-p-dioxin	pg/L	N	NA	NA	NA	NA	NA	NA	NA	NA	0.33
2,4-Dinitrotoluene	µg/L	N	<0.13	<0.13	<0.13	<1.3	NA	NA	NA	NA	3.374
2,6-Dinitrotoluene	µg/L	N	<0.13	<0.13	<0.13	<2.6	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	µg/L	N	<0.13	<0.13	<0.13	<2.6	NA	NA	NA	NA	NA
m-Nitrotoluene	µg/L	N	0.49	<0.26	<0.26	<2.6	NA	NA	NA	NA	NA
o-Nitrotoluene	µg/L	N	0.38	<0.26	<0.26	<2.6	NA	NA	NA	NA	NA
Chloride	µg/L	N	NA	16.7	19.5	NA	NA	NA	NA	NA	NA
Sulfate	µg/L	N	NA	2.8	1.75 J	NA	NA	NA	NA	NA	NA
Aluminum	µg/L	N	NA	532 J	603	<200	NA	NA	NA	NA	NA
Arsenic	µg/L	N	NA	5.8	9.9	12	NA	NA	NA	NA	NA
Barium	µg/L	N	NA	251	258	260	NA	NA	NA	NA	NA
Calcium	µg/L	N	NA	9140 J	9180 J	9000	NA	NA	NA	NA	NA
Chromium	µg/L	N	NA	<10	<10	30	NA	NA	NA	NA	NA
Cobalt	µg/L	N	NA	<10	<20	<50	NA	NA	NA	NA	NA
Copper	µg/L	N	NA	18	<10	<25	NA	NA	NA	NA	NA
Iron	µg/L	N	NA	23800 J	29800 J	25000	NA	NA	NA	NA	NA
Lead	µg/L	N	NA	96 J	<90	<3	NA	NA	NA	NA	NA
Magnesium	µg/L	N	NA	8590 J	9290 J	9700	NA	NA	NA	NA	NA
Manganese	µg/L	N	NA	446	448	516	NA	NA	NA	NA	NA
Mercury	µg/L	N	NA	<.2	<.1	<.2	NA	NA	NA	NA	NA
Nickel	µg/L	N	NA	<15	23	<40	NA	NA	NA	NA	NA
Potassium	µg/L	N	NA	361	403	<5000	NA	NA	NA	NA	NA
Sodium	µg/L	N	NA	NA	NA	130000	NA	NA	NA	NA	NA
Strontium	µg/L	N	NA	206	216	310	NA	NA	NA	NA	NA
Thallium	µg/L	N	NA	178	205	1 UJ	NA	NA	NA	NA	.142 J
Vanadium	µg/L	N	NA	<10	<20	<50	NA	NA	NA	NA	NA
Zinc	µg/L	N	NA	18	26	<20	NA	NA	NA	NA	NA
Perchlorate	µg/L	N	NA	NA	NA	NA	<1	<4	0.71 UJ	100 J	<1.00
2,4-Dinitrotoluene	µg/L	N	<1.1	<1.1	<1.1	<10	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	µg/L	N	<1.1	<1.1	<1.1	<10	NA	NA	NA	NA	NA
2-Methylnaphthalene	µg/L	N	0.66 J	0.77	<0.67	<10	NA	NA	NA	NA	NA
Acenaphthene	µg/L	N	0.8	0.92	<0.75	<10	NA	NA	NA	NA	NA
Benzoic Acid	µg/L	N	NA	NA	NA	7.2 J	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	µg/L	N	<0.92	0.64 JB	<0.92	<10	NA	NA	NA	NA	NA
Dibenzofuran	µg/L	N	1.7	2	<0.83	<10	NA	NA	NA	NA	NA
Fluorene	µg/L	N	2.5	2.9	2.7	<10	NA	NA	NA	NA	NA
sec-BUTYLBENZENE	µg/L	N	NA	NA	0.55	0.52 J	NA	NA	NA	NA	NA
tert-BUTYLBENZENE	µg/L	N	NA	NA	1.9	1.2	NA	NA	NA	NA	NA

Notes:
B Concentration reported was detected significantly above the levels reported in associated equipment rinse samples and/or laboratory method and trip blanks.
J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.
R Rejected.
NA Not analyzed
pg/L picograms per liter
µg/L micrograms per liter

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	50WW01 9/30/1998 50WW01-980930	50WW01 9/30/1998 50WW01QCRE	50WW01 9/30/1998 C-50WW01QC-980930	50WW01 10/22/1998 50WW01-981022	50WW01 10/22/1998 C-50WW01QC-981022	50WW01 5/22/2000 50WW01-000522	50WW01 5/22/2000 C-50WW01QC-000522
		REG SHALLOW	FD SHALLOW	FD SHALLOW	REG SHALLOW	FD SHALLOW	REG SHALLOW	FD SHALLOW
1,2,3,4,6,7,8-HpCDD	µg/L N	25.672	NA	17.851	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	µg/L N	63.387	NA	31.038	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	µg/L N	275.671	NA	249.049	NA	NA	NA	NA
Tetryl	µg/L N	0.26 UJ	<0.26	0.26 UJ	NA	NA	NA	NA
Aluminum	µg/L N	9600 J	NA	9900 J	NA	NA	NA	NA
Antimony	µg/L N	5 UJ	NA	9	NA	NA	NA	NA
Beryllium	µg/L N	.8	NA	1	NA	NA	NA	NA
Calcium	µg/L N	12000	NA	12000	NA	NA	NA	NA
Chromium	µg/L N	30 J	NA	40	NA	NA	NA	NA
Copper	µg/L N	25 UJ	NA	<25	NA	NA	NA	NA
Iron	µg/L N	11000	NA	13000	NA	NA	NA	NA
Lead	µg/L N	8	NA	6	NA	NA	NA	NA
Magnesium	µg/L N	9600	NA	9700	NA	NA	NA	NA
Manganese	µg/L N	98 J	NA	112	NA	NA	NA	NA
Nickel	µg/L N	<40	NA	<40	NA	NA	NA	NA
Selenium	µg/L N	<12	NA	<7	NA	NA	NA	NA
Sodium	µg/L N	140000	NA	130000	NA	NA	NA	NA
Strontium	µg/L N	250	NA	240	NA	NA	NA	NA
Zinc	µg/L N	50	NA	60	NA	NA	NA	NA
Perchlorate	µg/L N	NA	NA	NA	<1	<1	1.6	2.6
1,1,2-Trichloroethane	µg/L N	<1	NA	<1	NA	NA	NA	NA
1,1-Dichloroethane	µg/L N	<1	NA	<1	NA	NA	NA	NA
1,1-Dichloroethene	µg/L N	<1	NA	<1	NA	NA	NA	NA
1,2,4-Trimethylbenzene	µg/L N	<1	NA	<1	NA	NA	NA	NA
1,2-Dichlorobenzene	µg/L N	<1	NA	<1	NA	NA	NA	NA
1,2-Dichloroethane	µg/L N	<1	NA	<1	NA	NA	NA	NA
1,4-Dichlorobenzene	µg/L N	<1	NA	<1	NA	NA	NA	NA
2-Butanone	µg/L N	<5	NA	<5	NA	NA	NA	NA
Acetone	µg/L N	<39	NA	<54	NA	NA	NA	NA
Benzene	µg/L N	<1	NA	<1	NA	NA	NA	NA
Chloroform	µg/L N	<1	NA	<1	NA	NA	NA	NA
cis-1,2-Dichloroethene	µg/L N	<1	NA	<1	NA	NA	NA	NA
Isopropylbenzene	µg/L N	<1	NA	<1	NA	NA	NA	NA
Methylene chloride	µg/L N	<1	NA	<1	NA	NA	NA	NA
Naphthalene	µg/L N	<1	NA	<1	NA	NA	NA	NA
Tetrachloroethene	µg/L N	<1	NA	<1	NA	NA	NA	NA
Toluene	µg/L N	<1	NA	<1	NA	NA	NA	NA
trans-1,2-Dichloroethene	µg/L N	<1	NA	<1	NA	NA	NA	NA
Trichloroethene	µg/L N	<1	NA	1.2	NA	NA	NA	NA
Vinyl chloride	µg/L N	<1	NA	<1	NA	NA	NA	NA

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	50WW01 10/2/2000	50WW01 10/2/2000	50WW01 2/10/2001	50WW01 3/9/2002	50WW01 3/9/2002	50WW01 3/9/2002	50WW01 9/21/2002	50WW01 8/31/2004	50WW02 9/30/1998
		50WW01-001002	C-50WW01QC-001002	50WW01-010210	50WW01-020309	50WW01QC-0203-FC	50WW01-020921	L0001-50WW01	50WW02-980930	
		REG	FD	REG	REG	FD	REG	REG	REG	REG
		SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-HpCDD	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	5.4 J
Aluminum	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	2400 J
Antimony	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	14
Beryllium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	<.5
Calcium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	36000
Chromium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	40
Copper	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	<25
Iron	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	3600
Lead	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	<3
Magnesium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	22000
Manganese	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	305
Nickel	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	60
Selenium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	<6
Sodium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	240000
Strontium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	630
Zinc	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA	30
Perchlorate	µg/L N	<4	<4	<0.71	<4.00	<4.00	<4.00	<1.0	NA	NA
1,1,2-Trichloroethane	µg/L N	NA	NA	NA	NA	NA	NA	<5	3.6	3.6
1,1-Dichloroethane	µg/L N	NA	NA	NA	NA	NA	NA	<5	32	32
1,1-Dichloroethene	µg/L N	NA	NA	NA	NA	NA	NA	<5	50	50
1,2,4-Trimethylbenzene	µg/L N	NA	NA	NA	NA	NA	NA	<5	3.9	3.9
1,2-Dichlorobenzene	µg/L N	NA	NA	NA	NA	NA	NA	<5	8.5	8.5
1,2-Dichloroethane	µg/L N	NA	NA	NA	NA	NA	NA	<5	98	98
1,4-Dichlorobenzene	µg/L N	NA	NA	NA	NA	NA	NA	<5	1.2	1.2
2-Butanone	µg/L N	NA	NA	NA	NA	NA	NA	<5	<5	<5
Acetone	µg/L N	NA	NA	NA	NA	NA	NA	<5	<67	<67
Benzene	µg/L N	NA	NA	NA	NA	NA	NA	<5	2.2	2.2
Chloroform	µg/L N	NA	NA	NA	NA	NA	NA	<5	25	25
cis-1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	NA	NA	<5	2100	2100
Isopropylbenzene	µg/L N	NA	NA	NA	NA	NA	NA	<5	0.9 J	0.9 J
Methylene chloride	µg/L N	NA	NA	NA	NA	NA	NA	<5	1	1
Naphthalene	µg/L N	NA	NA	NA	NA	NA	NA	<5	1.3	1.3
Tetrachloroethene	µg/L N	NA	NA	NA	NA	NA	NA	<5	35	35
Toluene	µg/L N	NA	NA	NA	NA	NA	NA	<5	0.69 J	0.69 J
trans-1,2-Dichloroethene	µg/L N	NA	NA	NA	NA	NA	NA	<5	15	15
Trichloroethene	µg/L N	NA	NA	NA	NA	NA	NA	5 UJ	2900	2900
Vinyl chloride	µg/L N	NA	NA	NA	NA	NA	NA	<5	100	100

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	50WW02 10/22/1998	50WW02 5/24/2000	50WW02 5/24/2000	50WW02 10/3/2000	50WW02 2/9/2001	50WW02 3/11/2002	50WW02 9/21/2002	50WW02 8/30/2004
		50WW02-981022	50WW02-000524	50WW02D	50WW02-001003	50WW02-010209	50WW02-020311	50WW02-020921	L0001-50WW02
		REG	REG	REG	REG	REG	REG	REG	REG
		SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW	SHALLOW
1,2,3,4,6,7,8-HpCDD	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Octachlorodibenzo-p-dioxin	pg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Copper	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Iron	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Lead	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Strontium	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	µg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	µg/L N	18000	3210 J	4190 J	9950	10000	6840	7600	2500
1,1,2-Trichloroethane	µg/L N	NA	<350	<100	<200	NA	NA	NA	3 J
1,1-Dichloroethane	µg/L N	NA	<350	<100	15	NA	NA	NA	16
1,1-Dichloroethene	µg/L N	NA	<350	<100	<200	NA	NA	NA	20
1,2,4-Trimethylbenzene	µg/L N	NA	<350	<100	<200	NA	NA	NA	5 UJ
1,2-Dichlorobenzene	µg/L N	NA	<350	<100	<200	NA	NA	NA	6 UJ
1,2-Dichloroethane	µg/L N	NA	<350	<100	79	NA	NA	NA	58
1,4-Dichlorobenzene	µg/L N	NA	<350	<100	<200	NA	NA	NA	5 UJ
2-Butanone	µg/L N	NA	<1800	440 J	<20000	NA	NA	NA	<5
Acetone	µg/L N	NA	<1800	<500	1700	NA	NA	NA	<5
Benzene	µg/L N	NA	<350	<100	<200	NA	NA	NA	1 J
Chloroform	µg/L N	NA	<350	<100	<200	NA	NA	NA	13
cis-1,2-Dichloroethene	µg/L N	NA	3100	2300 J	4060	NA	NA	NA	1800
Isopropylbenzene	µg/L N	NA	<350	<100	<200	NA	NA	NA	5 UJ
Methylene chloride	µg/L N	NA	<700	<200	150	NA	NA	NA	<5
Naphthalene	µg/L N	NA	<350	<100	<200	NA	NA	NA	5 UJ
Tetrachloroethene	µg/L N	NA	<350	<100	<200	NA	NA	NA	28
Toluene	µg/L N	NA	<350	<100	<200	NA	NA	NA	<5
trans-1,2-Dichloroethene	µg/L N	NA	<350	<100	<200	NA	NA	NA	8
Trichloroethene	µg/L N	NA	18000	11000	16100	NA	NA	NA	9200
Vinyl chloride	µg/L N	NA	<350	<100	<200	NA	NA	NA	36

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GROUNDWATER RESULTS

PARAMETER	UNITS FILTERED	67WW04 12/19/2000 67WW04-001219 REG SHALLOW	67WW04 9/12/2004 L0001-67WW04 REG SHALLOW	67WW05 12/19/2000 67WW05-001219 REG SHALLOW	67WW05 9/12/2004 L0001-67WW05 REG SHALLOW	67WW06 12/19/2000 67WW06-001219 REG INTERMEDIATE	67WW06 12/19/2000 67WW06QC FD INTERMEDIATE	67WW06 9/12/2004 L0001-67WW06 REG INTERMEDIATE	67WW07 12/19/2000 67WW07-11:15 REG SHALLOW
Chloride	mg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	mg/L N	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum	µg/L N	825	NA	106	NA	114	161	NA	139
Barium	µg/L N	225	NA	133	NA	738	735	NA	3310
Beryllium	µg/L N	<.8	NA	<.8	NA	<.8	<.8	NA	.811
Cadmium	µg/L N	<1	NA	<1	NA	<1	<1	NA	2.58
Calcium	µg/L N	108000	NA	90700	NA	373000	380000	NA	131000
Chromium	µg/L N	<5	NA	89.8	NA	25.1	22.7	NA	31.3
Cobalt	µg/L N	24.7	NA	<10	NA	119	126	NA	66.9
Copper	µg/L N	<10	NA	26.5	NA	10 UJ	10 UJ	NA	26.7 J
Iron	µg/L N	1160 J	NA	676 J	NA	4890	4960	NA	526
Lead	µg/L N	3.47	NA	<3	NA	<3	<3	NA	<3
Magnesium	µg/L N	64200	NA	46700	NA	190000	197000	NA	84300
Manganese	µg/L N	1190	NA	407	NA	3450	3480	NA	2410
Nickel	µg/L N	60	NA	160	NA	146 J	155 J	NA	182 J
Potassium	µg/L N	3000 J	NA	<1000	NA	7490	7820	NA	1170 J
Selenium	µg/L N	12.8 J	NA	10 UJ	NA	14.5	16.5	NA	11.4
Sodium	µg/L N	527000	NA	504000	NA	486000	468000	NA	533000
Strontium	µg/L N	1290	NA	993	NA	6540	6570	NA	2560
Thallium	µg/L N	<5	NA	<5	NA	<5	<5	NA	<5
Zinc	µg/L N	19.8 J	NA	10.6 J	NA	26 J	28.5 J	NA	53.7 J
1,1,1-Trichloroethane	µg/L N	<0.1	<5	<0.1	<5	<0.1	<0.1	<5	<0.1
1,1,2-Trichloroethane	µg/L N	<0.1	<5	<0.1	<5	<0.1	<0.1	<5	<0.1
1,1-Dichloroethane	µg/L N	NA	<5	NA	<5	NA	NA	<5	NA
1,1-Dichloroethene	µg/L N	<0.2	<5	<0.2	<5	<0.2	<0.2	<5	<0.2
1,2-Dichloroethane	µg/L N	<0.1	<5	<0.1	<5	3.51	3.5	<5	2.28
2-Butanone	µg/L N	<25	<5	<25	<5	<25	<25	<5	<25
Chloroform	µg/L N	<0.1	<5	<0.1	<5	2.83	2.95	<5	<0.1
Chloromethane	µg/L N	<0.1	<5	<0.1	1 J	<0.1	<0.1	<5	<0.1
cis-1,2-Dichloroethene	µg/L N	<0.1	<5	<0.1	<5	<0.1	<0.1	<5	<0.1
Hexachlorobutadiene	µg/L N	NA	5 UJ	NA	5 UJ	NA	NA	5 UJ	NA
ISOBUTYL ALCOHOL	µg/L N	NA	<100	NA	<100	NA	NA	<100	NA
Methylene chloride	µg/L N	<1	<5	<1	1 BJ	1.37	1.43	<5	<1
Toluene	µg/L N	<0.8	<5	<0.8	<5	<0.8	<0.8	<5	<0.8
Trichloroethene	µg/L N	<0.1	1 J	<0.1	<5	0.14 J	0.15 J	<5	<0.1
Vinyl chloride	µg/L N	<0.2	<5	<0.2	<5	<0.2	<0.2	<5	<0.2

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GROUNDWATER RESULTS

PARAMETER	UNITS	FILTERED	67WW07 9/12/2004 L0001-67WW07	G4WW01 12/8/1998 G4WW01	G4WW01 9/12/2004 L0001-G4WW01	G4WW02 12/8/1998 G4WW02	G4WW02 12/8/1998 G4WW02QC	G4WW02 9/12/2004 L0001-G4WW02	G4WW03 12/8/1998 G4WW03	G4WW03 9/12/2004 L0001-G4WW03
			REG SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW	FD SHALLOW	REG SHALLOW	REG SHALLOW	REG SHALLOW
Chloride	mg/L	N	NA	926	NA	838	818	NA	2080	NA
Sulfate	mg/L	N	NA	250	NA	190	150	NA	260	NA
Aluminum	µg/L	N	NA	6000	NA	6000	5600	NA	1300	NA
Barium	µg/L	N	NA	<200	NA	<200	<200	NA	<200	NA
Beryllium	µg/L	N	NA	.8	NA	.6	<.5	NA	<.5	NA
Cadmium	µg/L	N	NA	<.8	NA	.8	.8	NA	<.8	NA
Calcium	µg/L	N	NA	140000	NA	98000	94000	NA	240000	NA
Chromium	µg/L	N	NA	50	NA	50	40	NA	20	NA
Cobalt	µg/L	N	NA	<50	NA	<50	<50	NA	<50	NA
Copper	µg/L	N	NA	<25	NA	<25	<25	NA	<25	NA
Iron	µg/L	N	NA	8200	NA	9600	8300	NA	2000	NA
Lead	µg/L	N	NA	7	NA	5	4	NA	<3	NA
Magnesium	µg/L	N	NA	75000	NA	62000	58000	NA	150000	NA
Manganese	µg/L	N	NA	430	NA	440	388	NA	457	NA
Nickel	µg/L	N	NA	50	NA	70	60	NA	80	NA
Potassium	µg/L	N	NA	5000 UJ	NA	5000 UJ	5000 UJ	NA	5000 UJ	NA
Selenium	µg/L	N	NA	<5	NA	<5	<5	NA	<5	NA
Sodium	µg/L	N	NA	450000	NA	450000	400000	NA	870000	NA
Strontium	µg/L	N	NA	3000	NA	2300	2000	NA	7600	NA
Thallium	µg/L	N	NA	1.2	NA	<1	1.5	NA	2.1	NA
Zinc	µg/L	N	NA	50	NA	50	50	NA	40	NA
1,1,1-Trichloro	µg/L	N	<5	560	<5	100	100	<5	1800	<5
1,1,2-Trichloro	µg/L	N	<5	33	1 J	6.4	5.9 J	<5	24	<5
1,1-Dichloro	µg/L	N	<5	14	12	<1	<10	<5	<20	<5
1,1-Dichloro	µg/L	N	<5	380	280	2.4	<10	<5	36	<5
1,2-Dichloro	µg/L	N	<5	27	13	<1	<10	<5	<20	<5
2-Butanone	µg/L	N	<5	61	<5	55	66	<5	<100	<5
Chloroform	µg/L	N	<5	<4	<5	<1	<10	<5	<20	<5
Chloromethane	µg/L	N	<5	<8	<5	<2	<20	<5	<40	<5
cis-1,2-Dichloro	µg/L	N	<5	<4	1 J	<1	<10	<5	<20	<5
Hexachlorobenzene	µg/L	N	2 J	<4	<15	<1	<10	5 UJ	<20	5 UJ
ISOBUTYLALCOHOL	µg/L	N	<100	<800	<100	120	<2000	<100	<4000	<100
Methylene chloride	µg/L	N	<5	<4	<5	<1	<10	<5	<20	<5
Toluene	µg/L	N	<5	65	<5	9.3	7.7 J	<5	91	<5
Trichloroethylene	µg/L	N	<5	6.3	6	<1	<10	<5	<20	<5
Vinyl chloride	µg/L	N	<5	<4	1 J	<1	<10	<5	<20	<5

Notes:

- J The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.
- UJ The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the "non-detect" may be inaccurate or imprecise. The non-detect result should be estimated.

NA Not analyzed
mg/L milligrams per liter
µg/L micrograms per liter



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

May 14, 2007

DAIM-BD-LO

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

Re: Final Addendum 11, Monitored Natural Attenuation Sampling, LHAAP-16, -17, -29, -46, -47, -50 and -35A(58), Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas, May 2007

Dear Mr. Tzhone,

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

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

Sincerely,

A handwritten signature in black ink, reading "Rose M. Zeiler", is positioned above the typed name.

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

Copies furnished:
Fay Duke, TCEQ, Austin, TX
Paul Bruckwicki, Caddo Lake NWR, TX
Cliff Murray, COE – Tulsa District, OK
John R. Lambert, COE – Tulsa District, OK
David Cobb, Shaw – Stoughton, MA
P. Srivastav, Shaw – Houston, TX (for project files)



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

May 14, 2007

DAIM-BD-LO

Ms. Fay Duke
Texas Commission on Environmental Quality
TCEQ Environmental Cleanup Section II MC-221
12100 Park 35 Circle
Austin, TX 78753

Re: Final Addendum 11, Monitored Natural Attenuation Sampling, LHAAP-16, -17, -29, -46, -47, -50 and -35A(58), Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas, May 2007

Dear Ms. Duke,

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

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

Sincerely,

A handwritten signature in black ink, reading "Rose M. Zeiler", is positioned below the "Sincerely," text.

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

Copies furnished:
Stephen Tzhone, USEPA Region 6, Dallas, TX
Paul Bruckwicki, Caddo Lake NWR, TX
Cliff Murray, COE – Tulsa District, OK
John Lambert, COE – Tulsa District, OK
David P. Cobb, Shaw – Stoughton, MA
P. Srivastav, Shaw – Houston, TX (for project files)

Response to Comments
Draft Addendum 11, Monitoring Natural Attenuation Sampling at LHAAP-16, LHAAP-17, LHAAP-29, LHAAP-46, LHAAP-47, LHAAP-50, and LHAAP-35A(58), Longhorn Army Ammunition Plant, Karnack, Texas (February 2007)

May 2007

Reviewer: Cliff Murray, USACE; Rose Zeiler, BRAC

Respondents: Shaw Environmental, Inc.

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commenter Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Page	Section/ Paragraph	Comment	C, D ¹ , E or X	Response	A or D ²
Comments from Cliff Murray, USACE received 3/9/07						
1		Figures	"I have no comments other than that for Figure 1-1 and 2. -5 the boundary used for LHAAP-58 is the overly large boundary that was discussed in a memo earlier this year. I believe that the revised boundary should be used."	C	The boundary was changed according to the USACE memo regarding LHAAP-58.	
Comments from Rose Zeiler, BRAC received 3/9/07						
1		Table 2-2	I note that for Site 47, the MNA sampling is on the central and east portions of the site. I recommend that sampling representative of the west side also be conducted, and that it be done in Well 47WW25 because that well had a TCE detection of over 9,000 ppb and has only been sampled once.	C	The well was added to Table 2-2. Please note that the first round of sampling was completed in February 2007 before the comments were received on March 9, 2007. This well will be sampled when we conduct the next round of sampling.	

FINAL
ADDENDUM 11
MONITORED NATURAL ATTENUATION SAMPLING
LHAAP-16, -17, -29, -46, -47, -50, -35A(58)

FINAL INSTALLATION-WIDE WORK PLAN
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

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

May 2007

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Appendix A	Project-Specific Standard Operating Procedures
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Acronyms and Abbreviations

CDAP	Chemical Data Acquisition Plan
COC	contaminants of concern
LHAAP	Longhorn Army Ammunition Plant
MARC	Multiple Award Remediation Contract
mL	milliliter
MNA	monitored natural attenuation
Shaw	Shaw Environmental, Inc.
SOP	standard operating procedure
TCE	trichloroethylene
TCEQ	Texas Commission on Environmental Quality
TNT	trinitrotoluene
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 Introduction

The U.S. Army Corps of Engineers (USACE), Tulsa District, contracted Shaw Environmental, Inc. (Shaw), under the Louisville District's Multiple Award Remediation Contract (MARC) No. W912QR-04-D-0027, Task Order DS02, to attain remedy-in-place, operating properly and successfully, or response complete at 28 sites at the Longhorn Army Ammunition Plant (LHAAP) in Karnack, Texas. This document is an addendum to the *Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas* (Shaw, 2006) (published separately) and presents the proposed approach for monitored natural attenuation (MNA) sampling at sites LHAAP-16, -17, -29, -46, -47, -50, -35A(58). The approach presented in this document is intended to be generic and may be used for MNA sampling at other sites at LHAAP.

The LHAAP is located in central-east Texas in the northeastern corner of Harrison County (**Figure 1-1**). The facility occupies 8,493 acres between State Highway 42 in Karnack, Texas, and the western shore of Caddo Lake. The nearest cities are Marshall, Texas, approximately 14 miles to the southwest, and Shreveport, Louisiana, approximately 40 miles to the east. Caddo Lake is a large freshwater lake that bounds LHAAP to the north and east. The eastern fence of LHAAP is 3.5 miles from the Texas-Louisiana state border.

1.1 Project Objectives

The objective of this sampling event is to collect and analyze MNA groundwater samples from monitoring wells at designated sites located at LHAAP. The results will be used in determining the effectiveness of MNA over time. MNA relies on natural biological, chemical, and physical processes that act to reduce the mass and concentration of groundwater contaminants of concern (COCs).

The following water quality, chemical, and biological parameters will be collected: pH, oxidation-reduction potential, conductivity, temperature, dissolved oxygen, turbidity, total organic carbon, ferrous iron, nitrates, nitrites, chloride, sulfates, sulfides, methane, ethane, ethene, salinity, alkalinity, carbon dioxide, and *dehalococcoides*.

Field conditions encountered during the work may warrant a change in the planned number of samples. Such changes will be documented in the field log book.

Changes to the sampling frequency, wells sampled, and analytical parameters will be proposed in performance monitoring reports as appropriate.

1.2 Site Description and History

1.2.1 LHAAP-16 Site Description and History

LHAAP-16 is a former landfill located in the south-central portion of LHAAP, immediately north of Avenue Q, and includes approximately 20 acres. The site is bound to the northeast by Harrison Bayou and the outskirts are forested. LHAAP-16 was used for disposal of solid and industrial waste (Jacobs Engineering Corporation [Jacobs], 2001). Previous historical data indicate that the groundwater COCs are trichloroethylene (TCE) and perchlorate. Under an interim remedial action Record of Decision, a landfill cover was constructed over the waste in 1996-1997.

1.2.2 LHAAP-17 Site Description and History

LHAAP-17 is identified as the former Burning Ground No.2/Flashing Area. Located in the southeastern section of LHAAP at the intersection of Scudday Avenue and Avenue Q, LHAAP-17 is heavily wooded and consists of low cleared areas separated by a gravel access road. The site was used for burning bulk trinitrotoluene (TNT), photo flash powder, and reject material. The waste residues were reportedly removed in 1984. The site is currently inactive (Jacobs, 2002). Volatile organic compounds (VOCs), perchlorate, and explosives are the COCs in the groundwater at LHAAP-17 (Jacobs, 2002).

1.2.3 LHAAP-29 Site Description and History

LHAAP-29, known as the former TNT Production Area, is a heavily wooded, 85-acre site in the western-central portion of the LHAAP installation. The site is bounded by Avenue E on the southwest, Zeugner Drive (also known as 1st Street) on the northwest, and 18th Street on the southeast. To the northeast, LHAAP-29 is partially bounded by Avenue D, but also includes the Bulk Toluene Storage Area, which is a wooded area that extends for approximately 500 feet northeast of Avenue D. LHAAP-29 is currently inactive, but once contained five active and one standby TNT production lines. Underground pipe lines and foundations of former production facilities are still in place at the site. The underground pipe lines were originally constructed for cooling water drainage and TNT wastewater conveyance. VOCs (predominantly methylene chloride), perchlorate, and explosives are the COCs in the groundwater at LHAAP-29 (Jacobs, 2002).

1.2.4 LHAAP-46 Site Description and History

LHAAP-46, the Plant 2 Area, covers an area of approximately 190 acres and is located in the northwestern portion of LHAAP. The site is bounded to the south-southwest by Avenue P, to the southeast and east by 11th Street and Raymer Street, to the north by the northern LHAAP property fence line, and to the west by a heavily wooded area.

Plant 2 was originally designed to produce JB-2 propellant fuel and construction began in November 1944. Construction ceased in 1945 with the end of World War II. In 1952, Plant 2 was reactivated for the production of pyrotechnic devices. The site produced pyrotechnic and illumination devices until approximately 1997. Previous site investigations indicate that COCs in the groundwater at LHAAP-46 are VOCs (Jacobs, 2003).

1.2.5 LHAAP-47 Site Description and History

LHAAP-47 (Plant 3 Area) is located in the north-central portion of LHAAP to the southeast of LHAAP-46. The site covers an area of approximately 275 acres. LHAAP-47 is bounded to the east by Karnack Avenue, to the west by Avenue P, to the south by 51st Street, and to the north by 62nd and 66th Streets. The area consists of asphalt-paved roads and parking areas surrounding the Plant 3 buildings, with heavy vegetation and wooded areas to the north and northeast.

Plant 3 construction was initiated in July 1953 and production of rocket motors began in 1954, continuing until the 1980s. Some rocket motor production facilities were converted to produce pyrotechnic and illumination devices and were active until the late 1990s. Previous site investigations indicate that TCE and perchlorate are COCs in the groundwater (Jacobs, 2003).

1.2.6 LHAAP-50 Site Description and History

Located in the north-central portion of LHAAP and occupying approximately 1 acre of land, LHAAP-50 is covered by grass, brush, and trees. The site is bounded to the west by a drainage ditch, to the south by a former railroad bed to the east by South Crockett Avenue, and to the north by Goose Prairie Creek.

A 47,000 gallon aboveground storage tank was once located on LHAAP-50. The tank was used to store wastewater collected from industrial waste production sumps located at various sites throughout the installation. COCs in the groundwater are TCE and perchlorate (Jacobs, 2003).

1.2.7 LHAAP-35A(58) Site Description and History

LHAAP-35A(58) is located in the north-central portion of LHAAP and covers an area of approximately 22 acres. LHAAP-35A(58) is the location of a former Shop Area that was established in 1942. The Shop Area fulfilled a broad range of support activities including a plant-operated laundry, and automotive, woodworking, metal working, painting, refrigeration, and electrical shops. The site became inactive in 1996. Previous investigations indicate that VOCs are COCs in the groundwater (Jacobs, 2003).

2.0 *Field Activities*

Field activities at sites identified for MNA evaluation are divided into the following major tasks. Each task is described in the subsequent sections.

- Task 1 Mobilization and Site Setup
- Task 2 Groundwater Sampling
- Task 3 Investigation-Derived Waste Management

Additional information regarding these tasks can be found in Final Installation-Wide Work Plan Appendix C, Chemical Data Acquisition Plan (CDAP) and Appendix D, Field Procedures (Shaw, 2006). Field procedures described in this document are consistent with those employed previously at the site (Shaw, 2004).

2.1 *Task 1 — Mobilization and Site Setup*

Prior to the mobilization of field personnel to the installation, Shaw will notify the Texas Commission on Environmental Quality (TCEQ), the U.S. Environmental Protection Agency (USEPA), and LHAAP facility and Army personnel a minimum of ten business days in advance.

2.2 *Task 2 — Groundwater Sampling*

Shaw has currently identified wells at seven sites (LHAAP-16, LHAAP-17, LHAAP-29, LHAAP-46, LHAAP-47, LHAAP-50, and LHAAP-35A[58]) for collection and analysis of samples to evaluate MNA. The well locations are highlighted in **Figures 2-1** through **2-5**.

Sampling will take place at a sufficient frequency to adequately evaluate natural attenuating conditions at each site. Prior to commencement of groundwater sampling, groundwater levels will be measured in accordance with Standard Operating Procedure (SOP) 02, Groundwater Level Measurements, (see **Appendix A**). **Table 2-1** provides an itemization of sample parameters, container requirements, sample methods, hold times, and preservative requirements for samples taken at each site. The location of the duplicate samples will be determined in the field. **Table 2-2** shows the wells currently proposed to be sampled during MNA sampling events. The wells to be sampled, the sampling frequency, and the parameters analyzed may be changed or revised as indicated in **Section 1.0**.

Monitoring wells will be sampled using the low flow method. The only exceptions will be slow recharging wells that go dry or drawdown significantly, whereby equilibrium cannot be maintained. Procedures for low flow purging and sampling and alternative means are detailed in SOP 01, Groundwater Sampling, in **Appendix A** of this work plan addendum. The equipment to

be used during sampling is presented in **Table 2-3**. The major steps of groundwater sampling are as follows:

- Prepare sampling site by laying out plastic sheeting on adjacent ground.
- Calibrate field equipment and instruments and verify that they are in proper working order and record calibration in logbook.
- Don required personal protective equipment as specified in the Health and Safety Plan, Appendix A of the Final Installation-Wide Work Plan (Shaw, 2006). At a minimum, a fresh pair of non-powdered disposable gloves must be donned prior to initiating sampling activities and between each sample point.
- Perform groundwater sampling in accordance with the CDAP, Appendix C of the Final Installation-Wide Work Plan (Shaw, 2006).
- Record the sampling procedures on a Field Sampling Report or logbook.
- Measure general water quality parameters (e.g., pH, conductivity, temperature, oxidation/reduction potential, turbidity, salinity) using field instrument(s) and record measurements on a Field Sampling Report or logbook. Water quality parameters will be measured intermittently throughout the sampling process.
- Measure ferrous iron with a Hach DR/850, DR/890 or DR/850, DR/890 colorimeter. The steps for recording ferrous iron concentrations with the Hach DR/850, DR/890 are as follows:
 1. Select program 33.
 2. Add 25 milliliters (mL) of groundwater purged from well to 40-mL volatile organic analysis vial.
 3. Press “zero” to calibrate.
 4. Add 1 pack of reagent for a 25 mL sample.
 5. Press timer. This will set the timer for 3 minutes to allow the reagent to dissolve into the groundwater sample.
 6. After 3 minutes, press read.
 7. Record ferrous iron concentration.
- Complete COC documentation as outlined in SOP 03, Non-Hazardous Sample Handling, Packaging, and Shipping (see **Appendix A**).

2.3 Task 3 — Investigation-Derived Waste Management

Wastes generated during the proposed activities will include wastewater (from equipment decontamination and well purging) and miscellaneous wastes. Management of the waste streams is described below.

2.3.1 Wastewater

Wastewater generated from equipment decontamination, purging, and well sampling will be stored in sealable containers, including 5-gallon buckets, 55-gallon drums, and/or larger containers. Containers will be transported to the groundwater treatment plant at LHAAP-18/24 for disposal and will be discharged into the influent stream of the plant.

2.3.2 Miscellaneous Wastes

Miscellaneous wastes include spent personnel protective equipment, high-density polyethylene sheeting, rags, paper towels, etc. These wastes will not be characterized and will be placed in plastic bags for disposal as non-hazardous waste.

3.0 References

Jacobs Engineering Corporation (Jacobs), 2001, *Feasibility Study for Site 16, Karnack, Texas*, Draft Final, Oak Ridge, TN, December.

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

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

Shaw Environmental, Inc. (Shaw), 2004, *Final Work Plan, Groundwater Data Gaps Investigation, Groups 2 and 4, Longhorn Army Ammunition Plant, Karnack, Texas*, Houston, Texas, February.

Shaw, 2006, *Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas*, Houston, Texas, January.

Tables

Table 2-1
Groundwater Parameter, Analytical Method, Container, Preservative and Holding Time

LHAAP-16, -46, -47, -50	Method	Container	Hold Time	Preservative
<i>Contaminants</i>				
VOCs	8260B	3 - 40 ml voa vial	7 days	HCl
Perchlorate	EPA 314.1	1-500 ml plastic	28 days	None
<i>Water Quality^a</i>				
pH	YSI	NA	NA	NA
Oxidation-Reduction Potential				
Conductivity				
Temperature				
Dissolved Oxygen				
Turbidity				
Salinity				
Total Organic Carbon	415.1	3 - 40 ml voa vial	28 days	H ₂ SO ₄
Alkalinity	310.1	1,000 ml plastic	14 days	4°C
Ferrous Iron	Hach	NA	NA	NA
<i>Anions^b</i>				
Nitrates	300	1-500 ml plastic	48 hours	4°C
Nitrites				
Chloride				
Sulfates				
Sulfides	376.2	1-500 ml plastic	7 days	Zn Acetate, 4°C
<i>Gases^c</i>				
Methane	RSK 175	3 - 40 ml voa vial	14 days	4°C
Ethane				
Ethene				
Carbon Dioxide	RSK 175	3 - 40 ml voa vial	14 days	4°C
<i>Biological</i>				
<i>Dehalococcoides</i>	Shaw ^d	2-L amber glass	7 days	NA

Notes and Abbreviations:

VOCs analyzed by EPA Method 8260B. Perchlorate analyzed by EPA Method 314.

^a Parameter measured during field investigation, except for total organic carbon and alkalinity, which are sent to lab.

^b Anions will be collected in same container with the exception of sulfides.

^c Gases will be collected in same containers.

C degrees celcius

L liter

mL milliliter

NA not applicable

RSK Method for analyzing dissolved gases

VOA volatile organic analysis

VOC volatile organic compound

Table 2-1 (continued)
Groundwater Parameter, Analytical Method, Container, Preservative and Holding Time

LHAAP-17 and LHAAP-29	Method	Container	Hold Time	Preservative
<i>Contaminants</i>				
VOCs	8260B	3 - 40 mL voa vial	7 days	HCl
Perchlorate	EPA 314.1	1-500 mL plastic	28 days	None
Explosives	8330 ^a	1-L amber glass	7 days	None
<i>Water Quality^b</i>				
pH	YSI	NA	NA	NA
Oxidation-Reduction Potential				
Conductivity				
Temperature				
Dissolved Oxygen				
Turbidity				
Salinity				
Total Organic Carbon	415.1	3 - 40 mL voa vial	28 days	H ₂ SO ₄
Alkalinity	310.1	1,000 mL plastic	14 days	4°C
Ferrous Iron ^a	Hach	NA	NA	NA
<i>Anions^c</i>				
Nitrates	300	1-500 ml plastic	48 hours	4°C
Nitrites				
Chloride				
Sulfates				
Sulfides	376.2	1-500 mL plastic	7 days	Zn Acetate, 4°C
<i>Gases^d</i>				
Methane	RSK 175	3 - 40 mL voa vial	14 days	4°C
Ethane				
Ethene				
Carbon Dioxide	RSK 175	3 - 40 mL voa vial	14 days	4°C
<i>Biological</i>				
Dehalococcoides	Shaw ^e	2-L amber glass	7 days	NA

Notes and Abbreviations:

VOCs analyzed by EPA Method 8260B. Perchlorate analyzed by EPA Method 314. Explosives analyzed by EPA Method 8330.

^a Method 8330 modified to include 2,6-Diamino-4-nitrotoluene and 2,4-Diamino-6-nitrotoluene.

^b Parameter taken during field investigation (TOC and alkalinity sent to lab).

^c Anions will be collected in same container with the exception of sulfides.

^d Gases will be collected in same containers.

^e The method for detecting dehalococcoides can be reviewed in Appendix A.

C degrees celcius

L liters

mL milliliters

NA not applicable

RSK Method for analyzing dissolved gases

VOA volatile organic analysis

VOC volatile organic compound

Table 2-1 (continued)
Groundwater Parameter, Analytical Method, Container, Preservative and Holding Time

LHAAP-35A(58)	Method	Container	Hold Time	Preservative
<i>Contaminants</i>				
VOCs	8260B	3 - 40 mL voa vial	7 days	HCl
<i>Water Quality^a</i>				
pH	YSI	NA	NA	NA
Oxidation-Reduction Potential				
Conductivity				
Temperature				
Dissolved Oxygen				
Turbidity				
Salinity				
Total Organic Carbon	415.1	3 - 40 mL voa vial	28 days	H ₂ SO ₄
Alkalinity	310.1	1,000 mL plastic	14 days	4°C
Ferrous Iron	Hach	NA	NA	NA
<i>Anions^b</i>				
Nitrates	300	1-500 mL plastic	48 hours	4°C
Nitrites	300	1-500 mL plastic	48 hours	4°C
Chloride	300	1-500 mL plastic	48 hours	4°C
Sulfates	300	1-500 mL plastic	48 hours	4°C
Sulfides	376.2	1-500 mL plastic	7 days	Zn Acetate, 4°C
<i>Gases^c</i>				
Methane	RSK 175	3 - 4 mL voa vial	14 days	4°C
Ethane				
Ethene				
Carbon Dioxide	RSK 175	3 - 4 mL voa vial	14 days	4°C
<i>Biological</i>				
Dehalococcoides	Shaw ^d	2-L amber glass	7 days	NA

Notes and Abbreviations:

VOCs analyzed by EPA Method 8260B.

^a Parameter taken during field investigation (TOC and alkalinity sent to lab).

^b Anions will be collected in same container with the exception of sulfides.

^c Gases will be collected in same containers.

^d The method for detecting dehalococcoides can be reviewed in Appendix A.

C degrees celcius

L liters

mL milliliters

NA not applicable

RSK Method for analyzing dissolved gases

VOA volatile organic analysis

VOC volatile organic compound

Table 2-2
Proposed Wells to be Sampled During MNA Events

LHAAP-16	Zone	Screened Interval (ft-btoc)	Approximate Pump Intake Depth (in feet)	Estimated Tube Length (in feet)	Well Selection Rationale
16WW12	S	14-24	19	22	assess lateral/downgradient extent of shallow groundwater
16WW22	S	21-31	26	29	assess lateral/downgradient extent of shallow groundwater
16WW13	S	14-24	19	22	assess lateral/downgradient extent of shallow groundwater
16WW16	S	19-29	24	27	assess groundwater at plume hotspot
16WW30	S	25-30	27.5	30.5	assess lateral/downgradient extent of shallow groundwater
16WW29	I	37-42	39.5	42.5	assess extent of intermediate groundwater
16WW25	I	39-49	44	47	assess extent of intermediate groundwater
16WW37	I	40.5-45.5	43	46	assess groundwater at plume hotspot
16WW36	S	16.5-21.5	19	22	assess groundwater at plume hotspot
16WW26	S	12.5-17.5	15	18	assess lateral/downgradient extent of shallow groundwater
16WW34	S	27-32	33	30	assess lateral/downgradient extent of shallow groundwater
16WW38	S	19-29	24	28	assess lateral/downgradient extent of shallow groundwater
16WW05	S	15.5-30.5	20.5	24	assess groundwater in the presumed upgradient direction

LHAAP-17	Zone	Screened Interval (ft-btoc)	Approximate Pump Intake Depth	Estimated Tube Length	Well Selection Rationale
17WW16	D	141-151	146	149	assess extent of deep groundwater
17WW05	D	142-152	147	150	assess extent of deep groundwater
17WW10	S	20.5-30.5	25.5	28.5	assess lateral extent of shallow groundwater
17WW06	S	11-21	16	19	assess lateral extent of shallow groundwater
17WW12	I	5-15	10	13	assess extent of intermediate groundwater
130	S	8-23	15.5	18.5	assess lateral/downgradient extent of shallow groundwater
17WW01	S	10.8-30.8	20.8	23.8	assess groundwater at plume hotspot
17WW02	S	12-22	17	20	assess lateral/downgradient extent of shallow groundwater
17WW08	S	21-31	26	29	assess groundwater in the presumed upgradient direction

LHAAP-29	Zone	Screened Interval (ft-btoc)	Approximate Pump Intake Depth	Estimated Tube Length	Well Selection Rationale
29WW15	S	20-30	25	28	assess groundwater at plume hotspot
29WW36	S	23-33	28	31	assess lateral/downgradient extent of shallow groundwater
29WW38	S	34-44	39	42	assess lateral extent of shallow groundwater
29WW06	S	22-32	27	30	assess lateral/downgradient extent of shallow groundwater
29WW35	I	85-95	90	93	assess extent of intermediate groundwater
29WW26	S	23-33	28	31	assess groundwater in the presumed upgradient direction

LHAAP-46	Zone	Screened Interval (ft-btoc)	Approximate Pump Intake Depth	Estimated Tube Length	Well Selection Rationale
46WW02	I	35-45	40	43	assess extent of intermediate groundwater
LHSMW18	S	14.5-24.5	19.5	22.5	assess lateral extent of shallow groundwater
LHSMW19	S	16.6-26.6	21.6	24.6	assess lateral/downgradient extent of shallow groundwater
46WW04	S	14-24	19	22	assess lateral extent of shallow groundwater
46WW01	S	14-24	19	22	assess groundwater at plume hotspot
LHSMW22	S	21-31	36	39	assess lateral/downgradient extent of shallow groundwater
LHSMW23	I	18.4-38.4	28.4	31.4	assess extent of intermediate groundwater
LHSMW17	S	13.6-23.6	18	21	assess groundwater in the presumed upgradient direction

LHAAP-47	Zone	Screened Interval (ft-btoc)	Approximate Pump Intake Depth	Estimated Tube Length	Well Selection Rationale
47WW13	S	8-18	13	16	assess lateral/downgradient extent of shallow groundwater
LHSMW43	S	9-19	24	27	assess groundwater at plume hotspot
47WW30	S	12.5-22.5	17.5	20.5	assess lateral/downgradient extent of shallow groundwater
47WW14	I	39-49	44	47	assess extent of intermediate groundwater
47WW09	I	28-38	33	36	assess extent of intermediate groundwater
47WW25	S	15-25	20	23	assess cross-gradient extent of shallow groundwater
47WW12	S	9-19	14	17	assess lateral extent of groundwater
LHSMW52	S	11.7-21.7	16	20	assess groundwater in the presumed upgradient direction

LHAAP-50	Zone	Screened Interval (ft-btoc)	Approximate Pump Intake Depth	Estimated Tube Length	Well Selection Rationale
50WW06	I	45-55	50	53	assess extent of intermediate groundwater
50WW02	S	9-19	14	17	assess groundwater at plume hotspot
50WW05	S	12-22	17	20	assess lateral/downgradient extent of shallow groundwater
50WW03	S	10-20	15	18	assess lateral extent of shallow groundwater
50WW04	S	10-20	15	18	assess groundwater in the presumed upgradient direction

LHAAP-35A(58)	Zone	Screened Interval (ft-btoc)	Approximate Pump Intake Depth	Estimated Tube Length	Well Selection Rationale
LHSMW05	S	11.9-21.9	16.9	19.9	assess groundwater at plume hotspot
LHSMW06	S	10-20	15	18	assess lateral extent of shallow groundwater
LHSMW07	S	17-27	22	25	assess lateral/downgradient extent of shallow groundwater
LHSMW04	S	18.2-28.2	23.2	26.2	assess lateral/downgradient extent of shallow groundwater
35AWW03	S	9-19	14	17	assess groundwater in the cross-gradient direction

Notes and Abbreviations:

Depths may vary depending upon water level

S shallow

I intermediate

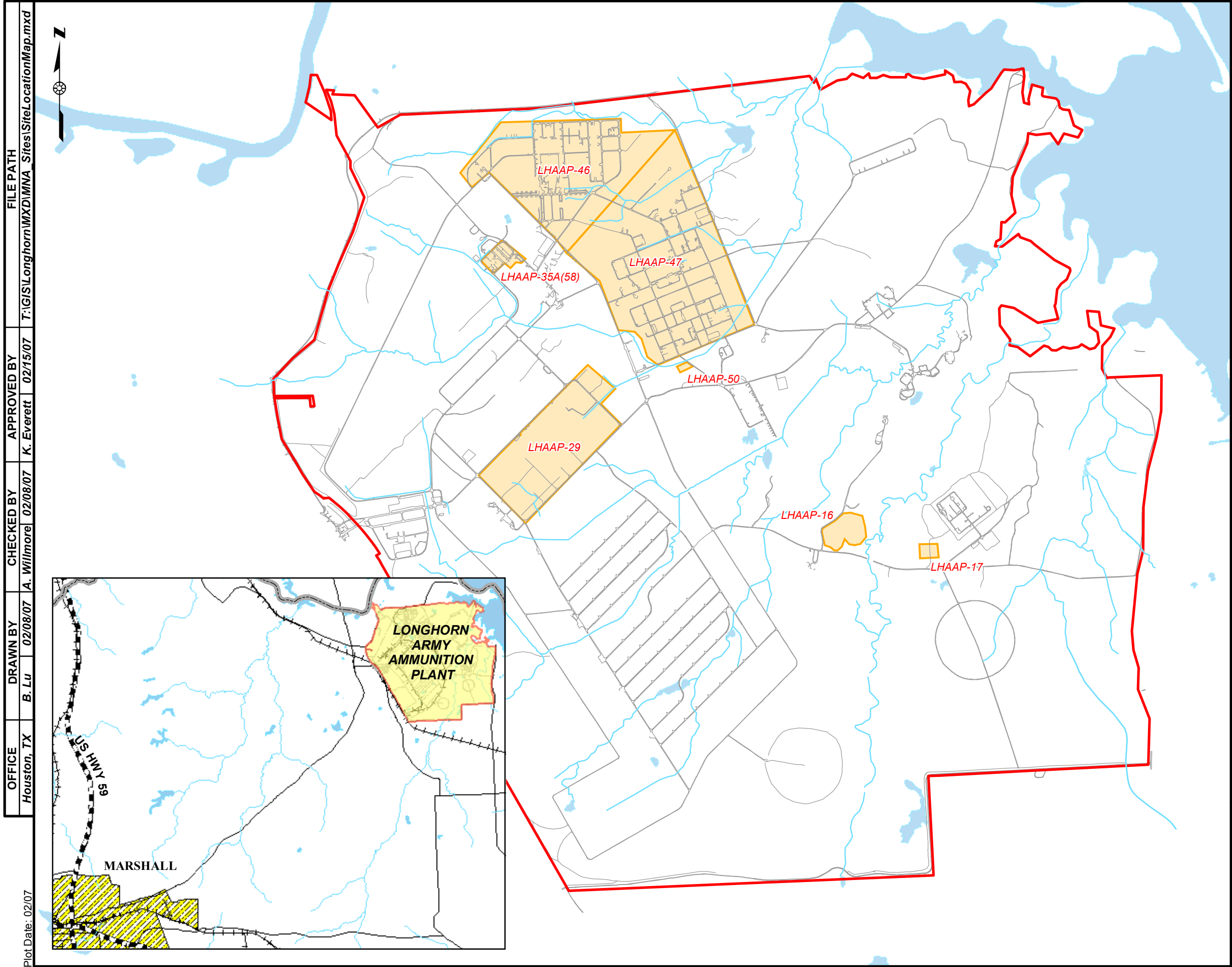
D deep

ft-btoc feet below top of casing

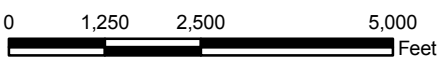
Table 2-3
Sample Equipment Requirements


Equipment	Purpose of Equipment
Hach DR/850 or DR/890	Measures ferrous iron concentration
YSI 6920	Measures water quality parameters including salinity, turbidity, D.O. (dissolved oxygen), pH, temperature, conductivity, and ORP (oxidation/reduction potential)
Air Compressor	Provides air pressure for low flow purging
Water level meter	Gauges groundwater elevation within the well
Air Regulator/ Control Box	Allows for adjustment of pumping rates
Teflon Bladders	Allow water intake while sampling
Bladder pumps	Pump water to surface
4000 feet of HDPE 1/4-inch-diameter tubing	Aids transport of groundwater from pump to surface
photoionization detector	Provides selective determination of aromatic hydrocarbons
flame ionization detector	Detects components from the groundwater which can be burned
HDPE	high-density polyethylene

Figures



- LEGEND**
- Stream
 - Road
 - Site
 - Lake
 - LHAAP Boundary





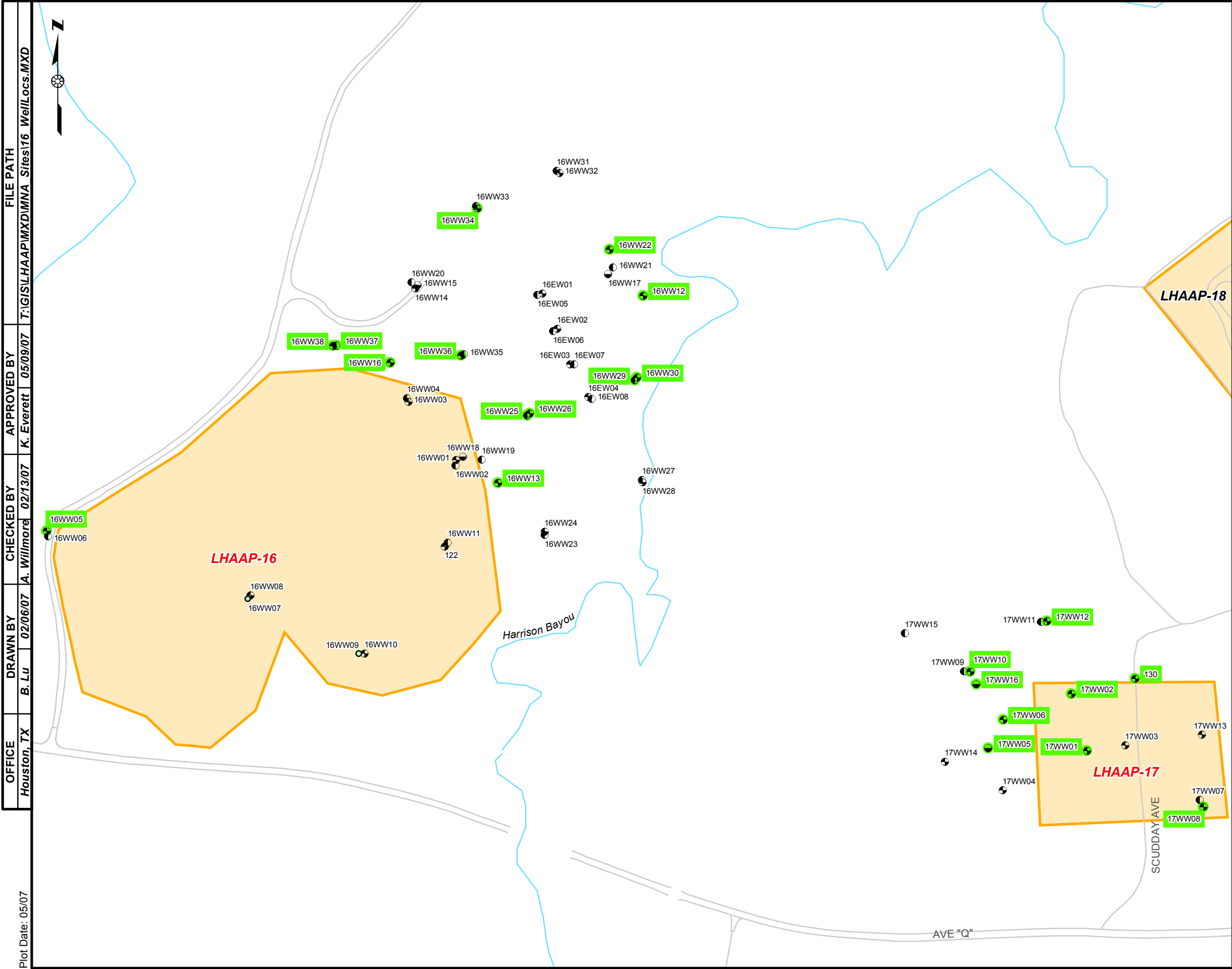
U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE 1-1
SITE LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

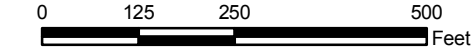
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Plot Date: 02/07



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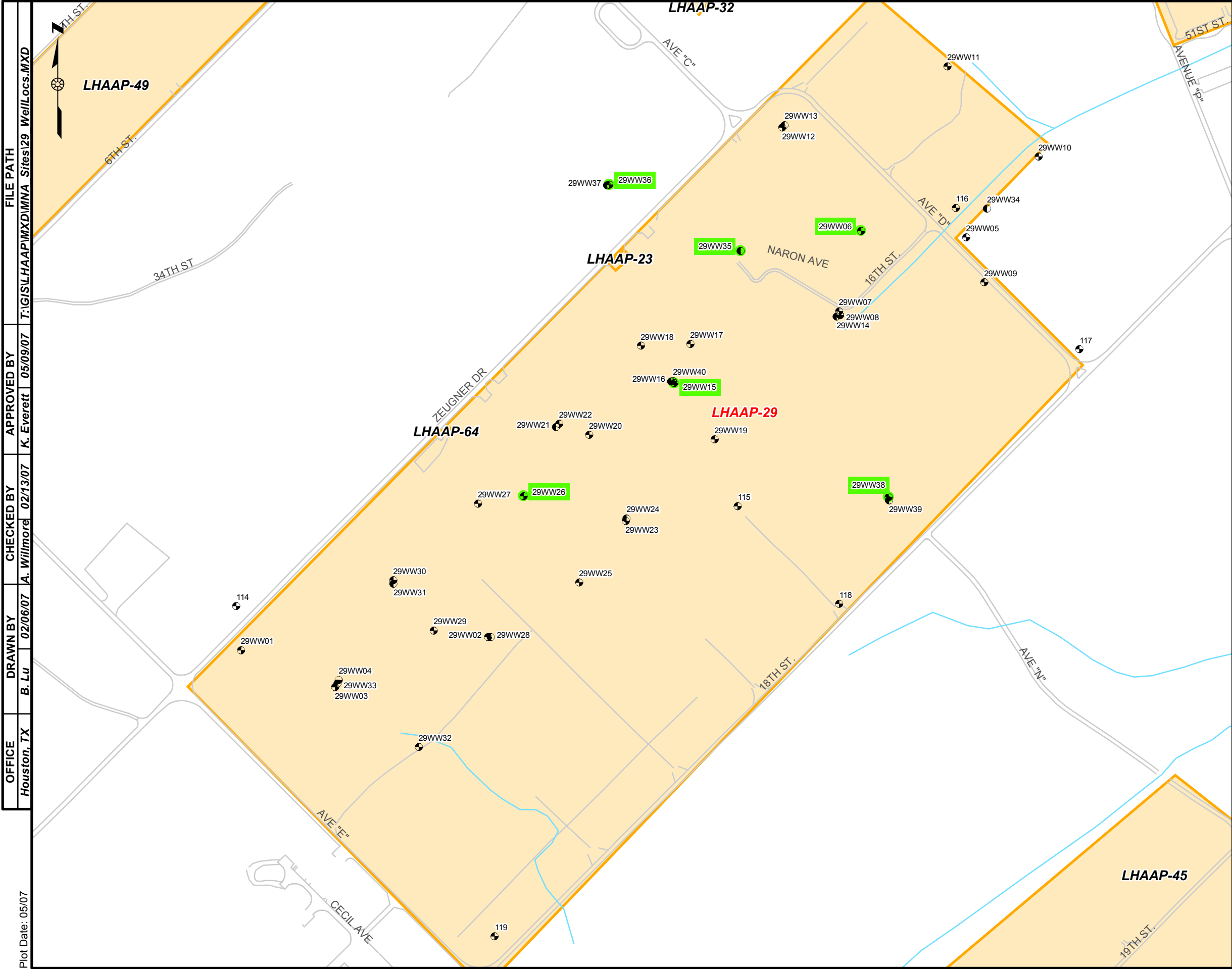


U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE 2-1

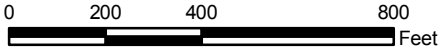
MONITORING WELL LOCATIONS
LHAAP-16 AND LHAAP-17

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS



OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
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Plot Date: 05/07

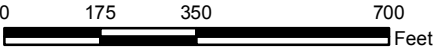
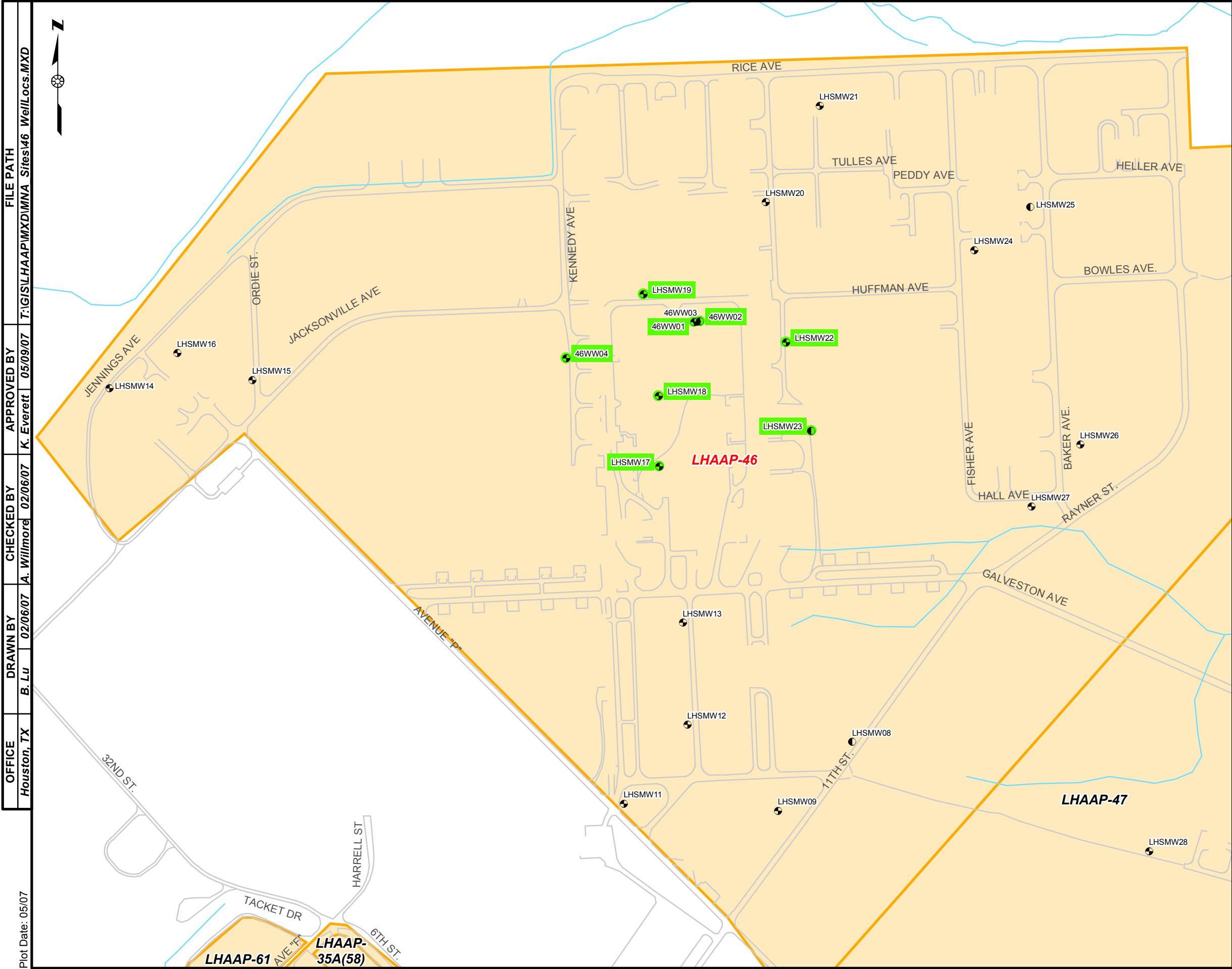


U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE 2-2

MONITORING WELL LOCATIONS
LHAAP-29

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

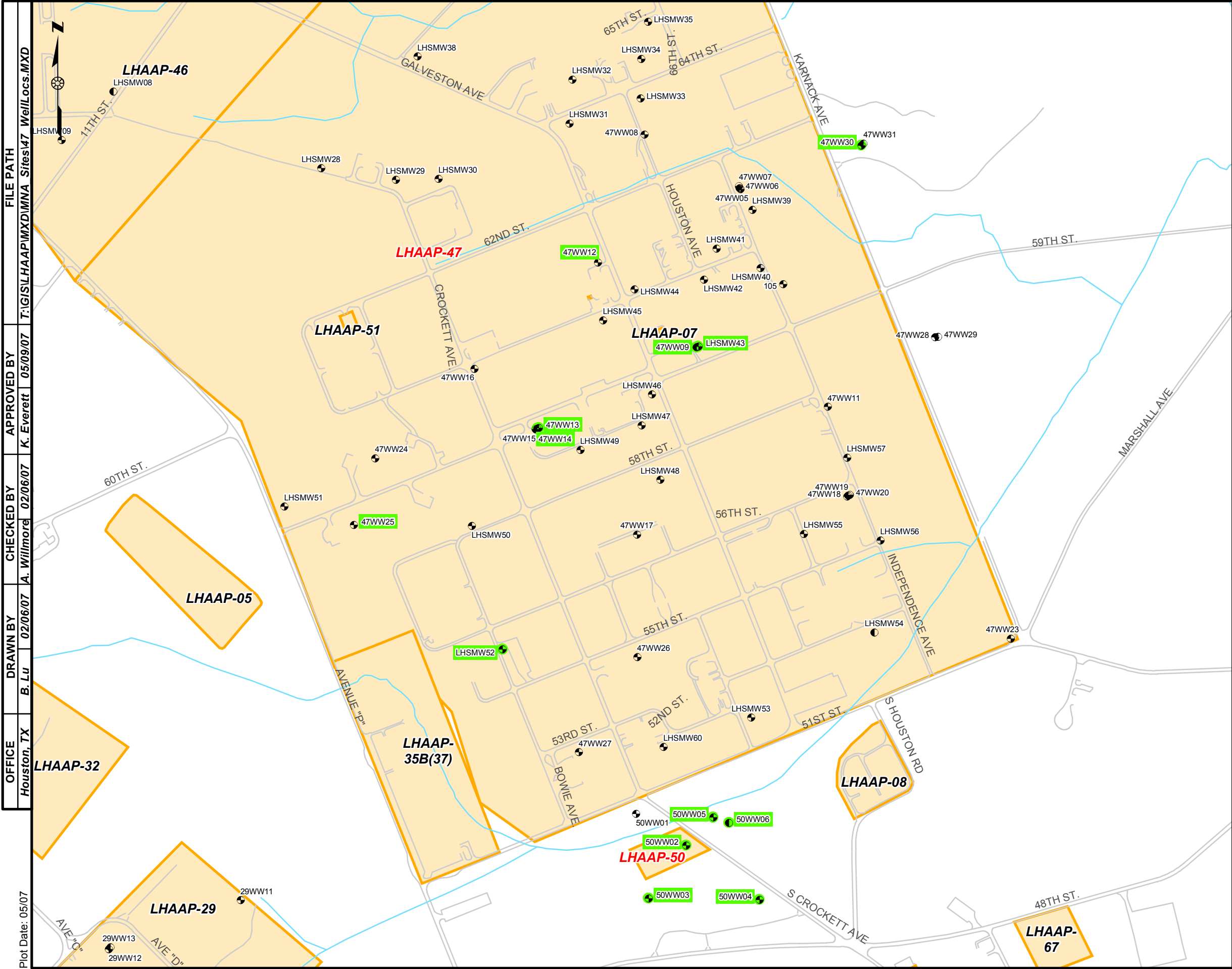


U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE 2-3

MONITORING WELL LOCATIONS
LHAAP-46

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

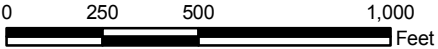


LEGEND

Monitoring Wells

- Shallow
- Intermediate
- Deep
- Well to Be Sampled

- Stream
- Road
- Site

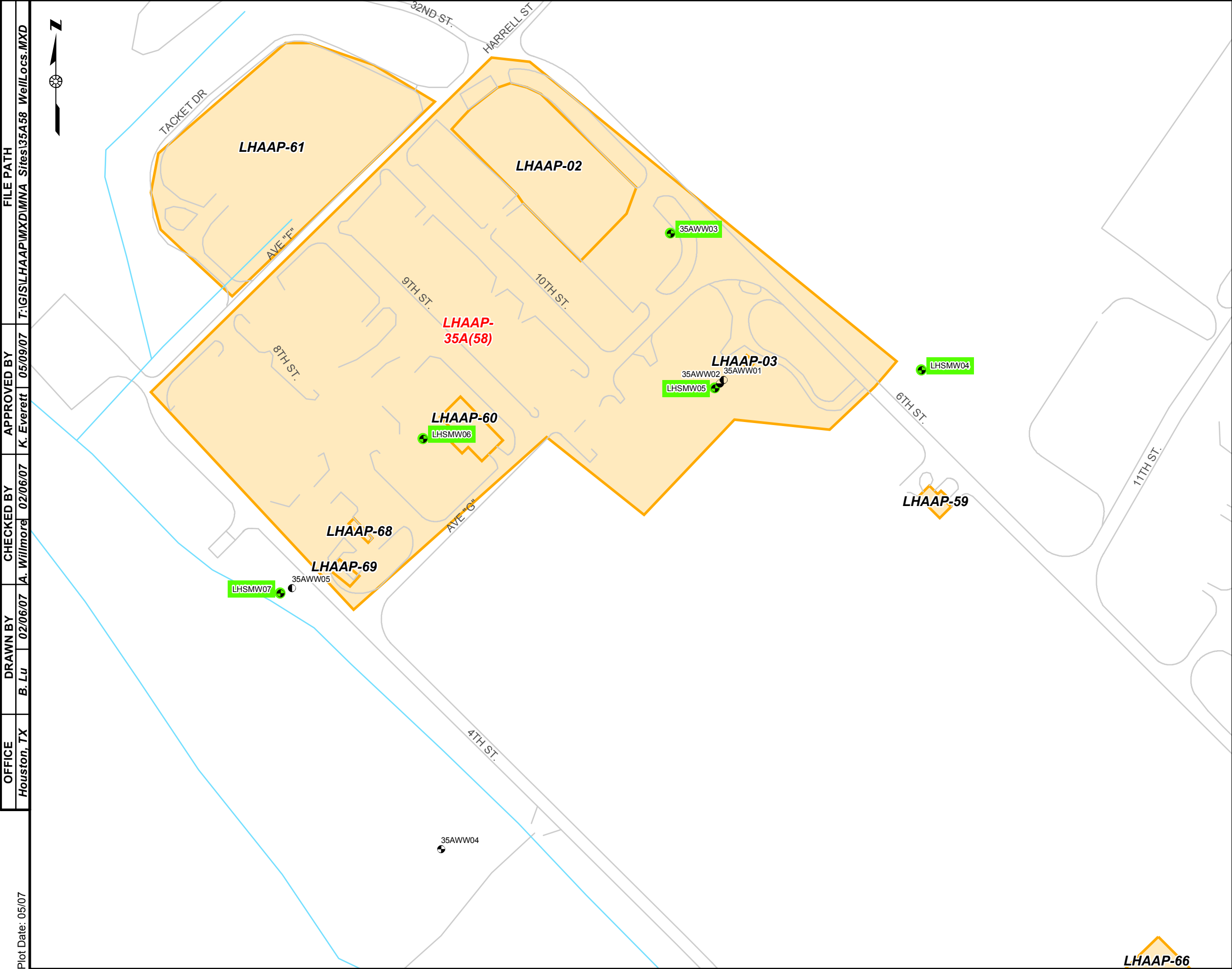


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TULSA, OKLAHOMA

FIGURE 2-4

MONITORING WELL LOCATIONS
LHAAP-47 AND LHAAP-50

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS



OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
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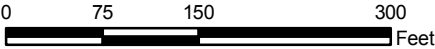
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LEGEND

Monitoring Wells

- Shallow
- Intermediate
- Deep
- Well to Be Sampled

- Stream
- Road
- Site



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

FIGURE 2-5

MONITORING WELL LOCATIONS
LHAAP-35A(58)

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS



Appendix A

Project-Specific Standard Operating Procedures

- **SOP 01 Groundwater Sampling**
- **SOP 02 Groundwater Level Measurements**
- **SOP 03 Non-Hazardous Sample Handling, Packaging, and Shipping**
- **SOP 04 Decontamination**
- **SOP 05 Investigation-Derived Waste**
- **SOP 06 Field Data Collection for Natural Attenuation**

SOP 01 Groundwater Sampling

SHAW STANDARD OPERATING PROJECT PROCEDURE

LONGHORN ARMY AMMUNITION PLANT

ATTACHMENT 1

Subject: GROUNDWATER SAMPLING

1.0 PURPOSE AND SUMMARY

This Standard Operating Project Procedure (SOPP) establishes guidelines and procedures for use by field personnel in sampling monitoring well groundwater.

A consistently implemented groundwater sampling procedure will help ensure data comparability between different sampling events and between sites. One of the following methods shall be used to collect groundwater samples. The method to be used shall depend upon the site conditions or requirements of the work plan. The low-flow method shall be used unless other methods are specified or approved for special circumstances.

(a) ***Low-flow purge and sample using a submersible bladder pump.***

The method involves purging the well at low-flow rates until water quality parameters stabilize or are within acceptable ranges, and collecting the sample at the same low flow rates. This method should be used by default unless the site conditions or the work plan require using a different method. A bladder pump is preferred for low flow sampling; however, other pumps (e.g., peristaltic pump) may be acceptable depending upon the objective of the sampling.

(b) ***Volume purge and sample using a bailer..***

The method involves purging a fixed number of well volumes using a bailer. Purging is continued until at least 3 well volumes are purged and the parameters have stabilized.

This method shall be used in lieu of the low-flow method, only if warranted by the site conditions (e.g., bent well casing). A bailer may also be used for collecting sample from a well that goes dry even at the slowest pumping rate during low-flow purging. In such a case, the well is pumped dry and sample is collected with a bailer as soon as sufficient quantity of water has accumulated in the well. This method shall be used only if specified in the work plan or approved by a task manager or the technical lead.

The low-flow purge and sample method shall be used as a default method for collecting groundwater samples for chemical analysis. The use of method (b) will be restricted only to special circumstances, either if specified in the work plan or if warranted by site conditions.

If site conditions warrant the use of method (b), prior approval from the technical lead is required and the approving person must be identified in the sample collection log.

1.1 Low-Flow Purge and Sample

Introduction. The low-flow (minimum drawdown, micropurging) sampling method is based upon the premise that a pump located within the screened interval of a well and pumping at a rate corresponding to the hydraulic conductivity of the formation, will rapidly establish a horizontal laminar flow of groundwater and withdraw fresh formation water without significant mixing or dewatering of the stagnant casing water in the well (U.S. Army Corps of Engineers, 1995). The low flow method aims to

minimize well water turbidity which may be caused by resuspension of well sediments or additional development of the formation during high speed pumping.

Establishment of a low flow regime will be ensured by carefully monitoring the drawdown because excessive drawdown indicates that the pump is withdrawing stagnant casing water. The maximum drawdown allowed will be 0.3 feet (4 inches). During purging, the flow rate will typically be maintained within the range of 0.1-0.5 liter/minute (L/min). The flow rate will be decreased further if the drawdown exceeds 0.3 feet. Flow rates up to 1 L/min may be used in purging some high yielding residuum aquifers, if the drawdown remains within the allowable limit of 0.3 feet. Flow rates greater than 1 L/min may be allowed in bedrock wells where the well may be screened across a cavity, with the limitation of the maximum drawdown. However, the flow rate in all cases must be slowed down to 0.1 to 0.3 L/min during sampling to prevent turbulence and aeration of water.

If excessive drawdown is noted using the lowest possible pump rate, then the low-flow method is not applicable. In such a case, the well will be pumped dry once and sample will be collected with a bailer as soon as adequate quantity of water for samples is available.

2.0 RESPONSIBILITY MATRIX

2.1 Site Manager

The Site Manager or Field Team Leader, is responsible for ensuring that field activities are completed to meet the project objectives, that they are conducted in accordance with the project plans and requirements, and that all activities are performed according to the respective procedures. The Site Manager is responsible for ensuring that all site personnel are trained in the procedures, that the procedures are adhered to, and that all activities are documented.

2.2 Field Team

All members of the field team (samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring that all team members also perform work in accordance with this procedure.

3.0 DEFINITIONS

Bailer. A bailer is an enclosed cylindrical tube containing a floating ball check-valve at the bottom. Lowering the bailer into water causes the ball to float allowing water to enter the cylinder. Raising the bailer through the water causes the ball to settle, creating a seal to trap the water so that it can be brought to the surface.

Bladder Pump. A bladder pump is an enclosed cylindrical tube containing a flexible membrane bladder. Well water enters the bladder through a one-way check-valve at the bottom. Gas is forced into the annular space (positive displacement) surrounding the bladder through a gas supply line. The gas displaces the well water through a one-way check-valve at the top. The water is brought to the surface through a water discharge line. The gas (air or nitrogen) is provided by compressors or compressed gas cylinders.

Peristaltic Pump. A peristaltic pump is a self-priming, low volume pump consisting of a rotor and ball bearing rollers. Tubing placed around the rotors is squeezed by the rotors as they revolve. The squeezing produces a wavelike contractual movement which causes water to be drawn through the tubing. The peristaltic pump is limited to sampling at depths of less than 25 feet.

Purging. The process of evacuation of the static water in the monitoring well to allow formation water to flow into the well. The aim of purging a well before sampling is to obtain a sample that is representative of the groundwater in the soil or rock formation. Purging can be accomplished either by utilizing low-flow purge or volume purge methods. In the low-flow purge method, water is pumped at a slow rate to establish a horizontal laminar flow to draw water from the formation without drawing in the stagnant casing water. Volume purge involves evacuating 3-5 well volumes of water to ensure that all stagnant water has been removed from the well.

Water Quality Parameters. Chemical and physical properties of groundwater measured during purging and sampling to ensure that a representative groundwater sample has been collected and to document the ambient subsurface conditions at the time of sampling. The parameters normally measured include pH, Eh, temperature, dissolved oxygen, conductivity, and turbidity. The measurements are made at specified intervals and documented in appropriate sample collection logs completed in the field.

4.0 PROCEDURE

4.1 Required Records And Forms

1. Groundwater Sampling Log (Attachment 1.0)
2. Chain-of-Custody Form
3. Sampling and Analysis Plan
4. Material Safety Data Sheets (MSDS)
5. Field Activity Daily Log (FADL).

4.2 Required Materials, Equipment, Or Supplies

The following supplies are required for low-flow purge and sample method. Other supplies as needed in addition or in-lieu of those listed below are specified in respective sections.

1. Personal protective equipment (PPE) as required by the site-specific health and safety plan
2. Calculator
3. Decontamination solutions; nonphosphate detergent, rinse water, deionized water
4. Compressor, air
5. Container, 1-gal clear glass
6. Controller Box
7. Cooler with ice and packing materials
8. Cylinder, graduated, 2-liter
9. Drum, 55-gallon

10. Filters, high capacity, in-line sample filter, 0.45 micron
11. Filtration units, (disposable) and hand-operated vacuum pump (if needed in-lieu of in-line filtration)
12. Flow-through cell or equivalent
13. Gasoline
14. Gloves, nitrile or latex
15. Keys for locking well caps
16. Labels, sample bottles
17. Litmus paper or pH indicator strips
18. Paper towels
19. Pens, waterproof
20. Pipettes
21. Pump, bladder
22. Radio, two-way, hand-held or cellular phone
23. Safety glasses with side shields
24. Sample containers
25. Sheeting, polyethylene
26. Steel tape, weighted
27. Stop watch
28. Thermometer
29. Photoionization Detector (PID)
30. Trash bags, large plastic
31. Trash can, 32-gallon plastic
32. Tubing, Teflon[®]-lined polyethylene discharge bundled with polyethylene air tube
33. Water Level Indicator.

4.3 General Requirements

Decontamination:

1. All field sampling equipment (pump, bailer, water discharge tubing, support cables, water level indicator, flow-through cells, etc) likely to come in contact with the sampled groundwater shall be decontaminated before and after each use or between wells. The pump shall be initially disassembled and decontaminated. Refer to the decontamination SOPP for complete procedures.
2. The water discharge tubing shall then be attached and the pump used to twice circulate detergent solution followed by potable water and deionized water rinses. Only Teflon[®] or Teflon[®]-lined tubing shall be reused after decontamination. Polyethylene or tygon tubing shall be discarded after each use and shall not be decontaminated for reuse.

Other Requirements

3. Provide shade for the spooled tube when a sampling event occurs during summer months in full sun. Otherwise, the tube may act as an effective heater, warming the groundwater sample and creating a potential for volatilization.

4. The portable generator/compressors shall be placed downwind from the well being sampled.
5. Store field parameter measurement “instruments” in shade during transportation and at the sampling site. The instruments may give inaccurate readings if left under full sun.
6. To the extent possible, groundwater sampling shall be conducted so as to sample upgradient, presumably “clean” wells first.
7. All personnel involved in sampling shall wear appropriate health and safety clothing and gear, including clean nitrile gloves, in accordance with the site-specific health and safety plan.
8. In order to minimize turbidity in the well, pump and tubing assemblages shall be lowered into the well as slowly as possible to minimize turbidity.

4.4 Specific Requirements for Low-Flow Sampling

Follow steps given below:

Pump Installation

1. Measure the static water level and the total well depth with an electric water level indicator.
2. Based on the well design information, subsurface geology, and the measured water level, determine the location of the pump intake using the guidelines given below:
 - a. If a zone with a relatively high hydraulic conductivity (K) is present in the screened interval, place the pump intake within this zone. A high K zone may be a sandy or gravel unit within an overall clayey unit or a fracture zone within the bedrock. If the high K zone is near the bottom of the screen, the pump intake should be as much above the well bottom as possible.
 - b. If a high K zone is not present and the screen is completely submerged, place the pump intake near the middle or slightly above the middle of the screen.
 - c. If a high K zone is not present and if the water level is below the top of the screen, place the pump near the middle of the water column. The pump intake should be as much above the well bottom as possible.
3. Connect the safety cable, discharge tube, and air tube to the bladder pump. The discharge tube will be Teflon[®]-lined polyethylene and its length will be appropriate for the well being sampled. For example, a 100-foot long tube may not be used in sampling a 30-foot deep well, instead a 50-foot length will be used.

Using an appropriate length of tube will minimize the amount of decontamination fluids generated and lessen the opportunity for chemical and physical changes in the water due to contact with the spooled tube.

4. Gently lower the pump to the appropriate sampling depth so as to minimize mixing of stagnant casing water with the screen water and resuspension of bottom sediments. Secure the pump at the desired depth by clamping the support cable to the 4-inch non-locking well cap.
5. Lower an electric water level indicator (with an audio and visual alarm) again into the well, measure and record the water level. The water level may be temporarily elevated because of the insertion of the pump into the well. Wait for a few minutes until the water level returns to the static level.
6. Make proper connections for the pump. Attach the air supply line to the pump controller. Connect the pump discharge tube to a "T" insert with a valve. Connect two sections of Teflon[®]-lined tube to the two remaining ends of the "T". Connect one tube to the flow through cell of the water quality meter and place the discharge from the flow cell into the purge water container. The third tube from the "T" will be used for sample collection.
7. Calibrate water quality meters and place probes into the flow through cell.
8. Measure the water level in the well. Secure the water level probe 0.3 foot (4 inches) below the water level and keep the instrument on.
9. Start the pump at the lowest setting. Gradually increase the flow rate.
10. Constantly monitor the drawdown as the flow rate is increased. If the drawdown exceeds 0.3 foot, indicated by visual or audio alarms on the water level indicator, decrease the flow rate appropriately.
11. Monitor the pump flow rate in mL/min using a stop watch and a graduated measuring cylinder. The target flow rate is 100 to 500 mL/min (0.1 to 0.5 L/min), which may be increased in the case of a rapid recharging well to 1 L/min (residuum well) or greater (bedrock well), with the maximum drawdown limitation of 0.3 foot.
12. Measure water quality indicator parameters every 3 to 5 minutes. The parameters and their tolerance limits are provided in Table 1 and discussed further in a subsequent section. The measurements shall be recorded on the groundwater sampling form. All measurements shall be recorded in units shown on the form. If measurements are made in different units, these units must be clearly shown on the form.
13. Once water quality indicator parameters stabilize (four consecutive readings within acceptable variability), turn the valve at the "T" junction so that the water

is diverted from the flow cell to the tube designated for sample collection. Collect samples at 100 to 500 mL/min purging rate.

A bailer should be used for sampling in the case where a well is extremely slow to recharge (i.e., the recovery rate is below the minimum possible pump rate) and has to be pumped dry. Follow the procedures given below under these circumstances.

14. If the recharge rate of a well fails to sustain the lowest possible flow rate of the pump, causing an excessive drawdown, purge the well dry once. Remove the pump from the well and allow the well to recover until adequate water for samples is available.
15. Use a bailer to collect samples as soon as adequate water is available in the well. Collect samples for different parameters as the water becomes available, in the order specified in section 4.8. The recovery time may vary from a couple of hours to 12 hours. A minimum amount of time should be allowed between the drying of the well and sample collection. If a well is left unsampled for over 12 hours, the process should be repeated by purging the well dry again.

4.5 Specific Requirements for Volume Purge and Sampling Using a Bailer

The following procedures shall be applicable while using a bailer for purging and sampling a well. A bailer shall be used for purging only under special circumstances. For example, the well casing may be bent and may not allow insertion of a bladder pump beyond the bend. However, prior approval from the principal investigator or the task manager shall be obtained and documented on the sample collection form before using this method.

1. Prepare and decontaminate equipment as per general procedures.
2. Measure the static water level and the total well depth with an electric water level indicator.
3. Use Teflon[®] bailers, if the bailers are to be decontaminated between wells and reused, or disposable bailers.
4. Use disposable twine with the bailer. Do not decontaminate and reuse plastic twine. Only Teflon[®]-covered steel cable may be decontaminated and reused at another well.
5. To start purging, gently lower and raise the bailer in the water column.
6. Record water quality parameters at least twice for each well volume evacuated.
7. Purge until at least 3 well volumes have been evacuated and the well parameters have stabilized or the well is bailed dry. Proceed with sample collection once parameter stabilization and low turbidity values (Table 1) have been achieved. If

the well is bailed dry, wait until adequate water is available in the well and proceed with sample collection.

8. Collect the samples in the analyte order provided in a subsequent section.
9. If collecting a filtered sample, use a disposable filtration unit with a hand-operated vacuum pump. Alternatively, send an unpreserved (no nitric acid added) sample to the laboratory. The sample will be filtered in the laboratory before analysis.
10. Record all pertinent information on the groundwater sampling form, identifying the sampling method used (i.e., volume purge and sample with a bailer) in the "Comments" field. Any fields in the form not applicable to the method used shall be marked "NA."

4.6 Disposal of Purge Water

The water purged from the well is considered investigation-derived waste (IDW). All purge water shall be containerized and handled according to the work plan.

4.7 Specific Requirements for Water Quality Parameter Measurements

Water quality parameters to be monitored during the purge process shall include pH, temperature, conductivity, redox potential (Eh), dissolved oxygen (DO), and turbidity. Measurements shall be made at intervals required by the specific method used. If using a pump, a flow-through cell will be used to measure field parameters at the discharge from the pump at a frequency specified in the sample collection log. If using a bailer for purging, field parameters shall be measured at least twice per well volume evacuated.

The goal of the purging process is to obtain a groundwater sample that is representative of the surrounding aquifer. Field parameters are the simplest indicators for determining when the formation water is being removed. The normal ranges of field parameters are indicated in Table 1. Stabilization of parameters is required for before analytical samples may be collected, irrespective of the method used. Field parameter stabilization is defined as four consecutive readings within the criteria presented in Table 1.

Professional judgement should be used in evaluating field measurements. For example, if DO readings are in the 5 to 7 milligrams per liter (mg/L) range, then 10 percent is a reasonable fluctuation. But if DO is in the 0.5 to 1 mg/L range, then fluctuations within 10 percent are perhaps overly stringent and 20-50 percent variations may be allowed. The same is true for conductivity and the 10 mV goal for redox. If after 3 well volumes have been purged, all but one or two parameters have stabilized, but are relatively close to their respective target bounds, then this may be an adequate indication that formation water is being removed and sample may be collected. Rationale for samples collected when field parameters are outside of the target fluctuations will be documented on the sample collection logs.

Under low-flow sampling conditions, no minimum volume of water is required to be removed from a well prior to sampling. Under volume purge techniques (pump or bailer), at least 3 well volumes of water should be purged before sampling. Up to 5 well volumes may be purged if parameters do not stabilize after purging 3 volumes and there is an indication that the parameters may stabilize with further purging. However, if field measurements have not stabilized after 5 well volumes have been removed, then the task manager or technical lead shall be contacted to determine whether collecting a sample is appropriate.

Turbidity measurements should be treated differently for different situations. When the analytical program specifies metals (total or unfiltered) for laboratory analysis, then the target turbidity shall be less than 10 NTU, and consecutive turbidity readings less than 10 NTU will be considered equivalent. When metals are not an analytical parameter, then turbidity is not as great a concern, and the target shall be less than 20 NTU. However, in both cases, these goals may not be attainable due to silty or clayey sections of the aquifer matrix. If each parameter has stabilized, but turbidity is still above the target NTU value, then purging shall continue in an effort to attain the target NTU. Decisions to continue purging will be based on how far out of compliance the values are (e.g., 15 versus 100 NTU), and will be made by the technical lead on a case-by-case basis.

During purging, the field parameter values shall be periodically compared to the normal parameter ranges (Table 1). Parameters outside the normal range may indicate a problem with instrument calibration or a faulty well construction. The accuracy of certain instruments tends to drift with time and such instruments may require frequent calibration. An example of a faulty well construction is the presence of cement grout in the screen interval due to a poor bentonite seal. The cement grout causes the pH of the groundwater to be abnormally high (11-13 range). If the parameters are observed to be outside the normal range, the instruments shall be recalibrated and the measurement repeated. If the parameters are still outside the normal range for 4 consecutive readings during purging, the well construction may be faulty and the task manager or technical lead must be contacted for further direction. No samples shall be collected from a well with questionable construction until further direction.

4.8 Sample Collection

Regardless of the purging technique used, samples shall be collected at flow rates in the range 0.1-0.5 L/min or poured gently to avoid aeration, bubble formation, or turbulent filling of sample bottles.

Samples shall be collected in the following order of target analytes, if adequate amount of water is available in the well:

- Volatile organic compounds (VOC)
- Semivolatile organic compounds (SVOC)
- Turbidity
- Major water quality cations and anions

- Carbonate/biocarbonate
- Total suspended solids
- Total dissolved solids
- Kjeldahl nitrogen
- Total metals
- Dissolved metals
- Total petroleum hydrocarbons
- Cyanide
- Ammonia, nitrogen.

Samples for any target analytes not listed above shall be collected in the order of decreasing volatility within the framework of this list. If the amount of water available in the well is low, minimum volume requirements provided in Table 2 should be implemented or certain target analytes may be omitted, upon approval from the task manager and project chemist.

Filtered Samples. Filtered groundwater samples are normally not needed if a successful low-flow sampling program is implemented. However, if specified in the work plan, filtered groundwater samples will be collected according to the following procedures:

1. If using a flow cell, connect an inline, disposable 0.45 μm filter to the discharge flow tube attached to the "T" junction upstream from the flow cell. If a flow cell is not being used, connect the filter to the discharge tube of the pump. Collect the water discharging from the filter in the sample container.
2. If the low rate is too slow to allow filtration through an in-line filter or if samples are collected by a bailer, an alternative filtration method may be required. A disposable filtration unit and a hand-operated vacuum pump will be used to filter the sample in the field.
3. If filtration can not be accomplished in the field, an unpreserved sample (no nitric acid added) cooled to 4°C shall be shipped to the laboratory along with the preserved sample for unfiltered analysis. The unpreserved sample shall be filtered upon receipt and the filtrate preserved with nitric acid. The data from the laboratory filtered sample will be reported as "dissolved metals."

4.9 Records

For each monitoring well purged, the technician shall complete a groundwater sampling form (Attachment A). This form prompts the technician to identify and record information such as: site ID, well ID, sample number, depth of well, depth to water, and well diameter. The technician can then use the information on the form to perform a well casing volume calculation. The form also includes spaces to record the field parameters that are measured during purging and any comments and observations. This form also prompts the technician to record the sample number, collection date, and time, sample containers, and associated QC sample information.

All well purging and sampling data and information shall be recorded in the Field Activity Data Log (FADL) for the site sampled. The FADL entries shall be recorded chronologically and the time of the entry recorded first. All FADL continuation pages shall be sequentially numbered and the last page recorded for the day shall be signed and dated by the recording technician.

5.0 CROSS REFERENCE

U.S. Environmental Protection Agency (USEPA), 1986, *Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document*, OSWER-9950.1, September.

U.S. Army Corps of Engineers (USACE), 1994, *Requirements for the Preparation of Sampling and Analysis Plans*, EM 200-1-3, September.

U.S. Environmental Protection Agency (USEPA), 1996, *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, Region 4, May.

U.S. Environmental Protection Agency (USEPA), 1995, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, Groundwater Issue*, EPA/540/S-95/504, December.

7.0 TABLES

Table 1 - Water Quality Indicator Parameters

Table 2 - Water Sample Volume Requirements

8.0 ATTACHMENTS

Attachment A - Groundwater Sampling Form

Table 1
Water Quality Indicator Parameters

Measurement	Normal Range	Acceptable Variability ^a
PH	4.6 to 8.5	± 0.1
Temperature (°C)	10 to 18	± 10%
Specific Conductivity (µS/cm)	10 to 8,000	± 3%
Redox (mV)	+400 to -300	± 10
Dissolved oxygen (mg/L)	<10	± 10%
Turbidity (NTU)	variable	± 10% ^b

Notes and Abbreviations:

- ^a acceptable variability for four consecutive readings
^b values of less than 10 NTU are considered to be equivalent

°C degrees celsius
µS/cm micro siemens per centimeter
mV millivolt
mg/L milligrams per liter
NTU nephelometric turbidity unit

Table 2
Water Sample Volume Requirements

Analysis	Standard Volume (mL)	Minimum Volume (mL)*	Minimum Volume Option*
Volatile organics	120	40	X
Semivolatile organics	1000	1000	
Pesticides/PCBs	1000	1000	
Herbicides	1000	1000	
Metals – Total	500	125	X
Metals – Dissolved	500	125	X
Mercury – Total	Included with metals	Included with metals	
Mercury – Dissolved	(100)	(100)	
Cyanide	500	125	X
Anions	250	100	X
Nitrate-nitrite	100	50	X
Total suspended solids and total dissolved solids (TSS and TDS)	500	200	X
Total organic carbon (TOC) RCRA 4/well	4 x 25	4 x 25	
Total organic halides (TOX) RCRA 4/well	4 x 100	4 x 100	
Total petroleum hydrocarbon (TPH)	1000	1000	X
Gasoline range organics (GRO)	80	40	X
Diesel range organics (DRO)	1000	1000	

Notes:

- * Quantitation limits (detection levels) may be affected when operating with minimum sample volumes. If volumes are lowered below the minimum sample volumes, quantitation limits will be raised.

SOP 02 Groundwater Level Measurements

SHAW STANDARD OPERATING PROJECT PROCEDURE

LONGHORN ARMY AMMUNITION PLANT

ATTACHMENT 2

Subject: GROUNDWATER LEVEL MEASUREMENTS

1.0 PURPOSE AND SUMMARY

This Standard Operating Project Procedure (SOPP) establishes guidelines and procedures for use by field personnel in determining the groundwater level in monitoring wells.

Proper recording procedures are necessary to assure the quality and integrity of all groundwater level measurements. Prior to collecting groundwater levels, a strategy should be developed based on the objectives of the investigation.

The measurement of the ground water level in a well is frequently conducted in conjunction with ground water sampling to determine the "free" water surface. This potentiometric surface measurement can be used to establish ground water flow direction and gradients. Total well depth and ground water level measurements are needed to determine the volume of water in the well casing prior to purging the well for sampling purposes.

All ground water level and total depth measurements should be made relative to an established reference point on the well casing and should be documented in the field records. To be useful for establishing ground water gradient, the reference point should be tied in with the NGVD (National Geodetic Vertical Datum) or a local datum.

When measuring wells for water table or potentiometric surface analysis, and if the contaminant history is known for each of the wells, it is advisable to monitor water levels beginning with the least contaminated wells first and progressing to the most contaminated wells last, where practical.

Documents other than those required by the contract and consulted in the preparation of this SOPP are listed under "Cross Reference."

The details within this SOPP should be used in conjunction with the Work Plan which will generally provide the following information:

- Data collection objectives;
- Locations for data collection;
- Types of data to be collected; and
- Specific quality control (QC) procedures required.

2.0 TABLE OF CONTENTS

- 1.0 Purpose and Scope
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3.3	Site Contractor Quality Control Systems Manager (CQCSM)
4.0	Definitions
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5.1	Required Records and Forms
5.2	Required Material, Equipment, or Supplies
5.3	General Requirements
5.4	Specific Requirements
5.5	Records
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3.0 RESPONSIBILITY MATRIX

3.1 Site Manager

The Site Manager or Field Team Leader, is responsible for ensuring field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures. The Site Manager is responsible for ensuring all site personnel are trained in the procedures, the procedures are adhered to, and all activities are documented.

3.2 Field Team

All members of the field team (samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members also perform work in accordance with this procedure.

3.3 Site Contractor Quality Control Systems Manager (CQCSM)

The Site CQCSM is responsible for ensuring that this procedure is correctly implemented and that data collected meet the requirements of the Project Work Plan.

4.0 DEFINITIONS

Electronic Water Level Indicator. This instrument consists of a spool of dual wire, a probe attached to the end, and an indicator. When the probe comes in contact with the water, the circuit is closed and a meter light and/or buzzer attached to the spool will signal the contact. Penlight or 9-volt batteries are normally used as a power source. Measurements should be made and recorded to the nearest 0.01 foot.

5.0 TEXT

5.1 Required Records And Forms

1. Field Activity Daily Log (FADL)
2. Instrument operation manual.

5.2 Required Materials, Equipment, Or Supplies

1. Indelible black-ink pens and markers

2. Personal protective clothing and gear
3. Gloves, nitrile
4. Keys for locking well caps
5. Paper towels
6. Radio, two-way, hand held or cellular phone
7. Safety glasses
8. Appropriate equipment and meters for obtaining field measurements as specified in the Work Plan (i.e., water quality)
9. Linear measuring device (e.g., tape measure)
10. Electronic water indicator (appropriate length)
11. Organic vapor analyzer (FID/PID).

The equipment must be capable of recording a measurement to the accuracy required by the Work Plan. Project data quality objectives and site characteristics must be taken into account when determining the groundwater level measurement equipment to use. The total number of wells to be measured, weather, tidal influences, pumping, and construction can all affect water level measurements.

5.3 General Requirements

Operation manuals provide operation and calibration procedures to be followed. Several standard steps should be taken before beginning any depth measurement of groundwater level measurement activity is performed.

1. Verify that all personnel have read and understood the approved site-specific health and safety plan and have the proper training and certifications required under OSHA.
2. Verify the site location by existing maps and surface features. Mark off the boundaries of the work site with flagging or other means to prohibit access to unauthorized personnel.
3. Check to see that all the necessary equipment (including PPE) is available at the site, is in good working condition, and has been properly decontaminated.
4. Check that all monitoring equipment is properly calibrated and operating. Measuring tapes should be checked a minimum of every six months against a surveyor's tape to determine if shrinking or stretching has occurred.
5. Visually inspect the well to ensure that it is undamaged, properly labeled and secured. Any damage or problems with the well head should be noted on the FADL and the site manager notified for repair or replacement of the equipment.
6. Uncap the well and monitor the air space for organic vapors immediately above the open casing with an FID/PID. (Observe if any air is flowing into or out of the casing. In the event such conditions are observed, they should be noted on the FADL. If air is observed to be entering or flowing out of the casing, the sounder

should not be placed inside the well until the air flow stops and pressure equalizes.

5.4 Specific Requirements

The specific procedure for determining groundwater level using an electronic water level indicator is described below.

1. Lower the electronic water level indicator into the well until the water surface is encountered as indicated by an audible (beep) or visual (light) signal.
2. When the water surface is reached, give the tape a short, sharp jerk to ensure that the probe is not responding to condensation along the well casing.
3. Measure the distance from the water surface to the permanent reference point. For aboveground "stickup" completions, the reference point is usually a groove cut into the north side of the casing. If no permanent reference point is available for an aboveground completion, measure from another permanently fixed structure or from ground level. The point of measurement should then be noted on the FADL and the appropriate form on which the water level is recorded. For flush mount completions, such as street boxes, the groundwater level measurement should be referenced to a steel grate placed across the rim of the street box and over the casing. Any aboveground completions without permanent reference points or marks should be brought to the attention of the appropriate supervisory personnel.
4. Collect measurements until two consecutive measurements are identical or within the specified tolerance (usually 0.01 ft). Record all appropriate information on the FADL. At a minimum, the following information must be recorded:
 - project name and number;
 - unique well identification number;
 - date and time of measurement collection;
 - depth to water to the specified tolerance;
 - weather conditions; and any problems encountered.
5. Once the water level measurement is completed, turn the device in the off position and slowly lower the probe to the bottom of the well to sound the depth. Record the depth to the bottom of the well to the nearest 0.01 feet and document the bottom condition (i.e., soft, silty, hard).
6. Cap and relock the well.
7. Perform all equipment decontamination procedures as specified in the field procedures in Attachment 9 of Appendix D. Measuring **equipment must be decontaminated** prior to utilizing for well measurements.

5.5 Records

All information will be recorded on a FADL for the subject site. The FADL entries will be recorded chronologically and the time of the entry recorded first. All FADL continuation pages will be sequentially numbered and the last page recorded for the day will be signed and dated by the recording technician. Records generated as a result of this SOPP will be controlled and maintained in the project record files.

6.0 EXCEPTION PROVISIONS

None.

7.0 CROSS REFERENCE

Annual Book of ASTM Standards, 1987 *Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)*, D4750.

EPA, 1996, *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, Region 4, Athens, GA.

EPA, 1986, *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*, OSWER-9950.1, U.S. Government Printing Office, Washington, D.C.

U.S. Army Corp of Engineers, 1998, *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites*, EM 1110-1-4000.

8.0 TABLES

None

9.0 ATTACHMENTS

None.

SOP 03 Non-Hazardous Sample Handling, Packaging, and Shipping

SHAW STANDARD OPERATING PROJECT PROCEDURE

LONGHORN ARMY AMMUNITION PLANT

ATTACHMENT 3

Subject: NON-HAZARDOUS SAMPLE HANDLING, PACKAGING AND SHIPPING

1.0 PURPOSE AND SUMMARY

This Standard Operating Project Procedure (SOPP) establishes guidelines and procedures for field personnel to use in the packaging and shipping of environmental samples for chemical and physical analysis.

This SOPP only applies to the packaging and shipping of low concentration environmental samples. This procedure does not apply to those samples considered hazardous materials, hazardous waste, mixed waste, radioactive waste, or dangerous goods. Those requirements are specified in the Department of Transportation (DOT) 49 CFR 171-178 and the most current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations. The details within this SOPP are only applicable to the general requirements for sample packaging and shipping and should only be used as a guide for developing more job-specific work plans.

The details within this SOPP should be used in conjunction with the Work Plan, which will generally provide the following information:

- Sample collection objectives
- Locations and depths of soil samples to be collected
- Numbers and volumes of soil samples to be collected
- Types of analyses to be conducted for the samples
- Specific quality control (QC) procedures and sampling required

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- 7.0 Cross Reference
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- 9.0 Attachments

3.0 RESPONSIBILITY MATRIX

- 3.1 Site Manager:** The Site Manager or Field Team Leader, is responsible for ensuring field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures. The Site Manager is responsible for ensuring all site personnel are trained in the procedures, the procedures are adhered to, and all activities are documented.
- 3.2 Field Team:** All members of the field team (samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members also perform work in accordance with this procedure.
- 3.3 Site Contractor Quality Control Systems Manager (CQCSM):** The Site CQCSM is responsible for the periodic review of documentation generated during sample handling, packaging, and shipping and the periodic review and audit of field personnel as they perform the work. If problems arise, the site CQCSM is also responsible for swift implementation of corrective action (i.e., retraining personnel, additional review of work plans and procedures, variances to requirements, issuing nonconformances).

4.0 DEFINITIONS

Environmental Sample - A low concentration sample that does not meet DOT or IATA definitions for a regulated shipment.

Hazardous Materials/Dangerous Goods Sample - Medium or high concentration sample regulated by either DOT or IATA.

Hazardous Waste - Any substance listed in 40 CFR Subpart D (260.30 et seq.) or otherwise characterized as ignitable, corrosive, reactive, or toxic as specified in Subpart C (261.20 et seq.) that would be subject to manifest and packaging requirements specified in 40 CFR 262. Hazardous waste is defined and regulated by the U.S. Environmental Protection Agency (USEPA).

Hazardous Material/Dangerous Good - A material in a quantity or form which may pose an unreasonable risk to health, safety, and/or property as defined by DOT when transported in commerce. Hazardous materials are defined by DOT (49 CFR 171.8), and dangerous goods are defined by IATA (Section 3).

Sample - Physical evidence collected from a facility or the environment which is representative of conditions at the point and time at which the sample is collected.

U. S. DOT Regulations – Requirements for shipping hazardous materials by highway domestically found at 49 CFR 171-178.

IATA Regulations, current edition – Requirements for shipping dangerous goods by air both domestically and internationally.

5.0 TEXT

5.1 Supplies and Equipment

The following is a list of the supplies and equipment needed to implement this SOPP in the field.

5.1.1 Required Records and Forms

1. Sample Collection Log (SCL)
2. Field Activity Daily Log (FADL)
3. Sample tags/labels and the appropriate forms/documentation for sample shipment
4. Material Safety Data Sheets (MSDS)
5. Site-Specific Field Sampling Plan.
6. CFR 171-178 for ground shipping or the IATA regulations for air shipping.

5.1.2 Materials, Equipment, or Supplies

1. Indelible black-ink pens and markers
2. Plastic or metal coolers (typically provided by the laboratory)
3. Waterproof sealing tape
4. Ice (double bagged)
5. Fiberglass packing tape
6. Nitrile or Latex gloves
7. Plastic Zip-Loc[®] bags
8. Bubble wrap, styrofoam packing material, vermiculite (or other absorbent)

5.2 Procedures

The following steps must be followed when packaging and shipping non-regulated environmental samples:

1. Properly label (with indelible ink) sample container with the site, unique sample identifier, matrix type, time and date of collection, analytical method, preservatives, and sampling personnel at the time of sample collection. Clear tape should be placed over the label to minimize damage to sample label caused by moisture.
2. As soon as possible after sample collection, tightly seal the container, and place a piece of custody tape over or around the cap. The custody tape should be placed over the cap so that any attempt to remove the cap will

cause the tape to be broken. Do not place custody tape over a volatile organic analysis (VOA) vial septum.

3. Prepare chain-of-custody and request for analyses forms as required by the Quality Control Plan.
4. Place all containers in separate, appropriately sized, airtight, seam sealing polyethylene bags (e.g., Ziploc®). Seal the bag, removing any excess air and wrap with bubble wrap or similar material.
5. Place the bagged container inside an insulating shipping container, such as a common plastic picnic cooler (not styrofoam).
6. Surround the bagged container with absorbent material (e.g., vermiculite).
7. Samples must be packed so they are surrounded and covered by a sufficient volume of ice to maintain a 4 ± 2 degrees Celsius (°C) temperature immediately following collection of the samples in the field and during the entire shipping period. Ice used in the cooler must be contained in two sealed, leak-proof plastic bags to prevent contact of the sample containers with melted ice.
8. Samples labels must be compared to the COC forms to ensure proper documentation. Sample labels must be attached so they will not come loose from sample containers during shipment or if they become wet (the use of clear tape wrapped around the label will prevent this).
9. Place additional packing material (e.g. bubble wrap, vermiculite, or styrofoam) on top of the samples to eliminate the potential for samples to shift during shipment. Cushioning materials may be used to inhibit breakage of sample containers; however, cushioning material must not interfere with maintaining sample cooling.
10. Record the air bill number or other shipping information on the COC.
11. Place the original COC in a resealable bag and tape to inside of top of cooler. A copy of the COC must be retained for the field file.
12. Place custody seals on shipping container. Use custody seals on individual bottles if coolers might be opened during transport (customs, etc.).
13. Seal cooler with strapping tape over the custody seals. Place address label on cooler. Mark the container "THIS END UP," or apply arrow labels that indicate the proper position to be maintained during shipping.

14. If samples are shipped via commercial overnight delivery service, a copy of the shipping bill must be retained in the appropriate files. All pertinent information must also be recorded on the FADL. If sampling personnel are delivering samples to the laboratory, this should be noted on the COC. In this case, the cooler need not have custody seals during transport.
15. The laboratory should be contacted to confirm safe arrival of all samples. If delivery of samples will occur at the laboratory on weekends or holidays, the laboratory will be notified to have someone available to receive them. Any problems occurring after sample shipment should be recorded on the FADL along with the names of personnel at the laboratory who explained the problem.
16. For packages containing preserved samples or sample containers with preservative inside, shipping details are provided in Section 7.0, "Restrictions/Limitations".

6.0 EXCEPTION PROVISIONS

1. Blue ice or similar products are not allowed for shipping because it/they do not maintain the 4°C standard required for sample shipping, it should only be used while in the field collecting samples.
2. Samples must be packed so they are surrounded and covered by a sufficient volume of ice to maintain a 4 ± 2 °C temperature immediately following collection of the samples in the field and during the entire shipping period. Ice used in the cooler must be contained in sealed, leak-proof plastic bags to prevent contact of the sample containers with melted ice.
3. When shipping packages containing samples preserved with corrosives such as hydrochloric acid, sulfuric acid, and sodium hydroxide, the samples will not meet DOT's definition of Class 8 – Corrosives because of the preservative as long as these limitations are met:
 - hydrochloric acid in water solution at a concentration of 0.04% or less by weight (pH \geq 1.96),
 - nitric acid in water solution at a concentration of 0.15% or less by weight (pH \geq 1.62),
 - sulfuric acid in water solution at a concentration of 0.35% or less by weight (pH \geq 1.15), and
 - sodium hydroxide in water solution at a concentration of 0.08% or less weight (pH \geq 12.30).
4. After it has been established that the samples do not meet DOT's definition of Class 8 – Corrosive because of the preservative, it must still be determined if the contaminant of

- concern causes the sample to meet any of DOT's hazard class definitions. If it does, appropriate identification, classification, packaging, marking, labeling, and documentation must be performed accordingly.
5. When shipping bottles that contain only preservatives, the trained shipper will attempt to meet the small quantity/excepted quantity or limited quantity requirements detailed in the DOT or IATA regulations in order to reduce preparation time, materials costs, handling hazards, and shipping costs. Complete instructions are found in the appropriate sections of the applicable regulations.
 6. Per 49 CFR 172 Subpart H, an employee who performs hazardous materials (or dangerous goods) shipping is required to complete General Awareness and Function-Specific Training covering his or her particular shipping responsibilities to be updated at least every three years for domestic shipping or every two years for international shipping.

RECORDS

All sample packaging and shipment data will be recorded on the book or FADL for the samples shipped. The FADL entries will be recorded chronologically and the time of the entry recorded first. All FADL continuation pages will be sequentially numbered and the last page recorded for the day will be signed and dated by the recording technician.

Records generated as a result of this SOPP will be controlled and maintained in the project record files.

7.0 CROSS REFERENCE

Department of Transportation, *Hazardous Materials Regulations*, 49 CFR Parts 171-180.

EPA, 1996, *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, Region 4, Athens, GA.

HAZWRAF, 1996. *Document No. DOE/HWP-100, Standard Operating Procedure 5C, Packing and Shipping Environmental Samples*.

International Air Transport Association, *Dangerous Goods Regulations*, current edition.

8.0 TABLES

None.

9.0 ATTACHMENTS

None.

SOP 04 Decontamination

SHAW STANDARD OPERATING PROJECT PROCEDURE

LONGHORN ARMY AMMUNITION PLANT

ATTACHMENT 4

Subject: FIELD EQUIPMENT DECONTAMINATION

1.0 PURPOSE AND SUMMARY

The objective of this procedure is to describe the proper methods for decontaminating downhole and sampling equipment used to perform field investigations.

Decontamination of field equipment is necessary to ensure that chemical analyses reflect actual concentrations at sampling locations by maintaining the quality of samples and preventing cross-contamination. Furthermore, decontamination reduces the health hazards to field personnel and prevents the spread of contaminants off-site.

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3.0 RESPONSIBILITY MATRIX

3.1 Site Manager

The Site Manager or Field Team Leader, is responsible for ensuring that field activities are completed to meet the project objectives, that they are conducted in accordance with the project plans and requirements, and that all activities are performed according to the respective procedures. The Site Manager is responsible for ensuring that all site personnel are trained in the procedures, that the procedures are adhered to, and that all activities are documented.

3.2 Field Team

All members of the field team (samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring that all team members perform work in accordance with this procedure. The field team members are also responsible for communication of issues with task managers and technical leads, and for documenting change orders and directions.

3.3 Site Contractor Quality Control System Manager

The site CQCSM is responsible for ensuring that this procedure is correctly implemented and that the quantity and quality of field equipment decontamination activities meet the requirements of the project Work Plan.

4.0 DEFINITIONS

Decontamination. The process of removing or reducing undesirable physical and chemical constituents, from equipment or materials that come into direct contact with the sample media. Decontamination minimizes the potential for cross-contamination and ensures the representativeness of physical or chemical analyses proposed for a given sample.

Sampling Equipment. Sampling equipment includes split spoons, hand augers, bailers, submersible pumps, bowls, knives, scoops, water samplers, non-disposable filtration equipment, or any equipment that directly contacts samples.

Sample Contacting Equipment. Equipment that comes in direct contact with the sample or portion of the sample that will undergo chemical analyses or physical testing (for example, bailer, split-spoon sampler).

Potable water. Tap water used for drinking purposes by general population.

Deionized water. Deionized, solvent-free water (ASTM Type II or equivalent). Deionized water can be provided by the laboratory.

Detergent. Laboratory grade detergent for washing equipment is recommended such as Liquinox® or Alconox®.

5.0 TEXT

5.1 Required Forms and Documentation

- Field Activity Daily Log (FADL)
- Material safety data sheets (MSDS).

5.2 Required Materials, Equipment, or Supplies

Decontamination procedures for small equipment; downhole and heavy equipment; pumps; and downhole probes are described below separately. Each section also includes the required materials, equipment, and supplies.

5.3 Specific Requirement for Small Sampling Equipment

Before samples are collected, small sample-contacting equipment will be decontaminated appropriately. Small sampling equipment includes split spoons,

bailers, knives, mixing bowls, etc. Equipment necessary to complete decontamination procedures includes:

- 5-gallon (gal) or larger plastic buckets or troughs
- Laboratory-grade detergent; Liquinox[®] recommended
- Three stiff-bristle brushes capable of cleaning the inside and outside of equipment
- Teflon[®] sprayers or wash bottles, or 2 - to 5 - gallon manual pump sprayer (pump sprayer material must be compatible with the solution used)
- Plastic sheeting
- Disposable wipes
- Aluminum foil
- Potable water
- Deionized water
- 10 % Nitric acid solution made from reagent grade nitric acid and deionized water (use only on glass, Teflon[®], or stainless steel)
- Gloves, goggles, and other protective clothing as specified in the site-specific health and safety plan.

The following decontamination procedures will be followed:

1. Set up a decontamination line on plastic sheeting covering the ground or on a table covered by plastic sheeting or aluminum foil (shiny side away from equipment). At a minimum, clean plastic sheeting must be used to cover the ground beneath decontamination equipment and plastic sheeting or aluminum foil must cover tables or other surfaces where decontaminated equipment is to be placed. The decontamination area should be located away from potential contaminant sources (e.g., construction areas) to reduce or eliminate potential cross-contamination during decontamination. The decontamination area should progress from “dirty” to “clean” and end with an area for drying equipment.
2. The decontamination line should consist of several buckets or troughs in one line. The first bucket will contain a detergent solution. The next two buckets will contain potable water for rinses. A final liberal rinse of deionized laboratory grade water with a bottle sprayer completes the line.
3. Dislodge as much loose dirt as possible from equipment before beginning the decontamination process. Wash the item thoroughly in the bucket or trough of detergent solution. Use a stiff-bristle brush to dislodge any clinging dirt. Before washing, disassemble any items that might trap contaminants internally.
4. Rinse in second bucket or trough containing potable water. Rinse water shall be replaced as necessary (generally when water is cloudy).
5. Repeat step 3 in the third bucket or trough for a second rinse. A rinse with nitric acid in a spray bottle may be added before this step if sampling for metals.
6. Using a hand sprayer, rinse the item with deionized water over the fourth bucket.

7. If the equipment will have time to fully air dry before its next use, allow to air dry. If the equipment will not be allowed to fully air dry, rinse with deionized water over the last rinse bucket before reassembling or using any equipment.
8. If equipment will not be used immediately after drying, wrap in aluminum foil (shiny side out) for storage and transport.
9. Record decontamination protocol, equipment types, and date on the FADL at each occurrence.
10. After the decontamination activities are complete, collect all contaminated waters, plastic sheeting, aluminum foil, disposable gloves, boots, and clothing. Place contaminated items in properly labeled containers for disposal. Liquids and solids must be drummed separately. Decontamination water can be taken to the on site groundwater treatment system for disposal.

5.4 Specific Requirement for Downhole and Heavy Equipment

Downhole equipment consists of nonsampling tools such as hollow-stem augers, drill pipe, bits, casing, and screen. Drill rigs, backhoes, and other heavy machinery are also included. Equipment necessary to complete decontamination procedures includes:

- Plastic sheeting or steel, prefabricated decontamination pad. See below for decontamination pad construction requirements.
- Metal, wooden, or plastic sawhorses or other stands
- Laboratory-grade detergent, Liquinox[®] recommended
- Steam cleaner or high pressure hot water washer capable of generating 2,500 pounds per square inch of pressure and producing steam or hot water (200 °F), with soap compartment
- Stiff-bristle brushes
- 2- to 5-gal manual pump sprayer (pump sprayer must be compatible with the solution used)
- Potable water
- Gloves, goggles, boots, and other protective clothing as specified in the site-specific health and safety plan.

Before drilling, sampling, excavating, leaving the site, and in between each location, all drilling equipment used in field sampling activities must be decontaminated. All downhole augering, drilling, and sampling equipment shall be sandblasted (off-site) if it is new, painted, (such as split spoons or auger flights) or exhibits build-up of rust or caked material. Heavy equipment not directly used for sampling will be decontaminated at a designated area designed to contain decontamination wastes and waters. The area designated is located at the on site wastewater treatment plant decontamination pad. If a decontamination pad is needed for site-specific requirements, a temporary pad can be constructed. The following steps must be taken when decontaminating this equipment.

1. Set up a decontamination pad that is large enough (up to the size of the drill rig) to fully contain the equipment to be cleaned. If practical, a centralized decontamination area should be established. This area should be set up to contain contaminated rinse waters and may be constructed using one or more layers of heavy plastic sheeting, 6mm or heavier, with bermed sides, a lined excavated pit, or a bermed concrete or asphalt pad. If possible, the area should be constructed to eliminate or minimize any overspray or wind-blown spray from decontamination activities (e.g., plastic sheeting secured to a wood frame surrounding the area). The decontamination area must be constructed so that fluids can be easily pumped from the area to holding containers.
2. Set up a "clean" area upwind of the decontamination pad to receive cleaned equipment for air drying. At a minimum, clean plastic sheeting must be used to cover surfaces on which decontaminated equipment is to be placed.
3. Don personal protective equipment as specified in the site-specific health and safety plan before beginning cleaning activities.
4. For heavy equipment, areas exposed to contaminated soil should be sprayed using a steam spray unit. Be sure to spray down all surfaces, including the undercarriage. It is also good practice to clean the motor, hydraulic lift, oil fill, and fuel tank area to avoid introducing contamination at the work site.
5. For smaller equipment such as augers, place the objects to be cleaned on metal or plastic-covered wooden sawhorses, supports, or decontamination trays. Using the steam-spray unit, spray the contaminated equipment. Be sure to spray inside corners and gaps especially well; use a brush, if necessary, to dislodge dirt.
6. For steps 4 and 5, aim the sprayer downward as much as possible to avoid spraying outside the decontamination area.
7. If the condition of downhole or heavy equipment warrants using hot soapy water in the steam-spray unit, rinse the equipment with clean, clear potable water following the steam spray. If using steam spray without a detergent the potable water rinse is not necessary.
8. Remove the equipment from the decontamination area to the "clean" area to dry.
9. Record decontamination protocol, equipment types, and date on the FADL.
10. After decontamination procedures are complete, or any time the decontamination fluids fill the bermed or contained area, decontamination fluids will be collected and transferred to appropriate containers. Place all plastic and personal protective equipment into appropriate containers. All containers must be labeled properly for disposal. Liquids and solids must be drummed separately.

5.5 Specific Requirement for Pump and Pump Assemblies

Any pump in which potentially contaminated fluids come into contact with any part of the pump equipment requires decontamination. This requirement does not apply to peristaltic pumps because water does not contact any part of the pump. Only Teflon[®] or Teflon[®]-lined tubing should be reused for sampling after decontamination. If using PVC or polyethylene tubing, discard the tubing after each use unless the tubing is used for well development, where properly-decontaminated tubing may be reused. Polyethylene or PVC tubing can not be properly decontaminated and potential for cross-contamination during sampling remains high. This requirement also applies to the tygon tubing attached to the rollers of a peristaltic pump. The tygon tubing shall be discarded after use at a well.

The procedure provided below applies primarily to the decontamination of bladder pumps. A field setup may be implemented while decontaminating pumps other than bladder pumps or if frequent trips to the field office are not practical or cost effective. Equipment needed to complete decontamination procedures include:

- Deionized water
- Plastic sheeting
- Source of electricity (generator or direct line)
- Compressor and controller for bladder pumps
- Three to five decontamination cells (4-inch diameter PVC) for pumps and tubing
- Laboratory-grade detergent, Liquinox[®] recommended
- Gloves, goggles, boots, and other protective clothing as specified in the site-specific work plan.

Following the use of a pump for development, purging, or sampling, the pump should be decontaminated by the following method.

1. Set up decontamination cells in a line on the plastic. Only three cells are required for normal decontamination.
2. Add potable water with a small amount of detergent to the first container; add potable water alone to the second container. Add deionized water to the third container. There should be sufficient water in each container to accomplish the decontamination procedure.
3. Place one drum close enough to the decontamination area to collect the spent decontamination fluids.
4. Place the pump in the first container and pump enough water through it to equal at least three pump-and-tube-volumes. Pump the water into the waste drum. Move the pump to the second container and repeat. Repeat again with deionized water in the third cell. However, one volume of deionized water is the minimum amount required for this rinse.

5. If necessary, the pump can be disassembled and each part can be decontaminated using several buckets as described in the equipment decontamination method above.
6. Record decontamination protocol, equipment types, and date on the FADL.
7. After decontamination activities are complete, collect all contaminated water; solvents; plastic sheeting; aluminum foil; and disposable gloves, boots, and clothing. Place contaminated items in properly labeled drums for disposal. Liquids and solid wastes must be drummed separately and handled in accordance with the investigation-derived waste procedure. (Liquids will be disposed at the on site wastewater treatment plant.)

5.6 Specific Requirement for Downhole Probes

Decontamination of downhole probes, such as water level indicators, pressure transducers, Trolls®, etc. shall be based on the contamination expected in a well and on professional judgement.

5.6.1 Water Level Indicator

For decontaminating water level indicators during snapshot water level sweeps, follow the steps given below:

1. Carry a detergent solution and deionized water in two separate spray bottles.
2. Spray detergent solution in a piece of paper towel and deionized water in another piece of paper towel.
3. This method involves wiping the water level indicator cable as it is pulled out of a well.
4. Grab the water level indicator cable with the two paper towels in your hands such that the detergent paper towel is below the deionized water paper towel.
5. The cable should be pulled out slowly by a second person and rolled onto the carrying wheel.
6. Once the probe is out of the well, spray it first with the detergent solution and then with deionized water. Wipe with a clean paper towel and store in the carrying case.

Records generated as a result of this written procedure will be controlled and maintained in the project record files.

5.7 Restrictions and Limitations

- Fluids decontamination rinses must be stored separately until disposal is made at the on site wastewater treatment plant.

- All deionized or distilled water must have field-blank samples collected and analyzed at the proper frequency to ensure the purity of the water.

6.0 EXCEPTION PROVISIONS

None.

7.0 REFERENCES

American Society for Testing of Materials (ASTM), 1990, *Standard Practice for Decontamination of Field Equipment Used at Radioactive Waste Sites*, D 5088-90, September.

U.S. Environmental Protection Agency (EPA), 1991, *Handbook of Suggested Practices for the Design and Installation of Around-Water Monitoring Wells*, EPA/600/4-89/034, PB 92-216886, March.

U.S. Environmental Protection Agency (EPA), 1996, *Standard Field Cleaning Procedures, Appendix B, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*, USEOA Region 4, May.

8.0 TABLES

None

9.0 ATTACHMENTS

None.

SOP 05 Investigation-Derived Waste

IT STANDARD OPERATING PROJECT PROCEDURE

LONGHORN ARMY AMMUNITION PLANT

ATTACHMENT 5

Subject: INVESTIGATION DERIVED WASTE

1.0 PURPOSE AND SUMMARY

This Standard Operating Project Procedure (SOPP) establishes specific management practices for the in-process handling and subsequent disposition of environmental media generated as a result of investigation and removal actions.

Longhorn Army Ammunition Plant (LHAAP) is conducting investigation, remediation, and removal activities, which generate environmental media. The media typically consists of drill cuttings, monitor well purge and development water, spent PPE, and other inert materials (i.e., plastic, rope, tape, paper, etc.) generated during operations, well installation and sampling activities, remedial actions, and associated site activities. When accumulated, the media must be managed appropriately to minimize the exposure to human health and the environment while adhering to applicable regulatory requirements.

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3.0 RESPONSIBILITIES

3.1 Site Manager

The Site Manager or Field Team Leader, is responsible for ensuring that field activities are completed to meet the project objectives, that they are conducted in accordance with the project plans and requirements, and that all activities are performed according to the respective procedures. The Site Manager is responsible for ensuring that all site personnel are trained in the procedures, that the procedures are adhered to, and that all activities are documented.

3.2 Field Team

All members of the field team (samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring that all team members also perform work in accordance with this procedure.

3.3 Site Contractor Quality Control Systems Manager (CQCSM)

The Site CQCSM is responsible for ensuring that this procedure is correctly implemented and that the quantity and quality of field measurable physical characteristic samples collected meet the requirements of the project.

4.0 DEFINITIONS

None.

5.0 TEXT

5.1 Required Records and Forms

- Sample Collection Log (SCL)
- Field Activity Daily Log (FADL)
- Sample tags/labels and the appropriate forms/documentation for sample shipment
- Material Safety Data Sheets (MSDS)
- Field Sampling Plan/Work Plan.

5.2 Required Materials, Equipment, or Supplies

- Indelible black ink pens and markers
- Appropriate sample containers
- Insulated cooler and water proof sealing tape
- Nitrile or latex gloves
- Decontamination equipment and supplies, including rinse bottles and deionized water
- Personal protective clothing and gear
- Appropriate equipment and meters for obtaining field measurements (i.e., PID/FID).

5.3 Procedures

5.3.1 Preparation

The following steps must be followed when preparing for management activities of IDW:

- Verify that all personnel have read and understand the approved site-specific health and safety plan and have the proper training and certifications required under OSHA.
- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.
- Document the sampling events, recording the information on the SCL or equivalent form as specified. Document any and all deviations from standard operating procedures on the FADL and include rationale for changes.

5.3.2 Specific Preparation

The following paragraphs detail the planned methodologies for dealing environmental media once generated during site activities

Initial Handling Requirements

All environmental media will be managed in an effort to minimize exposure to human health and the environment. Typically, the media will be generated as a result of two major activities, drilling soil-test borings and constructing and sampling ground-water monitoring wells. In instances where soil test borings are advanced, either for the sole purpose of retrieving soil samples or to allow for the retrieval of a ground-water sample via a hydropunch or similar sampling device, including obtaining a sample from an open borehole, the following handling protocols for investigation-derived waste (IDW) soil will be used:

- All soil cuttings will be placed adjacent to the borehole on plastic or other suitable material capable of precluding contact with the ground surface.
- All cuttings will be covered daily or during rainfall events to prevent contact with moisture.
- Upon completion of the downhole activity (i.e., drilling, groundwater sampling, etc.), the soil cuttings will be placed back into the borehole from which they were generated.
- Replaced cuttings will be compacted to the extent practical and a 1- by 1-foot by three inches thick grout cap will be placed over the top of the borehole to prevent vertical migration of surface water.

In cases where a soil-test boring is advanced for the purposes of installing a groundwater monitoring well, all environmental media accumulated will be containerized to allow for characterization upon generation and situated at a predesignated staging area or near the point of generation. As solids are generated, they will first be placed into 55-gallon drums, or other approved

containers including roll-off boxes, until they are characterized as hazardous or nonhazardous. Pending further characterization, solids may be bulked into larger approved containers situated within the work area. Liquids may be bulked upon generation unless directed otherwise. All solids and liquids will be separated prior to disposal.

After each container (i.e., drum, roll-off box, etc.) has been filled, the container and lid, if appropriate, will be labeled indicating a description of the media (i.e., soil, purge water, decon water, PPE), origin of media (i.e., sample identification such as boring or well), date the media was placed in the container, site identification (i.e., LHAAP-##), date container was sealed and sampled, and any other pertinent information (i.e., hazardous versus nonhazardous). The containers may be labeled using a paint pen or other indelible marker that will not fade when exposed to weather. A record of the number of containers and their contents will be completed at each generation site and will be included in the logbook before leaving each site.

At the end of each day and/or field activity, all containers will be sealed or covered in such a way to prevent the introduction of rain water or surface run-off.

A centralized staging area will be assigned for each site prior to initiation of any site work. Unless directed otherwise, the staging area will be located within the boundaries of the site where field work will take place. All filled containers generated for a given site will be placed in the central location. The containers will be moved from their original filling location to the staging area within 5 days of filling. In the event that conditions are present indicating the potential for reactive wastes, special handling and storage precautions will be utilized. The integrity of containers moved to the staging area will be monitored routinely, as required.

Waste may be transported between sites when required or in preparation of disposal activities without specific regulatory concurrence.

5.4 Characterization of Media

The characterization of the media will be determined by a two-step process. First, the materials will be characterized using analytical data obtained during the activity from which the materials were generated previously. As stated, it is anticipated that specific generation activities will include soil-test borings, monitoring well installations, and monitoring well purge and development actions. Water obtained from specific monitor well sampling points (i.e., purge and development water) will be characterized using groundwater sampling data taken from the specific well site from which the water was obtained. Analytical data obtained from a particular borehole reflecting soil contaminant levels will be used to characterize solids generated from that borehole. Other solids such as rock, spent PPE, plastic sheeting, rope, unused monitor well construction materials, and other environmental media generated during field activities will be characterized for disposal based on the analytical results of the soil and water sampled at the specific location where the

solids were generated. Analytical results from both soils and water will be used to characterize decon water. When appropriate, analytical data will be extrapolated to reflect toxicity characteristic leaching procedure (TCLP) values (i.e., 20x divisor rule for soils). Generator's knowledge may be used to evaluate the media potential for corrosivity, ignitability, and reactivity.

If analytical results indicate contaminant levels below 75 percent of TCLP values, no additional analytical testing will be performed and the media will be considered nonhazardous. When analytical results indicate that elevated contaminant levels (i.e., more than 75 percent of TCLP) are present, additional analyses will be performed. In these cases, composite samples will be taken for each type of media generated (i.e., soil, water) and for each specific generation location (i.e., monitoring well, soil boring, etc.). Samples will be taken directly from the containers. Where multiple numbers of containers are generated for a particular media and generation site, the samples will be taken to ensure that the volume of soil from which one composite sample is prepared is equivalent to no more than the volume contained by ten 55-gallon drums. The suite of analyses to be run will be determined based on suspected contaminants and any prior available analytical data. Generator knowledge may be used to minimize the volume of analytical test required to adequately characterize the media. Hazardous versus nonhazardous determinations will be made utilizing those parameters outlined in TCEQ Administrative Code R. 335-501-515, Criteria for Identifying the Characteristics of Hazardous Wastes and for Listing Hazardous Waste. Where listed wastes are expected or where the potential exists, specific analytes (i.e., totals as opposed to TCLP) for the listed compounds will be tested in lieu of conducting a TCLP analysis. All sampling and analytical testing protocols will be consistent with TCEQ/EPA requirements and methodologies.

5.5 Management and Disposition

Once adequately characterized, the containers will be labeled as described. U.S. Department of Transportation (DOT) approved labels will be used if transportation outside of LHAAP boundaries is required or anticipated. The media may also be bulked on site (within the staging area), with like waste streams possessing compatible nonreacting characteristics. Hazardous and nonhazardous materials will be segregated and all liquids and solids will be separated. Other specific management requirements are as follows:

5.6 Waste Water

In general, all waste water (including decontamination water) generated during the described site activities will be disposed within the confines of LHAAP at the onsite groundwater treatment plant (GWTP). Other specifics are as follows:

5.6.1 Nonhazardous Wastewater

Wastewater determined to be nonhazardous (Section 40 Code of Federal Regulations [CFR] Part 261), but possessing some level of contaminants, will be disposed directly into LHAAP's GWTP.

All discharges will be in accordance with provisions outlined in Water Quality Program, of TCEQ's Administrative Code. More specifically, the discharge

will not be greater than 5 percent of the average dry weather capacity of the GWTP, greater than 5 percent of the design capacity of the GWTP, or subject to Section 403.6 of the Federal Water Pollution Control Act (FWPCA). No disposal permit is required as long as the waste water is discharged in quantities of less than 25,000 gallons per day and the water is nonhazardous (40 CFR 261).

Wastewater generated during site activities and for which analytical tests showed no level of contamination present above approved detection limits will be considered nonregulated. The disposal means and methods of nonregulated waste water are at the discretion of LHAAP representatives (e.g., storm water system, open ditch, etc.) and do not require regulatory consultation or concurrence.

5.6.2 Hazardous Wastewater

Hazardous wastewater will be transported, when required, and treated at an appropriate treatment facility when the following conditions are met:

1. The treatment facility meets the definition of a waste water treatment unit as defined TCEQ Administrative Code xxxxxxxx.
2. The treatment facility is capable of (a) rendering characteristically hazardous wastes (TCEQ Administrative Code xxxxxx) nonhazardous or (b) removing listed wastes (TCEQ Administrative Code xxxxxx) from the contaminated media so that the media no longer contains the listed waste for which the media was originally considered hazardous. If after treatment, analytical tests show the listed waste is not present above laboratory detection limits, then the contaminated media will be considered to no longer contain the listed waste and will no longer be considered hazardous.

Wastewater determined to be hazardous may be transported between sites and within LHAAP boundaries for treatment/disposition in accordance with the previously outlined provisions without specific regulatory concurrence.

In the event that LHAAP does not have a facility on-line capable of treating the hazardous wastewater at or approximately the time of generation, and the water is expected to remain onsite for a prolonged period of time (i.e., in excess of 120 days), the water will be stored in an area with an adequate secondary containment system until an approved treatment system is on-line.

Unless specifically mandated by TCEQ and the EPA, the treatment and disposal of hazardous and nonhazardous wastewater will be performed as previously described. The wastes will be treated and disposed in a timely manner so as to expedite site activities and to ensure the protection of human health and the environment. Except where noted, specific written concurrence from TCEQ and EPA prior to those actions previously described is not required.

5.7 Solids

Solids may include soil cuttings, rock, grout, spent PPE, plastic sheeting, rope, unused monitor well construction materials, and other environmental media generated during field activities. All solids will be containerized at or near the point of generation and staged as described in Section 5.3.2. Other specific management practices are as follows:

5.7.1 Nonhazardous Solids

Soil cuttings and rock determined to be nonhazardous will be staged within the confines of the site from which they were generated. After characterizations (hazardous versus nonhazardous) are finalized and depending upon site conditions, nonhazardous cuttings will be removed from containers and replaced "at or near" the location from which they were derived. "At or near" infers a media will be placed as near to its point of origin as is practical. Examples would be placing monitoring well cuttings around the monitoring well from which they originated as opposed to within it. However, when not practical, the media may be centrally located within the confines of the originating site in an area of minimal traffic and where the media could be managed in a manner protective of human health and the environment.

In the event that site conditions are not conducive to the replacement of the materials, soils exhibiting contaminant levels below analytical detection limits are considered non-regulated and will be disposed at the discretion of LHAAP representatives. Other nonhazardous solids such as spent PPE, plastic sheeting, rope, unused monitor well construction materials, and other environmental media generated during field activities that have been determined to be nonhazardous will be emptied into dumpsters or roll-offs for disposal at a permitted solid waste disposal facility.

5.7.2 Hazardous Solids

For management and disposition purposes, the solids will be broken into two major categories: those exhibiting hazardous characteristics and those containing listed hazardous waste.

Solids exhibiting hazardous characteristics or that contain a listed hazardous waste will be stored upon generation "at or near" the point of generation within the site of origin or bulked in anticipation of disposal activities at a centralized location at LHAAP. Secondary containment will not be required for the storage of hazardous solids as long as the containers are secure and monitored routinely for releases. Unless otherwise directed, the solids will not be subject to 90-day storage requirements.

Whenever practical and depending upon actual site conditions, containerized solids that do not possess hazardous characteristics but do contain listed wastes, will be removed from their storage containers

and replaced "at or near" the location from which they were derived. The solids may be replaced anytime after characterization is complete, but most likely at the end of the project phase. Once replaced, the materials will be managed in a manner as to minimize surface erosion. Because of the known presence of contaminants, the solids will be managed in a manner protective of human health and the environment.

The disposition of solids possessing hazardous characteristics will be determined on a case-by-case basis depending on specific contaminants, concentrations, and site conditions. The solids will be returned (i.e., from storage containers) to the site from which they were generated and the remediation of the media, if required, will be addressed, at which time a remedial plan is prepared for other contaminated soil at the site. Prior to this replacement, a request detailing the planned placement procedures with a site sketch indicating the planned placement location will be provided.

In the event that hazardous solids are not allowed to be returned to the site and on site treatment is not available, the media will be disposed off-site in accordance with state and federal requirements in a permitted disposal facility, as required.

6.0 EXCEPTION PROVISION

None.

7.0 CROSS REFERENCES

U.S. Environmental Protection Agency (EPA), 1992a, *Guide to Management of Investigative-Derived Wastes*, Office Of Solid Waste and Emergency Response, Publication 9345.3-03FS, April 1992.

U.S. Environmental Protection Agency (EPA), 1992b, *Management of Contaminated Media*, Region IV EPA, Guidance Number TSC-92-02, December 28, 1992.

U.S. Environmental Protection Agency (EPA), 1991, *Management of Investigative-Derived Wastes During Site Inspections*, Office Of Research and Development, Publication, EPA/540/G-91/009, May 1991.

McCoy and Associates, 1995, *RCRA Regulations and Keyword Index*, Elsevier, 1995.
Alabama Department of Environmental Management (ADEM), Division 14 - Hazardous Waste Program, Revised Effective April 28, 1995.

8.0 TABLES

None.

9.0 ATTACHMENTS

None

SOP 06 Field Data Collection for Natural Attenuation

SOP T-GS-010

Standards for Design of Field Data Collection Programs for Natural Attenuation Verification

STANDARD OPERATING PROCEDURE

Subject: Standards for Design of Field Data Collection Programs for Natural Attenuation Verification

1. PURPOSE

This procedure provides the standard practice for design of field data collection programs for natural attenuation verification. The procedure includes the minimum required steps and quality checks that employees and subcontractors are to follow when performing the subject task.

This procedure may also contain guidance for recommended or suggested practice that is based upon collective professional experience. Recommended practice goes beyond the minimum requirements of the procedure, and should be implemented when appropriate. Additional requirements for design of field data collection programs for natural attenuation verification may be developed as necessary, to supplement this procedure and address project-specific conditions and/or objectives.

2. SCOPE

Geosciences Standard Operating Procedure (SOP) T-GS-010 describes standards for design of field data collection programs for natural attenuation verification, and how such studies will be conducted and documented for projects executed by Shaw Environmental & Infrastructure, Inc. (Shaw E & I). The SOP addresses technical requirements and required documentation. Responsibilities of individuals performing the work are also detailed.

3. REFERENCES (STANDARD INDUSTRY PRACTICES)

Design of Field Data Collection Programs for Natural Attenuation Verification should follow accepted industry practices for data collection, analysis and reporting. These are presented in the latest version of the following ASTM Standards:

ASTM D5408-93	Standard Guide for Set of Data Elements to Describe a Ground-Water Site: Part One-Additional Identification Descriptors
ASTM D888-03	Test Methods for Dissolved Oxygen in Water
ASTM D1125-95	Test Methods for Electrical Conductivity and Resistivity of Water
ASTM D1293-99	Test Methods for pH of Water
ASTM D1498-00	Practice for Oxidation-Reduction Potential of Water
ASTM D4448-01	Guide for Sampling Groundwater Monitoring Wells
ASTM D4658-03	Test Method for Sulfide Ion in Water
ASTM E1689-95e1	Guide for Developing Conceptual Site Models for Contaminated Sites (editorially revised 2003)
ASTM E1739-95	Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites (editorially revised 2002)

ASTM E1912-98	Guide for Accelerated Site Characterization for Confirmed or Suspected Petroleum Releases
ASTM E 1943-98	Standard Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites

Additional reference materials, which are useful for conducting natural attenuation investigations, include the following:

- Barcelona, M.J. and Helfrich, J.A., 1986, "Well construction and purging effects on groundwater samples," *Environmental Science Technology*, Vol. 20, No. 11, pp 1179-1184.
- Barczewski, B. and Marschall, P., 1989, "The influence of sampling methods on the results of groundwater quality measurements," *Proceedings of the International Symposium on Contaminant Transport in Groundwater*, April 4-6, Stuttgart, Germany, H. E. Kobus and W. Kinzelback eds., pp 33-39.
- Chapelle, F.H., 1993, *Groundwater Microbiology and Geochemistry*, Wiley & Sons, New York.
- Collins, A.G., and Johnson, A.I., 1988, *Groundwater Contamination: Field Methods*, ASTM Publication Code Number 04-963000-38, ASTM Penn., 490 pp.
- Dalton, M.G., Huntsman, B.E., and Bradbury, K., 1991, "Acquisition and interpretation of water-level data", *Practical Handbook of Ground-water Monitoring*, Ed. D.M. Nielsen, Lewis Publishers, pp 367-396.
- ITRC, 1999, *Natural Attenuation of Chlorinated Solvents in Groundwater: Principals and Practices*, Interstate Technology and Regulatory Cooperation (ITRC) Work Group.
- Pankow, J.F., and Cherry, J.A., 1996, *Dense Chlorinated Solvents and Other DNAPLs in Groundwater*, Waterloo Press, Portland, Oregon, 522 pp.
- U.S. Environmental Protection Agency, 1985, *Practical Guide for Ground-Water Sampling*, EPA/600/2-85/104.
- U.S. Environmental Protection Agency, 1987, *Data Quality Objectives for Remedial Response Activities*, EPA/540/G-87/003.
- U.S. Environmental Protection Agency, 1999, *Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, OSWER Directive Number 9200, 4-17p Office of Solid Waste and Emergency Response, Washington DC.
- Wiedemeier, T.H., Wilson, J.T., Kampbell, D.H., Miller, R.N., and Hansen, J.E., 1995, *Technical Protocol for Implementing Intrinsic Remediation with Long-Term Monitoring for Natural Attenuation of Fuel Contamination Dissolved in Groundwater*, U.S. Air Force Center for Environmental Excellence, San Antonio, TX.
- Wiedemeier, T.H., Swanson, M.A., Moutoux, D.E., Gordon, E.K., Wilson, J.T., Wilson, B.H., Kampbell, D.H., Hansen, J.E., Haas, P., Chapelle, F.H., 1996, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*, U.S. Air Force Center for Environmental Excellence, San Antonio, TX.

Additional information regarding natural attenuation investigations can be found in the following websites:

- <http://www.epa.gov/swerust1/oswermna/>
- <http://www.epa.gov/OUST/cat/mna.htm>

- <http://www.sandia.gov/eeselector/gc/gc/na/mnahome.html>
- <http://www.em.doe.gov/techguide/>
- <http://www.itrcweb.org/common/default.asp>
- <http://www.epa.gov/ada/csmos.html>

4. DEFINITIONS

The following definitions are applicable to natural attenuation investigations and this SOP.

- **Abiotic**—Occurring without the involvement of microorganisms
- **Accelerated Anaerobic Bioremediation**—Addition of carbon substrates (electron donors) and/or nutrients to the subsurface in order to stimulate bacteria to degrade contaminants
- **Advection**—Transport of water and dissolved molecules along the groundwater flow path at an average expected velocity
- **Aerobe**—Bacteria that use oxygen as an electron acceptor
- **Aerobic**—Environmental conditions where oxygen is present
- **Aquifer**—An underground geological formation that stores and yields water in sufficient quantities
- **Anaerobic**—Environmental conditions where oxygen is absent
- **Anaerobic Respiration**—Process whereby microorganisms use a chemical other than oxygen as an electron acceptor. Common “substitutes” for oxygen are nitrate, sulfate, iron, and carbon dioxide
- **Biodegradation**—Biologically mediated conversion of one compound to another
- **Bioremediation**—Use of microorganisms to control, transform and/or destroy contaminants
- **Co-metabolism**—The process whereby a compound is converted to another chemical while microorganisms use other carbon compounds for their growth substrate
- **Daughter Product**—A compound that results directly from the biodegradation of another
- **Desorption**—The release of chemicals attached to solid surfaces (e.g., soil particles or grains)
- **Dilution**—The combined processes of advection and dispersion resulting in a reduced concentration of the molecules (solute) in the groundwater
- **Diffusion**—The process whereby molecules move from a region of higher concentration to a region of lower concentration as a result of Brownian motion
- **Dispersion**—The spreading of molecules along and away from the expected groundwater flow path during advection as a result of mixing of the molecules (solute) and groundwater in individual pores and channels
- **Dispersivity**—A property that quantifies mechanical dispersion in a medium
- **Effective Porosity**—The percentage of void volume that contributes to percolation or groundwater flow, roughly equal to the specific yield

- **Electron Acceptor**—A compound capable of accepting electrons during oxidation-reduction reactions. (e.g., oxygen, nitrate, sulfate etc.)
- **Electron Donor**—A compound capable of supplying electrons during oxidation-reduction reactions. (e.g., fuel hydrocarbons, naturally occurring organic carbon, etc.)
- **Hydraulic Conductivity**—The relative ability of a unit volume of soil, sediment or rock to transmit water
- **Hydraulic Gradient**—The maximum change in head per unit distance
- **Inorganic Compound**—A chemical that is not based on covalent carbon bonds
- **Intrinsic Bioremediation**—A type of in situ bioremediation that uses the innate capabilities of naturally occurring microbes to degrade contaminants without taking any engineering steps to enhance the process
- **Intrinsic Remediation**—In situ remediation that uses naturally-occurring processes to degrade or remove contaminants without using engineering steps to enhance the process
- **Mechanical Dispersion**—A physical process of mixing along a flow path in an aquifer resulting from differences in path length and flow velocity
- **Metabolic Byproduct**—A product of the reaction between an electron donor and an electron acceptor. Metabolic byproducts include volatile fatty acids, and daughter products of chlorinated aliphatic hydrocarbons (methane and chloride)
- **Microcosm**—A laboratory vessel set up to resemble as closely as possible the conditions of a natural environment
- **Mineralization**—The complete degradation of an organic chemical to carbon dioxide and water and, in some cases, inorganic ions
- **Monitored Natural Attenuation**—The reliance on natural attenuation processes to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods. (U.S. EPA, 1999)
- **Monooxygenase**—A microbial enzyme that catalyzes reaction in which one atom of the oxygen molecule is incorporated into a product and the other atom appears in water
- **Natural Attenuation Processes**—A variety of physical, chemical or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. (U.S. EPA, 1999)
- **Non-Aqueous Phase Liquids (NAPL)**—Organic liquid that exists as a separate layer when mixed with water
- **Obligate Aerobes**—Microorganisms that can use only oxygen as an electron acceptor
- **Obligate Anaerobes**—Microorganisms that grow only in the absence of oxygen
- **Oxidation**—Loss of electrons from a compound, such as an organic contaminant
- **Porosity**—The ratio of total void volume to total volume of a rock or sediment
- **Primary Substrate**—The electron donors and electrons acceptor that are essential to ensure the growth of microorganisms

- **Respiration**—The process of coupling oxidation of organic compounds with the reduction of inorganic compounds such as oxygen, nitrate, manganese IV, iron III and sulfate
- **Reduction**—Transfer of electrons to a compound such as oxygen. It occurs when another compound is oxidized
- **Saturated Zone**—Subsurface environment (i.e., soil or rock) where pore spaces are completely filled with water
- **Site Conceptual Model**—A description of the contaminant distribution at a release site, how the release occurred, the current state of the source area, the possible geochemical site type, the current plume characteristics, and potential future plume characteristics
- **Sorption**—Attachment of a substance on the surface of a solid by physical or chemical attraction
- **Stabilization**—The process whereby chemical molecules become chemically bound or transformed by a stabilizing solid (e.g., clay, humic materials), reducing the mobility of the molecule in groundwater
- **Substrate**—A compound that microorganisms can use in the chemical reactions catalyzed by their enzymes
- **Sulfate Reducer**—A microorganism that exists in anaerobic environments and reacts with sulfate ions to form hydrogen sulfide
- **Unsaturated Zone (Vadose Zone)**—Subsurface environment (i.e., soil or rock) above the water table where pores are partially or largely filled with air.
- **Volatilization**—Transfer of a chemical from the liquid to the gas phase

5. RESPONSIBILITIES

5.1. Procedure Responsibility

The Geosciences Discipline Lead is responsible for the development, maintenance, and revision of this procedure. Any questions, comments, or suggestions regarding this technical SOP should be sent to the Geosciences Discipline Lead. The Geosciences Discipline Lead's location and associated contact information can be found on the Insider.

5.2. Project Responsibility

Employees conducting natural attenuation investigations, or any portion thereof, are responsible for meeting the requirements of this procedure. Employees conducting technical review of company natural attenuation investigations are also responsible for following appropriate portions of this SOP.

For those projects where natural attenuation investigations are conducted, the Project Manager, or designee, is responsible for ensuring that investigation activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for recording information in sufficient detail to provide objective documentation (i.e., checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURES (TECHNICAL REQUIREMENTS AND STANDARDS)

The term "natural attenuation" refers to naturally-occurring processes in soil and groundwater environments that act without human intervention to reduce the mass, toxicity, mobility, volume or concentration of contaminants in those media. These in-situ processes include biodegradation,

dispersion, dilution, adsorption, volatilization, and chemical or biological stabilization or destruction of contaminants (EPA, 1996). All chemicals are affected by some of these processes in the environment.

Natural attenuation is generally evaluated using a "lines of evidence" approach. This approach forms the basis for all current protocols and guidance documents. The suggested lines of evidence are:

1. **Documented reduction of contaminant mass at the site** – This line of evidence is documented by reviewing historical trends in contaminant concentration and distribution, in conjunction with site geology and hydrogeology, to show that a reduction in the total mass of contaminants is occurring at the site
2. **Presence and distribution of geochemical and biochemical indicators of natural attenuation** – This line of evidence is documented by changes in concentrations and distributions of geochemical and biochemical indicator parameters that have been shown to be related to specific natural processes
3. **Direct evidence** – This line of evidence is documented through laboratory bench tests and microcosm studies and is used to do the following:
 - Confirm specific processes that cannot be conclusively demonstrated with field data alone
 - Estimate site-specific degradation rates that cannot be conclusively demonstrated with field data alone

The requirements, standards and/or procedures for conducting natural attenuation investigations are based upon the lines of evidence approach and are provided in the following text.

6.1. **Methodology for Design and Implementation of Field Data Collection Programs for Natural Attenuation Verification**

Natural attenuation investigations are conducted using a combination of field data collection and data evaluation techniques. The natural attenuation investigations process consists of several individual steps that should be incorporated into the design of programs for verification. These steps include the following:

1. Review Available Site Data
2. Review/Develop Site Conceptual Model
3. Screen the Data for Evidence of natural Attenuation and Develop Hypothesis to Explain the Attenuation Processes
4. Identify Additional Data Requirements.
5. Collect Additional Data
6. Refine the Site Conceptual Model
7. Conduct Performance Monitoring

These steps are common to all natural attenuation investigations regardless of their size or scope. Methodologies and basic requirements for each of the steps are included in the following sections. All the steps require documentation of their approaches and conclusions to complete the study process. The documentation/requirements are also described in the following sections.

6.1.1. **Step 1- Review Available Site Data**

The first step in evaluating natural attenuation is to review existing data. The data should initially be evaluated to determine the contaminants of concern at the site. Typically, the first line of evidence,

(i.e., loss of contaminants) is documented by reviewing historical trends in contaminant concentrations and distributions in conjunction with site geology and hydrogeology, to show that a reduction in the total mass of contaminants is occurring at the site. The second line of evidence is documented by examining change in the concentrations and distributions of geochemical and biochemical indicator parameters that have been shown to be related to specific natural attenuation processes.

Hydrogeologic and geochemical data can be used to indirectly demonstrate the type(s) of natural attenuation processes active at the site, and the rate at which such processes will reduce contaminant concentrations to required levels. Historical contaminant data can be interpreted as follows:

- A shrinking plume is evidence of natural attenuation;
- A stable plume is evidence of natural attenuation;
- An expanding plume indicates the contaminant mass loading rate to groundwater exceeds the natural attenuation rate.

Historical data may be presented in contour maps to depict concentration profiles. The maps should show the size and shape of contaminant plume and distribution of geochemical parameters. The data are then presented in terms of surface area impacted. The data may also be presented in graphical format to demonstrate trends in contaminant concentrations. The data and results of the review are also used to develop the site conceptual model.

6.1.2. Step 2 Review/Develop Site Conceptual Model

Upon review of the historical data a site conceptual model should be prepared. The site conceptual model is a description of the site-specific hydrogeologic system and contaminant transport mechanisms. The model will generally include groundwater flow and solute transport pathways but may also include other transport mechanisms. This model is typically used to achieve that following goals:

- Present and explain chemical distributions in the site groundwater in relation to groundwater flow and transport processes; and
- Facilitate the identification of risk assessment elements used in exposure analysis, including sources, release mechanisms, transport pathways, exposure points, and potential receptors.
- Determine appropriate types, numbers and placement of sample locations

The Project Hydrogeologist should review and approve the developed conceptual model. Any changes to the data collection program's scope and/or conceptual model must be documented and approved by the Project Hydrogeologist, with a reference to the original documentation. The Project Hydrogeologist is the professional responsible for technical oversight of hydrogeologic characterization of the site and verifying that the conceptual model is consistent with observed site conditions.

The conceptual model will include and depict/describe the following site characteristics, as applicable:

- The nature and three-dimensional (3-D) extent of contamination, including:
 - Contaminant species
 - Contaminant properties
 - Contaminant location
 - Contaminant concentration
 - Contaminant form/phase (solid, NAPL, vapor, adsorbed)

- Site processes mobilizing contaminants, including:
 - Volatilization
 - Leaching
 - Mobile NAPL- gravity, water table fluctuations, groundwater flow
 - Dissolution in Groundwater
- Factors/influences on contaminant transport, including:
 - Lithology
 - Hydrogeology (flow rates, flow paths, gradients)
 - Utilities
- Changes in contaminant location and concentration with time, including:
 - Soil concentrations
 - NAPL movement
 - Changes in dissolved fraction
 - Seasonal fluctuations.
- Definition of the point(s) of attainment, such as:
 - Surface water bodies
 - Drinking water supplies
 - Ecological receptors
 - Vapor concentration points
 - Downgradient monitoring wells

The conceptual model's scope should also include:

- A basic description of the problem
- Site background information
- Definition of the area to be investigated
- Special factors, which may influence the investigation program.

Natural attenuation field investigations should be designed to characterize and quantify the natural attenuation processes that affect each contaminant and potential contaminant identified at the site. Some processes may dominate the attenuation process such as biodegradation for organic compounds.

Consideration should be given to the change in geochemical conditions of the aquifer caused by natural attenuation process affecting other chemicals. For instance, although metals are not biodegradable, intrinsic biodegradation of organics may create conditions in which the mobility, or toxicity of metals may increase or decrease. Examples of this may be reduction of hexavalent

chromium to trivalent chromium under reducing conditions or increased solubility of barium under sulfate reducing conditions.

Some consideration should be given to the spatial distribution of the conditions causing natural attenuation. Contaminants may migrate through zones in which various natural attenuation processes may be encountered. For instance, chlorinated ethenes may migrate from highly reducing zones into oxidizing conditions. Each of these areas will have a different affect on the attenuation.

The conceptual model should also be used to evaluate if a site is a candidate for monitored natural attenuation (MNA) (see definitions, Section 4). Generally, contaminants that may be considered for MNA approach can be separated into two separate groups as follows:

- Organics
 - Fuel hydrocarbons
 - Chlorinated organics
 - Explosives
 - Pesticides
 - Herbicides
- Inorganics
 - Metals
 - Inorganic anions
 - Radioactive nuclides

The conceptual site model should be used to determine the potential maximum distance of plume migration before the migration of the plume can be arrested by implementation of a contingency plan.

6.1.3. Step 3 - Screen the Data for Evidence of Natural Attenuation and Develop Hypothesis to Explain the Attenuation Processes

Although historical data is often incomplete for completion of natural attenuation investigations sufficient data may be available to develop a hypothesis. In general, little data are required to develop a hypothesis to evaluate natural attenuation. If the contaminants are known, then an understanding of the attenuation processes that typically affect that contaminant may be speculated. An example would include adsorption or dispersion of inorganic plumes or biodegradation of petroleum hydrocarbons.

A useful tool for site screening is a scorecard that is associated with each contaminant. Various scorecards are presented in several of the protocols listed above. The scorecard is designed to help rapidly determine if natural attenuation may be possible under the observed site conditions. Credit is added or subtracted based on the presence of favorable or unfavorable conditions. Scorecards are useful if sufficient information is collected during the investigation process. The scorecard may also be a useful tool in identifying data gaps.

6.1.4. Step 4 - Identify Additional Data Requirements

Typically, site characterization investigations are designed to determine the absence of presence of contamination and are not designed to describe how the plume is behaving. Generally, these do not emphasize the hydrogeologic characterization of the site.

As delineated in the EPA policy directives, a MNA monitoring system should be adequately designed to do the following:

- Demonstrate that natural attenuation is occurring at an acceptable rate
- Determine if the contaminant plume is expanding either laterally or vertically
- Ensure no impact to potential receptors
- Detect new contaminant releases into the environment that could alter the effectiveness of natural attenuation processes
- Detect any changes in environmental conditions that may reduce the efficacy of natural attenuation processes
- Identify potentially toxic transformation products resulting from the degradation of organics or the decay of radionuclides
- Verify the attainment of cleanup objectives.

Selection of natural attenuation as a remedy demands a higher level of understanding of the mechanisms acting on the contaminant plume than needed for other remediation techniques. Therefore, more importance is given to collecting data from the site. Natural attenuation investigations include characterization of the magnitude and extent of contamination. Additional emphasis is placed on collection of data indicative of attenuation processes. The purpose of the natural attenuation investigation should be conducted to determine the following site characteristics:

- Characteristics of plume formation
- Three-Dimensional distribution of the source and extent of contamination
- Movement of water and vapor through and from the source area.
- Variation in groundwater flow velocity and direction
- Hydraulic conductivity, gradient, dilution/dispersivity
- Rate of transport and rate of attenuation of contaminants including:
 - Mass flux of contaminants
 - Change in concentration along flow path
 - Biodegradation rates
 - Supply of electron acceptors or donors to complete attenuation of the contaminants in groundwater
- Persistence of contaminant mass through adsorption and precipitation

The data collected is focused on concentration of geochemical indicators as well as the contaminants. Contaminant concentration data are organized to determine the flux of contaminant in the entire plume from the source along flow path and to the receptor. Data are needed to determine direction and rate of contaminant migration. Data may also be needed to indicate changes in environmental conditions over time, especially changes that may indicate diminished natural attenuation performance or inability to effectively monitor the system.

MNA field investigations may be divided into two separate zones, a MNA management zone and an MNA buffer zone. The MNA management zone encompasses the maximum projected plume boundary based on understanding of flow, transport and attenuation processes and quantitatively accounts for all remaining uncertainties. The management zone is not necessarily the size of the plume as it currently exists. A larger zone may be established for plumes that have not become static. The management zone can be further divided into the following zones.

- Source Zone – encompasses the high concentration area in which contaminant are dispersed into the aquifer.
- Plume boundary- encompasses the lateral and vertical extent of the contaminants of concern.
- Non-Significant Migration zone- encompasses the zone between the plume and sentinel wells in which the plume can migrate without the initiation of contingency plans.

The MNA buffer zone encompasses the area extending from the MNA management zone boundary to the nearest potential receptor. Sample locations should be placed to define and monitor changes in the biochemical and geochemical characteristics of each of the MNA management zones. The density of sampling during characterization must be related to the geological complexity of the site.

Site characterization monitoring should consider multiple lines of evidence including:

- Redox conditions
- Distribution of contaminants and daughter products.
- Hydrologic framework

The types, amounts and location of data to be collected and developed from steps 1 through 4 should be described in a sampling and analysis plan as part of the project-specific work plans. The sampling and analysis plan and/or project work plans should also include the following:

- Basic information and results generated from steps 1 through 4
- Types of analyses to be conducted on the samples
- Detailed procedures for sampling and field data collection
- Quality assurance/quality control (QA/QC) requirements for sample collection, handling, analysis and validation.

The project work plans should be used to help guide the collection of additional data.

6.1.5. Step 5 - Collect Additional Data

Upon determination of the data requirements necessary for completion of the natural attenuation, the field investigation should be conducted. Generally, these investigations use an iterative approach for determination of the fate and transport of chemicals in the matrix. An iterative approach is conducted by alternately collecting data and identifying data gaps. The process may begin by using screening tools for preliminary characterization data collection and progress to higher quality data collection devices for final site characterization. The benefits of the iterative approach may include:

- Higher resolution of data collection and analysis
- Optimization of well placement and data collection
- More representative data
- Better understanding of the transport and fate of contaminants.
- Greater investment in hydrogeologic characterization
- More conservative estimate of contaminant mass

Natural attenuation investigations may be conducted by collection and analysis of samples from a variety of matrices including air, soil, sediment, surface water and groundwater. The actual matrices

to be sampled will be determined based on the location of the source, potential contaminant migration pathways and location of potential receptors.

In general, samples primarily will be collected from soils and groundwater. Surface sample collection may include grab soil and surface water samples. Surface water level measurement locations may include pits, lakes, rivers, bays, and oceans. Subsurface sample collection devices may include soil borings, wells and piezometers, and various direct push sample methods. If site conditions permit direct push technologies may be used as a more cost effective method for data collection. Wells and piezometers used in natural attenuation investigations should be constructed in a manner that allows accurate reflection of actual groundwater fluctuations. Wells should be constructed in accordance with the appropriate Shaw E & I SOP(s).

Wells should be installed upgradient of the plume to define background conditions in the aquifer. Additional wells should be installed along inferred centerline of the plume and on lateral and terminal edges of the plume.

Sample collection should be conducted in a manner that allows the most representative conditions of the site. Groundwater samples should be collected using low-flow purging techniques.

All data should be maintained in appropriate permanent records in accordance with applicable Shaw E & I SOPs and/or project-specific requirements.

6.1.6. Step 6 - Refine the Site Conceptual Model

The field data should be evaluated to ensure that the data are sufficient to complete the goals of the natural attenuation investigation as defined in the project work plan. Based on the review of the data, the conceptual model should be reevaluated to ensure that the investigation-derived data are sufficient to achieve the goals described in Section 6.1.2. If data indicates that the conceptual model was substantially inaccurate, steps 1 through 5 may be reconducted to more accurately evaluate the natural attenuation characteristics of the site. The revised site conceptual model should be reviewed and approved by the Project Hydrogeologist.

6.1.7. Step 7 Conduct Performance Monitoring

Once a conceptual model has been accepted, a period of monitoring is required to verify that the forecast of the conceptual mode. There are three kinds of monitoring strategies:

1. Site characterization to describe disposition of contamination and forecast its future behavior
2. Validation monitoring to determine whether the predictions of site characterizations are accurate
3. Long-term monitoring to ensure that the behavior of the contaminant plume does not change.

The monitoring program should specify the location, frequency and type of samples and measurements necessary to evaluate whether the remedy is performing as expected and is capable of attaining remediation objectives. All monitoring programs should be designed to accomplish the following:

- Demonstrate that natural attenuation is occurring according to expectations;
- Detect changes in environmental conditions (i.e., hydrogeologic, geochemical, microbiological, or other changes) that may reduce the efficacy of any of the natural attenuation processes;
- Identify any potentially toxic and/or mobile transformation products;
- Verify that the plume(s) is not expanding either downgradient, laterally or vertically;
- Verify no unacceptable impact to downgradient receptors;

- Detect new releases of contaminants to the environment that could impact the effectiveness of the natural attenuation remedy;
- Demonstrate the efficacy of institutional controls that were put in place to protect potential receptors; and
- Verify attainment of remediation objectives.

The frequency of monitoring should be adequate to detect, in a timely manner, the potential changes in site conditions listed above. The frequency of validation monitoring should be related to:

- The natural variability of the contaminant
- The distance and time of travel from the source to the location where the acceptance criteria are applied
- The reduction in contaminant concentration required to meet the acceptance criteria.

Performance monitoring should be conducted until remediation objectives have been achieved, and longer if necessary to verify that the site no longer poses a threat to health or the environment.

6.2. Potential Natural Attenuation Investigations Errors

The following are common errors conducted during natural attenuation investigations. The most effective method for eliminating errors is to assure collection of the highest quality data and to apply good hydrogeologic practices in conducting the investigations:

- Inaccurate electron acceptor measurement
- Inaccurate aquifer matrix organic carbon content determination
- Inaccurate determination of hydrogeologic parameters (transmissivity, porosity, gradient)
- Inaccurate determination of Non Aqueous Phase Liquids mass
- Improper sampling procedures.
- Improper placement of monitor wells vertically and horizontally
- Underestimation of contaminant concentrations and mass.
- Misidentification of contaminant migration routes (i.e., utility lines etc.)

If natural attenuation investigations results do not make physical sense or are not consistent with observed site conditions, the study data and methods should be reviewed for potential errors or other causal factors. The study results should then be revised appropriately before formally presenting the results and generating conclusions.

6.3. Report Preparation

The results of the natural attenuation investigation should be presented in an appropriate report. The report should be prepared to satisfy the project requirements and in accordance with Shaw E & I SOPs. The report should include a description of the following items:

- Description of the conceptual model
- List of potential natural attenuation processes identified for further investigation;
- Analytical data collected to evaluate potential natural attenuation processes;

- Field investigation methods employed to collect required data;
- An evaluation of the data with respect to the potential attenuation processes identified;
- Results of the data evaluation
- Conclusions and uncertainties in the investigation results

6.4. Technical Review

All natural attenuation investigation plans, designs and results should undergo technical review. The technical reviewer should be a person capable of planning and conducting the natural attenuation investigations, and also understanding and comparing observed field data to the conceptual and natural attenuation investigation results. The technical reviewer should not have participated in the portion of the natural attenuation investigations to be reviewed. The technical reviewer should be carefully selected and may be a qualified person outside the project team. Individuals needing assistance in finding qualified technical reviewers may consult internal Shaw technical listings for experts in natural attenuation processes including hydrogeology, biology, and geochemistry or may possibly use an expert outside of Shaw, if necessary.

The technical review, at a minimum, should consider and evaluate the following items:

- Definition of problem – The basic description of the problem is provided as well as the basic scope of the natural attenuation investigation to be conducted.
- Site conceptual model – The hydrogeologic system to be evaluated as well as the conceptual flow and solute transport system (if applicable) are appropriately defined and are supported by site data; parameters needed for evaluation of attenuation processes are appropriately identified; conceptual model is approved by the Project Hydrogeologist.
- Sampling frequency - The sampling frequency must be at an interval appropriate to determine the parameters that are to be determined within the margin of error that is necessary to resolve the issue.

Any issues raised during the technical review should be resolved between the reviewer and staff conducting the natural attenuation investigations before external (i.e., outside of Shaw E & I) submission of the draft or final report. The technical review comments and issues, and corresponding resolution should be documented and filed with the project records. If a natural attenuation investigation report is prepared documentation of the report review may also be included with the project records. Such records should be maintained until project closeout.

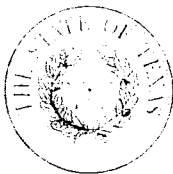
7. ATTACHMENTS

None.

8. FORMS

None.

Kathleen Hartnett White, *Chairman*
Larry R. Soward, *Commissioner*
H. S. Buddy Garcia, *Commissioner*
Glenn Shankle, *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 14, 2007

Ms. Rose Zeiler
Army / BRAC Site Manager
Longhorn Army Ammunition Plant
Post Office Box 220
Ratcliff, AR 72951

Re: Final LHAAP-12 Well Abandonment and Installation Reports
Groundwater Data Gaps Investigation, Groups 2 and 4,
Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas, April 2007

Dear Ms. Zeiler:

The Texas Commission on Environmental Quality (TCEQ) has completed review of the Final LHAAP-12 Well Abandonment and Installation Report, Groundwater Data Gaps Investigation (Shaw Environmental, Inc., April 2007). The report summarizes the activities associated with the abandonment of the 12 existing monitoring wells and the installation and sampling of replacement wells at the LHAAP 12. We are satisfied with the responses provided to the TCEQ's comments on the draft final report and have no additional comments.

If you have any questions or need additional information, please feel free to contact me at (512) 239-2443.

Sincerely,

A handwritten signature in black ink, appearing to read "Fay Duke", is written over a horizontal line.

Fay Duke, Project Manager
Team 2, Environmental Cleanup Section II
Remediation Division

FD/

cc: Mr. Stephen L. Tzhone, U. S. Environmental Protection Agency Region 6, Dallas, TX
Mr. Cliff Murray, U.S. Army Corps of Engineers, Tulsa, OK
Dr. Barry Forsythe, U.S. Fish and Wildlife Service, Dallas, TX
Mr. Paul Bruckwicki, U.S. Fish and Wildlife Service, Karnack, TX



**Subject: Draft Final Minutes, Monthly Managers Meeting,
Longhorn Army Ammunition Plant (LHAAP)**

Location of Meeting: Teleconference

Date of Meeting: May 15, 2007, 01:00 PM – 4:30 PM

Meeting Participants:

BRAC:	Rose M. Zeiler
USACE-Tulsa:	John Lambert
USAEC	Jeff Armstrong
Shaw Environmental:	Dave Cobb, Praveen Srivastav, John Elliott, Van Vangala, Kay Everett, Greg Jones, Jon Lindberg, Amar Bumb
USEPA Region 6:	Steve Tzhone, Scott Harris, Mike Overbay, Gary Miller
TCEQ:	Fay Duke, Dale Vodak
USFWS:	Paul Bruckwicki
USGS:	Kent Becher, Phil Harte

Action Items from April 2007 Manager's Meeting

Army Action Items

- **Forward MMRP report to EPA and TCEQ when available.** The MMRP report was forwarded to EPA and TCEQ.
- **Utility easement transfer status.** The utility easement transfer status was discussed. Army indicated that the easement would be transferred to FWS when details are worked out.

Shaw Action Item

- **Provide additional information on LHAAAP-16 to TCEQ.** Shaw provided additional information on LHAAAP-16 to TCEQ.

EPA Action Item

- **Steve Tzhone to determine if a proposed plan and public comment period is required with an NFA ROD that follows implementation of an Action Memorandum and EE/CA that had already undergone public review.** Steve indicated that an NFA ROD will still need to have a proposed plan with public review, but that those do not have to be complicated.

TCEQ Action Items

- **Fay Duke to respond to Shaw's request to use actual data for calculation of a dilution factor after her review of data provided.** Fay Duke indicated that data from appropriate times were not available for Harrison Bayou and well 16WW12 to allow calculation of dilution factors. She indicated that the results from the creek should be approximately 6 months after the result from the well, assuming a groundwater velocity of 225 feet/year.
- **Fay Duke will find out how Standard 3 MSC equations are to be used.** She will find out the applicability of the equations.

Defense Environmental Restoration Program (DERP) PBC Update (Dave Cobb/Praveen Srivastav)

Dave Cobb briefly went over the highlights on the document status table. EPA's Steve Tzhone indicated that comments on the BERA document were not available as yet but they were close to being finalized. He indicated that the comments would be broken up into three sections: the first section will consist of general comments overall, the second section will consist of specific comments, and the third section will pertain to the development of a table showing COPECs, the contents which were not agreed upon in the past. The reviewers felt that a table of COPECs should be included and may affect clean up alternatives. Steve had more details from a BERA call the previous day and will give everyone a heads up on this later. He expected the comments to come out the next week.

Fay asked about Shaw's responses to BERA Volume I comments. Jon Lindberg with Shaw indicated that they were holding all responses until comments are received on Volume II. Both volumes will be submitted together as one document. Steve Tzhone said that they needed a conference call to discuss all issues and would include Susan Roddy's comments who had been away. Steve Tzhone said that all the assessors thought that the COPECs need to be addressed and agreed upon. Praveen Srivastav stated that comments on Step 3 were about issues such as background evaluations, and were addressed to come up with the list of COPECs that was carried forward. Dave Cobb indicated that the list of COPECs was submitted to the regulators before work on Steps 4 through 8 was commenced. Shaw had added a few COPECs based on the review of Step 3 report by the regulators. Jon Stated that Shaw expected some minor changes to the COPECs list but was not expecting extensive revisions. Steve Tzhone indicated that the risk assessors didn't know why some COPECs dropped off or why some new ones weren't included. Some clarification would have to be added.

Rose Zeiler asked if the assessors were close to finalizing their comments. Fay Duke indicated that comments on Volume II were very close to being finalized. She said that Vicky Reat's (TCEQ) comments on Volume I covered everything Susan Roddy (EPA) was worried about. Rose Zeiler said that the BERA would impact many TERC sites. One of the concerns expressed by EPA risk assessors was that the CERCLA process was apparently not followed with respect to ecological risk for the TERC sites where feasibility studies and proposed plans were completed before BERA was complete. Rose Zeiler said that the CERCLA process was not entirely followed with respect to ecological risk for some of the smaller TERC sites where ecological risk was not expected to impact remedial alternatives. The decision to proceed was made in coordination with regulators in order to expedite these sites towards closure and

transfer while awaiting conclusion of the BERA. In fact, the Army tracked the ecological risk associated with the TERC sites as the BERA proceeded in order to be aware of any unforeseen potential impact. Steve Tzhone said they plan to submit the comments the following week and then Shaw will have two weeks to respond to their comments. Fay said that if Shaw had any comments or questions before she got back from her vacation, Shaw can talk directly with Vicky Reat, the TCEQ risk assessor.

Dave Cobb continued with the Document Status update. He said that the underground injection control (UIC) permit form had been submitted to the state. Documents for other other sites were in various stages awaiting the availability of data from the BERA.

Kent Becher with the USGS said that he would be glad to share the database they have been working on regarding LHAAP. It was suggested they bring copies for the June monthly manager's meeting. They would be contacting Rose on what kind of presentation to make at the RAB meeting.

Phil Harte, USGS, said they had some additional questions for Shaw regarding their modeling which may be addressed by phone. There was some discussion on how the stream stage data was collected and the amount of data available. Praveen Srivastav requested a separate call on the LHAAP-16 modeling issue because it may be a long discussion. EPA's reviewer Phil Harte had requested additional information to complete his review of the model. Praveen Srivastav indicated that Shaw is putting the information together and will be send it out later in the week.

Rose Zeiler asked how the regulators would be handling the USGS' recommendation. Steve Tzhone indicated that his assumption was that everyone would accept USGS' recommendations. Rose asked TCEQ how they would handle the USGS recommendation. Fay Duke said that they had not discussed how they would be handling them. She indicated that Chuck's reaction in the last meeting was not good and Fay was not ready to speak on this yet. She asked if the USGS have any gauges for volumetric calculations. There are some 12-15 existing measurements over several months from December 1999-March 2000. They may look at some local groups to get the volumetric calculations. Steve reiterated that the USGS' review of the model was aimed to help resolve any conflict regarding the use of the model and said this was not to be the final word, but he had hoped that recommendations made by the USGS would be helpful in resolving issues. Phil can highlight some leading questions to get people to start thinking about them. Phil said he can wrap up quickly after getting information from Shaw (which will be sent by Thursday May 17, 2007) and send to Kent Becher by next week. Steve Tzhone will forward USGS comments to everyone when he receives it. A call among the modelers is planned around the time of the next RAB meeting in June (June 11-13, 2007).

At Steve Tzhone's request Mike Overbay and Gary Miller of USEPA were on the teleconference to answer questions about requirements for meeting Operating Properly and Successfully (OPS). Rose Zeiler noted that OPS is required for deed transfers where property changes from federal to non-federal hands. This is not the case at Longhorn where the Army is transferring the property to USFWS. The United States Government remains the owner and only administrative control of the site is transferred from agency to agency and so by statutory

definition an OPS would not normally be required. However, an OPS demonstration was added by Army to the Transfer Memorandum of Agreement (MOA) between USFWS and Army as a means by which USFWS would be assured the property was environmentally suitable for transfer.

Mike Overbay said that OPS means that the Army must demonstrate that a remedy at a site is operating properly and successfully. He said what should be included is a trend analysis and a projection by extrapolation of when the clean up goals be achieved as indicated in ROD. Rose Zeiler asked that if MNA or LUC is the remedy, what will be needed to demonstrate OPS? Mike said EPA guidance document is helpful in this regard. And from a technical standpoint there is already an advantage – there's no remedy to construct. All historical monitoring that has been done at the site can be used to support OPS by demonstrating that anticipated and adequate progress is being made. Rose asked if data for a certain period is required for an active remedy. Mike indicated that the time of monitoring before OPS depends upon how much variability is in the data. If the data show that concentrations have been showing a declining mass over time, there is no problem, but he went on to say that it is hard to say how long it will take to show the changes needed. If there is variability in the data, a longer monitoring period may be required before OPS to obtain overall trends.

Mike Overbay said that documentation for MNA can include all past monitoring in order to demonstrate OPS. Mike indicated that request for approval of OPS can be processed expeditiously if everything is in one document, a separate stand-alone document that summarizes all the information and includes summary tables and any appendices or attachments necessary to support the demonstration. Rose asked about the review time frame, and Steve indicated it is typically a 30-day process. Steve will process it first and route it where it should go. Rose said that the Army will submit the OPS document for LHAAP-12 in June 2007.

LHAAP-16. Praveen Srivastav will send any relevant information if found regarding the dilution factor. The plan is to collect one round of MNA data as a baseline using wells selected that are outside the zone of influence of the extraction wells. If the preliminary results look favorable for MNA as a remedy, then the FS will be submitted.

LHAAP-18/24. The optimization plan will be sent to the regulators after Shaw receives Army's comments. The UIC permit is in progress and contact had been made with the agency.

GWTP. Van Vangala indicated that there were no major problems at the Groundwater Treatment Plant (GWTP) last month and that operations were proceeding normally. He said that there was one call out last month due to power failure – two power poles fell down. The plant was shut down for 24 hours in order to replace 2 poles. The poles were located near Landfill 12. The fabrication work for the replacement pipe for the Catox unit at the GWTP is still being planned for early June.

Status of Site Evaluation Report, LHAAP-06, -07, -51, -55, -64, -66, -68.

The comments on this report were similar to those on TERC sites LHAAP-59. Comments were received from TCEQ. Steve will check document status with Scott Harris (EPA). Dave Cobb indicated that Shaw has collected SPLP samples from the sites in the report. Results are expected in two weeks.

Defense Environmental Restoration Program (DERP) TERC Update (Praveen Srivastav/John Elliott)

Jeff Armstrong mentioned that funds for the rate adjustment are available and that Tulsa is filling out the necessary paperwork.

John Elliott indicated that the contingency language provided for the LUC deed recordation will be provided to Fay Duke the next day. Fay will then forward to the TCEQ attorney.

John Elliott discussed the highlights of the Document Status Table. Shaw had not received comments from EPA on the site evaluation report for 48/53 and the draft final PP that were submitted together. Steve will check on status.

MMRP Update

TCEQ is estimating what is needed to review this document so a purchase order can be issued. Scott Harris may have the time at the end of May to do the review. John Lambert (USACE) indicated that the electronic versions should have gone out from CAPE to Scott and Fay's attention.

Transfer Update

ECOP IV

Rose Zeiler reported that the fire station has officially been transferred to FWS. ECOP IV, encompassing about 640 acres, had been offered to FWS, but there has not been an official acceptance yet. ECOP V (Landfill 12) has been sent up to BRAC for legal review and will be completed this fiscal year. The OPS will follow finalization of the ECOP and the property will be ready for transfer. A sixth ECOP is being considered to accomplish transfer of the utility ROW to USFWS. FWS is looking at this to see if they can take the easement where it crosses environmental sites. ECOP VII will be the post-BERA transfer sites and will include Sites 8, 32, 48 and 53.

Pits and Hazards.

Fort Worth will be on site on the 12th of June in preparation for Pits and Hazards kickoff.

Demolition Landfill

The landfill has been seeded up and needs inspection prior to closure.

Next monthly manager's meeting is scheduled for June 12, 2007 at 2:30 PM at LHAAP to coincide with the RAB meeting scheduled for 6:30 that evening.

Meeting Adjourned.**Action Items:****Shaw**

- Will send any relevant information if found regarding dilution factors for LHAAP-16 to TCEQ.
- Provide requested information to Phil Harte with USGS.
- The contingency language provided for the LUC deed recordation will be sent to Fay Duke tomorrow (May 23, 2007)
- Call among the modelers will be initiated between June 11 and 13, 2007.

EPA

- Steve Tzhone will check status on several reports currently in review.

USGS

- USGS will provide a copy of the database they are developing at next months' meeting.

TCEQ

- More clarification is needed regarding how Standard 3 MSC equations are to be used.



**Status of Technical Documents – 4 week look ahead
Longhorn Army Ammunition Plant – PBC Contract
May 11, 2007**

No.	Documents in Progress	Submittal Date	Army	Regulator	Comments Due from USACE/ Regulators	Comment Resolution	Status	On Stakeholder's Portal?	Remarks
ERA									
1	Draft Final Step 3 report (Vol I of BERA)	1/16/07		x	2/15/07		Under regulatory review. Regulator not issuing comments until sees Vol. 2.	x	TCEQ comments received 5/3/07. EPA comments not received and now not expected until 5/15/07.
2	Draft Final BERA (Vol II of BERA)	3/6/07		x	4/6/07		Under regulatory review	x	TCEQ comments received 5/3/07. EPA comments not received and now not expected until 5/15/07.
ENVIRONMENTAL									
4	Draft Final SI/Evaluation Report, LHAAP-02	3/30/06		x			Comments rec'd from TCEQ 8/29/06. EPA comments rec'd 5/12/06.	x	Final will be issued when BERA information available.
5	Draft Final Proposed Plan, LHAAP-60	7/7/06		x			Comments rec'd from TCEQ 8/1/06. EPA comments rec'd 8/21/06.	x	Final to be submitted when BERA information available.
7	Draft Final TCRA Memo – LHAAP-04, -49, -50, and Pistol Range	12/6/06	x				On hold. Currently undergoing contractual resolution between Army and Shaw.		
9	Draft Feasibility Study, LHAAP-58	TBD					On hold pending BERA		Draft versions 80% complete. Draft will be issued when BERA information available.
10	Draft Feasibility Study, LHAAP-17	TBD					On hold pending BERA		Draft versions 80% complete. Draft will be issued when BERA information available.
12	Draft Final Feasibility Study, LHAAP-16	TBD					On hold pending BERA		Decision made to hold DF document until BERA information available based on EPA comments regarding CERCLA process.



**Status of Technical Documents – 4 week look ahead
Longhorn Army Ammunition Plant – PBC Contract
May 11, 2007**

No.	Documents in Progress	Submittal Date	Army	Regulator	Comments Due from USACE/ Regulators	Comment Resolution	Status	On Stakeholder's Portal?	Remarks
13	Draft Final SI Report for LHAAP-06, 07, -51, -55, -64, -66, -68 (combined)	1/11/07		x	2/10/07		In regulatory review. No comments rec'd.	x	Document to be revised to reflect changes in standards for comparison and inclusion SPLP data. Revised version expected to be issued late May 2007.
14	Draft SI Report for LHAAP-35/36	5/18/07 (Army)					In preparation		
17	Draft Final LHAAP-16 MNA Evaluation Proposal	3/2/07		x	4/2/07	EPA comments rec'd 3/28/07, TCEQ comments pending.	In regulatory review	x	
18	Draft SI Report for LHAAP-03	5/17/07 (Army)					In preparation		Will be incorporated into FINAL SI report for sites -06, -07, -51, -55, -64, -66, -68. Revised version expected to be issued late May 2007.

**Technical Document Status Table
TERC Task Order NO. 0109
Longhorn Army Ammunition Plant**

Site	Documents in Progress	Draft Document				Draft Final Document									Final
		Draft Submittal Date	Army Comments	Shaw RTC	Comment Resolution	Draft Final Submittal Date	AEC Comments	EPA Comments	TCEQ Comments	Shaw RTC	Army Comments	Comment Resolution	Army forward RTC to TCEQ & EPA	Comment Resolution	Final Submittal Date
08	Proposed Plan, LHAAP-08	05/01/06	05/24/06			07/07/06	08/25/06	08/21/06	09/20/06	09/29/06			11/21/06	TCEQ 12/07/06 EPA 02/21/07	
08	Record of Decision, LHAAP-08														
12	Operating Properly and Successfully Demonstration Report, LHAAP-12	<u>07/25/07</u>													
32	Proposed Plan, LHAAP-32					07/21/06	08/25/06	09/05/06	09/12/06	09/19/06			11/21/06	TCEQ 12/07/06 EPA 01/26/07	
32	Record of Decision, LHAAP-32														
37/67	Proposed Plan, LHAAP-37/67	05/02/06	05/24/06	06/06/06	06/22/06	07/18/06	08/25/06	09/05/06	09/20/06	10/19/06	10/31/06	11/07/06	11/21/06	TCEQ 04/27/07 EPA 02/21/07	<u>08/16/07</u>
37/67	Record of Decision, LHAAP-37/67														
48/53	Revised Proposed Plan, LHAAP-48/53	09/25/06	10/31/06	11/14/06	01/12/07	04/09/07	USACHPPM 04/25/07 OC 05/15/07	6/12/07 via USACE	04/27/07	06/27/07	07/12/07 07/13/07	<u>07/19/07</u>			
48/53	Record of Decision, LHAAP-48/53														
59	Site Investigation Report, LHAAP-59	11/02/06	11/07/06	11/09/06	11/15/06	11/21/06	None Required	03/20/07	01/11/2007, 03/20/07, & 03/22/07	04/02/07	RMZ 04/12/07 USACE 04/11/07	04/12/07	04/25/07	TCEQ 06/15/07 EPA 04/30/07	<u>08/02/07</u>
59	Record of Decision, LHAAP-59														

Shaw Forecasted Submittal Date

Shaw Action Item

Army Action Item

EPA & TCEQ Action Item

Current Action item

LONGHORN ARMY AMMUNITION PLANT,**Karnack, Texas*****MONTHLY MANAGERS' MEETING*****AGENDA**

DATE: Tuesday, 15 May 2007
TIME: 1:00 p.m.
PLACE: Teleconference Toll-Free Number: 866-797-9304, Passcode: 4155734

Welcome **RMZ**

Review of April 2007 Meeting Minutes and Action Items **RMZ**

Army

- Forward MMRP report to EPA and TCEQ when available.
- Utility easement transfer status.

Shaw

- Provide additional information on LHAAP-16 to TCEQ.

EPA

- Steve Tzhone to determine if a proposed plan and public comment period is required with an NFA ROD that follows implementation of an Action Memorandum and EE/CA that had already undergone public review – this question relates to the NTCRA at MMRP sites.

TCEQ

- Fay Duke to respond to Shaw's request to use actual data for calculation of a dilution factor after reviewing data to be provided by Shaw.
- Fay Duke will find out how Standard 3 MSC equations are to be used. Are they to be used to calculate clean up goals after a risk assessment or they can be used in lieu of a risk assessment?

Defense Environmental Restoration Program (DERP) PBC Update **DC/PS**

- Document Status/Environmental Sites (Table)
- LHAAP-18/24 Injection testing/permit
- LHAAP-16 FFS Addendum
- Status of Site Evaluation Report, LHAAP-3, 6, 7, 51, 55, 64, 66, 68

DERP Total Environmental Restoration Contract Update **PS/JE**

- Documents Status/Environmental Sites (Table)

MMRP Update **JRL**

Transfer Update **RMZ**

- ECOPs III (Fire Station), IV (Cemetery) and V
- Pits and Hazards Abatement
- Utility Easement