LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

CHRONOLOGICAL INDEX

Volume 5 of 25

2007

Bate Stamp Numbers
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Prepared for

Department of the Army
Longhorn Army Ammunition Plant

1976 – 2007

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

VOLUME 5 of 25

2007

A. Title: Report - Final Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12
Author(s): Shaw
Recipient: All Stakeholders
Date: June 7 2007
Bate Stamp: 00045727 - 00045743

B. Title: Legal Notice - Industrial Solid Waste Notice of Land Use Controls at LHAAP-12
Author(s): Rose Zeiler, Site Manager LHAAP
Recipient:
Date: June 13, 2007
Bate Stamp: 00045744 - 00045755

C. Title: Report - Evaluation of Perimeter Well Data for Use as Groundwater Background
Author(s): Shaw
Recipient: All Stakeholders
Date: June 14, 2007
Bate Stamp: 00045756 - 00046051

June 7, 2007 Shaw/TERC 07-035

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 Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Murray:

Shaw Environmental, Inc. is pleased to submit the attached *Final Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12.* 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,

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 101st – 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 *(mailing only)* 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

00045729

June 7, 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 Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12, Longhorn Army Ammunition Plant, Karnack, Texas, June 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,

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)

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

00045730

June 7, 2007

DAIM-BD-LO

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

Re: Final Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12, Longhorn Army Ammunition Plant, Karnack, Texas, June 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,

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)

Comments on Draft Final Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12, Longhorn Army Ammunition Plan

00045731

May 2006

Response to Comments submitted to Army on May 18, 2007

TCEQ Reviewer: Fay Duke, Project Manager, Texas Commission on Environmental Quality
USEPA Reviewer: Raji Josiam, Remedial Project Manager, USEPA Region 6
Respondents: Song-Kai Yan and Praveen Srivastav, Shaw E & I

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

Comment No.	Page Number	Section/ Paragraph	Comment	C, D[1], E or X	Response	A or D[2]
TCEQ Review Comments						
1		General	I was reviewing the MNA modeling results for LHAAP-35B and LHAAP-67. Something is not quite right. I notice that the input parameters of LHAAP-35B are fairly similar to LHAAP-12 but the resulting time calculations are very different. For example, under the scenarios of no degradation with continuous source of TCE for 10 years, the attenuation time for LHAAP-12 is estimated to be 2,651 years while the attenuation time for LHAAP-35B is estimated at 39 years. In LHAAP-12, there were drastic differences in attenuation periods between the assumptions of instantaneous source versus continuous source but one do not find those differences in LHAAP-35B.	C	The difference in attenuation periods between the assumptions of instantaneous source versus continuous source was attributed to many factors: the size of the source, the hydraulic conductivity, the thickness of the water-bearing unit, the degradation rate and the retardation coefficient. Since TCE was evaluated for all the sites, its chemical properties such as degradation and adsorption should be similar, and therefore, the difference in attenuation period cannot be attributed to the degradation rate and the retardation factor. The other factors did influence the difference. The larger the size, or smaller the hydraulic conductivity, or thicker the layer, the longer it would take to reach MCL for the continuous source. Average hydraulic conductivity (K) was estimated to be 7.55×10^{-4} cm/sec (=781.1 feet/year) for LHAAP-12. **A more conservative median value of 5.92×10^{-5} cm/sec (61.3 feet/year) was used in the model since the tested K value ranges from 3.5×10^{-7} to 4.53×10^{-3} cm/sec.** Also, since the time to reach MCL was evaluated only at the source area where K value is smaller, the average value was more	A

<table>
<tr><th>Comment No.</th><th>Page Number</th><th>Section/ Paragraph</th><th>Comment</th><th>C, D[1], E or X</th><th>Response</th><th>A or D[2]</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>realistic. The text in bold will be added to page 1, Section 2.0, 2nd bullet.</td><td></td></tr>
<tr><td></td><td></td><td></td><td>I was not able to find sufficient information in the modeling result reports to decipher the differences. Could Shaw provide me with the equations used in the MNA calculations of the time required for maximum COC concentration to natural attenuation to MCL?</td><td></td><td>The equation used in this model (AT123D) is a partial differential equation that consists of Darcy velocity, hydraulic dispersion coefficient, dissolved solute concentration, adsorption coefficient, contaminant release rate, radioactive decay rate, effective porosity, degradation rate and bulk density of the porous media (see attached Mathematical Representation of AT123D). After running AT123D, the time to MCL was obtained from the hard copy output file that lists the concentrations at each designated location along and lateral to the pathway.</td><td>A</td></tr>
<tr><td></td><td></td><td></td><td>Additionally, could you provide me with the sensitivity analysis of these particular calculations (which of the input parameters are the most sensitive)?</td><td></td><td>The following table presents the sensitivity analysis results for both degradation rate and hydraulic conductivity:
Time to TCE MCL at the Source Area (years)
<table><tr><th></th><th>Instantaneous Source</th><th>Continuous Source</th></tr><tr><td>No Degradation</td><td>486 (44)</td><td>2651 (213)</td></tr><tr><td>Half-life = 45 years</td><td>118 (32)</td><td>261 (112)</td></tr><tr><td>Half-life = 4.5 years</td><td>23 (12)</td><td>40 (29)</td></tr></table></td><td>A</td></tr>
</table>

TCEQ Reviewer: Fay Duke, Project Manager, Texas Commission on Environmental Quality
USEPA Reviewer: Raji Josiam, Remedial Project Manager, USEPA Region 6
Respondents: Song-Kai Yan and Praveen Srivastav, Shaw E & I

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

Comment No.	Page Number	Section/ Paragraph	Comment	C, D[1], E or X	Response	A or D[2]
					Note: Numbers not in parentheses are for median K = 5.92×10^{-5} cm/sec; numbers in parentheses are for average K = 7.55×10^{-4} cm/sec. For the degradation rate, a half-life ranging from 4.5 years to infinity (no degradation) was assumed and the corresponding time to MCL was estimated. The above comparison shows that the time to MCL is sensitive to changes in both degradation rate and hydraulic conductivity. Overall, however, for both the instantaneous and continuous source scenarios, the degradation rate is as sensitive or more sensitive than hydraulic conductivity. One notable exception is for the no degradation, instantaneous source scenario.	
EPA Review Comments						
2	1	1.0 Introduc-tion	Modeling was performed to calculated the time required for the maximum TCE concentration of 508 ug/L detected at the "source" (monitoring well 12WW12) during the winter 2004 sampling event (U.S. Army Corps of Engineers and ALL Consulting, 2006) to naturally attenuate to the MCL level of 5 ug/L. Why was only TCE considered? Why were the	C	When using the AT123D model, the chemical reaction process from parent product to daughter product cannot be evaluated. TCE was the only chemical modeled due to its high concentration. This information will be included in Section 1.0 of the final document.	A

Comments on Draft Final Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12, Longhorn Army Ammunition Plan

00045734

May 2006

Response to Comments submitted to Army on May 18, 2007

TCEQ Reviewer: Fay Duke, Project Manager, Texas Commission on Environmental Quality
USEPA Reviewer: Raji Josiam, Remedial Project Manager, USEPA Region 6
Respondents: Song-Kai Yan and Praveen Srivastav, Shaw E & I

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

Comment No.	Page Number	Section/ Paragraph	Comment	C, D[1], E or X	Response	A or D[2]
			daughter products not considered in the modeling? Please explain this in the introduction.			
3	1	2.0 Input Parame-ters	Are the daughter products taken into account? If not, why not? If not, what is the uncertainty in the number of years in not taking the daughter products into account.	C	Although daughter products are present, they are not included in the model and any uncertainty associated with daughter products cannot be determined. By using different TCE degradation rates, including the most conservative approach of no degradation, the time to MCL is expected to be within the range of values presented. For additional information, please see responses to Comment No. 1 and Comment No. 2.	A

Comments on Draft Final Results of Modeling for Natural Attenuation of Trichloroethene at LHAAP-12, Longhorn Army Ammunition Plan

00045735

May 2006

Response to Comments submitted to Army on May 18, 2007

TCEQ Reviewer: Fay Duke, Project Manager, Texas Commission on Environmental Quality
USEPA Reviewer: Raji Josiam, Remedial Project Manager, USEPA Region 6
Respondents: Song-Kai Yan and Praveen Srivastav, Shaw E & I

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

Comment No.	Page Number	Section/ Paragraph	Comment	C, D[1], E or X	Response	A or D[2]
4	2	4.0 Discussion	However, assuming a value of degradation with a half-life of 45 years, the time for TCE to attenuate to the MCL for the instantaneous and continuous sources increases to 118 and 261 years, respectively. As evidenced by the presence of daughter products, there is some TCE degradation taking place at the source; therefore, it is concluded that the values of 118 years and 261 years are more realistic. The RD Addendum for Landfill 12 (LHAAP-12) dated August 2006 indicates the following "5.0 Monitored Natural Attenuation – Based on groundwater modeling, groundwater APARs are expected to be met through natural attenuation in 23 to 261 years. Monitoring of natural attenuation is required to ascertain that the remedy is effective." There is inconsistency in the number of years between the two documents. Please correct.	C	At Site 12, since degradation was evident by the presence of VC, the modeling result for the "no degradation" scenario is not likely to happen and therefore only the range of values in Table 1 with degradation were cited in the remedial design. For additional information, the Final Modeling Report has been included as a reference in section 5.0. The Final Remedial Design will be changed to indicate 118 to 261 years to MCL so that it is consistent with this document.	A Note: My comment pertains to the inconsistency between the number of years in The RD Addendum for Landfill 12 (LHAAP-12) dated August 2006 and this document. Since 118 yrs to 261 yrs is more conservative I agree leaving this document as is. However, does the RD Addendum for Landfill 12 (LHAAP-12) dated August 2006 have to be modified?

Mathematical Representation of AT123D

The advection-dispersion equation is the governing equation for contaminant distribution in groundwater. Yeh (1981) gives this equation, assuming incompressible flow, as

$$\frac{\partial(n_e C)}{\partial t} = \nabla \cdot (n_e \bar{\bar{D}} \nabla C) - \nabla \cdot C\vec{q} + \dot{M} - K n_e C$$

$$- \lambda n_e C - (\frac{\partial(\rho_b S)}{\partial t} + \lambda \rho_b S) \qquad (1)$$

where $\vec{q}$ = Darcy velocity vector (L/T), $\bar{\bar{D}}$ = hydraulic dispersion coefficient tensor (L^2/T), C = dissolved solute concentration (M/L^3), S = adsorbed solute concentration on the solid phase (or soil surface) (M/M), ρ_b = bulk density of the porous media (M/L^3), $\dot{M}$ = contaminant source release rate ($M/(L^3T)$), n_e = effective porosity, λ = radioactive decay constant (1/T), K = degradation rate (1/T), and ∇ = gradient = $(\vec{i}\partial/\partial x + \vec{j}\partial/\partial y + \vec{k}\partial/\partial z)$.

The term on the left side of equation (1) represents the time rate of change of dissolved contaminant mass per unit volume of the aquifer. The first term on the right side of equation (1) represents the combined effects of hydraulic dispersion and molecular diffusion. The second term on the right side represents the advection of contaminant. The third term represents an external source of contaminant to the aquifer system. The fourth term on the right side of equation (1) accounts for the chemical and biological degradation of contaminant, while the fifth term represents radioactive decay. The last two terms of equation (1),

00045737

FINAL
RESULTS OF MODELING FOR NATURAL ATTENUATION OF TRICHLOROETHENE AT LHAAP-12 LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

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

Prepared by
Shaw Environmental, Inc.
3010 Briarpark, Suite 400
Houston, Texas 77042

TERC No. DACA56-94-D-0020, Shaw Project No. 845714
Task Order No. 109

June 2007

Table of Contents

List of Tables

Acronyms and Abbreviations

µg/L	micrograms per liter
cm/sec	centimeters per second
COC	chemicals of concern
DCE	dichloroethylene
foc	fraction of organic carbon
K	hydraulic conductivity
Kd	distribution coefficient
Koc	carbon-water sorption coefficient
LHAAP	Longhorn Army Ammunition Plant
MCL	maximum contaminant level
Shaw	Shaw Environmental, Inc.
TCE	trichloroethene

00045740

1.0 Introduction

LHAAP-12 is located approximately at the center of Longhorn Army Ammunition Plant (LHAAP) with LHAAP-67 to the north and LHAAP-16 to the southeast. The chemicals of concern (COCs) in groundwater are trichloroethene (TCE) and its daughter products cis-1,2-dichloroethylene (DCE) and vinyl chloride at maximum concentrations of 508, 110, and 2.1 micrograms per liter (µg/L), respectively. The COC concentrations are higher than the maximum contaminant levels (MCL) of 5, 70, and 2 µg/L respectively.

Modeling was performed to calculate the time required for the maximum TCE concentration of 508 µg/L detected at the "source" (monitoring well 12WW12) during the winter 2004 sampling event (U.S. Army Corps of Engineers and ALL Consulting, 2006) to naturally attenuate to the MCL level of 5 µg/L. The computer program, AT123D, was utilized to calculate the time for the natural attenuation of TCE. When using the AT123D model, the chemical reaction process from parent product to daughter product cannot be evaluated. TCE was the only chemical modeled due to its high concentration.

This document discusses the modeling results.

2.0 Input Parameters

Groundwater modeling was based on the following assumptions and considerations:

- *Contaminant source*. Placement of a multilayer cap isolated the waste in Landfill 12 and minimized the leaching of contaminants to groundwater. The source is considered to be instantaneous, but a continuous source was also modeled to present a conservative comparison.
- *Aquifer parameters*. The aquifer parameters, including the hydraulic conductivity, effective porosity, and hydraulic gradient at LHAAP-12 were obtained from the most recent site groundwater monitoring report (U.S. Army Corps of Engineers and ALL Consulting, 2006). These parameters are consistent with the values used in the *Final Modeling Report – Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment, Longhorn Army Ammunition Plant* (Shaw Environmental, Inc. [Shaw], 2007). These values are:
  - Average hydraulic conductivity (K) was estimated to be 7.55×10^{-4} centimeters per second (cm/sec) = 781.1 feet/year. A more conservative median value of 5.92×10^{-5} cm/sec (61.3 feet/year) was used in the model since the tested K value ranges from 3.5×10^{-7} to 4.53×10^{-3} cm/sec.
  - Hydraulic gradient: 0.016 feet/feet

  - Effective porosity assumed at 0.25
  - The thickness of the shallow water-bearing zone is 12.5 feet

- *Chemical properties*. The distribution coefficient, Kd is the partition coefficient for a chemical to be distributed to soil and groundwater (Kd = Koc × foc). For TCE, the carbon-water sorption coefficient (Koc) obtained from literature values (Montgomery, 2000) is 100 cm^3/g and the fraction of organic carbon (foc) is assumed to be 0.1 percent (consistent with the Final Modeling Report mentioned above). The Kd value is used to calculate the retardation factor.

- *Degradation rates*. Although recent investigations showed that TCE concentrations have slightly increased at the source area from 400 µg/L in 2002 to 508 µg/L in 2004, the presence of daughter products; cis-1,2-DCE and vinyl chloride in groundwater indicates that TCE has undergone some degree of degradation. Because a decreasing trend in TCE concentration is not clearly evident, a range of degradation rates for TCE were assumed during the current modeling; from a half-life of 4.5 years (Howard, et. al, 1991) to conservative 45 years, and to no degradation at all. The results are expected to be a wide range of the time period for TCE to naturally attenuate to the MCL.

3.0 Computer Code and Modeling Results

AT123D was chosen to evaluate the time for the recent TCE concentrations to naturally attenuate to the MCL of 5 µg/L. A pseudo three-dimensional grid was constructed such that the contaminant source is located 100 feet from the origin of the grid. This allows the change of concentration over time at the source to be recorded. The horizontal longitudinal axis extends to the potential receptor, which is at Central Creek, approximately 588 feet from the source. The horizontal transverse axis extends 60 feet on both sides of the longitudinal axis. The vertical axis extends to 12.5 feet, which is the thickness of the shallow water-bearing zone.

The modeling results are presented in **Table 1**.

4.0 Discussion

The type of the contaminant source (instantaneous or continuous) and the degradation rate of TCE are the major factors that influence the time for TCE to attenuate to the MCL at the source. Without consideration of degradation rate, the time for TCE to attenuate to the MCL for the instantaneous source is 486 years, whereas, it takes 2,651 years for the continuous source option. The time for TCE to attenuate to the MCL is reduced dramatically if both cases are simulated with a half-life of 4.5 years (literature value from Howard et al., 1991). However, assuming a

value of degradation with a half-life of 45 years, the time for TCE to attenuate to the MCL for the instantaneous and continuous sources increases to 118 years and 261 years, respectively. As evidenced by the presence of daughter products, there is some TCE degradation taking place at the source; therefore, it is concluded that the values of 118 years and 261 years are more realistic.

5.0 References

Howard, P.H., R.S. Boethling, W.F. Jarvis, W.M., Meylan, and E.M. Michalenko, 1991, *Environmental Degradation Rates*, Lewis Publishers, Inc.

Montgomery, J.H., 2000, *Groundwater Chemicals Desk Reference*, 3rd Edition, Lewis Publisher.

Shaw Environmental, Inc., 2007, *Final Modeling Report – Derivation of Soil and Groundwater Concentrations Protective of Surface Water and Sediment, Longhorn Army Ammunition Plant, Karnack, Texas*, prepared for U.S. Army Corps of Engineers, Tulsa District, Houston, Texas, February.

U.S. Army Corps of Engineers and ALL Consulting, 2006, *Groundwater Monitoring Report, Sites 12 and 16 – Spring 2003, Spring 2004, and Winter 2004, Longhorn Army Ammunition Plant, Karnack, Texas*, January.

00045743

Table 1
Estimated Time for TCE Concentration at the Source to be Reduced to the MCL (5 µg/L)

	Attenuation Period Assuming an Instantaneous Source (years)	Attenuation Period Assuming a Continuous Source for 10 years (years)
No Degradation	486	2,651
Half-life = 45 years	118	261
Half-life = 4.5 years	23	40

Notes:
µg/L micrograms per liter
MCL maximum contaminant level
TCE trichloroethene

STATE OF TEXAS

HARRISON COUNTY

INDUSTRIAL SOLID WASTE
NOTICE OF LAND USE CONTROLS AT LHAAP-12

KNOW ALL MEN BY THESE PRESENTS THAT:

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

I

The U.S. Army, Department of Defense, has performed a remediation of the land described herein. The remediation site is a capped landfill located on the Former Longhorn Army Ammunition Plant (LHAAP) and is designated as LHAAP-12. The site is included in TCEQ Notice of Registration No. 30990 as Unit Number 001. LHAAP was placed on the National Priorities List (NPL) during August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA), and TCEQ (formerly known as Texas Water Commission) entered into an agreement under the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. Remedial activities at LHAAP-12 were performed in accordance with the FFA requirements.

The landfill was used intermittently for the disposal of industrial solid waste, possibly containing small quantities of hazardous constituents generated at LHAAP. A Record of Decision (ROD) for LHAAP-12 was signed by USEPA in 1995 establishing the construction of a cap as an interim remedial action for the site to mitigate potential risks posed by the burial of landfill waste. Construction of the landfill cap was completed in 1998. The final remedy consists of land use controls (LUCs) in conjunction with monitored natural attenuation as documented in the Final ROD signed by USEPA on July 24, 2006. The site was not remediated to levels suitable for unrestricted use. LUCs at LHAAP-12 are required to ensure the integrity of the landfill cap and cover system and prevent human exposure to contaminated groundwater. Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E, 12100 Park 35 Circle, Austin, Texas, 78753, (512) 239-2900, Monday through Friday 8:00 a.m. to 5:00 p.m. or the Administrative Record available at the

Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670, (903) 935-4465, Monday through Thursday 10:00 a.m. to 8 p.m., Friday and Saturday 10:00 a.m. to 5:30 p.m.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public of the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

II

The LHAAP-12 parcel is a 50.541 acre tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in Exhibit A. Within the LHAAP-12 parcel are designated LUC boundaries including a 9.429 acre tract, more or less, and a 45.939 acre tract, more or less, as described in Exhibit A. The LUC boundaries are also presented in the attached Figure 1.

Future use of the parcel is intended as a national wildlife refuge consistent with non-residential use. The United States Department of the Army has undertaken careful environmental study of the LHAAP-12 site and concluded that the LUCs set forth below are required to ensure protection of human health and the environment.

(1) **Landfill Restriction**. A closed non-hazardous landfill (LHAAP-12) of approximately 7 acres is located within the 9.429 acre tract. The landfill restriction boundary consists of the 7-acre capped landfill and an area extending to the surrounding fence. LUCs have been established to protect the integrity of the remedy. No activity shall be conducted or permitted that would damage the integrity of the landfill cover (i.e. digging or disturbing the existing cover or contents of the landfill). The LUCs will remain in place for perpetuity unless otherwise removed by the U.S. Army per agreement with the USEPA and TCEQ.

(2) **Residential Use Restriction**. The residential use restriction boundary consists of the 9.429 acre-tract, more or less, and includes the 7-acre capped landfill and an area extending to the surrounding fence. This tract shall be used solely for the purpose of a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences; child care facilities; and nursing home or assisted living facilities; and any type of educational purpose for children/young adults in grades kindergarten through 12.

(3) **Groundwater Restriction**. The groundwater use restriction boundary consists of the 45.939 acre tract, more or less, and extends beyond the landfill

00045746

boundary. Groundwater underlying this land is contaminated with trichloroethene (TCE) and other volatile organic compounds and shall not be accessed or used for any purpose without the prior written approval of U.S. Army, the USEPA and the TCEQ. A LUC restricting the use of groundwater has been established for the protection of human health. The U.S. Army will notify the Texas Department of Licensing and Regulation of the groundwater restriction which includes prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval by the U.S. Army, the USEPA and the TCEQ. The LUC will remain in place until applicable or relevant and appropriate requirements (ARARs) as established in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulation 300) are met. Due to the potential for TCE-contaminated groundwater to migrate, monitored natural attenuation will be implemented to assure that TCE-contaminated groundwater will not migrate to nearby surface water at levels that may present an unacceptable risk to human health and the environment. The monitoring and reporting associated with this remedy will continue until ARARs are achieved.

The owner of the site is the Department of the Army, and its address where more specific information may be obtained from is as follows:

ATTN: DAIM-BD-LO (R. Zeiler)
Post Office Box 220
Ratcliff, AR 72951

Rose M. Zeiler
Longhorn AAP Site Manager

EXECUTED this the 13th day of June, 2007.

BEFORE ME, on this the 13th day of June, personally appeared Rose M. Zeiler, of United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 13 day of June, 2007.

NOTARY PUBLIC STATE OF TEXAS
LYNDA G. HAYS
Notary Public State of Texas
COMM. EXP. 5-02-2010

Lynda G. Hays
Notary Public in and for the State of Texas,
County of Harrison

EXHIBIT A

NOTE

ALL BEARINGS, DISTANCES (UNLESS LABELED OTHERWISE), & COORDINATES ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, NORTH CENTRAL ZONE, CODE 4202, NAD 1983 (92). THE SCALE FACTOR APPLIED EQUALS 0.999918513 & IS BASED ON SURFACE TRAVERSE BETWEEN STATIONS 2-95 & 3-95. THE COMPUTED LAND AREA IS BASED ON SURFACE DISTANCES

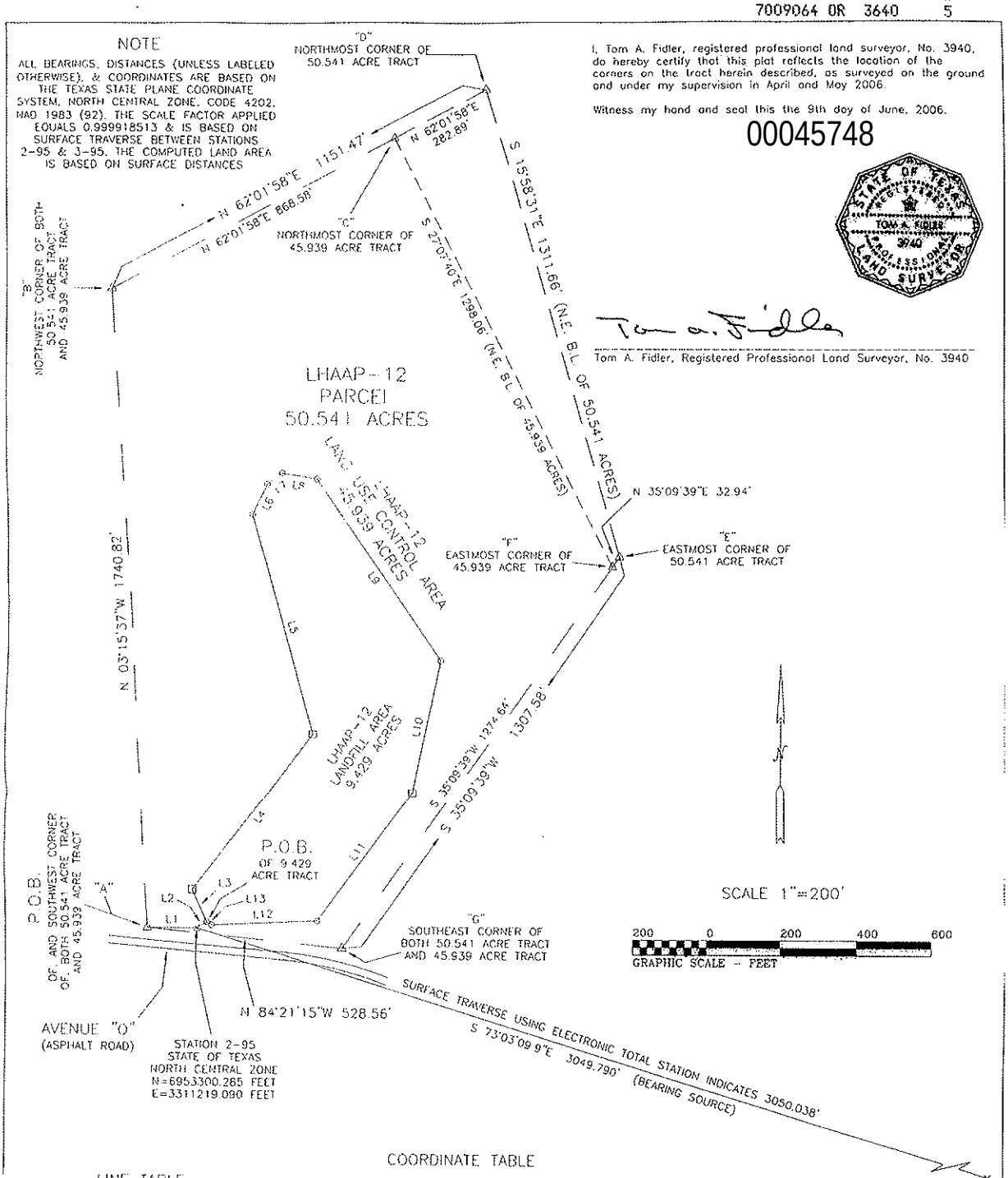
I, Tom A. Fidler, registered professional land surveyor, No. 3940, do hereby certify that this plat reflects the location of the corners on the tract herein described, as surveyed on the ground and under my supervision in April and May 2006.

Witness my hand and seal this the 9th day of June, 2006.

00045748

STATE OF TEXAS REGISTERED TOM A. FIDLER 3940 PROFESSIONAL LAND SURVEYOR

Tom A. Fidler, Registered Professional Land Surveyor, No. 3940



LINE TABLE

COURSE	BEARING	DISTANCE
L1	S 89°52'35"W	132.09'
L2	N 58°35'33"E	31.72'
L3	N 23°52'43"W	96.81'
L4	N 37°07'57"E	537.87'
L5	N 15°28'17"W	618.92'
L6	N 26°16'28"E	90.81'
L7	N 54°00'30"E	50.67'
L8	S 81°02'29"E	96.24'
L9	S 34°25'01"E	596.16'
L10	S 12°11'35"W	370.18'
L11	S 36°09'00"W	434.64'
L12	S 87°15'04"W	286.47'
L13	N 57°18'20"W	15.33'

COORDINATE TABLE

POINT	NORTH	EAST
A	6953300.000	3311087.000
B	6955038.000	3310988.000
C	6955445.333	3311755.144
D	6955578.000	3312005.000
E	6954317.000	3312366.000
F	6954290.070	3312347.030
G	6953248.000	3311613.000

NOTES:

- O INDICATES 12" DIAMETER WOODEN FENCE CORNER POST (FOUND)
- □ INDICATES 10" DIAMETER WOODEN FENCE CORNER POST (FOUND)
- × INDICATES TYPE "G" CORPS OF ENGINEERS MONUMENT (FOUND)
- △ INDICATES 1/2" IRON REBAR WITH ORANGE PLASTIC CAP ENGRAVED "FIDLER" & "RPLS 3940" (SET IN CONCRETE)
- ——— INDICATES BARBED WIRE FENCE AND PERIMETER OF 9.429 ACRE TRACT
- — — — INDICATES PERIMETER OF 50.541 ACRE TRACT ONLY
- — - — - — INDICATES PERIMETER OF 45.939 ACRE TRACT ONLY
- ——— ——— INDICATES PERIMETER OF BOTH 50.541 ACRE TRACT AND 45.939 ACRE TRACT

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 606 LONGVIEW, TEXAS 75606
PHONE (903) 236-3377 FAX (903) 236-3530
E-MAIL landmark@cablelynx.com

SHEET 1 OF 4

50.541 ACRES
45.939 ACRES
9.429 ACRES
LONGHORN army AMMUNITION PLANT
HARRISON COUNTY, TEXAS

JOB #0407088	0407088.CRD	0605063A.DWG
06/09/2006	0605063.CRD	DRAWN BY JTJ

00045749

FIELD NOTES DESCRIPTION OF
"LHAAP-12 PARCEL"
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The hereinafter described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-12 Parcel" being 50.541 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said tract "LHAAP-12 Parcel" being more particularly described as follows:

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999918513, and is based on surface traverse (using electronic total station) between type "G" Corps of Engineers monuments "2-95"(N=6953300.285 feet & E=3311219.090 feet) and "3-95"(N=6952411.298 feet & E=3314136.438 feet). Said traverse indicates a surface distance of 3050.038 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940".

Commencing at the monument "2-95" referenced above,

THENCE S 89deg52'35"W 132.09' to an I.R.O.P.C. set in concrete for the S.W.C. of this tract and this POINT OF BEGINNING,

THENCE N 03deg15'37"W 1740.82' along the W.B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Northwest corner,

THENCE N 62deg01'58"E 1151.47' along the N.W. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Northmost corner,

THENCE S 15deg58'31"E 1311.66' along the N.E. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Eastmost corner,

THENCE S 35deg09'39"W 1307.58' along the S.E. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Southeast corner,

THENCE N 84deg21'15"W 528.56' along the S.B.L. of this tract to this POINT OF BEGINNING, containing 50.541 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.

Tom A. Fidler, R.P.L.S. Number 3940

00045750

FIELD NOTES DESCRIPTION OF
"LHAAP-12 LAND USE CONTROL AREA"
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The hereinafter described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-12 Land Use Control Area" being 45.939 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said "LHAAP-12 Land Use Control Area" being more particularly described as follows:

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999918513, and is based on surface traverse (using electronic total station) between type "G" Corps of Engineers monuments "2-95"(N=6953300.285 feet & E=3311219.090 feet) and "3-95"(N=6952411.298 feet & E=3314136.438 feet). Said traverse indicates a surface distance of 3050.038 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940".

Commencing at the monument "2-95" referenced above,

THENCE S 89deg52'35"W 132.09' to an I.R.O.P.C. set in concrete for the S.W.C. of this tract and this POINT OF BEGINNING,

THENCE N 03deg15'37"W 1740.82' along the W.B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Northwest corner,

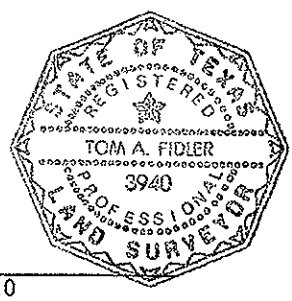
THENCE N 62deg01'58"E 868.58' along the N.W. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Northmost corner,

THENCE S 27deg07'40"E 1298.06' along the N.E. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Eastmost corner,

THENCE S 35deg09'39"W 1274.64' along the S.E. B.L. of this tract to an I.R.O.P.C. set in concrete for this tract's Southeast corner,

THENCE N 84deg21'15"W 528.56' along the S.B.L. of this tract to this POINT OF BEGINNING, containing 45.939 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

00045751

FIELD NOTES DESCRIPTION OF
"LHAAP-12 LANDFILL AREA"
CADDO LAKE NATIONAL WILDLIFE REFUGE
HARRISON COUNTY, TEXAS

The hereinafter described tract of land is located in Harrison County, Texas, near the town of Karnack, tract "LHAAP-12 Landfill Area" being 9.429 acres of land out of the Longhorn Ordance Works Reservation (also known as the Longhorn Army Ammunition Plant, Karnack, Texas), said "LHAAP-12 Landfill Area" being more particularly described as follows:

Surveyor's Note: All bearings and distances herein (unless labeled surface distance) are based on the Texas State Plane Coordinate System, North Central Zone, Code 4202, NAD 1983 (92). The scale factor applied equals 0.999918513, and is based on surface traverse (using electronic total station) between type "G" Corps of Engineers monuments "2-95"(N=6953300.285 feet & E=3311219.090 feet) and "3-95"(N=6952411.298 feet & E=3314136.438 feet). Said traverse indicates a surface distance of 3050.038 feet between said monuments. The computed land area is based on surface distances. As used herein, the abbreviation I.R.O.P.C. indicates 1/2" iron rebar with orange plastic cap engraved "Fidler" & "RPLS 3940".

Commencing at the monument "2-95" referenced above,

THENCE N 58deg35'33"E 31.72' to a 12" diameter wooden fence corner post found for a Southwest corner of this tract and this POINT OF BEGINNING,

THENCE generally along a barbed wire fence the following eleven courses,

N 23deg52'43"W 96.81' to a 10" diameter wooden fence corner post found for the Westmost corner of this tract,

N 37deg07'57"E 537.87' to a 10" diameter wooden fence corner post,

N 15deg28'17"W 618.92' to a 12" diameter wooden fence corner post,

N 26deg16'28"E 90.81' to a 12" diameter wooden fence corner post,

N 54deg00'30"E 50.67' to a 12" diameter wooden fence corner post found for the Northmost corner of this tract,

00045752

S 81deg02'29"E 96.24' to a 12" diameter wooden fence corner post,

S 34deg25'01"E 596.16' to a 12" diameter wooden fence corner post found for the Eastmost corner of this tract,

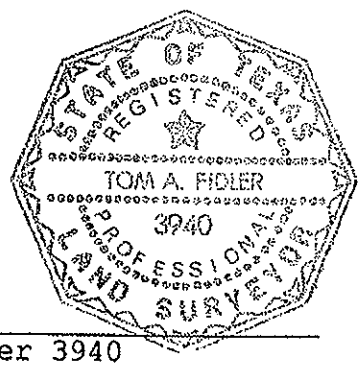
S 12deg11'35"W 370.18' to a 10" diameter wooden fence corner post,

S 36deg09'00"W 434.64' to a 12" diameter wooden fence corner post,

S 87deg15'04"W 286.47' to a 12" diameter wooden fence corner post,

N 57deg18'20"W 15.33' to this POINT OF BEGINNING, containing 9.429 acres, more or less.

I, Tom A. Fidler, registered professional land surveyor No. 3940 in the State of Texas, do hereby certify that this field notes description is the result of a survey made on the ground and under my supervision.



Tom A. Fidler, R.P.L.S. Number 3940

FIGURE 1

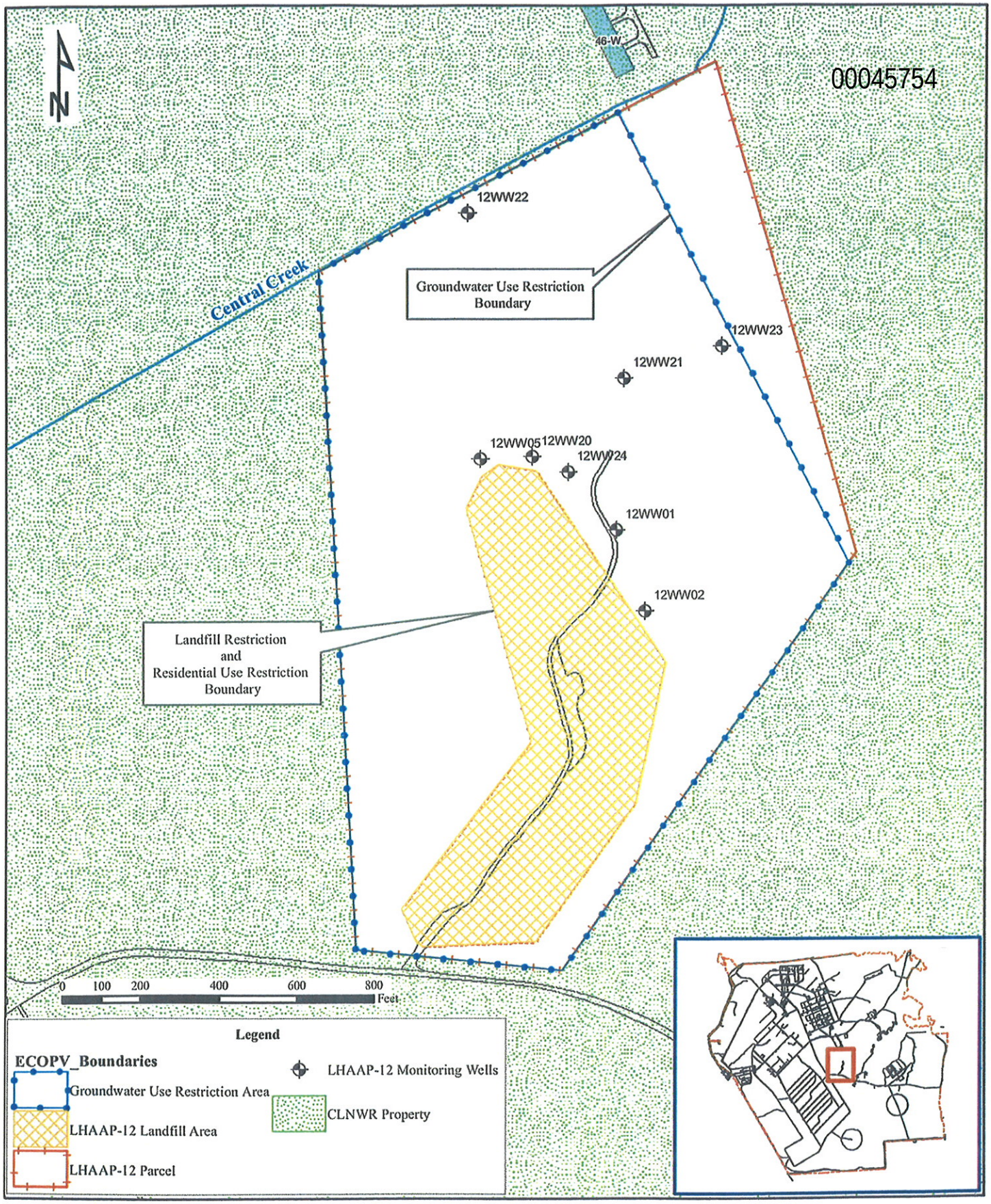


FIGURE 1

Land Use Control Boundaries

Doc	Bk	Vol	Pg
7009064	OR	3640	12

00045755

STATE OF TEXAS COUNTY OF HARRISON

I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the volume and page of the named records of:

Harrison County

as stamped hereon by me.

Jun 13,2007

HONORABLE PATSY COX, COUNTY CLERK
Harrison County

June 14, 2007 Shaw/TERC 07-039

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 Evaluation of Perimeter Well Data for Use as Groundwater Background, Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Murray:

Shaw Environmental, Inc. is pleased to submit the attached *Final Evaluation of Perimeter Well Data for Use as Groundwater Background.* 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,

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 101st – 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 *(mailing only)* 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

00045758

June 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 Evaluation of Perimeter Well Data for Use as Groundwater Background, Longhorn Army Ammunition Plant, Karnack, Texas, June 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,

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

00045759

June 14, 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 Evaluation of Perimeter Well Data for Use as Groundwater Background, Longhorn Army Ammunition Plant, Karnack, Texas, June 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,

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 Evaluation of Perimeter Well Data for Use as Groundwater Background
Longhorn Army Ammunition Plant, Karnack, Texas

October 9, 2006

00045760

Reviewer: Fay Duke, Project Manager, Team 2, Environmental Cleanup Section II, Remediation Division
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[1], E or X	Response	A or D[2]
Fay Duke, TCEQ						
1		General	We noted that the results for metals and anions of MW111 are significantly different from the concentration in MW110 and MW112. Please provide rationales for the cause of these significant differences in concentrations.	C	Chloride and sulfate concentrations in MW111 appear less than concentrations in MW110 and MW112. Some metal concentrations in MW111 appear greater than those in the other two wells, and others appear similar or less. These observations will be noted in the revised document and will be discussed qualitatively using information from boring logs and other information related to the water bearing zone at MW111.	
			The TCEQ recommends that evaluations be conducted to determine whether all these wells are from the same population as planned for in the Installation Wide Background Study Work Plan (Shaw, 2004). Specifically, the work plan anticipated that "Sample will under go trilinear and bivariate analysis to determine whether they are from the same population of water quality types. Evaluation will be conducted to determine whether concentrations of metal are related to Eh and pH conditions in groundwater."	C	**Section 5.0** of the Installation Wide Background Study Work Plan (Shaw, 2004), anticipated the variability of groundwater properties among the perimeter wells. That Work Plan describes potential variability related to depth of the wells and notes that the wells are located in different drainage areas (i.e. MW110 is a shallow well located near Harrison Bayou, MW111 is located near Central Creek, MW112 is located near Goose Prairie Creek, and MW133 and MW134 are deeper wells located near Big Cypress Bayou). Groundwater quality parameters measured between December 2003 and December 2004 were evaluated statistically to quantify this variability and its impact on metal species and their adsorption and mobility in unfiltered samples. The results of this analysis are shown in **Appendix B** of the revised document. The results of the statistical analysis of groundwater quality parameters are described in **Section 4.1.3** of the revised document, which relates the results of	

Comment #	Page	Section/Paragraph	Comment	C, D[1], E or X	Response	A or D[2]
					statistical analysis of water quality parameters to metal ion species in the water and describes the variability of those properties as representative of shallow groundwater sources across LHAAP, such that analytical data from the upgradient perimeter wells MW110, MW111, and MW112 provide representative background data for use in risk assessments.	
			Additionally, because monitoring wells 110, 111, and 112 are located near the channel of surface water drainage, the evaluation of the effect of the surface water influences was anticipated in the work plan. Please provide the findings of the evaluation.	C	Section 5.0 of the 2004 Work Plan anticipated that the locations of wells MW110, MW111, and MW 112 near the channels of surface water drainages might subject the wells to surface water influence by occasional flooding. Paragraph 2. Section 2.2 of the revised report has been inserted that reads, "Perimeter monitoring wells MW110, MW111, and MW 112 are located near the channels of surface water drainages that might subject the wells to surface water influence by occasional flooding, as noted in the Work Plan (Shaw, 2004d). The creeks at LHAAP are shallow, and the groundwater is typically 10 to 15 feet bgs. The creeks recharge the shallow groundwater during wet periods. The perimeter wells are located upgradient or laterally gradient with respect to LHAAP. Recharge from the creeks is expected to reflect natural conditions. Another impact from surface water in creeks is the potential for flooding to occur in areas around the monitoring wells. Any observed abnormal well conditions are noted in sample collection logs made at each sampling event and, absent compromising well conditions such as evidence of flooding, samples were collected. It is unlikely that unobserved flooding had influenced these wells between December 2003	

Comment #	Page	Section/Paragraph	Comment	C, D[1], E or X	Response	A or D[2]
			Please also provide the rationale for the exclusions of the previous data in the background calculation. We noted from the Work Plan, that previous data collected by USACE would undergo outlier testing and other steps in the preparation of statistical data set to assess whether it would be included in the background calculation. Please provide the findings of the evaluation.	C	and December 2004 given that conditions at LHAAP have been generally dry, and the top of the well casings are approximately 3 feet above ground surface (see **Figures 1-4**, **1-5**, and **1-6** and related boring logs in **Appendix A**)." It is important to note that the sampling protocol requires purging of the well until water quality parameter measurements are stable, which is done to ensure that the sample is representative of aquifer water. As described in the first two paragraphs of Section 2.2 of the draft final report, wells MW110, MW111, and MW112 were installed by the USACE and first sampled in 1995. However, sampling by low-flow methods began in December 2003. Therefore, the analytical results of samples collected by low-flow methods between December 4, 2003 and December 16, 2004 were included in the background study as representative of the then current conditions of groundwater. Because the groundwater data collected prior to December 2003 were not collected by low-flow methods, they are expected to be turbid from suspended solids introduced by earlier sampling methods, and not be representative of groundwater. Therefore, the outlier analysis of such turbid samples does not pertain to the groundwater data used in the draft report.	

Comments on Draft Final Evaluation of Perimeter Well Data for Use as Groundwater Background
Longhorn Army Ammunition Plant, Karnack, Texas

October 9, 2006

00045763

Reviewer: Fay Duke, Project Manager, Team 2, Environmental Cleanup Section II, Remediation Division
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[1], E or X	Response	A or D[2]
2		General	It is stated that wells 133 and 134 were disqualified as candidates for background wells because RDZ and perchlorate were detected. Although the analytical data for Wells 133 and 134 are not included in the background calculation, the analytical results should still be reported.	C	The data from these wells were added to the revised report as **Table 3-3** for information purposes. The following sentences were added to the first paragraph of **Section 3.2**, "Data from monitoring wells MW133 and MW134 are shown in **Table 3-3** for informational purposes only. Because these wells were shown to contain perchlorate and RDX, the wells have been included in the LHAAP groundwater monitoring program that is conducted according to the approved Work Plan (Shaw, 2006)."	
Stephen Tzhone, USEPA						
3		General	A summary table should be prepared for each constituent to include the mean, median, maximum, minimum, and Maximum Contaminant Level (MCL), highlighting any that exceed MCL.	C	**Table 3-1** and the related discussion in **Sections 3.1** and **3.2** illustrate the chemicals that may be associated with LHAAP operations (explosives, volatile organic compounds [VOCs], semi-volatile organic compounds [SVOCs], nitrate/nitrite, and perchlorate), including those that were not detected in any sample. Those samples that contained detected concentrations in any sample were shown in Table 3-3 of the draft final report and are discussed in **Section 3.2**. **Table 3-3** was renumbered to **Table 3-4** and was revised to show the detected values and highlight those that exceed the MCL. Tables 5-1 and 5-2 of the draft final report include the mean, median, maximum, and minimum concentrations and other properties of the data set for each chemical of interest. A table of MCL values for metals and anions of concern was added as **Table 5-5** to the revised report for informational purposes. The following text was added as the last	

Comments on Draft Final Evaluation of Perimeter Well Data for Use as Groundwater Background
Longhorn Army Ammunition Plant, Karnack, Texas

October 9, 2006

00045764

Reviewer: Fay Duke, Project Manager, Team 2, Environmental Cleanup Section II, Remediation Division
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[1], E or X	Response	A or D[2]
					paragraph of **Section 5.0** of the revised report, "A table of MCL values for background metals and anions (**Table 5-5**) is shown for informational purposes (USEPA, 2002c). The MCL values refer to the usability of the shallow groundwater source as a drinking water supply if used untreated. It is important to note that a metal can be detected above MCL concentrations, yet be naturally occurring so that it can serve as an indicator of background concentrations for comparison with other shallow groundwater sources at LHAAP."	

00045765

FINAL
EVALUATION OF PERIMETER WELL DATA FOR USE AS GROUNDWATER BACKGROUND 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, Project No. 845714
Task Order No. 0109

June 2007

FINAL
EVALUATION OF PERIMETER WELL DATA FOR USE AS GROUNDWATER BACKGROUND
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
JUNE 2007

PRAVEEN SRIVASTAV
Name of Texas Professional Geoscientist

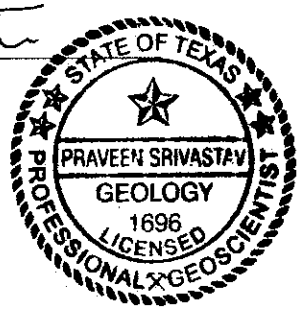
1696
License Number

SHAW ENVIRONMENTAL, INC.
Company

3010 BRIARPARK DRIVE, SUITE 400, HOUSTON, TX 77042
Address

I certify with my signature below, that the written descriptions and graphical depictions of geology and hydrogeology contained within this report were prepared under my supervision, and accurately reflect existing knowledge about the geology and hydrogeology of the referenced site.

Signature



6/11/07
Date Signed

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
atm-cu m/mol	atmospheres-cubic meter per mole
BCF	Biological Concentration Factor
bgs	below ground surface
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DO	dissolved oxygen
ERA	ecological risk assessment
K_{oc}	organic carbon partition coefficient
L	lognormal
LHAAP	Longhorn Army Ammunition Plant
MCL	maximum contaminant level
MDL	method detection limit
mm	millimeter
mm Hg	millimeters Mercury
MW	monitoring well
N	normal
NP	nonparametric
ORP	oxidation-reduction potential
PAH	polynuclear aromatic hydrocarbons
QC	quality control
RDX	cyclonite
SD	standard deviation
Shaw	Shaw Environmental, Inc.
SVOC	semivolatile organic compound
TCEQ	Texas Commission on Environmental Quality
TNT	trinitrotoluene
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UTL	upper tolerance limit
VOC	volatile organic compound

00045770

Executive Summary

This report, prepared by Shaw Environmental, Inc. (Shaw) for the U.S. Army Corps of Engineers (USACE), Tulsa District, under Total Environmental Restoration Contract DACA56-94-D-0020, Task Order 0109, describes an evaluation of perimeter well data for use as background at the former Longhorn Army Ammunition Plant (LHAAP) located in Harrison County near Karnack, Texas. The study was performed as part of an installation-wide background study of environmental media (soil, surface water, sediment, and groundwater). The analytical results from this study may be used to support installation-wide human health and ecological risk assessments and feasibility studies, and may assist in determining the suitability of transfer of parcels of land to the U.S. Fish and Wildlife Service (USFWS). This groundwater study was conducted under authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 in accordance with the *Final Installation-Wide Background Study Work Plan, Longhorn Army Ammunition Plant, Karnack*, *Texas* (Shaw, 2004a). The sampling and analysis of other environmental media (soil, surface water, and sediment) were reported previously.

The LHAAP operated intermittently from 1942 through 1997 and is now inactive. The LHAAP produced explosives, pyrotechnic devices, photoflash bombs, simulators, hand signals, tracer ammunition, and solid-fuel rocket motors and propellant. Previous environmental studies have shown that industrial operation and waste management practices have affected soil, groundwater, surface water, and sediment at the LHAAP. The LHAAP is a part of the Cypress Bayou Basin in the Piney Woods ecological region of Texas and has mixed pine-hardwood forests that cover flat to gently rolling terrain that support an abundant and diverse plant community with a wide range of habitats.

The groundwater samples were collected quarterly from December 2003 through December 2004 at three monitoring wells (MW110, MW111, and MW112) on the perimeter of LHAAP property at locations unaffected by LHAAP operations. Groundwater samples collected at each well were analyzed for metals (filtered and unfiltered), volatile organic compounds, perchlorate, anions, and total dissolved solids concentrations. The validation and evaluation of chemical data used in this report have been presented separately in quarterly groundwater monitoring reports from USACE.

It is assumed in this study that the perimeter sampling areas have not been impacted by contamination. Some samples contained detectable or trace levels of chemicals associated with plants common to the local ecology, fertilizers or pesticide formulations, and components of plastics that are ubiquitous in the environment and are not related to LHAAP processes. Of the classes of chemicals analyzed in groundwater samples, only metals and anions were detected

with sufficient frequency to be considered background constituents. Concentrations of chemicals associated with LHAAP processes were reported in samples from the monitoring wells but the results were either not confirmed in later sampling events, or they reflect low concentrations. Therefore, none of the three wells was disqualified from the study. Statistical parameters of the resulting data sets were calculated for each chemical and are summarized in **Table ES-1**.

The intended use of the perimeter well groundwater data sets is for future comparison with LHAAP site-specific groundwater concentrations. The primary methods for comparing site-specific data to perimeter data involve comparing the perimeter data set as a whole to the site-specific data set. Because these methods compare the central portions of the distributions with less emphasis on the upper portions, they will be combined with comparisons of the upper confidence limit and upper tolerance limit concentrations of both data sets. These evaluations will provide the comprehensive statistical approach described in the Work Plan (Shaw, 2004a).

00045772

1.0 Introduction

This report, prepared by Shaw Environmental, Inc. (Shaw) for the U.S. Army Corps of Engineers (USACE), Tulsa District, under Total Environmental Restoration Contract DACA56-94-D-0020, Task Order 0109, describes the procedures and results of a characterization of chemical concentrations in groundwater from perimeter wells at the former Longhorn Army Ammunition Plant (LHAAP) near Karnack, Texas. The study was performed as part of an installation-wide background study of environmental media (soil, surface water, sediment, and groundwater). The analytical results for the environmental media will be used to support an installation-wide ecological risk assessment (ERA), site-specific human health risk assessments and feasibility studies, and will assist in determining the suitability of transfer of parcels of land to the U.S. Fish and Wildlife Service (USFWS) in a phased manner. This groundwater study was conducted under authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 in accordance with Work Plan requirements (Shaw, 2004a).

The groundwater samples were collected quarterly from December 2003 through December 2004 at three groundwater monitoring well locations on the perimeter of LHAAP at locations unaffected by LHAAP operations. Groundwater samples collected were analyzed in the laboratory for a suite of chemicals and properties that included total and dissolved metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PAHs), explosives, anions, perchlorate, and water quality parameters. The analytical results for the groundwater samples were evaluated using statistical methods based on U.S. Environmental Protection Agency (USEPA) guidance (USEPA, 2002a,b) and Texas Commission on Environmental Quality (TCEQ) guidelines. The analytical data were validated to verify sufficient precision, accuracy, completeness, and comparability to provide a representation of background conditions at LHAAP to support comparisons of perimeter and LHAAP-related concentrations.

The sampling and analysis of other environmental media (soil, surface water, and sediment) were reported previously (Shaw 2004b,c).

1.1 Site Location and History

The LHAAP is located in northeast Texas in Harrison County. The installation occupies nearly 8,500 acres between State Highway 43 at Karnack, Texas and the southwestern shore of Caddo Lake **(Figure 1-1)**. The nearest cities are Marshall, Texas, approximately 14 miles to the southwest, and Shreveport, Louisiana, approximately 40 miles to the east.

The LHAAP was established in December 1941 when the Army issued a contract to build a six-line production facility for manufacturing trinitrotoluene (TNT). The LHAAP was operated

intermittently from 1942 through 1997 and was placed on inactive status. The Army issued a contract to remove salvageable property in the following year. The LHAAP installation has been inactive since 1997 and approximately 6,000 acres of land have been transferred to the USFWS.

The LHAAP produced 414 million pounds of TNT, 3.4 million pyrotechnic devices, photoflash bombs, simulators, hand signals, 40-millimeter (mm) tracers, 200,000 solid-fuel rocket motors, and approximately 50 million pounds of propellant for the U.S. Department of Defense inventory. The LHAAP was also used for the static firing and elimination of Pershing I and II rocket motors in compliance with the Intermediate-Range Nuclear Forces Treaty between the United States and the former Union of Soviet Socialist Republics.

Soil, groundwater, surface water, and sediment have been contaminated by industrial operations and waste management practices at the LHAAP (Jacobs, 2001a,b; 2002a,b; 2003a). Industrial operations at LHAAP involved the manufacturing or use of secondary explosives, rocket motor propellants, and pyrotechnics. Explosives included cyclonite (RDX), TNT, and black powder. Rocket propellants contain a rubber binder, an oxidizer (ammonium perchlorate), and a powdered metal fuel (aluminum). Pyrotechnics were generally composed of an inorganic oxidizer (sodium nitrate), a metal powder (magnesium), and a binder. Other materials used in LHAAP operations included acids, lubricants, and solvents. Waste management activities included sanitary and industrial waste treatment, construction and use of holding/evaporation ponds and sanitary and contaminated waste landfills, storm water drainage, and operation of demolition/burning grounds.

1.2 Physical Setting

The LHAAP is located in an area of the country characterized by a mild climate, with an average low temperature of 35 degrees Fahrenheit (°F) and an average high of 91°F. Precipitation averages 46.9 inches per year, with a slight peak in the spring. Mixed pine-hardwood forests that cover flat to gently rolling terrain characterize LHAAP. Most of the terrain has an average slope of 3 percent or less, but slopes as steep as 12 percent can be found in the western and northwestern portions of the installation and along Harrison Bayou.

The LHAAP is a part of the Cypress Bayou Basin in the Piney Woods ecological region of Texas. Its gentle topography and mild climate support an abundant and diverse plant community with a wide range of habitats. This diversity creates the potential for a large variety of animal species to inhabit LHAAP. As the buildings have been demolished, more and more of the facility has been left to nature, as evidenced by the pine trees growing among concrete remnants. Common mammals found at LHAAP include white-tailed deer, red and gray foxes, rabbits, squirrels, opossums, skunks, armadillos, beavers, and raccoons. In addition to mammals, a total of 334 bird species have been documented as inhabiting Caddo Lake's drainage system and

potentially inhabiting LHAAP during a portion of the year. A reported 53 different reptile species inhabit the Cypress Bayou Basin.

Surface water at LHAAP drains northeast into Caddo Lake via four drainage systems: Saunders Branch, Harrison Bayou, Central Creek, and Goose Prairie Creek **(Figure 1-2)**. Caddo Lake is a part of Big Cypress Bayou. Saunders Branch flows onto LHAAP near the southeastern corner of the installation and then northward into Caddo Lake. Approximately 11 percent of the heavily wooded, eastern section of LHAAP is drained by this system. Harrison Bayou enters LHAAP on the southern edge of the installation. The bayou captures approximately 30 percent of the surface drainage of LHAAP and transverses the installation in a northeasterly direction. Central Creek enters LHAAP on its western edge, just south of the town of Karnack. Central Creek accounts for approximately 29 percent of the surface drainage from the installation to Caddo Lake. The headwaters of Goose Prairie Creek are located near the northwestern corner of the plant and consist of two primary tributaries, Goose Prairie Creek North and Goose Prairie Creek South. Goose Prairie Creek flows across the northern part of the installation and drains approximately 30 percent of LHAAP. Flow in these drainage systems is intermittent.

The shallow subsurface geology at LHAAP consists of a thin veneer of Quaternary alluvium overlying unconsolidated Tertiary age sediments of the Wilcox Group. The Wilcox Group consists of interbedded sands, silts, and clays. The stratigraphic thickness of the Wilcox Group ranges from a maximum of 350 feet in the northwestern corner of LHAAP to approximately 130 to 140 feet at the eastern side of the facility. Based upon interpretations of boring logs generated during site investigations at LHAAP, a series of moderately transmissive groundwater zones occur in the unconsolidated sands of the Wilcox.

1.3 Hydrogeology

Groundwater and geologic data obtained during field activities at the LHAAP indicate varying degrees of heterogeneity within the subsurface hydrogeology across the plant. This heterogeneity indicates the fluvial-deltaic type depositional environment typical of Quaternary and Wilcox Group sediments that comprise the unconsolidated deposits underlying LHAAP. The unconsolidated sediments of the Wilcox Group are comprised primarily of elongated, interconnected, channel-fill sand deposits within alluvial belts interbedded with less permeable interchannel sediments. These interbedded, less permeable deposits have a tendency to form aquitards that locally limit the flow between the saturated zones (Jacobs, 2001b, 2002a).

LHAAP has historically been characterized as consisting of three silty or sandy water-bearing zones within the Wilcox Group: a shallow, intermediate, and a deep zone. More clay-rich units separate these zones. These water-bearing Wilcox Group units overlay the relatively impermeable Midway Formation (Jacobs, 2001b, 2002a).

Monitoring wells (MW)110, MW111, and MW112 were installed within the shallow saturated sand zone. As observed across LHAAP, the clay layers separating the shallow and intermediate zones are laterally discontinuous and the two zones are not distinct at the scale of the whole installation. Based on historical field studies, the shallow and intermediate water-bearing units are thought to be hydrologically connected in part. This characterization is based upon boring logs and well construction diagrams from previous investigations, as water levels and soil descriptions tend to be comparable within shallow and intermediate wells within close proximity. The water-bearing zones and semi-confining clay zones are depicted in the conceptual geologic cross-section presented as **Figure 1-3**.

Boring logs and other information on the installation and completion of these wells is provided in previous USACE reports (USACE, 1995).

Photographs of monitoring wells MW110, MW111, and MW112 are shown in **Figures 1-4** through **1-6**, respectively.

While the depth to groundwater across the site ranges from 1 to 70 ft below ground surface (bgs), the typical depth to groundwater is 12 to 16 feet. The regional groundwater flow direction beneath the facility is generally east-northeast towards Caddo Lake, and can vary by site location. The aforementioned perimeter wells are considered to be upgradient based on previous groundwater measurement events performed at LHAAP as indicated in **Figure 1-2**.

1.4 Objectives of Study

The objective of this study is to establish concentrations of compounds in groundwater from upgradient perimeter wells at the LHAAP that are not affected by LHAAP operations. The perimeter groundwater concentrations may represent background levels. The results reported here may be used to support human health and ecological risk assessments, data gaps investigations, and feasibility studies. These activities will in turn support future decision making for LHAAP.

1.5 Scope

This report describes concentrations of chemicals in groundwater, the application of statistical analysis methodology, the upper confidence limits (UCLs) of mean concentrations, and the upper tolerance limits (UTLs).

2.0 Groundwater Sample Collection and Analysis

This section describes the monitoring well locations and laboratory analytical methods for sampling conducted quarterly from December 4, 2003 to December 16, 2004. The sampling procedures applied were described in the work plans developed by Jacobs Engineering, Inc. (Jacobs, 2003b) and amended by stakeholders during meetings in October 2003. Based on review comments for the draft final work plan and decisions made during the stakeholders meetings, the Work Plan document was revised by Shaw and the final document was submitted in January 2004 (Shaw, 2004a).

2.1 Groundwater Sampling Locations

The groundwater samples were collected quarterly by USACE from three monitoring wells located at the perimeter of the LHAAP property **(Figure 1-2)**. Monitoring wells MW110, MW111, and MW112 were installed during May and June of 1982 to determine background concentrations of chemicals in groundwater as part of a larger survey of contamination at LHAAP (USACE, 1995). In the larger survey, 32 monitoring wells were installed, including four boundary wells numbered MW108, MW110, MW111, and MW112. Because well MW108 is located hydraulically downgradient from LHAAP plant operations, the analyses from well MW108 were not considered in later background groundwater reports (USACE, 1995) and are not included in this report.

Monitoring wells MW110, MW111, and MW112 are 20, 21, and 22 feet deep, respectively, and all are completed with 15 foot screens at the bottom of the well. Boring logs and completion logs are provided in an earlier report (USACE, 1995) and are attached in **Appendix A**. MW110 is located near Harrison Bayou, MW111 is located near Central Creek, and MW112 is located near Goose Prairie Creek (**Figure 1-2)**.

Two additional monitoring wells (MW133 and MW134) were installed at the northwest perimeter of LHAAP to sample groundwater from a deeper water-bearing zone. MW133 was drilled to a depth of 90 feet bgs and was screened from 64.5 to 84.5 feet. MW134 was drilled approximately 10 feet to the southwest of MW133 to a total depth of 151 feet, plugged back to a depth of 101.5 feet, and screened at 89 to 109 feet bgs (USACE, 1995). Monitoring wells MW133 and MW134 are not considered to be suitable background groundwater monitoring wells as described in **Section 3.2**, and are not shown in **Figure 1-2**.

2.2 Groundwater Sample Collection

Groundwater from monitoring wells MW110, MW111, and MW112 has been monitored periodically since the first background analytical data were reported (USACE, 1995). The

analytical data in this report describes concentrations in samples collected in five sampling events from December 4, 2003 to December 16, 2004. Because these five events span one year, they reflect seasonal variability in groundwater concentrations. The dates of sample collection for each sampling round are shown in **Table 2-1**.

Perimeter monitoring wells MW110, MW111, and MW112 are located near the channels of surface water drainages that might subject the wells to surface water influence by occasional flooding, as noted in the Work Plan (Shaw, 2004d). The creeks at LHAAP are shallow, and the groundwater is typically 10 to 15 bgs. The creeks recharge the shallow groundwater during wet periods. The perimeter wells are located upgradient or laterally gradient with respect to LHAAP. Recharge from the creeks is expected to reflect natural conditions. Another impact from surface water in creeks is the potential for flooding to occur in areas around the monitoring wells. Any observed abnormal well conditions are noted in sample collection logs made at each sampling event and, absent compromising well conditions such as evidence of flooding, samples were collected. It is unlikely that unobserved flooding had influenced these wells between December 2003 and December 2004 given that conditions at LHAAP have been generally dry, and the top of the well casings are approximately 3 feet above ground surface (see **Figures 1-4**, **1-5**, and **1-6** and related boring logs in **Appendix A**).

Use of low-flow purge and sample methods began with the December 2003 event to minimize collection of suspended solids as potential artifacts of the sampling procedures (Shaw, 2004a). Because the samples were collected by different methods before December 2003, analytical data from earlier sampling events are not included in this report.

Prior to sampling, water quality parameters were recorded in the sampling logs **(Appendix B)**. Water samples were collected when the variability of each parameter was within the specified tolerances (shown in **Table 2-2**) and the well was judged to be stable.

At certain times, groundwater recharge was insufficient to provide the water volume required for all analyses **(Appendix B)**. When a partial sample could be taken, the available water volume was allocated to analysis of organic compounds (explosives, VOCs, or SVOCs) that might indicate LHAAP process-related contamination, if detected. For this reason, no water sample could be taken from MW111 in September 2004 and no metals or anions, including perchlorate, were analyzed in water taken from MW111 in December 2003. No SVOC analyses were performed on samples taken from any well in December 2004.

2.3 Chemical Analysis

The groundwater samples were analyzed for concentrations of total and dissolved metals, anions, perchlorate, explosives, VOCs, and SVOCs **(Table 2-1)**. General Engineering Laboratories, Inc. (PO Box 30712, Charleston, South Carolina, 29417), under contract to the USACE, performed

the analysis. The data was provided by the USACE to Shaw in electronic and paper copy formats. The usability of the analytical data was evaluated in accordance with USEPA requirements and project-imposed requirements specified in the task order, and were validated by a Shaw chemist. Groundwater data validation was performed by Shaw following each sampling event according to methods described in the Groundwater Data Gaps Investigation Work Plan (Shaw, 2004d). The analytical results are described in **Section 3.0**.

3.0 Data Review

Analytical results for the groundwater samples are presented in **Tables 3-1** and **3-2**. Certain analytical results were assigned qualifiers by the analytical laboratory or in the data validation process that indicate special circumstances specific to the sample. The data qualifiers specified in the groundwater data are:

U – Not detected. The compound was not detected above the associated reporting limit.

J – Estimated. The compound was identified during analysis; the value reported is the estimated concentration above the method detection limit (MDL) and below the reporting limit.

B – The compound was detected in associated equipment rinse samples and/or laboratory method or trip blanks. Concentration reported is above the blank concentrations (5X/10X rule was applied).

R – The reported results were rejected due to severe deficiencies in supporting quality control (QC) data, anomalies noted in sampling or analysis process, or the presence or absence of the compound could not be verified from available data. The qualifier indicates rejection of value in event of reanalysis.

UJ – The compound was not detected above the associated reporting limit. Evaluation of supporting QC data and/or sampling or analysis processes indicate that the detection limit or reporting limit is less accurate or precise than those for the majority of the samples, and the value should be estimated. Because this qualifier describes the reporting limit and not the reported concentration, it does not indicate that the compound was detected in the sample. Details regarding assignment of the UJ qualifier to the specific samples are given in Appendix B of the data validation report for the soil background study (Shaw, 2003).

L – Result may be biased low. Details are given in the background soil study data validation report (Shaw, 2003).

H – Result may be biased high. Details are given in the background soil study data validation report (Shaw, 2003).

3.1 Background Chemicals

Background chemicals in groundwater were designated in the Work Plan (Shaw, 2004a) and include:

- Metals, including total concentration and dissolved concentrations determined from analysis of filtered water samples
- Inorganic anions
- Water quality parameters, including oxidation-reduction potential (ORP), specific conductivity, temperature, dissolved oxygen (DO) concentration, turbidity, and pH
- PAHs, which represent anthropogenic compounds likely to be present in background as a result of non-site related activities.

These compounds are referred to as "background chemicals" in the remainder of the report.

Other chemicals were analyzed as possible indicators of LHAAP-related contamination and, if detected, may be used to eliminate a monitoring well location from the statistical evaluation. These chemicals are classified as explosives, perchlorate, and VOCs, and are referred to as "operations-related chemicals" in this report.

3.2 Detection of Other Chemicals in Perimeter Well Samples

Detection of certain chemicals known to be associated with industrial operations could indicate that a perimeter sampling well location has been affected by such operations. Examination of data from the analysis of groundwater from the monitoring wells MW133 and MW134 showed that low levels of RDX and perchlorate were detected in one or more samples. Because RDX and perchlorate are products of LHAAP operations, monitoring wells MW133 and MW134 were disqualified as candidates of background wells and analytical data for all chemicals from these wells were eliminated from further consideration in this report. Data from monitoring wells MW133 and MW134 are shown in **Table 3-3** for informational purposes only. Because these wells were shown to contain perchlorate and RDX, the wells have been included in the LHAAP groundwater monitoring program that is conducted according to the approved Work Plan (Shaw, 2006).

Examination of analytical results for the groundwater from the perimeter wells **(Tables 3-1** and **3-2)** shows that acetone, o-nitrotoluene, and chloromethane were detected in one or more samples **(Table 3-4)**. Other samples contained low (J-qualified) levels of combined nitrate and nitrite, m-nitrotoluene, chloromethane, methylene chloride, or di-n-butylphthalate. None of these compounds exceeds their respective maximum contaminant level (MCL) concentrations established in the Safe Drinking Water Act. No perchlorate or SVOC compounds other than the

phthalate esters mentioned above were detected or reported at J-qualified concentrations in perimeter well groundwater samples.

The o- and m-nitrotoluene isomers detected in groundwater taken from monitoring wells MW110 and MW111 in July 2004 are chemicals used in the manufacture of TNT and other explosives. These detections were not confirmed in later samples from these wells taken in September and December 2004.

The o- and m-nitrotoluene isomers are expected to occur in the environment as a result of their use in consumer products and extensive use in agriculture as described below. Because monitoring wells MW110, MW111, and MW112 are hydrogeologically upgradient of all other LHAAP wells, the detection of low levels of nitrotoluenes in groundwater at these perimeter locations is not sufficient to exclude the wells from use in the background comparisons.

The chemicals detected or estimated in groundwater from upgradient wells are used in industry or agriculture. As such, these chemicals might be expected to occur in the off-LHAAP background sampling areas. The following information regarding these chemicals describes the origins, uses, and environmental fate of these chemicals (U.S. National Library of Medicine, 2004).

Acetone, Chemical Abstracts Service* (*CAS) Registry Number: 67-64-1. Acetone is used as a solvent for fats, oils, waxes, resins, rubbers, and plastics, and in the manufacture of rayon, acrylic fibers, and isoprene. Acetone is used as a nail polish remover and in the manufacture of explosives, airplane dopes, rayon, modacrylic fibers, isoprene, and photographic films. Acetone occurs naturally as a metabolic byproduct of plants and animals, and is released into the atmosphere from wood fires.

Acetone also undergoes photodecomposition by sunlight, with an estimated half-life of about 80 days. Acetone is expected to have very high mobility in soils, and volatilization from dry soil surfaces is expected. Volatilization from moist soil surfaces is also expected based upon the measured Henry's Law constant (1.87×10^{-5} atmospheres-cubic meter per mole [atm-cu m/mol]). Acetone is expected to biodegrade under aerobic and anaerobic conditions. In water, acetone is not expected to adsorb to suspended solids or sediment based upon its estimated organic carbon partition coefficient (K_{oc}) value.

Volatilization from water surfaces is expected to be an important environmental process given its estimated Henry's Law constant. Estimated half-lives for a model river and model lake are 38 and 333 hours, respectively. Volatilization half-lives in a shallow stream were measured in the range of 8 to18 hours.

Acetone is ubiquitous in the environment as a result of its occurrence in nature and consumer products, and its extensive use in industry. Therefore, the detection of low levels of acetone in groundwater at these perimeter locations is not sufficient to exclude the samples from use in background evaluations.

Di-n-butylphthalate: CAS Registry Number: 84-74-2. Di-n-butylphthalate is used as a plasticizer in nitrocellulose lacquers, elastomers, and explosives, and as a solvent for chlorinated rubber, resins, and perfume oils. It is used as a perfume fixative, a textile-lubricating agent, and is used in safety glass, printing inks, paper coatings, adhesives, and insect repellants.

Di-n-butylphthalate's production and use in industry and consumer products has lead to its release to the environment through various waste streams. Based on a measured vapor pressure of 2.01×10^{-5} millimeters Mercury (mm Hg) at 25 degree Celsius (°C), di-n-butylphthalate is expected to exist in both the vapor and particulate-phase in the ambient atmosphere. Vapor-phase di-n-butylphthalate is degraded in the atmosphere with an atmospheric half-life of about 42 hours by reaction with photochemically produced hydroxyl radicals. Particulate-phase di-n-butylphthalate is removed from the atmosphere by wet and dry deposition. Di-n-butylphthalate is expected to have low mobility in soil based upon a measured log K_{oc} value of 3.14. Volatilization from dry soil surfaces is not expected based upon the vapor pressure of this compound. Volatilization from moist soil surfaces is expected based upon the measured Henry's Law constant of 4.5×10^{-6} atm-cu m/mol. Biodegradation of di-n-butylphthalate is expected to occur under both aerobic and anaerobic conditions based upon numerous screening and river die-away tests. In water, di-n-butylphthalate is expected to adsorb to sediment or particulate matter given its measured K_{oc} value. This compound is expected to volatilize from water surfaces given its experimental Henry's Law constant. Estimated half-lives for a model river and model lake are 14 and 105 days, respectively. Hydrolysis may be an important environmental fate for this compound based upon an estimated hydrolysis half-life of 125 days at pH 8. The potential for bioconcentration in aquatic organisms is considered low to moderate based upon experimental Biological Concentration Factor (BCF) values in the range of 12 to 117 measured in oysters, shrimp, and fish.

Di-n-butylphthalate is ubiquitous in the environment as a result of its extensive use in consumer products in industry. Therefore, the detection of low levels of di-n-butylphthalate in groundwater at these perimeter locations is not sufficient to exclude the wells from use in background evaluations.

Chloromethane: CAS Registry Number: 74-87-3. Chloromethane is used as a catalyst carrier in low-temperature polymerization of polymers, including butyl rubber. It is used in the manufacture of tetramethyl lead, silicones, methylcellulose, fumigants, and methylarsonate

herbicides. Chloromethane is used as refrigerant fluid for thermostatic equipment, a blowing agent for some polystyrene foams, in timber products processing, and as a topical anesthetic.

Natural sources of chloromethane include volcanoes, volatilization from seawater, and from plants (e.g., cedar and cypress trees). Chloromethane is produced in seawater by the reaction of chloride ions with methyl iodide, which is produced photosynthetically by marine organisms. Whether this is the only mechanism for natural generation of atmospheric chloromethane is unclear but measurements of the mean ocean air flux of 13×10^{-7} grams per square centimeter per year for the eastern Pacific Ocean can account for the atmospheric reservoir of chloromethane when extrapolated to global waters. This mechanism is believed to make a significant impact on the global burden of chloromethane. Chloromethane is released from brush and forest fires with production of an estimated 0.6 g of chloromethane per kilogram of vegetation burned.

Chloromethane use in industry and commercial products may release chloromethane to environmental media. If released to air, a vapor pressure of $4.30 \times 10^{+3}$ mm Hg at 25 °C indicates chloromethane will exist solely as a gas in the ambient atmosphere. Gas-phase chloromethane degrades in the atmosphere by reaction with photochemically produced hydroxyl radicals with an estimated half-life of 310 days. If released to soil, chloromethane is expected to have very high mobility based upon an estimated K_{oc} of 14. Volatilization from moist soil surfaces is expected to be an important process based upon a Henry's Law constant of 8.82×10^{-3} atm-cu m/mol. Chloromethane may volatilize from dry soil surfaces based upon its vapor pressure. Field and laboratory results demonstrate that several halogenated aliphatics may biodegrade slowly under anaerobic conditions, but not under aerobic conditions. If released into water, chloromethane is not expected to adsorb to suspended solids and sediment in water based upon the estimated K_{oc}. Volatilization from water surfaces is expected to be an important process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for chloromethane in a model river and a model lake are 46 minutes and 3 days, respectively. An estimated BCF of 3 suggests the potential for bioconcentration in aquatic organisms is low.

Chloromethane occurs in the environment as a result of its occurrence in nature and consumer products, and its extensive use in industry. Therefore, the detection of low levels of chloromethane in groundwater at these perimeter locations is not sufficient to exclude the perimeter wells from use in background evaluations.

o-Nitrotoluene: CAS Registry Number: 88-72-2. o-Nitrotoluene is used as an intermediate in the synthesis of synthetic azo and sulfur dyes, and as an intermediate in the synthesis of explosives, rubber chemicals, pesticides, and pharmaceuticals.

Use of consumer products and pesticides may release o-nitrotoluene to the environment. If released to air, an extrapolated vapor pressure of 1.88×10^{-1} mm Hg at 25 °C indicates o-nitrotoluene will exist solely as a vapor in the ambient atmosphere. Vapor-phase o-nitrotoluene degrades in the atmosphere by reaction with photochemically produced hydroxyl radicals with an estimated half-life of 42 days. o-Nitrotoluene is also expected to undergo direct photolysis, with 2-methyl-6-nitrophenol and 2-methyl-4-nitrophenol being its primary photoproducts. If released to soil, o-nitrotoluene is expected to have moderate mobility based upon an estimated K_{oc} of 420. Volatilization from moist soil surfaces is expected to be a slow process based upon a Henry's Law constant of 1.25×10^{-5} atm-cu m/mol. The biodegradation of o-nitrotoluene in soils has not been studied extensively; one study indicated that it persists for greater than 64 days using a silt loam soil inoculum. In anaerobic soils, o-nitrotoluene has been reported to degrade to toluidine, with little additional degradation.

If released into water, o-nitrotoluene is not expected to adsorb to suspended solids and sediment based upon its estimated K_{oc}. o-Nitrotoluene has been observed to be partially or completely degraded in aqueous sewage treatment systems and completely degraded in rivers or streams. Half-lives reported for degradation in those aquatic environments studied ranged from less than 3 days to greater than 64 days. Volatilization from water surfaces is expected to be slow based upon this compound's estimated Henry's Law constant. o-Nitrotoluene is estimated to volatilize from a model river with a half-life of 56 hours; its half-life in a model lake is estimated to be 30 days. An estimated BCF of 12 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis is not expected to be an important environmental process since this compound lacks functional groups that hydrolyze under environmental conditions.

o-Nitrotoluene occurs in the environment as a result of its occurrence in consumer products and its extensive use in industry. Therefore, the detection of low levels of o-nitrotoluene in groundwater at these perimeter locations is not sufficient to exclude the samples from use in background evaluations.

m-Nitrotoluene: CAS Registry Number: 99-08-1. m-Nitrotoluene is used as an intermediate in the manufacture of azo and sulfur dyes, explosives, and pesticides.

m-Nitrotoluene use in the manufacture of dyes and pesticides may result in its release to the environment. If released to air, an extrapolated vapor pressure of 0.205 mm Hg at 25 °C indicates m-nitrotoluene will exist solely as a vapor in the ambient atmosphere. Vapor-phase m-nitrotoluene is expected to degrade in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 17 days. m-Nitrotoluene is also expected to undergo direct photolysis, with 3-methyl-2-nitrophenol, 3-methyl-6-nitrophenol, and 3-methyl-4-nitrophenol being its primary photoproducts. If released to soil, m-nitrotoluene is expected to have moderate mobility based upon an estimated K_{oc} of

510. Volatilization from moist soil surfaces is expected to be a moderately important process based upon a Henry's Law constant of 9.30 x 10^{-6} atm-cu m/mol. Biodegradation of m-nitrotoluene in soils has not been studied extensively but one study indicated that it persists for greater than 64 days in a silt loam soil inoculum. In anaerobic soils, m-nitrotoluene was reported to degrade to toluidine, with little additional degradation.

If released into water, m-nitrotoluene is expected to adsorb to suspended solids and sediment based upon its estimated K_{oc}. m-Nitrotoluene has been observed to be partially or completely degraded in aqueous sewage treatment systems, and completely degraded in aquifers and in rivers or streams. Half-lives reported for degradation in those aquatic environments studied range from less than 3 days to greater than 64 days. Volatilization from water surfaces is not expected to be an important process based upon this compound's estimated Henry's Law constant. A BCF of 16 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis is not expected to be an important environmental process because this compound lacks functional groups that hydrolyze under environmental conditions.

m-Nitrotoluene is expected to occur in the environment as a result of its use in consumer products and its extensive use in industry. Therefore, the detection of low levels of m-nitrotoluene in groundwater at these perimeter locations is not sufficient to exclude the samples from use in background evaluations.

Methylene Chloride: CAS Registry Number: 75-09-2. Methylene chloride is used as a solvent in paint removers, metal degreasing fluids, and cleaning fluids. It is used as food processing solvent for decaffeinating coffee, spices, and beer hops. Methylene chloride is used in chemical manufacture of polycarbonate plastics, insecticides and herbicides, and pharmaceuticals, and is used as an aerosol propellant for insecticides.

If released to air, a vapor pressure of 435 mm Hg at 25 °C indicates methylene chloride will exist solely as a vapor in the ambient atmosphere. Vapor-phase methylene chloride degrades in the atmosphere by reaction with photochemically produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 119 days. If released to soil, methylene chloride is expected to have very high mobility based upon an estimated K_{oc} of 24. It is strongly bound to peat moss, less strongly to clay, only slightly to dolomite limestone, and not at all to sand.

Volatilization from moist soil surfaces is expected to be an important process based upon a estimated Henry's Law constant of 3.25×10^{-3} atm-cu m/mol. If released into water, methylene chloride is not expected to adsorb to suspended solids and sediment in water based upon the estimated K_{oc}. Biodegradation is possible in natural waters but will probably be very slow compared with evaporation. Volatilization from water surfaces is expected to be an important process based upon this compound's Henry's Law constant. Estimated volatilizations half-lives

for a model river and model lake are 1 hr and 4 days, respectively. An estimated BCF of 2 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis is not an important degradation process under normal environmental conditions.

Methylene chloride is expected to occur in the environment around LHAAP as a result of application of insecticides and herbicides to soil during farming of the areas upstream from sampling locations followed by infiltration to groundwater. Therefore, the detection of low levels of methylene chloride in this perimeter well is not sufficient to exclude the samples from use in background evaluations.

Nitrates: CAS Registry Number: 14797-55-8. Nitrates are used in fertilizers for crops such as cotton, tobacco, and vegetables in the United States. Major industrial uses include military explosives and pyrotechnics. The nitrates are found in formulations of herbicides, insecticides, and slow-burning solid rocket propellants. Nitrates are found in natural deposits associated with sodium and potassium chloride, potassium nitrate, sodium sulfate, magnesium chloride, and other salts.

Nitrates are very soluble in water and can contribute to algal blooms in static waters, and affect local species population balance in the aquatic environment. Because of its solubility, nitrate can infiltrate the soil and migrate downward toward the groundwater. Nitrate is somewhat persistent in water but nitrate degradation can occur under anaerobic conditions.

Nitrate is expected to occur in the LHAAP environment as a result of production of TNT and other nitrated toluene compounds. Nitrate is expected to occur in off-LHAAP background areas from fertilizer use also. Because nitrate is expected in both background and operations-related groundwater samples, background samples that contain low nitrate concentrations are not excluded from the perimeter well study and will be used in future comparisons with LHAAP site-specific concentrations.

Nitrites: CAS Registry Number: 7632-00-0. Sodium nitrite is used in metal treatment and finishing operations, in the recovery of tin from scrap, and as an anticorrosion inhibitor for multipurpose greases. It has minor uses in fertilizers and major uses in the manufacture of dyes and as a food preservative. Potassium nitrite (CAS Registry Number: 7758-09-0) is also used as a food preservative. Sodium nitrite occurs naturally in brines.

Nitrites are soluble in water and are expected to be present in groundwater and surface water bodies. Nitrite is not believed to occur in the LHAAP environment as a result of production of TNT but is expected to be present as residues from fertilizer use. Because nitrite might be expected in both background and operations-related groundwater samples, samples that contain

low nitrate concentrations are not excluded from the perimeter well study and will be used in future comparisons with LHAAP site-specific concentrations.

00045788

4.0 Statistical Analysis

The objective of the statistical analysis is to evaluate concentrations of compounds in environmental media at the LHAAP. Following the validation and review of analytical data **(Section 3.0)**, the statistical analysis consisted of the following steps as specified in the Work Plan (Shaw, 2004a).

4.1 Preparation of the Statistical Data Set

Groundwater sample analysis data used to calculate statistical values were prepared as specified in the Work Plan (Shaw, 2004a).

4.1.1 Analysis by Multiple Methods

Occasionally, groundwater constituents were analyzed by more than one analytical method; usually for PAHs or metals. The laboratory reported results from the most sensitive analytical method when multiple analyses were performed. For example, metals analyzed by graphite furnace method results were reported in preference to results of inductively coupled plasma methods, and gas chromatography-mass spectral method results for PAH analyses were reported in preference to gas chromatography results.

4.1.2 Data Set Identification

Data for each background chemical in groundwater from shallow monitoring wells MW110, MW111, and MW112 (20 to 22.25 feet bgs, Shaw, 2004a) are shown in **Tables 3-1** and **3-2**. Measurements of water quality parameters made in the field are shown in **Appendix A** and also summarized in **Table 2-2**.

4.1.3 Statistical Evaluation of Groundwater Properties

Groundwater properties of samples collected from monitoring wells MW110, MW111, and MW112 between December 2003 and December 2004 (**Tables 2-2** and **3-1**) were evaluated to describe the groundwater zone located upgradient from LHAAP sites and to evaluate use of chemical analysis data in risk assessments. Data used in the evaluation (**Appendix B, Table B-1**) were taken from tables in **Sections 2.0** and **3.0**. The pH, conductivity, DO concentration, ORP, and turbidity measured in nephelometric turbidity units, were evaluated as properties related to groundwater interactions with metals that are of interest to human health and environmental risk assessments.

Because water quality parameters are closely interrelated in their reactions with dissolved and suspended metals and ions, correlation analysis was applied as a statistical method to identify important variables in the data, and to classify their roles in the description of the groundwater

zone sampled by the perimeter wells. It was shown that pH, ORP, and turbidity measurements are not significantly correlated with any other groundwater property or with concentrations of selected metals and anions that are related to chemical properties of the groundwater (aluminum, calcium, magnesium, potassium, iron [Fe], manganese [Mn], chloride, sulfate, and total nitrate/nitrite). All statistical analyses were made using the Statistica© software program (StatSoft, 2004). Results of statistical evaluations of groundwater data are described in **Appendix B**.

Comparisons of water quality parameters and ion concentrations measured among samples from the three wells were made using the nonparametric (NP) Kruskal-Wallis test at a confidence level of 95 percent. Comparisons of water quality parameters showed that pH, ORP, DO, and turbidity of samples from the three wells are not statistically different with 95 percent confidence, and that differences in conductivity are marginally significant (**Appendix B**). Comparisons of anions, cations, and selected metal concentrations in groundwater showed that aluminum, iron, and nitrate/nitrite concentrations are not significantly different among the three perimeter wells. Significant differences were found in manganese, chloride, sulfate, calcium, magnesium, and potassium concentrations in groundwater from MW111. These comparisons indicate that differences between concentrations of chemical species are related to groundwater from MW111 (**Appendix B**). These evaluations of water quality parameters and ion concentrations indicate that groundwater from all three wells reflects acidic oxidizing conditions that favor formation of Fe(II) and Fe(III), Mn(II), and Cr(III) species. The concentrations of anions and cations that reflect water hardness are significantly lower in water from MW111 compared to MW110 and MW112.

Because wells MW110, MW111, and MW112 were installed in three different watersheds (Harrison Bayou, Central Creek, and Goose Prairie Creek), it is reasonable to expect that concentrations associated with water hardness could differ for one of the wells. The variability of water quality parameters related to the oxidation capacity of the medium as measured by the dissolved oxygen concentration, which is expected to be seasonally influenced by decaying organic matter in near-surface soil above the shallow water-bearing zone. Oxidation reduction potential and acidity, which relate to the oxidation states of metals and the formation of colloids and suspended solids, which relate to adsorption of metals, do not indicate statistically significant differences among groundwater samples from the three watersheds (**Appendix B**). The variability that is observed is attributed to the variability associated with the watersheds and reflects the variability of shallow groundwater beneath all of LHAAP. As such, the groundwater data from the upgradient perimeter wells MW110, MW111, and MW112 reflect groundwater characteristics of shallow groundwater at LHAAP and provide representative background data for use in risk assessments.

00045790

5.0 Chemical Concentrations in Groundwater

Concentrations of chemicals are described for groundwater to provide:

- Number of samples, number of detects, number of non-detects, frequency of detection
- Minimum and maximum reporting limits
- Minimum and maximum detected values
- Mean, median, standard deviation (SD), as appropriate for the distribution
- 95 percent UTL with 95 percent coverage, as appropriate for the distribution
- 95 percent UCL of the mean, as appropriate for the distribution.

Statistical properties of groundwater data are shown in **Tables 5-1** through **5-3**.

5.1 Handling Non-Detects and Frequency of Detection

Many guidance and regulatory documents (USEPA, 1992a,b; 2002a) allow the use of a simple substitution method for censored data sets having low values reported as "non-detects" with fewer than 15 percent non-detects. However, because groundwater analysis results reported by the laboratory for this study included an MDL for each sample, the MDL was used in this analysis as the surrogate concentration for all calculations involving undetected (U-qualified) data. Data reported as analyzed but qualified as UJ-, UJ,L- or UJ,H were counted as nondetects and the surrogate values were used in subsequent calculations. Concentrations reported as detected at estimated concentrations (J-qualified) were counted as detects and the qualified value was used in calculations (Shaw, 2004a).

5.2 Distribution Analysis

Statistical analyses of groundwater data followed the Work Plan (Shaw, 2004a) by using either parametric or NP methods, as appropriate, for the distribution type. The type of statistical distribution of data for each chemical was examined using the Shapiro-Wilk W test (Gilbert, 1987). The results of distributional testing of chemical concentrations in unfiltered samples **(Table 5-1)** indicate that magnesium, manganese, zinc, chloride and sulfate ion concentrations have the normal (N) distribution. All other data sets have the lognormal (L) or NP distribution. In filtered samples **(Table 5-2)**, antimony, magnesium, manganese, selenium, and zinc concentrations have the N distribution. All other data sets have the L or NP distribution.

5.3 Basic and Summary Statistics

Following data review, preparation, and distribution testing of the data set, summary characteristics were calculated, as appropriate, for the distribution to include the 95 percent UCL and the 95 percent UTL with 95 percent coverage. The results for total chemical concentrations

in unfiltered samples and of dissolved species in filtered samples are shown in **Tables 5-1** and **5-2**, respectively.

5.3.1 Calculation of the 95 Percent UCL of Normally Distributed Concentrations

For normal distributions **(Tables 5-1** and **5-2)**, the UCL was calculated using the equation (USEPA, 2002b):

$$UCL = \bar{x} + t_{1-\alpha,n-1} \ (s / \sqrt{n}) \qquad \textbf{Equation 5-1}$$

where:

UCL	=	95 percent upper confidence limit (α= 0.05) of the arithmetic mean
$\bar{x}$	=	sample arithmetic mean
$t_{1-\alpha,n-1}$	=	critical value for Student's t distribution
n	=	number of samples in data set
s	=	sample SD

5.3.2 Calculation of the 95 Percent UCL of the Mean by the Bootstrapping Method

The bootstrapping method was used to calculate the 95 percent UCL of concentrations that are not normally distributed. Bootstrapping is an NP statistical technique where the given data set is resampled with replacement, and the mean is calculated (USEPA, 1997, 2002b). When repeated a large number of times, an accurate estimation of the variance of the population may be determined, which allows the development of confidence limits for a given parameter, such as the mean. Bootstrapping is considered a robust statistical method for calculating the UCL because it does not place assumptions on the distribution of the data set.

The bootstrap technique was used to generate the 95 percent UCL for lognormal or NP distributions and for lognormal distributions that contain more than 15 percent nondetects. The 95 percent UCLs calculated from 2,000 bootstrap replications are shown in **Tables 5-3** and **5-4**.

5.3.3 Calculation of Upper Tolerance Limit

The 95 percent UTL with 95 percent coverage (95 percent/95 percent UTL) was calculated for all normal and lognormal distributions using the equation:

$$UTL = \bar{x} + k(a) \qquad \textbf{Equation 5-2}$$

where:

UTL	=	upper tolerance limit (95 percent confidence and 95 percent coverage)
$\bar{x}$	=	arithmetic mean
a	=	SD
k	=	tolerance factor = 2.670 for 13 values (USEPA, 1989)

The tolerance factor (k) required for calculating the 95 percent/95 percent UTL of a data set that has 13 samples was taken from guidance (USEPA, 1989, Table 5 of Appendix B). For

lognormally distributed data, this equation was applied to natural logarithms of the concentrations and the 95 percent/95 percent UTL concentrations **(Tables 5-1** and **5-2)** were calculated as the retransformation of the values calculated by the equation.

Nonparametric UTLs were determined for NP distributions and lognormal distributions that had more than 15 percent nondetects. Determination of NP UTLs requires a minimum of 60 samples to provide coverage of 95 percent at 95 percent confidence, where the maximum concentration is chosen as the UTL (Table 6 of Appendix B, USEPA, 1992b). It also indicates that the maximum concentration among 13 values provides coverage of approximately 79.4 percent of the distribution with 95 percent confidence, and the maximum concentration among 11 values provides coverage of approximately 76.2 percent with 95 percent confidence. Therefore, the maximum concentration of NP data with 13 samples **(Tables 5-3** and **5-4)** represents the 95 percent/79.4 percent UTL of the concentration. The maximum concentration of di-n-butylphthalate **(Table 5-3)** represents the 95 percent/76.2 percent UTL concentration.

One sample was reported to have detected concentrations of antimony and arsenic below their respective MDL values. Because there was no apparent indication in the analytical record to suggest why these results were not assigned a U qualifier, the results are shown as reported **(Tables 5-1** and **5-3)** and the non-parametric UTL values is assigned the MDL concentrations for these metals. It is recommended that an antimony or arsenic concentration in groundwater from an LHAAP site well detected above these MDL values should be interpreted as a detection above the perimeter groundwater UTL concentration.

A table of MCL values for background metals and anions (**Table 5-5**) is shown for informational purposes (USEPA, 2002c). The MCL values refer to the usability of the shallow groundwater source as a drinking water supply if used untreated. It is important to note that a metal can be detected above MCL concentrations, yet be naturally occurring so that it can serve as an indicator of background concentrations for comparison with other shallow groundwater sources at LHAAP.

00045793

6.0 Summary and Intended Use of Data

This study characterizes the concentrations of naturally occurring and anthropogenic chemicals in groundwater at LHAAP. The collection of samples, chemical and geotechnical laboratory analysis, and statistical analysis described in this report were performed as described in the Work Plan (Shaw, 2004a). The groundwater samples were collected from three monitoring wells located upgradient at the perimeter of the LHAAP. Water samples were taken quarterly from each well from December 2003 through December 2004.

The following conclusions were made in this study:

- No SVOC compounds were detected or reported at estimated concentrations in the samples other than one phthalate ester (di-n-butyl phthalate) that was reported at J-qualified concentrations in one sample.
- Detections of acetone, o-nitrotoluene, and chloromethane and detection of low levels of nitrate/nitrite, m-nitrotoluene, methylene chloride, and di-n-butylphthalate were reported in isolated samples.
- Most of the chemicals detected or reported at low estimated concentrations in groundwater from upgradient wells occur naturally or are used in industry, agriculture, pharmaceuticals, or consumer products. Chloromethane is produced naturally and is used in a variety of consumer products. Di-n-butylphthalate, methylene chloride, and o- and m-nitrotoluene isomers are used extensively in plastics and other consumer products such as dyes, pharmaceuticals, insecticides, and herbicides. Therefore, the detection of low levels of these chemicals in isolated samples is not sufficient to exclude samples from a well from use in background evaluations.
- Of the classes of chemicals analyzed in groundwater samples, only metals and anions were detected with sufficient frequency to be considered background constituents. The maximum and minimum detected concentration, maximum and minimum detection limits, mean, median, distribution types, UCL, and UTL characteristics of metal and anion concentrations in background groundwater are shown in **Tables 5-1** through **5-4**.

The intended use of the data sets for metals or anions in groundwater **(Table 5-1** through **5-4)** is for future comparison as background concentrations with LHAAP site-specific groundwater concentrations (Shaw, 2004a). The primary method of comparing site data to background data involves a comparison of distributions using the NP Wilcoxon Rank Sum Test. These comparisons use the 13-point data sets **(Tables 5-3** or **5-4)** as a whole. These tests compare the central locations and portions of the distributions with less emphasis on the upper and lower ranges of the data and do not involve the UCL or UTL concentrations. Because the

concentrations measured at the upper range of a data set also are important to background comparisons, current USEPA guidance (USEPA, 2002a,b) recommends a parallel statistical evaluation to include comparisons of the UCL and UTL concentrations of both data sets. The data shown in **Tables 5-3** and **5-4** will be used in this comprehensive statistical approach, as described in the Work Plan (Shaw, 2004a).

Groundwater samples often are filtered to estimate the concentrations of dissolved metals versus the concentration associated with colloids. The metal concentrations in filtered and unfiltered samples are shown separately in **Tables 5-1** through **5-4**. No statistical comparisons of metal concentrations were made to determine whether significant fractions of each metal were in the colloidal state. The tabulated data **(Tables 5-3** and **5-4)** may be used for comparison of data from filtered or unfiltered samples from a site without further manipulation.

If a statistical comparison of filtered and unfiltered background samples is desired, the comparison may be made using the NP Wilcoxon Rank Sum Test as described above or another appropriate approach described in USEPA (2002 a,b) guidance.

00045795

7.0 References

Gilbert, R.O., 1987, *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, New York.

Jacobs Engineering Group (Jacobs), 2001a, *Method of Accomplishment Group 2 Risk Assessment*, Oak Ridge, Tennessee, September.

Jacobs, 2001b, *Final Remedial Investigation Report, Group 2 Sites,* Longhorn Army Ammunition Plant, Karnack, Texas, April.

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

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

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

Jacobs, 2003b, *Draft Final Work Plan for the Installation-Wide Background Study, Revision 1,* Longhorn Army Ammunition Plant, Karnack, Texas, June.

Shaw Environmental, Inc. (Shaw), 2003, *Draft Data Quality Summary Report*, *Longhorn Army Ammunition Plant, Karnack, Texas*, submitted to U. S. Army Corps of Engineers, Tulsa District, December.

Shaw, 2004a, *Final Installation-Wide Background Study Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas*, January.

Shaw, 2004b, *Final Background Soil Study Report, Longhorn Army Ammunition Plant, Karnack, Texas*, July.

Shaw, 2004c, *Draft Final Background Surface Water and Sediment Report, Longhorn Army Ammunition Plant, Karnack, Texas*, submitted to the U. S. Army Corps of Engineers, Tulsa District, October.

Shaw, 2004d, *Final Work Plan, Groundwater Data Gaps Investigation, Groups 2 and 4, Longhorn Army Ammunition Plant, Karnack, Texas*, submitted to the U. S. Army Corps of Engineers, Tulsa District, September.

Shaw, 2006, *Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas*, January.

StatSoft, Inc. (2004). STATISTICA (data analysis software system), version 7. Tulsa, OK, www.statsoft.com.

U. S. Army Corps of Engineers (USACE), 1995, *Longhorn Army Ammunition Plant, Marshall, Texas*, *Final Groundwater Background Concentration Report*, Tulsa District, June.

U. S. Environmental Protection Agency (USEPA), 1989, *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance,* EPA/530-SW-89-026, Office of Solid Waste Management Division, Washington, D.C.

USEPA, 1992a, *Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 3: Reference-Based Standards for Soils and Solid Media*, Office of Policy, Planning and Evaluation, Washington DC, EPA 230-R-94-004.

USEPA, 1992b, *Statistical Training Course for Groundwater Monitoring Data Analysis,* sponsored by the U.S. Environmental Protection Agency Office of Solid Waste, EPA/530-R-93-003.

USEPA, 1997, *Technology Support Center Issue: The Lognormal Distribution in Environmental Applications*, prepared by Singh, A.K., A. Singh and M. Engelhardt for the Office of Solid Waste and Emergency Response, EPA/600/R-97/006, December.

USEPA, 2002a, *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites,* EPA 540-R-01-003, OSWER Directive 9285.7-41, Washington, DC, September.

USEPA, 2002b, *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites*, OSWER Directive 9285.6-10, Washington, DC, December.

USEPA, 2002c, *List of Contaminants and Their MCLs,* EPA 816-F-02-013, Washington, DC, July.

U.S. National Library of Medicine, 2004, Hazardous Substances Databank (HSDB®) accessible via Toxicology Data Network (TOXNET®) at http://www.sis.n/m.nih.gov/Tox/ToxMain.html (October 2004), Bethesda, Maryland.

Tables

00045798

Table ES-1
Summary Statistics for Detected Analytes in Perimeter Well Groundwater Data[a]

Chemical	Maximum Detected Concentration (µg/L)	95% UCL (µg/L)	95% UTL [b] (µg/L)
Dissolved Metals			
Aluminum	821	3.72E+02	1.86E+03
Antimony	10.5	7.75E+00	1.22E+01
Arsenic	62.1	2.90E+01	3.42E+02
Barium	120	5.04E+01	1.20E+02
Beryllium	0.813	3.66E-01	8.13E-01
Cadmium	5.1	1.62E+00	5.10E+00
Calcium	301000	2.03E+05	3.01E+05
Chromium	4.02	1.71E+00	5.12E+00
Cobalt	29.9	1.81E+01	1.87E+02
Copper	2.39	1.76E+00	2.39E+00
Iron	1010	5.13E+02	4.23E+03
Lead	2.4	1.82E+00	2.40E+00
Magnesium	330000	2.18E+05	4.59E+05
Manganese	5860	3.79E+03	7.84E+03
Nickel	93	3.72E+01	2.29E+02
Potassium	2980	2.09E+03	2.98E+03
Selenium	58.7	2.75E+01	6.35E+01
Silver	1.92	1.11E+00	1.92E+00
Strontium	7200	5.25E+03	7.20E+03
Vanadium	1.16	8.51E-01	1.16E+00
Zinc	54.3	2.74E+01	5.92E+01
Total Metals			
Aluminum	1990	7.16E+02	2.68E+03
Antimony	11.5	6.65E+00	1.15E+01
Arsenic [c]	0.167	2.24E+00	1.67E-01
Barium	128	6.07E+01	1.28E+02
Beryllium	0.851	3.97E-01	8.51E-01
Cadmium	2.29	8.67E-01	2.29E+00
Calcium	302000	2.04E+05	3.02E+05
Chromium	8.09	3.25E+00	1.58E+01
Cobalt	32.1	1.92E+01	1.51E+02
Copper	3.22	1.83E+00	3.22E+00
Iron	2310	8.87E+02	4.01E+03
Magnesium	331000	2.19E+05	4.62E+05
Manganese	5570	3.81E+03	7.82E+03
Mercury	0.0793	5.21E-02	7.93E-02
Nickel	92	3.95E+01	2.11E+02
Potassium	2740	2.19E+03	2.74E+03
Selenium	46.1	2.01E+01	4.61E+01
Silver	1.91	1.21E+00	1.91E+00
Strontium	7330	5.17E+03	7.33E+03
Vanadium	3.99	1.66E+00	3.99E+00
Zinc	22.9	1.44E+01	3.02E+01

Notes and Abbreviations:

[a] Groundwater samples were collected from shallow depth wells.

[b] An upper tolerance limit (UTL) with 79% coverage (13 samples), 81% coverage (14 samples), and 76% coverage (11 samples) at 95% confidence is calculated for normally or lognormally distributed data with 15% or fewer nondetects. If greater than 15% of the data are nondetects, or if the data distribution is undefined, the maximum detected concentration is used as the UTL.

[c] The UCL is higher than the maximum detected concentration because the undiluted method detection limit used as the surrogate value for the nondetect samples (2.24 µg/L) is higher than the maximum detected concentration of 0.167 µg/L.

UCL upper confidence limit

µg/L microgram per liter

00045799

Table 2-1
Perimeter Well Groundwater Sample Summary

Location	Sample Number	Sample Date	Sample Type	Well Type	Analyses
Unfiltered Samples					
110	PW-MW-110-031203	3-Dec-03	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
110	PW-MW-110-040331	31-Mar-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
110	PW-MW-110-040715	15-Jul-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
110	PW-MW-110-040915	15-Sep-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
110	PW-MW-110-041216	16-Dec-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, VOC
111	PW-MW-111-031204	4-Dec-03	REG	Shallow	Explosives, SVOC, VOC
111	PW-MW-111-040331	31-Mar-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
111	PW-MW-111-040715	15-Jul-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
111	PW-MW-111-041216	16-Dec-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, VOC
112	PW-MW-112-031204	4-Dec-03	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
112	PW-MW-112-040330	30-Mar-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
112	PW-MW-112-040714	14-Jul-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
112	PW-MW-112-040915	15-Aug-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, SVOC, VOC
112	PW-MW-112-041216	16-Dec-04	REG	Shallow	Anions, Explosives, Perchlorate, Metals, VOC
Filtered Samples					
110	PW-MW-110-031203	3-Dec-03	REG	Shallow	Metals
110	PW-MW-110-040331	31-Mar-04	REG	Shallow	Metals
110	PW-MW-110-040715	15-Jul-04	REG	Shallow	Metals
110	PW-MW-110-040915	15-Sep-04	REG	Shallow	Metals
110	PW-MW-110-041216	16-Dec-04	REG	Shallow	Metals
111	PW-MW-111-040331	31-Mar-04	REG	Shallow	Metals
111	PW-MW-111-040715	15-Jul-04	REG	Shallow	Metals
111	PW-MW-111-041216	16-Dec-04	REG	Shallow	Metals
112	PW-MW-112-031204	4-Dec-03	REG	Shallow	Metals
112	PW-MW-112-040330	30-Mar-04	REG	Shallow	Metals
112	PW-MW-112-040714	14-Jul-04	REG	Shallow	Metals
112	PW-MW-112-040915	15-Aug-04	REG	Shallow	Metals
112	PW-MW-112-041216	16-Dec-04	REG	Shallow	Metals

Abbreviations:

REG regular environmental sample
SVOC semivolatile organic compound
VOC volatile organic compound

00045800

Table 2-2
Water Quality Parameters of Groundwater from Perimeter Wells

Location	Sampling Date	Time	Volume Purged (gallons)	Flow (mL/min)	Temperature (deg. C) (+/- 0.5)	pH (+/- 0.1)	Specific Conductivity (uS/cm) (+/- 3%)	Dissolved Oxygen (mg/L) (+/- 10%)	Oxidation Reduction Potential (mV) (+/- 10 mV)	Turbidity (NTU) (+/- 10%)
110	3-Dec-03	13:51	low flow	200	19.13	5.96	6.24	1.3	238	3.9
110	31-Mar-04	9:30	low flow	500	18.00	5.95	6.667	0.21	184	18.7
110	15-Jul-04	10:12	low flow	350	19.23	5.90	2.781	1.75	194	12.9
110	16-Dec-04	13:05	low flow	100	17.28	6.45	5.511	1.99	395	10.3
110	15-Sep-04	15:39	low flow	383	21.09	6.04	4.434	3.9	154	15.9
111	4-Dec-03	7:00	low flow	na[a]	15.15	5.74	2.46	2.98	240	8
111	31-Mar-04	13:34	low flow	330	16.45	4.54	0.0700	2.31	326	42.3
111	15-Jul-04	8:30	low flow	470	24.21	5.91	1.88	2.17	166	43.6
111	16-Dec-04	10:45	low flow	100	18.62	6.49	0.0922	1.97	876	3.1
111	15-Sep-04	No Sample								
112	4-Dec-03	7:00	low flow	na[a]	15.4	7.04	5.1	2.74	na	0
112	31-Mar-04	13:11	low flow	180	16.44	5.73	4.78	0.3	169	0.7
112	14-Jul-04	10:42	low flow	220	19.87	5.94	3.391	1.16	34	53
112	16-Dec-04	12:00	low flow	100	18.57	6.72	0.985	1.71	470	50.9
112	15-Sep-04	19:21	low flow	100	21.31	5.91	3.341	0.9	184	0

Notes:

[a] Wells were purged dry due to low recharge and sample collected the next day

mL/min	milliliters per minute
deg. C	degrees Celsius
uS/cm	microsiemens per centimeter
mg/L	milligrams per liter
mV	millivolts
NTU	nephelometric turbidity units
na	not applicable/not available

00045801

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Total Metals

Parameter				Aluminum					Antimony					Arsenic				
Units				ug/L					ug/L					ug/L				
CAS Number				7429-90-5					7440-36-0					7440-38-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	252	14.7	100			2.79	5.08	10			0.167	2.24	5		
110	PW-MW-110-040331	31-Mar-04	REG	272	14.7	100			5.08	5.08	10	U	U	22.4	22.4	50	U	U
110	PW-MW-110-040715	15-Jul-04	REG	459	14.7	100			5.08	5.08	10	U	U	22.4	22.4	50	U	U
110	PW-MW-110-040915	15-Sep-04	REG	323	147	1000	J	J	5.08	5.08	10	U	U	2.24	2.24	5	U	U
110	PW-MW-110-041216	16-Dec-04	REG	769	294	2000	J	J	11.5	5.08	10		B	44.7	44.7	100	U	U
111	PW-MW-111-040331	31-Mar-04	REG	652	14.7	100			5.08	5.08	10	U	U	2.24	2.24	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1990	14.7	100			5.08	5.08	10	U	U	2.24	2.24	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	243	14.7	100			5.08	5.08	10	U	U	2.24	2.24	5	U	U
112	PW-MW-112-031204	4-Dec-03	REG	147	147	1000	U	U	5.08	5.08	10	U	U	2.24	2.24	5	U	U
112	PW-MW-112-040330	30-Mar-04	REG	159	14.7	100		B	5.08	5.08	10	U	U	11.2	11.2	25	U	U
112	PW-MW-112-040714	14-Jul-04	REG	98.9	14.7	100	J	B	6.27	5.08	10	J	J	22.4	22.4	50	U	U
112	PW-MW-112-040915	15-Sep-04	REG	195	73.4	500	J	J	5.08	5.08	10	U	U	2.24	2.24	5	U	U
112	PW-MW-112-041216	16-Dec-04	REG	324	147	1000	J	J	5.08	5.08	10	U	U	22.4	22.4	50	U	U

Footnotes are shown on last page.

00045802

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Total Metals

Parameter				Barium					Beryllium					Cadmium				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-39-3					7440-41-7					7440-43-9				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	16	0.222	5			0.158	0.158	5	U	U	1.41	0.313	2		
110	PW-MW-110-040331	31-Mar-04	REG	16.3	0.222	5			0.158	0.158	5	U	U	0.449	0.313	2	J	J
110	PW-MW-110-040715	15-Jul-04	REG	15.4	0.222	5			0.158	0.158	5	U	U	0.313	0.313	2	U	U
110	PW-MW-110-040915	15-Sep-04	REG	14.6	0.222	5			0.158	0.158	5	U	U	0.642	0.313	2	J	J
110	PW-MW-110-041216	16-Dec-04	REG	14.5	0.222	5			0.258	0.158	5	J	B	0.313	0.313	2	U	U
111	PW-MW-111-040331	31-Mar-04	REG	95	0.222	5			0.426	0.158	5	J	J	0.368	0.313	2	J	J
111	PW-MW-111-040715	15-Jul-04	REG	92.4	0.222	5			0.584	0.158	5	J	J	0.313	0.313	2	U	U
111	PW-MW-111-041216	16-Dec-04	REG	128	0.222	5			0.851	0.158	5	J	B	0.622	0.313	2	J	B
112	PW-MW-112-031204	4-Dec-03	REG	25.5	0.222	5			0.158	0.158	5	U	U	0.313	0.313	2	U	U
112	PW-MW-112-040330	30-Mar-04	REG	25.6	0.222	5			0.158	0.158	5	U	U	0.502	0.313	2	J	J
112	PW-MW-112-040714	14-Jul-04	REG	27.1	0.222	5			0.158	0.158	5	U	U	0.313	0.313	2	U	U
112	PW-MW-112-040915	15-Sep-04	REG	26.9	0.222	5			0.202	0.158	5	J	J	2.29	0.313	2	J	J
112	PW-MW-112-041216	16-Dec-04	REG	29.7	0.222	5			0.322	0.158	5	J	B	0.46	0.313	2	J	B

Footnotes are shown on last page.

00045803

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Total Metals

Parameter				Calcium					Chromium					Cobalt				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-70-2					7440-47-3					7440-48-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	205000	5.54	100			8.09	0.503	5			4.09	0.541	5		
110	PW-MW-110-040331	31-Mar-04	REG	302000	5.54	100			0.503	0.503	5	U	U	3.58	0.541	5	J	J
110	PW-MW-110-040715	15-Jul-04	REG	221000	5.54	100			0.969	0.503	5	J	J	1.79	0.541	5	J	J
110	PW-MW-110-040915	15-Sep-04	REG	209000	5.54	100			0.503	0.503	5	U	U	7.43	0.541	5		
110	PW-MW-110-041216	16-Dec-04	REG	190000	5.54	100			0.738	0.503	5	J	B	1.26	0.541	5	J	J
111	PW-MW-111-040331	31-Mar-04	REG	3710	5.54	100			1.34	0.503	5	J	J	2.86	0.541	5	J	J
111	PW-MW-111-040715	15-Jul-04	REG	2980	5.54	100			3.94	0.503	5	J	J	6.45	0.541	5		
111	PW-MW-111-041216	16-Dec-04	REG	4970	5.54	100			1.34	0.503	5	J	B	7.59	0.541	5		
112	PW-MW-112-031204	4-Dec-03	REG	191000	5.54	100			3.94	0.503	5	J	J	32.1	0.541	5		
112	PW-MW-112-040330	30-Mar-04	REG	223000	5.54	100			0.634	0.503	5	J	J	12.1	0.541	5		
112	PW-MW-112-040714	14-Jul-04	REG	210000	5.54	100			0.503	0.503	5	U	U	29.1	0.541	5		
112	PW-MW-112-040915	15-Sep-04	REG	186000	5.54	100			2.68	0.503	5	J	J	30	0.541	5		
112	PW-MW-112-041216	16-Dec-04	REG	233000	5.54	100			0.503	0.503	5	U	U	27.7	0.541	5		

Footnotes are shown on last page.

00045804

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Total Metals

Parameter				Copper					Iron					Lead				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-50-8					7439-89-6					7439-92-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.26	1.39	5			561	12.6	100		J	17.2	17.2	50	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.39	1.39	5	U	U	214	12.6	100			1.72	1.72	4	U	U
110	PW-MW-110-040715	15-Jul-04	REG	1.41	1.39	5	J	J	586	12.6	100			1.72	1.72	4	U	U
110	PW-MW-110-040915	15-Sep-04	REG	1.39	1.39	5	U	U	375	12.6	100			1.72	1.72	4	U	U
110	PW-MW-110-041216	16-Dec-04	REG	1.39	1.39	5	U	U	952	252	2000	J	J	1.72	1.72	4	U	U
111	PW-MW-111-040331	31-Mar-04	REG	1.39	1.39	5	U	U	523	12.6	100			1.72	1.72	4	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1.46	1.39	5	J	J	2310	12.6	100			1.72	1.72	4	U	U
111	PW-MW-111-041216	16-Dec-04	REG	1.39	1.39	5	U	U	467	12.6	100			1.72	1.72	4	U	U
112	PW-MW-112-031204	4-Dec-03	REG	1.39	1.39	5	U	U	147	12.6	100		J	1.72	1.72	4	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.39	1.39	5	U	U	240	12.6	100			1.72	1.72	4	U	U
112	PW-MW-112-040714	14-Jul-04	REG	1.63	1.39	5	J	J	938	12.6	100			1.72	1.72	4	U	U
112	PW-MW-112-040915	15-Sep-04	REG	3.22	1.39	5	J	J	556	12.6	100			1.72	1.72	4	U	U
112	PW-MW-112-041216	16-Dec-04	REG	1.39	1.39	5	U	U	1230	12.6	100			1.72	1.72	4	U	U

Footnotes are shown on last page.

00045805

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Total Metals

Parameter				Magnesium					Manganese					Mercury				
Units				ug/L					ug/L					ug/L				
CAS Number				7439-95-4					7439-96-5					7439-97-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	128000	5.18	100			4220	0.296	10			0.0793	0.0472	0.2	J	JL
110	PW-MW-110-040331	31-Mar-04	REG	210000	5.18	100			4750	0.296	10			0.0472	0.0472	0.2	U	U
110	PW-MW-110-040715	15-Jul-04	REG	141000	5.18	100			5570	0.296	10			0.0472	0.0472	0.2	U	U
110	PW-MW-110-040915	15-Sep-04	REG	137000	5.18	100			4540	0.296	10			0.0472	0.0472	0.2	U	U
110	PW-MW-110-041216	16-Dec-04	REG	130000	5.18	100			2320	0.296	10			0.0472	0.0472	0.2	U	U
111	PW-MW-111-040331	31-Mar-04	REG	3340	5.18	100			67.7	0.296	10			0.0472	0.0472	0.2	U	U
111	PW-MW-111-040715	15-Jul-04	REG	3000	5.18	100			145	0.296	10			0.0472	0.0472	0.2	U	U
111	PW-MW-111-041216	16-Dec-04	REG	4600	5.18	100			171	0.296	10			0.0472	0.0472	0.2	U	U
112	PW-MW-112-031204	4-Dec-03	REG	252000	5.18	100			3350	0.296	10			0.0472	0.0472	0.2	U	UJL
112	PW-MW-112-040330	30-Mar-04	REG	292000	5.18	100			2160	0.296	10			0.0472	0.0472	0.2	U	U
112	PW-MW-112-040714	14-Jul-04	REG	263000	5.18	100			3460	0.296	10			0.0472	0.0472	0.2	U	U
112	PW-MW-112-040915	15-Sep-04	REG	234000	5.18	100			2910	0.296	10			0.0472	0.0472	0.2	U	U
112	PW-MW-112-041216	16-Dec-04	REG	331000	5.18	100			4050	0.296	10			0.0472	0.0472	0.2	U	U

Footnotes are shown on last page.

00045806

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Total Metals

Parameter				Nickel					Potassium					Selenium				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-02-0					2023695					7782-49-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	26.6	0.69	5			2740	16.5	100			27.3	2.81	5		
110	PW-MW-110-040331	31-Mar-04	REG	92	0.69	5			2040	165	1000		J	20.4	2.81	5		
110	PW-MW-110-040715	15-Jul-04	REG	70.9	0.69	5			1840	165	1000			13.6	2.81	5		
110	PW-MW-110-040915	15-Sep-04	REG	33.1	0.69	5			2710	16.5	100			2.81	2.81	5	U	U
110	PW-MW-110-041216	16-Dec-04	REG	25.1	0.69	5			2470	330	2000			56.2	56.2	100	U	U
111	PW-MW-111-040331	31-Mar-04	REG	4.84	0.69	5	J	J	250	16.5	100		J	2.81	2.81	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	6.86	0.69	5			419	16.5	100			2.81	2.81	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	8.45	0.69	5			128	16.5	100			2.81	2.81	5	U	U
112	PW-MW-112-031204	4-Dec-03	REG	27	0.69	5			2350	16.5	100			2.81	2.81	5	U	U
112	PW-MW-112-040330	30-Mar-04	REG	21.3	0.69	5			1790	82.4	500		J	21.8	2.81	5		
112	PW-MW-112-040714	14-Jul-04	REG	24.4	0.69	5			517	165	1000	J	J	23.6	2.81	5		
112	PW-MW-112-040915	15-Sep-04	REG	26.8	0.69	5			2260	16.5	100			2.81	2.81	5	U	U
112	PW-MW-112-041216	16-Dec-04	REG	28.5	0.69	5			2670	16.5	100			46.1	28.1	50	J	B

Footnotes are shown on last page.

00045807

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Total Metals

Parameter				Silver					Strontium					Thallium				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-22-4					7440-24-6					7440-28-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.53	0.835	5		B	4960	0.178	5			10	10	20	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.91	0.835	5	J	J	7330	0.178	5			100	100	200	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.835	0.835	5	U	U	5600	0.178	5			10	10	20	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.835	0.835	5	U	U	4890	0.178	5			10	10	20	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.835	0.835	5	U	U	4390	0.178	5			10	10	20	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.835	0.835	5	U	U	115	0.178	5			10	10	20	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.901	0.835	5	J	BJ	101	0.178	5			10	10	20	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.835	0.835	5	U	U	143	0.178	5			10	10	20	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.835	0.835	5	U	U	5190	0.178	5			10	10	20	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.06	0.835	5	J	J	5960	0.178	5			10	10	20	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.835	0.835	5	U	U	5580	0.178	5			10	10	20	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.835	0.835	5	U	U	5180	0.178	5			10	10	20	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.835	0.835	5	U	U	5980	0.178	5			10	10	20	U	U

Footnotes are shown on last page.

00045808

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Total Metals

Parameter				Vanadium					Zinc				
Units				ug/L					ug/L				
CAS Number				7440-62-2					7440-66-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.606	0.606	5	U	U	12.4	0.883	5		B
110	PW-MW-110-040331	31-Mar-04	REG	0.606	0.606	5	U	U	22.9	0.883	5		
110	PW-MW-110-040715	15-Jul-04	REG	0.606	0.606	5	U	U	20.1	0.883	5		
110	PW-MW-110-040915	15-Sep-04	REG	0.86	0.606	5	J	B	14.1	0.883	5		
110	PW-MW-110-041216	16-Dec-04	REG	1.6	0.606	5	J	B	9.83	0.883	5		B
111	PW-MW-111-040331	31-Mar-04	REG	1.1	0.606	5	J	J	6.63	0.883	5		
111	PW-MW-111-040715	15-Jul-04	REG	3.99	0.606	5	J	J	18.9	0.883	5		
111	PW-MW-111-041216	16-Dec-04	REG	1.15	0.606	5	J	B	11.6	0.883	5		B
112	PW-MW-112-031204	4-Dec-03	REG	0.606	0.606	5	U	U	0.883	0.883	5	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.606	0.606	5	U	U	3.61	0.883	5	J	J
112	PW-MW-112-040714	14-Jul-04	REG	0.606	0.606	5	U	U	4.73	0.883	5	J	B
112	PW-MW-112-040915	15-Sep-04	REG	1.1	0.606	5	J	J	14.6	0.883	5		
112	PW-MW-112-041216	16-Dec-04	REG	1.21	0.606	5	J	B	0.883	0.883	5	U	U

Footnotes are shown on last page.

00045809

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Anions

Parameter				Chloride					Nitrate / Nitrite					Sulfate				
Units				ug/L					ug/L					ug/L				
CAS Number				16887-00-6					39018					14808-79-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1070000	3220	20000			50	50	250	U	U	1690000	19300	40000		
110	PW-MW-110-040331	31-Mar-04	REG	1930000	3220	20000			10	10	50	U	U	2400000	19300	40000		
110	PW-MW-110-040715	15-Jul-04	REG	1330000	3220	20000			10	10	50	U	U	1880000	19300	40000		
110	PW-MW-110-040915	15-Sep-04	REG	999000	3220	20000			3	3	20	U	U	1620000	19300	40000		
110	PW-MW-110-041216	16-Dec-04	REG	986000	3220	20000			3	3	20	U	U	1530000	19300	40000		
111	PW-MW-111-040331	31-Mar-04	REG	10200	32.2	200			10	10	50	U	U	26600	193	400		
111	PW-MW-111-040715	15-Jul-04	REG	2070	32.2	200			10	10	50	J	J	18400	193	400		
111	PW-MW-111-041216	16-Dec-04	REG	5910	32.2	200			3	3	20	U	U	30300	193	400		
112	PW-MW-112-031204	4-Dec-03	REG	1030000	3220	20000			10	10	50	U	U	854000	19300	40000		
112	PW-MW-112-040330	30-Mar-04	REG	1640000	3220	20000			10	10	50	U	U	1040000	19300	40000		
112	PW-MW-112-040714	14-Jul-04	REG	1160000	3220	20000			10	10	50	U	U	873000	19300	40000		
112	PW-MW-112-040915	15-Sep-04	REG	933000	3220	20000			3	3	20	U	U	783000	19300	40000		
112	PW-MW-112-041216	16-Dec-04	REG	1560000	3220	20000			3	3	20	U	U	1010000	19300	40000		

Footnotes are shown on last page.

00045810

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Perchlorate

Parameter				Perchlorate				
Units				ug/L				
CAS Number				14797-73-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.989	0.989	4	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.989	0.989	4	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.05	0.05	0.2	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.05	0.05	0.2	U	UJL
110	PW-MW-110-041216	16-Dec-04	REG	0.05	0.05	0.2	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.989	0.989	4	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.05	0.05	0.2	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.05	0.05	0.2	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.989	0.989	4	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.989	0.989	4	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.05	0.05	0.2	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.05	0.05	0.2	U	UJL
112	PW-MW-112-041216	16-Dec-04	REG	0.05	0.05	0.2	U	U

Footnotes are shown on last page.

00045811

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Explosives

Parameter				1,3,5-Trinitrobenzene					1,3-Dinitrobenzene					2,4,6-Trinitrotoluene				
Units				ug/L					ug/L					ug/L				
CAS Number				99-35-4					99-65-0					118-96-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.0249	0.0249	0.104	U	U	0.033	0.033	0.104	U	U	0.0779	0.0779	0.104	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.0249	0.0249	0.104	U	U	0.033	0.033	0.104	U	U	0.0779	0.0779	0.104	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.0249	0.0249	0.104	U	U	0.033	0.033	0.104	U	U	0.0779	0.0779	0.104	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U
112	PW-MW-112-041216	38337	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U

Footnotes are shown on last page.

00045812

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Explosives

Parameter				2,4-Dinitrotoluene					2,6-Dinitrotoluene					2-Amino-4,6-dinitrotoluene				
Units				ug/L					ug/L					ug/L				
CAS Number				121-14-2					606-20-2					35572-78-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.0349	0.0349	0.104	U	U	0.0501	0.0501	0.104	U	U	0.0779	0.0779	0.104	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.0349	0.0349	0.104	U	U	0.0501	0.0501	0.104	U	U	0.0779	0.0779	0.104	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.0349	0.0349	0.104	U	U	0.0501	0.0501	0.104	U	U	0.0779	0.0779	0.104	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-041216	38337	REG	0.325	0.325	0.974	U	U	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U

Footnotes are shown on last page.

00045813

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Explosives

Parameter				4-Amino-2,6-dinitrotoluene					HMX					m-Nitrotoluene				
Units				ug/L					ug/L					ug/L				
CAS Number				19406-51-0					2691-41-0					99-08-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.0409	0.0409	0.104	U	U	0.0779	0.0779	0.104	U	U	0.064	0.064	0.104	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.0409	0.0409	0.104	U	U	0.0779	0.0779	0.104	U	U	0.064	0.064	0.104	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.521	0.325	0.974	J	J
111	PW-MW-111-041216	16-Dec-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.0409	0.0409	0.104	U	U	0.0779	0.0779	0.104	U	U	0.064	0.064	0.104	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-041216	38337	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U

Footnotes are shown on last page.

00045814

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Explosives

Parameter				Nitrobenzene					o-Nitrotoluene					p-Nitrotoluene				
Units				ug/L					ug/L					ug/L				
CAS Number				98-95-3					88-72-2					99-99-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.0131	0.0131	0.104	U	U	0.064	0.064	0.104	U	U	0.064	0.064	0.104	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.162	0.162	0.486	U	U	0.774	0.162	0.486			0.325	0.325	0.974	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.0131	0.0131	0.104	U	U	0.064	0.064	0.104	U	U	0.064	0.064	0.104	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.0131	0.0131	0.104	U	U	0.064	0.064	0.104	U	U	0.064	0.064	0.104	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
112	PW-MW-112-041216	38337	REG	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U

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00045815

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - Explosives

Parameter				RDX					Tetryl				
Units				ug/L					ug/L				
CAS Number				121-82-4					479-45-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.053	0.053	0.104	U	U	0.032	0.032	0.104	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.053	0.053	0.104	U	U	0.032	0.032	0.104	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.053	0.053	0.104	U	U	0.032	0.032	0.104	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
112	PW-MW-112-041216	38337	REG	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U

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00045816

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				1,1,1,2-Tetrachloroethane					1,1,1-Trichloroethane					1,1,2,2-Tetrachloroethane				
Units				ug/L					ug/L					ug/L				
CAS Number				630-20-6					71-55-6					79-34-5				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U

Footnotes are shown on last page.

00045817

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				1,1,2-Trichloroethane					1,1-Dichloroethane					1,1-Dichloroethene				
Units				ug/L					ug/L					ug/L				
CAS Number				79-00-5					75-34-3					75-35-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.44	0.44	1	U	U	0.41	0.41	1	U	U	0.41	0.41	1	U	U

Footnotes are shown on last page.

00045818

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				1,2,3-Trichloropropane					1,2,4-Trichlorobenzene					1,2-Dibromo-3-chloropropane				
Units				ug/L					ug/L					ug/L				
CAS Number				96-18-4					120-82-1					96-12-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	0.75	0.75	1	U	U

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00045819

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				1,2-Dibromoethane					1,2-Dichlorobenzene					1,2-Dichloroethane				
Units				ug/L					ug/L					ug/L				
CAS Number				106-93-4					95-50-1					107-06-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U

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00045820

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				1,2-Dichloropropane					1,3-Dichlorobenzene					1,4-Dichlorobenzene				
Units				ug/L					ug/L					ug/L				
CAS Number				78-87-5					541-73-1					106-46-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.25	0.25	1	U	U	0.33	0.33	1	U	U	0.25	0.25	1	U	U

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00045821

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				2-Butanone					2-Chloroethyl vinyl ether				
Units				ug/L					ug/L				
CAS Number				78-93-3					110-75-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	UJL
110	PW-MW-110-040331	31-Mar-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
110	PW-MW-110-040715	15-Jul-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
110	PW-MW-110-040915	15-Sep-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	UJL
110	PW-MW-110-041216	16-Dec-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
111	PW-MW-111-031204	4-Dec-03	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	UJL
111	PW-MW-111-040331	31-Mar-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
112	PW-MW-112-031204	4-Dec-03	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
112	PW-MW-112-040330	30-Mar-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
112	PW-MW-112-040714	14-Jul-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U
112	PW-MW-112-040915	15-Sep-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	UJL
112	PW-MW-112-041216	16-Dec-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U

Footnotes are shown on last page.

00045822

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				2-Hexanone					2-Propenal				
Units				ug/L					ug/L				
CAS Number				591-78-6					107-02-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
110	PW-MW-110-040715	15-Jul-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
110	PW-MW-110-040915	15-Sep-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
110	PW-MW-110-041216	16-Dec-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
111	PW-MW-111-031204	4-Dec-03	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
111	PW-MW-111-040331	31-Mar-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
112	PW-MW-112-031204	4-Dec-03	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
112	PW-MW-112-040714	14-Jul-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
112	PW-MW-112-040915	15-Sep-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U
112	PW-MW-112-041216	16-Dec-04	REG	1.45	1.45	5	U	U	4.06	4.06	5	U	U

Footnotes are shown on last page.

00045823

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Acetone					Acetonitrile					Acrylonitrile				
Units				ug/L					ug/L					ug/L				
CAS Number				67-64-1					75-05-8					107-13-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
110	PW-MW-110-040331	31-Mar-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
110	PW-MW-110-040715	15-Jul-04	REG	9.57	2.29	5			10.4	10.4	25	U	U	2	2	5	U	U
110	PW-MW-110-040915	15-Sep-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
110	PW-MW-110-041216	16-Dec-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
111	PW-MW-111-031204	4-Dec-03	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
111	PW-MW-111-040331	31-Mar-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
112	PW-MW-112-031204	4-Dec-03	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
112	PW-MW-112-040330	30-Mar-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
112	PW-MW-112-040714	14-Jul-04	REG	10.3	2.29	5			10.4	10.4	25	U	U	2	2	5	U	U
112	PW-MW-112-040915	15-Sep-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U
112	PW-MW-112-041216	16-Dec-04	REG	2.29	2.29	5	U	U	10.4	10.4	25	U	U	2	2	5	U	U

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00045824

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Benzene					Bromochloromethane					Bromodichloromethane				
Units				ug/L					ug/L					ug/L				
CAS Number				71-43-2					74-97-5					75-27-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.33	0.33	1	U	U	0.5	0.5	1	U	U	0.38	0.38	1	U	U

Footnotes are shown on last page.

00045825

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Bromoform					Bromomethane					Carbon disulfide				
Units				ug/L					ug/L					ug/L				
CAS Number				75-25-2					74-83-9					75-15-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U

Footnotes are shown on last page.

00045826

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Carbon tetrachloride					Chlorobenzene				Chloroethane				
Units				ug/L					ug/L				ug/L				
CAS Number				56-23-5					108-90-7				75-00-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	0.5	0.5	1	U	U

Footnotes are shown on last page.

00045827

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Chloroform					Chloromethane					cis-1,2-Dichloroethene				
Units				ug/L					ug/L					ug/L				
CAS Number				67-66-3					74-87-3					156-59-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.36	0.36	1	U	U	1.3	0.5	1			0.3	0.3	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.36	0.36	1	U	U	1.21	0.5	1			0.3	0.3	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.36	0.36	1	U	U	0.948	0.5	1	J	J	0.3	0.3	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	0.3	0.3	1	U	U

Footnotes are shown on last page.

00045828

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				cis-1,3-Dichloropropene					Dibromochloromethane					Dibromomethane				
Units				ug/L					ug/L					ug/L				
CAS Number				10061-01-5					124-48-1					74-95-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U

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00045829

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Dichlorodifluoromethane					Ethyl Methacrylate					Ethylbenzene				
Units				ug/L					ug/L					ug/L				
CAS Number				75-71-8					97-63-2					100-41-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.43	0.43	1	U	U	1	1	5	U	U	0.21	0.21	1	U	U

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00045830

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Hexachlorobutadiene					Iodomethane					Methacrylonitrile				
Units				ug/L					ug/L					ug/L				
CAS Number				87-68-3					74-88-4					126-98-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	1.01	1.01	5	U	U

Footnotes are shown on last page.

00045831

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Methyl isobutyl ketone					Methyl Methacrolate					Methylene chloride				
Units				ug/L					ug/L					ug/L				
CAS Number				108-10-1					80-62-6					75-09-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
110	PW-MW-110-040715	15-Jul-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
110	PW-MW-110-040915	15-Sep-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
110	PW-MW-110-041216	16-Dec-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
111	PW-MW-111-031204	4-Dec-03	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
111	PW-MW-111-040331	31-Mar-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
111	PW-MW-111-041216	16-Dec-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
112	PW-MW-112-031204	4-Dec-03	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
112	PW-MW-112-040714	14-Jul-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	3.29	1.9	2	J	J
112	PW-MW-112-040915	15-Sep-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U
112	PW-MW-112-041216	16-Dec-04	REG	1.78	1.78	5	U	U	1.11	1.11	5	U	U	1.9	1.9	2	U	U

Footnotes are shown on last page.

00045832

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Naphthalene					Propionitrile					Styrene					Tetrachloroethene				
Units				ug/L					ug/L					ug/L					ug/L				
CAS Number				91-20-3					107-12-0					100-42-5					127-18-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.26	0.26	1	U	U	1.22	1.22	5	U	U	0.25	0.25	1	U	U	0.33	0.33	1	U	U

Footnotes are shown on last page.

00045833

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Toluene					trans-1,2-Dichloroethene					trans-1,3-Dichloropropene				
Units				ug/L					ug/L					ug/L				
CAS Number				108-88-3					156-60-5					10061-02-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
111	PW-MW-111-031204	4-Feb-03	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U

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00045834

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				trans-1,4-Dichloro-2-butene					Trichloroethene					Trichlorofluoromethane				
Units				ug/L					ug/L					ug/L				
CAS Number				110-57-6					79-01-6					75-69-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-031204	4-Feb-03	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	1.17	1.17	5	U	U	0.36	0.36	1	U	U	0.5	0.5	1	U	U

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00045835

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - VOCs

Parameter				Vinyl acetate					Vinyl chloride					Xylenes, Total				
Units				ug/L					ug/L					ug/L				
CAS Number				108-05-4					75-01-4					1330-20-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
110	PW-MW-110-040715	15-Jul-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
110	PW-MW-110-040915	15-Sep-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
110	PW-MW-110-041216	16-Dec-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
111	PW-MW-111-031204	4-Feb-03	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
111	PW-MW-111-041216	16-Dec-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-031204	4-Dec-03	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-040714	14-Jul-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-040915	15-Sep-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
112	PW-MW-112-041216	16-Dec-04	REG	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U

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00045836

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				1,2,4,5-Tetrachloro-benzene					2,3,4,6-Tetrachlorophenol					2,4,5-Trichlorophenol				
Units				ug/L					ug/L					ug/L				
CAS Number				95-94-3					58-90-2					95-95-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.21	1.21	10	U	U	1.39	1.39	10	U	U	0.97	0.97	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.15	1.15	9.52	U	U	1.32	1.32	9.52	U	U	0.924	0.924	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	1.16	1.16	9.62	U	U	1.34	1.34	9.62	U	U	0.933	0.933	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	1.19	1.19	9.8	U	U	1.36	1.36	9.8	U	U	0.951	0.951	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	1.21	1.21	10	U	U	1.39	1.39	10	U	U	0.97	0.97	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	1.14	1.14	9.43	U	U	1.31	1.31	9.43	U	U	0.915	0.915	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1.17	1.17	9.71	U	U	1.35	1.35	9.71	U	UJL	0.942	0.942	9.71	U	UJL
112	PW-MW-112-031204	4-Dec-03	REG	1.19	1.19	9.8	U	U	1.36	1.36	9.8	U	U	0.951	0.951	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.14	1.14	9.43	U	U	1.31	1.31	9.43	U	U	0.915	0.915	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	1.16	1.16	9.62	U	U	1.34	1.34	9.62	U	U	0.933	0.933	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	1.13	1.13	9.35	U	U	1.3	1.3	9.35	U	U	0.907	0.907	9.35	U	U

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00045837

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				2,4,6-Trichlorophenol					2,4-Dichlorophenol					2,4-Dimethylphenol				
Units				ug/L					ug/L					ug/L				
CAS Number				88-06-2					120-83-2					105-67-9				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.39	0.39	10	U	U	0.47	0.47	10	U	U	0.47	0.47	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.371	0.371	9.52	U	U	0.448	0.448	9.52	U	U	0.448	0.448	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.375	0.375	9.62	U	U	0.452	0.452	9.62	U	U	0.452	0.452	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.382	0.382	9.8	U	U	0.461	0.461	9.8	U	U	0.461	0.461	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.39	0.39	10	U	U	0.47	0.47	10	U	U	0.47	0.47	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.368	0.368	9.43	U	U	0.443	0.443	9.43	U	U	0.443	0.443	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.379	0.379	9.71	U	UJL	0.456	0.456	9.71	U	UJL	0.456	0.456	9.71	U	UJL
112	PW-MW-112-031204	4-Dec-03	REG	0.382	0.382	9.8	U	U	0.461	0.461	9.8	U	U	0.461	0.461	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.368	0.368	9.43	U	U	0.443	0.443	9.43	U	U	0.443	0.443	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.375	0.375	9.62	U	U	0.452	0.452	9.62	U	U	0.452	0.452	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.364	0.364	9.35	U	U	0.439	0.439	9.35	U	U	0.439	0.439	9.35	U	U

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00045838

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				2,4-Dinitrophenol					2,4-Dinitrotoluene					2,6-Dichlorophenol				
Units				ug/L					ug/L					ug/L				
CAS Number				51-28-5					121-14-2					87-65-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	5	5	20	U	U	0.7	0.7	10	U	U	0.88	0.88	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	4.76	4.76	19	U	U	0.667	0.667	9.52	U	U	0.838	0.838	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	4.81	4.81	19.2	U	U	0.673	0.673	9.62	U	U	0.846	0.846	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	4.9	4.9	19.6	U	U	0.686	0.686	9.8	U	U	0.863	0.863	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	5	5	20	U	U	0.7	0.7	10	U	U	0.88	0.88	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	4.72	4.72	18.9	U	U	0.66	0.66	9.43	U	U	0.83	0.83	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	4.85	4.85	19.4	U	UJL	0.68	0.68	9.71	U	U	0.854	0.854	9.71	U	UJL
112	PW-MW-112-031204	4-Dec-03	REG	4.9	4.9	19.6	U	U	0.686	0.686	9.8	U	U	0.863	0.863	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	4.72	4.72	18.9	U	U	0.66	0.66	9.43	U	U	0.83	0.83	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	4.81	4.81	19.2	U	U	0.673	0.673	9.62	U	U	0.846	0.846	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	4.67	4.67	18.7	U	U	0.654	0.654	9.35	U	U	0.822	0.822	9.35	U	U

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00045839

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				2,6-Dinitrotoluene					2-Chloronaphthalene					2-Chlorophenol				
Units				ug/L					ug/L					ug/L				
CAS Number				606-20-2					91-58-7					95-57-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.5	0.5	10	U	U	0.4	0.4	1	U	U	0.41	0.41	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.476	0.476	9.52	U	U	0.381	0.381	0.952	U	U	0.39	0.39	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.481	0.481	9.62	U	U	0.385	0.385	0.962	U	U	0.394	0.394	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.49	0.49	9.8	U	U	0.392	0.392	0.98	U	U	0.402	0.402	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.5	0.5	10	U	U	0.4	0.4	1	U	U	0.41	0.41	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.472	0.472	9.43	U	U	0.377	0.377	0.943	U	U	0.387	0.387	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.485	0.485	9.71	U	U	0.388	0.388	0.971	U	U	0.398	0.398	9.71	U	UJL
112	PW-MW-112-031204	4-Dec-03	REG	0.49	0.49	9.8	U	U	0.392	0.392	0.98	U	U	0.402	0.402	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.472	0.472	9.43	U	U	0.377	0.377	0.943	U	U	0.387	0.387	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.481	0.481	9.62	U	U	0.385	0.385	0.962	U	U	0.394	0.394	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.467	0.467	9.35	U	U	0.374	0.374	0.935	U	U	0.383	0.383	9.35	U	U

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00045840

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				2-Methylnaphthalene					2-Methylphenol					2-Nitroaniline				
Units				ug/L					ug/L					ug/L				
CAS Number				91-57-6					95-48-7					88-74-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.5	0.5	1	U	U	0.45	0.45	10	U	U	0.64	0.64	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.476	0.476	0.952	U	U	0.429	0.429	9.52	U	U	0.61	0.61	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.481	0.481	0.962	U	U	0.433	0.433	9.62	U	U	0.615	0.615	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.49	0.49	0.98	U	U	0.441	0.441	9.8	U	U	0.627	0.627	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.5	0.5	1	U	U	0.45	0.45	10	U	U	0.64	0.64	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.472	0.472	0.943	U	U	0.425	0.425	9.43	U	U	0.604	0.604	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.485	0.485	0.971	U	U	0.437	0.437	9.71	U	UJL	0.621	0.621	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.49	0.49	0.98	U	U	0.441	0.441	9.8	U	U	0.627	0.627	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	0.425	0.425	9.43	U	U	0.604	0.604	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.481	0.481	0.962	U	U	0.433	0.433	9.62	U	U	0.615	0.615	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.467	0.467	0.935	U	U	0.421	0.421	9.35	U	U	0.598	0.598	9.35	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				2-Nitrophenol					3,3'-Dichlorobenzidine					3,3'-Dimethylbenzidine				
Units				ug/L					ug/L					ug/L				
CAS Number				88-75-5					91-94-1					119-93-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.59	0.59	10	U	U	0.51	0.51	10	U	U	1.71	1.71	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.562	0.562	9.52	U	U	0.486	0.486	9.52	U	UJ	1.63	1.63	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.567	0.567	9.62	U	U	0.49	0.49	9.62	U	U	1.64	1.64	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.578	0.578	9.8	U	U	0.5	0.5	9.8	U	U	1.68	1.68	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.59	0.59	10	U	U	0.51	0.51	10	U	U	1.71	1.71	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.557	0.557	9.43	U	U	0.481	0.481	9.43	U	UJ	1.61	1.61	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.573	0.573	9.71	U	UJL	0.495	0.495	9.71	U	U	1.66	1.66	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.578	0.578	9.8	U	U	0.5	0.5	9.8	U	U	1.68	1.68	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.557	0.557	9.43	U	U	0.481	0.481	9.43	U	U	1.61	1.61	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.567	0.567	9.62	U	U	0.49	0.49	9.62	U	U	1.64	1.64	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.551	0.551	9.35	U	U	0.477	0.477	9.35	U	U	1.6	1.6	9.35	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				3-Nitroaniline					4,6-Dinitro-2-methylphenol					4-Bromophenyl phenyl ether				
Units				ug/L					ug/L					ug/L				
CAS Number				99-09-2					534-52-1					101-55-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1	1	10	U	U	1	1	10	U	U	1.22	1.22	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.952	0.952	9.52	U	U	0.952	0.952	9.52	U	U	1.16	1.16	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.962	0.962	9.62	U	U	0.962	0.962	9.62	U	U	1.17	1.17	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.98	0.98	9.8	U	U	0.98	0.98	9.8	U	U	1.2	1.2	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	1	1	10	U	U	1	1	10	U	U	1.22	1.22	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.943	0.943	9.43	U	U	0.943	0.943	9.43	U	U	1.15	1.15	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.971	0.971	9.71	U	U	0.971	0.971	9.71	U	UJL	1.18	1.18	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.98	0.98	9.8	U	U	0.98	0.98	9.8	U	U	1.2	1.2	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.943	0.943	9.43	U	U	0.943	0.943	9.43	U	U	1.15	1.15	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.962	0.962	9.62	U	U	0.962	0.962	9.62	U	U	1.17	1.17	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.935	0.935	9.35	U	U	0.935	0.935	9.35	U	U	1.14	1.14	9.35	U	U

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00045843

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				4-Chloro-3-methylphenol					4-Chloroaniline					4-Chlorophenyl phenyl ether				
Units				ug/L					ug/L					ug/L				
CAS Number				59-50-7					106-47-8					7005-72-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.69	0.69	10	U	U	1.1	1.1	10	U	U	0.84	0.84	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.657	0.657	9.52	U	U	1.05	1.05	9.52	U	U	0.8	0.8	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.663	0.663	9.62	U	U	1.06	1.06	9.62	U	U	0.808	0.808	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.676	0.676	9.8	U	U	1.08	1.08	9.8	U	U	0.824	0.824	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.69	0.69	10	U	U	1.1	1.1	10	U	U	0.84	0.84	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.651	0.651	9.43	U	U	1.04	1.04	9.43	U	U	0.792	0.792	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.67	0.67	9.71	U	UJL	1.07	1.07	9.71	U	U	0.816	0.816	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.676	0.676	9.8	U	U	1.08	1.08	9.8	U	U	0.824	0.824	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.651	0.651	9.43	U	U	1.04	1.04	9.43	U	U	0.792	0.792	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.663	0.663	9.62	U	U	1.06	1.06	9.62	U	U	0.808	0.808	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.645	0.645	9.35	U	U	1.03	1.03	9.35	U	U	0.785	0.785	9.35	U	U

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00045844

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				4-Methylphenol					4-Nitroaniline					4-Nitrophenol				
Units				ug/L					ug/L					ug/L				
CAS Number				106-44-5					100-01-6					100-02-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.59	0.59	10	U	U	0.67	0.67	10	U	U	5	5	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.562	0.562	9.52	U	U	0.638	0.638	9.52	U	U	4.76	4.76	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.567	0.567	9.62	U	U	0.644	0.644	9.62	U	U	4.81	4.81	9.62	U	UJ
110	PW-MW-110-040915	15-Sep-04	REG	0.578	0.578	9.8	U	U	0.657	0.657	9.8	U	U	4.9	4.9	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.59	0.59	10	U	U	0.67	0.67	10	U	U	5	5	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.557	0.557	9.43	U	U	0.632	0.632	9.43	U	U	4.72	4.72	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.573	0.573	9.71	U	UJL	0.65	0.65	9.71	U	U	4.85	4.85	9.71	U	UJL
112	PW-MW-112-031204	4-Dec-03	REG	0.578	0.578	9.8	U	U	0.657	0.657	9.8	U	U	4.9	4.9	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.557	0.557	9.43	U	U	0.632	0.632	9.43	U	UJ	4.72	4.72	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.567	0.567	9.62	U	U	0.644	0.644	9.62	U	U	4.81	4.81	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.551	0.551	9.35	U	U	0.626	0.626	9.35	U	U	4.67	4.67	9.35	U	U

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00045845

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Acenaphthylene					Acetophenone					Aniline				
Units				ug/L					ug/L					ug/L				
CAS Number				208-96-8					98-86-2					62-53-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.5	0.5	1	U	U	0.37	0.37	10	U	U	1.61	1.61	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.476	0.476	0.952	U	U	0.352	0.352	9.52	U	U	1.53	1.53	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.481	0.481	0.962	U	U	0.356	0.356	9.62	U	U	1.55	1.55	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.49	0.49	0.98	U	U	0.363	0.363	9.8	U	U	1.58	1.58	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.5	0.5	1	U	U	0.37	0.37	10	U	U	1.61	1.61	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.472	0.472	0.943	U	U	0.349	0.349	9.43	U	U	1.52	1.52	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.485	0.485	0.971	U	U	0.359	0.359	9.71	U	U	1.56	1.56	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.49	0.49	0.98	U	U	0.363	0.363	9.8	U	U	1.58	1.58	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	0.349	0.349	9.43	U	U	1.52	1.52	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.481	0.481	0.962	U	U	0.356	0.356	9.62	U	U	1.55	1.55	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.467	0.467	0.935	U	U	0.346	0.346	9.35	U	U	1.5	1.5	9.35	U	U

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00045846

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Anthracene					Benzo(a)anthracene					Benzo(a)pyrene				
Units				ug/L					ug/L					ug/L				
CAS Number				120-12-7					56-55-3					50-32-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.476	0.476	0.952	U	U	0.476	0.476	0.952	U	U	0.476	0.476	0.952	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.467	0.467	0.935	U	U	0.467	0.467	0.935	U	U	0.467	0.467	0.935	U	U

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00045847

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Benzo(b)fluoranthene					Benzo(ghi)perylene					Benzo(k)fluoranthene				
Units				ug/L					ug/L					ug/L				
CAS Number				205-99-2					191-24-2					207-08-9				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.476	0.476	0.952	U	U	0.476	0.476	0.952	U	U	0.476	0.476	0.952	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.5	0.5	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.467	0.467	0.935	U	U	0.467	0.467	0.935	U	U	0.467	0.467	0.935	U	U

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00045848

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Benzyl Alcohol					bis(2-Chloroethoxy)methane				
Units				ug/L					ug/L				
CAS Number				100-51-6					111-91-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.91	0.91	10	U	U	0.48	0.48	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.867	0.867	9.52	U	U	0.457	0.457	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.875	0.875	9.62	U	U	0.462	0.462	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.892	0.892	9.8	U	U	0.471	0.471	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.91	0.91	10	U	U	0.48	0.48	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.858	0.858	9.43	U	U	0.453	0.453	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.883	0.883	9.71	U	U	0.466	0.466	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.892	0.892	9.8	U	U	0.471	0.471	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.858	0.858	9.43	U	U	0.453	0.453	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.875	0.875	9.62	U	U	0.462	0.462	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.85	0.85	9.35	U	U	0.449	0.449	9.35	U	U

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00045849

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				bis(2-Chloroethyl)ether					bis(2-Ethylhexyl)phthalate					Butyl benzyl phthalate				
Units				ug/L					ug/L					ug/L				
CAS Number				111-44-4					117-81-7					85-68-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.37	1.37	10	U	U	1.3	1.3	10	U	U	0.68	0.68	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.3	1.3	9.52	U	U	1.24	1.24	9.52	U	U	0.648	0.648	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	1.32	1.32	9.62	U	U	1.25	1.25	9.62	U	U	0.654	0.654	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	1.34	1.34	9.8	U	U	1.27	1.27	9.8	U	U	0.667	0.667	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	1.37	1.37	10	U	U	1.3	1.3	10	U	U	0.68	0.68	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	1.29	1.29	9.43	U	U	1.23	1.23	9.43	U	U	0.642	0.642	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1.33	1.33	9.71	U	U	1.26	1.26	9.71	U	U	0.66	0.66	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	1.34	1.34	9.8	U	U	1.27	1.27	9.8	U	U	0.667	0.667	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.29	1.29	9.43	U	U	1.23	1.23	9.43	U	U	0.642	0.642	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	1.32	1.32	9.62	U	U	1.25	1.25	9.62	U	U	0.654	0.654	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	1.28	1.28	9.35	U	U	1.21	1.21	9.35	U	U	0.636	0.636	9.35	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Chlorobenzilate					Chrysene					Dibenzo(a,h)anthracene				
Units				ug/L					ug/L					ug/L				
CAS Number				510-15-6					218-01-9					53-70-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.63	0.63	10	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.6	0.6	9.52	U	U	0.476	0.476	0.952	U	U	0.476	0.476	0.952	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.606	0.606	9.62	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.618	0.618	9.8	U	U	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.63	0.63	10	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.594	0.594	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.612	0.612	9.71	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.618	0.618	9.8	U	U	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.594	0.594	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.606	0.606	9.62	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.589	0.589	9.35	U	U	0.467	0.467	0.935	U	U	0.467	0.467	0.935	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Dibenzofuran					Diethyl phthalate					Dimethyl phthalate				
Units				ug/L					ug/L					ug/L				
CAS Number				132-64-9					84-66-2					131-11-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.42	0.42	10	U	U	0.89	0.89	10	U	U	0.53	0.53	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.4	0.4	9.52	U	U	0.848	0.848	9.52	U	U	0.505	0.505	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.404	0.404	9.62	U	U	0.856	0.856	9.62	U	U	0.51	0.51	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.412	0.412	9.8	U	U	0.873	0.873	9.8	U	U	0.52	0.52	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.42	0.42	10	U	U	0.89	0.89	10	U	U	0.53	0.53	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.396	0.396	9.43	U	U	0.84	0.84	9.43	U	U	0.5	0.5	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.408	0.408	9.71	U	U	0.864	0.864	9.71	U	U	0.515	0.515	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.412	0.412	9.8	U	U	0.873	0.873	9.8	U	U	0.52	0.52	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.396	0.396	9.43	U	U	0.84	0.84	9.43	U	U	0.5	0.5	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.404	0.404	9.62	U	U	0.856	0.856	9.62	U	U	0.51	0.51	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.393	0.393	9.35	U	U	0.832	0.832	9.35	U	U	0.495	0.495	9.35	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				di-n-Butyl phthalate					di-n-Octyl phthalate					Diphenylamine				
Units				ug/L					ug/L					ug/L				
CAS Number				84-74-2					117-84-0					122-39-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1	1	10	U	U	0.87	0.87	10	U	U	0.79	0.79	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.952	0.952	9.52	U	U	0.829	0.829	9.52	U	U	0.752	0.752	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.962	0.962	9.62	U	U	0.837	0.837	9.62	U	U	0.76	0.76	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.98	0.98	9.8	U	U	0.853	0.853	9.8	U	U	0.775	0.775	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	1.36	1	10	J	J	0.87	0.87	10	U	U	0.79	0.79	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.943	0.943	9.43	U	U	0.821	0.821	9.43	U	U	0.745	0.745	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.971	0.971	9.71	U	U	0.845	0.845	9.71	U	U	0.767	0.767	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.98	0.98	9.8	U	U	0.853	0.853	9.8	U	U	0.775	0.775	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.943	0.943	9.43	U	U	0.821	0.821	9.43	U	U	0.745	0.745	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.962	0.962	9.62	U	U	0.837	0.837	9.62	U	U	0.76	0.76	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.935	0.935	9.35	U	U	0.813	0.813	9.35	U	U	0.738	0.738	9.35	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Ethyl methanesulfonate					Fluoranthene					Fluorene				
Units				ug/L					ug/L					ug/L				
CAS Number				62-50-0					206-44-0					86-73-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.98	0.98	10	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.933	0.933	9.52	U	U	0.476	0.476	0.952	U	U	0.476	0.476	0.952	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.942	0.942	9.62	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.961	0.961	9.8	U	U	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.98	0.98	10	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.925	0.925	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.951	0.951	9.71	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.961	0.961	9.8	U	U	0.49	0.49	0.98	U	U	0.49	0.49	0.98	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.925	0.925	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.942	0.942	9.62	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.916	0.916	9.35	U	U	0.467	0.467	0.935	U	U	0.467	0.467	0.935	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Hexachlorobenzene					Hexachlorocyclopentadiene					Hexachloroethane				
Units				ug/L					ug/L					ug/L				
CAS Number				118-74-1					77-47-4					67-72-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.65	0.65	10	U	U	1	1	10	U	U	0.43	0.43	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.619	0.619	9.52	U	U	0.952	0.952	9.52	U	U	0.41	0.41	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.625	0.625	9.62	U	U	0.962	0.962	9.62	U	U	0.413	0.413	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.637	0.637	9.8	U	U	0.98	0.98	9.8	U	U	0.422	0.422	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.65	0.65	10	U	U	1	1	10	U	U	0.43	0.43	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.613	0.613	9.43	U	U	0.943	0.943	9.43	U	U	0.406	0.406	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.631	0.631	9.71	U	U	0.971	0.971	9.71	U	U	0.417	0.417	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.637	0.637	9.8	U	U	0.98	0.98	9.8	U	U	0.422	0.422	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.613	0.613	9.43	U	U	0.943	0.943	9.43	U	U	0.406	0.406	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.625	0.625	9.62	U	U	0.962	0.962	9.62	U	U	0.413	0.413	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.607	0.607	9.35	U	U	0.935	0.935	9.35	U	U	0.402	0.402	9.35	U	U

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00045855

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Indeno(1,2,3-cd)pyrene					Methyl methanesulfonate					Nitrobenzene				
Units				ug/L					ug/L					ug/L				
CAS Number				193-39-5					66-27-3					98-95-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.5	0.5	1	U	U	0.81	0.81	10	U	U	0.63	0.63	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.476	0.476	0.952	U	U	0.771	0.771	9.52	U	U	0.6	0.6	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.481	0.481	0.962	U	U	0.779	0.779	9.62	U	U	0.606	0.606	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.49	0.49	0.98	U	U	0.794	0.794	9.8	U	U	0.618	0.618	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.5	0.5	1	U	U	0.81	0.81	10	U	U	0.63	0.63	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.472	0.472	0.943	U	U	0.764	0.764	9.43	U	U	0.594	0.594	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.485	0.485	0.971	U	U	0.786	0.786	9.71	U	U	0.612	0.612	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.49	0.49	0.98	U	U	0.794	0.794	9.8	U	U	0.618	0.618	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	0.764	0.764	9.43	U	U	0.594	0.594	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.481	0.481	0.962	U	U	0.779	0.779	9.62	U	U	0.606	0.606	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.467	0.467	0.935	U	U	0.757	0.757	9.35	U	U	0.589	0.589	9.35	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				n-Nitrosodiethylamine					n-Nitrosodimethylamine					n-Nitrosodi-n-butylamine				
Units				ug/L					ug/L					ug/L				
CAS Number				55-18-5					62-75-9					924-16-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	5	5	10	U	U	5	5	10	U	U	1.07	1.07	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	4.76	4.76	9.52	U	U	4.76	4.76	9.52	U	U	1.02	1.02	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.76	0.76	9.62	U	U	4.81	4.81	9.62	U	U	1.03	1.03	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.775	0.775	9.8	U	U	4.9	4.9	9.8	U	U	1.05	1.05	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	5	5	10	U	U	5	5	10	U	U	1.07	1.07	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	4.72	4.72	9.43	U	U	4.72	4.72	9.43	U	U	1.01	1.01	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.767	0.767	9.71	U	U	4.85	4.85	9.71	U	U	1.04	1.04	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	4.9	4.9	9.8	U	U	4.9	4.9	9.8	U	U	1.05	1.05	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	4.72	4.72	9.43	U	U	4.72	4.72	9.43	U	U	1.01	1.01	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.76	0.76	9.62	U	U	4.81	4.81	9.62	U	U	1.03	1.03	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.738	0.738	9.35	U	U	4.67	4.67	9.35	U	U	1	1	9.35	U	U

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Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				n-Nitroso-di-n-propylamine					Pentachlorobenzene					Pentachloronitrobenzene				
Units				ug/L					ug/L					ug/L				
CAS Number				621-64-7					608-93-5					82-68-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.75	0.75	10	U	U	1.2	1.2	10	U	U	1.98	1.98	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.714	0.714	9.52	U	U	1.14	1.14	9.52	U	U	1.89	1.89	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.721	0.721	9.62	U	U	1.15	1.15	9.62	U	U	1.9	1.9	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.735	0.735	9.8	U	U	1.18	1.18	9.8	U	U	1.94	1.94	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.75	0.75	10	U	U	1.2	1.2	10	U	U	1.98	1.98	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.708	0.708	9.43	U	U	1.13	1.13	9.43	U	U	1.87	1.87	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.728	0.728	9.71	U	U	1.17	1.17	9.71	U	U	1.92	1.92	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.735	0.735	9.8	U	U	1.18	1.18	9.8	U	U	1.94	1.94	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.708	0.708	9.43	U	U	1.13	1.13	9.43	U	U	1.87	1.87	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.721	0.721	9.62	U	U	1.15	1.15	9.62	U	U	1.9	1.9	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.701	0.701	9.35	U	U	1.12	1.12	9.35	U	U	1.85	1.85	9.35	U	U

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00045858

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Pentachlorophenol					Phenacetin					Phenanthrene				
Units				ug/L					ug/L					ug/L				
CAS Number				87-86-5					62-44-2					85-01-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	5	5	10	U	U	1.77	1.77	10	U	U	0.5	0.5	1	U	U
110	PW-MW-110-040331	31-Mar-04	REG	4.76	4.76	9.52	U	U	1.69	1.69	9.52	U	U	0.476	0.476	0.952	U	U
110	PW-MW-110-040715	15-Jul-04	REG	4.81	4.81	9.62	U	U	1.7	1.7	9.62	U	U	0.481	0.481	0.962	U	U
110	PW-MW-110-040915	15-Sep-04	REG	4.9	4.9	9.8	U	U	1.74	1.74	9.8	U	U	0.49	0.49	0.98	U	U
111	PW-MW-111-031204	4-Dec-03	REG	5	5	10	U	U	1.77	1.77	10	U	U	0.5	0.5	1	U	U
111	PW-MW-111-040331	31-Mar-04	REG	4.72	4.72	9.43	U	U	1.67	1.67	9.43	U	U	0.472	0.472	0.943	U	U
111	PW-MW-111-040715	15-Jul-04	REG	4.85	4.85	9.71	U	UJL	1.72	1.72	9.71	U	U	0.485	0.485	0.971	U	U
112	PW-MW-112-031204	4-Dec-03	REG	4.9	4.9	9.8	U	U	1.74	1.74	9.8	U	U	0.49	0.49	0.98	U	U
112	PW-MW-112-040330	30-Mar-04	REG	4.72	4.72	9.43	U	U	1.67	1.67	9.43	U	U	0.472	0.472	0.943	U	U
112	PW-MW-112-040714	14-Jul-04	REG	4.81	4.81	9.62	U	U	1.7	1.7	9.62	U	U	0.481	0.481	0.962	U	U
112	PW-MW-112-040915	15-Sep-04	REG	4.67	4.67	9.35	U	U	1.65	1.65	9.35	U	U	0.467	0.467	0.935	U	U

Footnotes are shown on last page.

00045859

Table 3-1
Concentrations of Chemicals in Unfiltered Groundwater from Perimeter Wells - SVOCs

Parameter				Phenol					Pyrene					Pyridine				
Units				ug/L					ug/L					ug/L				
CAS Number				108-95-2					129-00-0					110-86-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.3	0.3	10	U	U	0.5	0.5	1	U	U	5	5	10	U	U
110	PW-MW-110-040331	31-Mar-04	REG	0.286	0.286	9.52	U	U	0.476	0.476	0.952	U	U	4.76	4.76	9.52	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.288	0.288	9.62	U	U	0.481	0.481	0.962	U	U	4.81	4.81	9.62	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.294	0.294	9.8	U	U	0.49	0.49	0.98	U	U	4.9	4.9	9.8	U	U
111	PW-MW-111-031204	4-Dec-03	REG	0.3	0.3	10	U	U	0.5	0.5	1	U	U	5	5	10	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.283	0.283	9.43	U	U	0.472	0.472	0.943	U	U	4.72	4.72	9.43	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.291	0.291	9.71	U	UJL	0.485	0.485	0.971	U	U	4.85	4.85	9.71	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.294	0.294	9.8	U	U	0.49	0.49	0.98	U	U	4.9	4.9	9.8	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.283	0.283	9.43	U	U	0.472	0.472	0.943	U	U	4.72	4.72	9.43	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.288	0.288	9.62	U	U	0.481	0.481	0.962	U	U	4.81	4.81	9.62	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.28	0.28	9.35	U	U	0.467	0.467	0.935	U	U	4.67	4.67	9.35	U	U

Notes and Abbreviations

ated as potential background chemical (Shaw, 2004a).

B chemical detected in rinsate or laboratory blank sample

BJ estimated concentration and chemical detected in laboratory blank

CAS Chemical Abstracts Service

J estimated concentration

JL estimated concentration

L value contains low bias

LQ data qualifier reported by laboratory

MDL analytical method detection limit reported by laboratory

REG regular sample

RLimit analytical reporting limit reported by laboratory

SVOC semivolatile organic compound

U undetected concentration

ug/L micrograms per liter

UJL undetected concentration

VOC volatile organic compound

VQ data qualifier applied during data validation with same meanings as LQ

00045860

Table 3-2
Concentrations of Chemicals in Filtered Groundwater from Perimeter Wells

Parameter				Aluminum					Antimony					Arsenic				
Units				ug/L					ug/L					ug/L				
CAS Number				7429-90-5					7440-36-0					7440-38-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	40.4	14.7	100			3.55	5.08	10			0.685	2.24	5		
110	PW-MW-110-040331	31-Mar-04	REG	98.8	14.7	100	J	B	8.03	5.08	10	J	J	22.4	22.4	50	U	U
110	PW-MW-110-040715	15-Jul-04	REG	821	14.7	100			5.08	5.08	10	U	U	22.4	22.4	50	U	U
110	PW-MW-110-040915	15-Sep-04	REG	299	147	1000	J	J	8.95	5.08	10	J	J	2.24	2.24	5	U	U
110	PW-MW-110-041216	16-Dec-04	REG	294	294	2000	U	U	7.73	5.08	10	J	B	62.1	44.7	100	J	J
111	PW-MW-111-040331	31-Mar-04	REG	52.9	14.7	100	J	B	5.08	5.08	10	U	U	2.24	2.24	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	568	14.7	100			5.08	5.08	10	U	U	2.24	2.24	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	57	14.7	100	J	J	10.5	5.08	10		B	2.24	2.24	5	U	U
112	PW-MW-112-031204	4-Dec-03	REG	117	14.7	100			8.16	5.08	10	J	J	11.2	11.2	25	U	U
112	PW-MW-112-040330	30-Mar-04	REG	110	14.7	100		B	6.84	5.08	10	J	J	11.2	11.2	25	U	U
112	PW-MW-112-040714	14-Jul-04	REG	85.7	14.7	100	J	B	8.43	5.08	10	J	J	22.4	22.4	50	U	U
112	PW-MW-112-040915	15-Sep-04	REG	252	73.4	500	J	J	5.08	5.08	10	U	U	2.24	2.24	5	U	U
112	PW-MW-112-041216	16-Dec-04	REG	221	147	1000	J	J	5.08	5.08	10	U	U	49	22.4	50	J	J

Footnotes are shown on last page.

00045861

Table 3-2
Concentrations of Chemicals in Filtered Groundwater from Perimeter Wells - Metals

Parameter				Barium					Beryllium					Cadmium				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-39-3					7440-41-7					7440-43-9				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	13.4	0.222	5			0.158	0.158	5	U	U	1.59	0.313	2		
110	PW-MW-110-040331	31-Mar-04	REG	16.2	0.222	5			0.158	0.158	5	U	U	0.352	0.313	2	J	J
110	PW-MW-110-040715	15-Jul-04	REG	17.8	0.222	5			0.158	0.158	5	U	U	0.313	0.313	2	U	U
110	PW-MW-110-040915	15-Sep-04	REG	15.8	0.222	5			0.158	0.158	5	U	U	0.525	0.313	2	J	J
110	PW-MW-110-041216	16-Dec-04	REG	14	0.222	5			0.158	0.158	5	U	U	0.423	0.313	2	J	B
111	PW-MW-111-040331	31-Mar-04	REG	85	0.222	5			0.357	0.158	5	J	J	0.479	0.313	2	J	J
111	PW-MW-111-040715	15-Jul-04	REG	82.8	0.222	5			0.496	0.158	5	J	J	5.1	0.313	2		
111	PW-MW-111-041216	16-Dec-04	REG	120	0.222	5			0.813	0.158	5	J	B	0.605	0.313	2	J	B
112	PW-MW-112-031204	4-Dec-03	REG	26.3	0.222	5			0.158	0.158	5	U	U	0.32	0.313	2	J	J
112	PW-MW-112-040330	30-Mar-04	REG	26.4	0.222	5			0.158	0.158	5	U	U	0.439	0.313	2	J	J
112	PW-MW-112-040714	14-Jul-04	REG	28	0.222	5			0.158	0.158	5	U	U	0.313	0.313	2	U	U
112	PW-MW-112-040915	15-Sep-04	REG	27.5	0.222	5			0.158	0.158	5	U	U	1.35	0.313	2	J	J
112	PW-MW-112-041216	16-Dec-04	REG	30.6	0.222	5			0.26	0.158	5	J	B	0.313	0.313	2	U	U

Footnotes are shown on last page.

00045862

Table 3-2
Concentrations of Chemicals in Filtered Groundwater from Perimeter Wells

Parameter				Calcium					Chromium					Cobalt				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-70-2					7440-47-3					7440-48-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	207000	5.54	100			4.02	0.503	5			3.77	0.541	5		
110	PW-MW-110-040331	31-Mar-04	REG	301000	5.54	100			0.632	0.503	5	J	J	3.78	0.541	5	J	J
110	PW-MW-110-040715	15-Jul-04	REG	226000	5.54	100			0.941	0.503	5	J	J	1.79	0.541	5	J	J
110	PW-MW-110-040915	15-Sep-04	REG	205000	5.54	100			0.503	0.503	5	U	U	6.4	0.541	5		
110	PW-MW-110-041216	16-Dec-04	REG	190000	5.54	100			0.658	0.503	5	J	B	0.541	0.541	5	U	U
111	PW-MW-111-040331	31-Mar-04	REG	3890	5.54	100			1.38	0.503	5	J	J	2.58	0.541	5	J	J
111	PW-MW-111-040715	15-Jul-04	REG	2950	5.54	100			1.99	0.503	5	J	J	5.95	0.541	5		
111	PW-MW-111-041216	16-Dec-04	REG	5020	5.54	100			1.55	0.503	5	J	B	5.97	0.541	5		
112	PW-MW-112-031204	4-Dec-03	REG	193000	5.54	100			0.599	0.503	5	J	J	28.4	0.541	5		
112	PW-MW-112-040330	30-Mar-04	REG	224000	5.54	100			0.804	0.503	5	J	J	12.3	0.541	5		
112	PW-MW-112-040714	14-Jul-04	REG	212000	5.54	100			0.503	0.503	5	U	U	29.8	0.541	5		
112	PW-MW-112-040915	15-Sep-04	REG	187000	5.54	100			1.17	0.503	5	J	J	29.9	0.541	5		
112	PW-MW-112-041216	16-Dec-04	REG	230000	5.54	100			0.503	0.503	5	U	U	26.7	0.541	5		

Footnotes are shown on last page.

00045863

Table 3-2
Concentrations of Chemicals in Filtered Groundwater from Perimeter Wells

Parameter				Copper					Iron					Lead				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-50-8					7439-89-6					7439-92-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.98	1.39	5			56.5	12.6	100		J	17.2	17.2	50	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.39	1.39	5	U	U	37.2	12.6	100	J	J	1.72	1.72	4	U	U
110	PW-MW-110-040715	15-Jul-04	REG	1.8	1.39	5	J	J	787	12.6	100			1.72	1.72	4	U	U
110	PW-MW-110-040915	15-Sep-04	REG	1.39	1.39	5	U	U	279	12.6	100			2.4	1.72	4	J	J
110	PW-MW-110-041216	16-Dec-04	REG	1.39	1.39	5	U	U	252	252	2000	U	U	34.4	34.4	100	U	U
111	PW-MW-111-040331	31-Mar-04	REG	1.39	1.39	5	U	U	25	12.6	100	J	J	1.72	1.72	4	U	U
111	PW-MW-111-040715	15-Jul-04	REG	1.39	1.39	5	U	U	1010	12.6	100			1.72	1.72	4	U	U
111	PW-MW-111-041216	16-Dec-04	REG	1.86	1.39	5	J	J	223	12.6	100			1.72	1.72	4	U	U
112	PW-MW-112-031204	4-Dec-03	REG	1.46	1.39	5	J	J	125	12.6	100		J	1.72	1.72	4	U	U
112	PW-MW-112-040330	30-Mar-04	REG	1.5	1.39	5	J	J	232	12.6	100			1.72	1.72	4	U	U
112	PW-MW-112-040714	14-Jul-04	REG	1.39	1.39	5	U	U	968	12.6	100			1.72	1.72	4	U	U
112	PW-MW-112-040915	15-Sep-04	REG	2.39	1.39	5	J	J	116	12.6	100			1.72	1.72	4	U	U
112	PW-MW-112-041216	16-Dec-04	REG	1.39	1.39	5	U	U	126	126	1000	U	U	1.72	1.72	4	U	U

Footnotes are shown on last page.

00045864

Table 3-2
Concentrations of Chemicals in Filtered Groundwater from Perimeter Wells

Parameter				Magnesium					Manganese					Mercury				
Units				ug/L					ug/L					ug/L				
CAS Number				7439-95-4					7439-96-5					7439-97-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	134000	5.18	100			4220	0.296	10			0.0472	0.0472	0.2	U	UJL
110	PW-MW-110-040331	31-Mar-04	REG	206000	5.18	100			4680	0.296	10			0.0472	0.0472	0.2	U	U
110	PW-MW-110-040715	15-Jul-04	REG	145000	5.18	100			5860	0.296	10			0.0472	0.0472	0.2	U	U
110	PW-MW-110-040915	15-Sep-04	REG	133000	5.18	100			4350	0.296	10			0.0472	0.0472	0.2	U	U
110	PW-MW-110-041216	16-Dec-04	REG	130000	5.18	100			2270	0.296	10			0.0472	0.0472	0.2	U	U
111	PW-MW-111-040331	31-Mar-04	REG	3210	5.18	100			64	0.296	10			0.0472	0.0472	0.2	U	U
111	PW-MW-111-040715	15-Jul-04	REG	2710	5.18	100			131	0.296	10			0.0472	0.0472	0.2	U	U
111	PW-MW-111-041216	16-Dec-04	REG	4600	5.18	100			158	0.296	10			0.0472	0.0472	0.2	U	U
112	PW-MW-112-031204	4-Dec-03	REG	227000	5.18	100			2910	0.296	10			0.0472	0.0472	0.2	U	UJL
112	PW-MW-112-040330	30-Mar-04	REG	295000	5.18	100			2190	0.296	10			0.0472	0.0472	0.2	U	U
112	PW-MW-112-040714	14-Jul-04	REG	270000	5.18	100			3540	0.296	10			0.0472	0.0472	0.2	U	U
112	PW-MW-112-040915	15-Sep-04	REG	237000	5.18	100			2930	0.296	10			0.0472	0.0472	0.2	U	U
112	PW-MW-112-041216	16-Dec-04	REG	330000	5.18	100			4020	0.296	10			0.0472	0.0472	0.2	U	U

Footnotes are shown on last page.

00045865

Table 3-2
Concentrations of Chemicals in Filtered Groundwater from Perimeter Wells

Parameter				Nickel					Potassium					Selenium				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-02-0					9/7/7440					7782-49-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	31.8	0.69	5			2980	16.5	100			33.9	2.81	5		
110	PW-MW-110-040331	31-Mar-04	REG	93	0.69	5			2190	165	1000		J	22.9	2.81	5		
110	PW-MW-110-040715	15-Jul-04	REG	75.3	0.69	5			2230	165	1000			15.8	2.81	5		
110	PW-MW-110-040915	15-Sep-04	REG	31.4	0.69	5			2660	16.5	100			2.81	2.81	5	U	U
110	PW-MW-110-041216	16-Dec-04	REG	24.3	0.69	5			2480	330	2000			58.7	56.2	100	J	J
111	PW-MW-111-040331	31-Mar-04	REG	4.68	0.69	5	J	J	283	16.5	100		J	2.81	2.81	5	U	U
111	PW-MW-111-040715	15-Jul-04	REG	5.3	0.69	5			177	16.5	100			2.81	2.81	5	U	U
111	PW-MW-111-041216	16-Dec-04	REG	8.99	0.69	5			120	16.5	100			2.86	2.81	5	J	B
112	PW-MW-112-031204	4-Dec-03	REG	22.1	0.69	5			2200	16.5	100			29.6	2.81	5		
112	PW-MW-112-040330	30-Mar-04	REG	21.5	0.69	5			1860	82.4	500		J	23.2	2.81	5		
112	PW-MW-112-040714	14-Jul-04	REG	24.8	0.69	5			325	165	1000	J	J	22.4	2.81	5		
112	PW-MW-112-040915	15-Sep-04	REG	26	0.69	5			2230	16.5	100			4.84	2.81	5	J	B
112	PW-MW-112-041216	16-Dec-04	REG	27.1	0.69	5			2310	165	1000			28.1	28.1	50	U	U

Footnotes are shown on last page.

00045866

Table 3-2
Concentrations of Chemicals in Filtered Groundwater from Perimeter Wells

Parameter				Silver					Strontium					Thallium				
Units				ug/L					ug/L					ug/L				
CAS Number				7440-22-4					7440-24-6					7440-28-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	1.17	0.835	5		B	5230	0.178	5			10	10	20	U	U
110	PW-MW-110-040331	31-Mar-04	REG	1.92	0.835	5	J	J	7200	0.178	5			100	100	200	U	U
110	PW-MW-110-040715	15-Jul-04	REG	0.835	0.835	5	U	U	5900	0.178	5			10	10	20	U	U
110	PW-MW-110-040915	15-Sep-04	REG	0.835	0.835	5	U	U	4820	0.178	5			10	10	20	U	U
110	PW-MW-110-041216	16-Dec-04	REG	0.835	0.835	5	U	U	4360	0.178	5			10	10	20	U	U
111	PW-MW-111-040331	31-Mar-04	REG	0.835	0.835	5	U	U	114	0.178	5			10	10	20	U	U
111	PW-MW-111-040715	15-Jul-04	REG	0.835	0.835	5	U	U	97.6	0.178	5			10	10	20	U	U
111	PW-MW-111-041216	16-Dec-04	REG	0.835	0.835	5	U	U	143	0.178	5			10	10	20	U	U
112	PW-MW-112-031204	4-Dec-03	REG	0.835	0.835	5	U	U	5350	0.178	5			10	10	20	U	U
112	PW-MW-112-040330	30-Mar-04	REG	0.984	0.835	5	J	J	5950	0.178	5			10	10	20	U	U
112	PW-MW-112-040714	14-Jul-04	REG	0.835	0.835	5	U	U	5750	0.178	5			10	10	20	U	U
112	PW-MW-112-040915	15-Sep-04	REG	0.835	0.835	5	U	U	5210	0.178	5			10	10	20	U	U
112	PW-MW-112-041216	16-Dec-04	REG	0.835	0.835	5	U	U	5920	0.178	5			10	10	20	U	U

Footnotes are shown on last page.

00045867

Table 3-2
Concentrations of Chemicals in Filtered Groundwater from Perimeter Wells

Parameter				Vanadium					Zinc				
Units				ug/L					ug/L				
CAS Number				7440-62-2					7440-66-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
110	PW-MW-110-031203	3-Dec-03	REG	0.606	0.606	5	U	U	15.7	0.883	5		
110	PW-MW-110-040331	31-Mar-04	REG	0.606	0.606	5	U	U	38.7	0.883	5		
110	PW-MW-110-040715	15-Jul-04	REG	0.84	0.606	5	J	J	21.7	0.883	5		
110	PW-MW-110-040915	15-Sep-04	REG	0.606	0.606	5	U	U	22.1	0.883	5		
110	PW-MW-110-041216	16-Dec-04	REG	0.997	0.606	5	J	B	9.29	0.883	5		B
111	PW-MW-111-040331	31-Mar-04	REG	0.606	0.606	5	U	U	18.4	0.883	5		
111	PW-MW-111-040715	15-Jul-04	REG	0.981	0.606	5	J	J	30.6	0.883	5		
111	PW-MW-111-041216	16-Dec-04	REG	1.16	0.606	5	J	B	16.7	0.883	5		
112	PW-MW-112-031204	4-Dec-03	REG	0.606	0.606	5	U	U	54.3	0.883	5		
112	PW-MW-112-040330	30-Mar-04	REG	0.606	0.606	5	U	U	5.97	0.883	5		
112	PW-MW-112-040714	14-Jul-04	REG	0.606	0.606	5	U	U	5.67	0.883	5		B
112	PW-MW-112-040915	15-Sep-04	REG	0.606	0.606	5	U	U	22.5	0.883	5		
112	PW-MW-112-041216	16-Dec-04	REG	0.985	0.606	5	J	B	0.883	0.883	5	U	U

Notes and Abbreviations:

Shading indicates chemical evaluated as potential background chemical (Shaw, 2004a).

B chemical detected in laboratory blank
CAS Chemical Abstracts Service
J estimated concentration
JL estimated concentration
L value contains low bias
LQ data qualifier reported by laboratory
MDL analytical method detection limit reported by laboratory
REG regular sample
RLimit analytical reporting limit reported by laboratory
U undetected concentration
ug/L micrograms per liter
UJL undetected concentration
VQ data qualifier applied during data validation with same meanings as LQ

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Metals

Parameter				Aluminum					Antimony					Arsenic					Barium				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				7429-90-5					7440-36-0					7440-38-2					7440-39-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	3980	14.7	100			5.08	5.08	10	<	U	2.55	2.24	5		J	61.3	0.222	5		
133	PW-MW-133D-030819	19-Aug-03	REG	1050	14.7	100			5.08	5.08	10	<	U	2.24	2.24	5	<	U	42.7	0.222	5		
133	PW-MW-133-031203	3-Dec-03	REG	110	14.7	100			5.08	5.08	10	U	U	2.24	2.24	5	U	U	35.2	0.222	5		
133	PW-MW-133-040330	30-Mar-04	REG	48.7	14.7	100	J	B	5.08	5.08	10	U	U	2.24	2.24	5	U	U	34.4	0.222	5		
133	PW-MW-133-040714	14-Jul-04	REG	44.9	14.7	100	J	B	5.08	5.08	10	U	U	2.24	2.24	5	U	U	36.6	0.222	5		
134	PW-MW-134DD-030618	18-Jun-03	REG	1480	14.7	100			5.08	5.08	10	<	U	2.24	2.24	5	<	U	41.2	0.222	5		
134	PW-MW-134QCDD-030618	18-Jun-03	FD	1500	14.7	100			5.08	5.08	10	<	U	2.24	2.24	5	<	U	41.5	0.222	5		
134	PW-MW-134DD-030819	19-Aug-03	REG	589	14.7	100			5.08	5.08	10	<	U	2.24	2.24	5	<	U	32.9	0.222	5		
134	PW-MW-134QCDD-030819	19-Aug-03	FD	115	14.7	100			5.08	5.08	10	<	U	2.24	2.24	5	<	U	33.8	0.222	5		
134	PW-MW-134-031203	3-Dec-03	REG	162	14.7	100			5.08	5.08	10	U	U	2.24	2.24	5	U	U	34.5	0.222	5		
134	PW-MW-134QC-031203	3-Dec-03	FD	170	14.7	100			5.08	5.08	10	U	U	3.14	2.24	5	J	J	33.8	0.222	5		
134	PW-MW-134QC-040330	30-Mar-04	FD	121	14.7	100		B	5.08	5.08	10	U	U	2.24	2.24	5	U	U	31.1	0.222	5		
134	PW-MW-134-040330	30-Mar-04	REG	222	14.7	100		B	5.08	5.08	10	U	U	2.24	2.24	5	U	U	31.2	0.222	5		
134	PW-MW-134-040714	14-Jul-04	REG	194	14.7	100		B	5.08	5.08	10	U	U	2.24	2.24	5	U	U	33.3	0.222	5		
134	PW-MW-134-040714-FD	14-Jul-04	FD	250	14.7	100			5.08	5.08	10	U	U	2.24	2.24	5	U	U	34.2	0.222	5		

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Metals

Parameter				Beryllium					Cadmium					Calcium					Chromium				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				7440-41-7					7440-43-9					7440-70-2					7440-47-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.274	0.158	5		J	0.685	0.313	2		J	8560	5.54	100			7.09	0.503	5		
133	PW-MW-133D-030819	19-Aug-03	REG	0.158	0.158	5	<	U	0.313	0.313	2	<	U	7660	5.54	100			4.02	0.503	5		J
133	PW-MW-133-031203	3-Dec-03	REG	0.158	0.158	5	U	U	0.313	0.313	2	U	U	7910	5.54	100			2.26	0.503	5	J	J
133	PW-MW-133-040330	30-Mar-04	REG	0.158	0.158	5	U	U	0.313	0.313	2	U	U	8100	5.54	100			0.852	0.503	5	J	J
133	PW-MW-133-040714	14-Jul-04	REG	0.158	0.158	5	U	U	0.313	0.313	2	U	U	8460	5.54	100			1.36	0.503	5	J	J
134	PW-MW-134DD-030618	18-Jun-03	REG	0.227	0.158	5		J	0.848	0.313	2		J	5640	5.54	100			8.98	0.503	5		
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.272	0.158	5		J	0.564	0.313	2		J	5620	5.54	100			9.03	0.503	5		
134	PW-MW-134DD-030819	19-Aug-03	REG	0.158	0.158	5	<	U	0.313	0.313	2	<	U	5290	5.54	100			5.48	0.503	5		
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.158	0.158	5	<	U	0.313	0.313	2	<	U	5480	5.54	100			5.33	0.503	5		
134	PW-MW-134-031203	3-Dec-03	REG	0.158	0.158	5	U	U	0.313	0.313	2	U	U	5510	5.54	100			3.14	0.503	5	J	J
134	PW-MW-134QC-031203	3-Dec-03	FD	0.158	0.158	5	U	U	0.313	0.313	2	U	U	5410	5.54	100			3.99	0.503	5	J	J
134	PW-MW-134QC-040330	30-Mar-04	FD	0.158	0.158	5	U	U	0.313	0.313	2	U	U	5340	5.54	100			2.23	0.503	5	J	J
134	PW-MW-134-040330	30-Mar-04	REG	0.158	0.158	5	U	U	0.313	0.313	2	U	U	5260	5.54	100			3.3	0.503	5	J	J
134	PW-MW-134-040714	14-Jul-04	REG	0.158	0.158	5	U	U	0.313	0.313	2	U	U	5410	5.54	100			2.42	0.503	5	J	J
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.158	0.158	5	U	U	0.313	0.313	2	U	U	5530	5.54	100			3.1	0.503	5	J	J

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Metals

Parameter				Cobalt					Copper					Iron					Lead				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				7440-48-4					7440-50-8					7439-89-6					7439-92-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	3.83	0.541	5		J	84.1	1.39	5			4510	12.6	100			5.06	1.72	4		
133	PW-MW-133D-030819	19-Aug-03	REG	0.956	0.541	5		J	79.5	1.39	5			1580	12.6	100			6.92	1.72	4		
133	PW-MW-133-031203	3-Dec-03	REG	0.541	0.541	5	U	U	67.7	1.39	5			123	12.6	100	J		1.72	1.72	4	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.541	0.541	5	U	U	64.8	1.39	5			127	12.6	100			1.72	1.72	4	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.541	0.541	5	U	U	65.7	1.39	5			129	12.6	100	B		1.72	1.72	4	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	1.39	0.541	5		J	4.29	1.39	5		J	2090	12.6	100			1.72	1.72	4	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	1.7	0.541	5		J	4.12	1.39	5		J	2060	12.6	100			1.72	1.72	4	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.541	0.541	5	<	U	1.39	1.39	5	<	U	701	12.6	100			1.72	1.72	4	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.541	0.541	5	<	U	1.4	1.39	5		J	145	12.6	100			1.72	1.72	4	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.541	0.541	5	U	U	1.4	1.39	5	J	J	232	12.6	100	J		1.72	1.72	4	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.541	0.541	5	U	U	1.39	1.39	5	U	U	222	12.6	100	J		1.72	1.72	4	U	U
134	PW-MW-134QC-040330	30-Mar-04	FD	0.541	0.541	5	U	U	1.39	1.39	5	U	U	160	12.6	100			1.72	1.72	4	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.541	0.541	5	U	U	1.39	1.39	5	U	U	249	12.6	100			1.72	1.72	4	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.541	0.541	5	U	U	1.39	1.39	5	U	U	203	12.6	100	B		1.72	1.72	4	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.541	0.541	5	U	U	1.39	1.39	5	U	U	321	12.6	100			1.72	1.72	4	U	U

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Metals

Parameter				Magnesium					Manganese					Mercury					Nickel				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				7439-95-4					7439-96-5					7439-97-6					7440-02-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	3530	5.18	100			137	0.296	10			0.0472	0.0472	0.2	<	U	6.47	0.69	5		
133	PW-MW-133D-030819	19-Aug-03	REG	2840	5.18	100			64.9	0.296	10			0.0472	0.0472	0.2	<	U	2.63	0.69	5		J
133	PW-MW-133-031203	3-Dec-03	REG	2790	5.18	100			10.7	0.296	10			0.0472	0.0472	0.2	U	UJL	2.7	0.69	5	J	J
133	PW-MW-133-040330	30-Mar-04	REG	2730	5.18	100			9.64	0.296	10	J	J	0.0472	0.0472	0.2	U	U	1.46	0.69	5	J	J
133	PW-MW-133-040714	14-Jul-04	REG	2930	5.18	100			8.28	0.296	10	J	J	0.0472	0.0472	0.2	U	U	1.95	0.69	5	J	J
134	PW-MW-134DD-030618	18-Jun-03	REG	2300	5.18	100			41.8	0.296	10			0.0472	0.0472	0.2	<	U	5.35	0.69	5		
134	PW-MW-134QCDD-030618	18-Jun-03	FD	2270	5.18	100			42	0.296	10			0.0472	0.0472	0.2	<	U	6.1	0.69	5		
134	PW-MW-134DD-030819	19-Aug-03	REG	1970	5.18	100			26.6	0.296	10			0.0472	0.0472	0.2	<	U	2.92	0.69	5		J
134	PW-MW-134QCDD-030819	19-Aug-03	FD	1960	5.18	100			22.8	0.296	10			0.0472	0.0472	0.2	<	U	2.28	0.69	5		J
134	PW-MW-134-031203	3-Dec-03	REG	2070	5.18	100			18.1	0.296	10			0.0472	0.0472	0.2	U	UJL	2.23	0.69	5	J	J
134	PW-MW-134QC-031203	3-Dec-03	FD	2040	5.18	100			17.9	0.296	10			0.0472	0.0472	0.2	U	UJL	2.94	0.69	5	J	J
134	PW-MW-134QC-040330	30-Mar-04	FD	1920	5.18	100			12.4	0.296	10			0.0472	0.0472	0.2	U	U	1.22	0.69	5	J	J
134	PW-MW-134-040330	30-Mar-04	REG	1920	5.18	100			13.8	0.296	10			0.0472	0.0472	0.2	U	U	1.69	0.69	5	J	J
134	PW-MW-134-040714	14-Jul-04	REG	2010	5.18	100			12.4	0.296	10			0.0472	0.0472	0.2	U	U	1.64	0.69	5	J	J
134	PW-MW-134-040714-FD	14-Jul-04	FD	2070	5.18	100			13.6	0.296	10			0.0472	0.0472	0.2	U	U	2.09	0.69	5	J	J

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Metals

Parameter				Potassium					Selenium					Silver					Sodium				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				2023695					7782-49-2					7440-22-4					7440-23-5				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	2640	16.5	100			2.81	2.81	5	<	U	0.835	0.835	5	<	U	not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	2370	16.5	100			2.81	2.81	5	<	U	0.835	0.835	5	<	U	not reported				
133	PW-MW-133-031203	3-Dec-03	REG	2470	16.5	100			2.81	2.81	5	U	U	1.26	0.835	5	J	B	not reported				
133	PW-MW-133-040330	30-Mar-04	REG	2250	16.5	100	J		2.81	2.81	5	U	U	0.835	0.835	5	U	U	not reported				
133	PW-MW-133-040714	14-Jul-04	REG	2440	16.5	100			2.81	2.81	5	U	U	0.835	0.835	5	U	U	not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	2280	16.5	100			2.81	2.81	5	<	U	0.924	0.835	5		J	not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	2300	16.5	100			2.81	2.81	5	<	U	0.835	0.835	5	<	U	not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	2210	16.5	100			2.81	2.81	5	<	U	0.835	0.835	5	<	U	not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	2230	16.5	100			2.81	2.81	5	<	U	0.835	0.835	5	<	U	not reported				
134	PW-MW-134-031203	3-Dec-03	REG	2190	16.5	100			2.81	2.81	5	U	U	1.56	0.835	5	J	B	not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	2140	16.5	100			2.81	2.81	5	U	U	1.34	0.835	5	J	B	not reported				
134	PW-MW-134QC-040330	30-Mar-04	FD	2070	16.5	100	J		2.81	2.81	5	U	U	0.835	0.835	5	U	U	not reported				
134	PW-MW-134-040330	30-Mar-04	REG	2010	16.5	100	J		2.81	2.81	5	U	U	0.835	0.835	5	U	U	not reported				
134	PW-MW-134-040714	14-Jul-04	REG	2250	16.5	100			2.81	2.81	5	U	U	0.835	0.835	5	U	U	not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	2320	16.5	100			2.81	2.81	5	U	U	0.835	0.835	5	U	U	not reported				

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Metals

Parameter				Strontium					Thallium					Vanadium					Zinc				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				7440-24-6					7440-28-0					7440-62-2					7440-66-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	140	0.178	5			10	10	20	<	U	6.55	0.606	5			44.4	0.883	5		
133	PW-MW-133D-030819	19-Aug-03	REG	123	0.178	5			10	10	20	<	U	2.49	0.606	5		J	29.3	0.883	5		
133	PW-MW-133-031203	3-Dec-03	REG	127	0.178	5			10	10	20	U	U	0.606	0.606	5	U	U	56	0.883	5		
133	PW-MW-133-040330	30-Mar-04	REG	129	0.178	5			10	10	20	U	U	0.606	0.606	5	U	U	61.1	0.883	5		
133	PW-MW-133-040714	14-Jul-04	REG	132	0.178	5			10	10	20	U	U	0.685	0.606	5	J	J	65.1	0.883	5		
134	PW-MW-134DD-030618	18-Jun-03	REG	106	0.178	5			10	10	20	<	U	5.08	0.606	5			19.9	0.883	5		
134	PW-MW-134QCDD-030618	18-Jun-03	FD	106	0.178	5			10	10	20	<	U	4.21	0.606	5		J	20.9	0.883	5		
134	PW-MW-134DD-030819	19-Aug-03	REG	98.7	0.178	5			10	10	20	<	U	1.33	0.606	5		J	19.1	0.883	5		
134	PW-MW-134QCDD-030819	19-Aug-03	FD	102	0.178	5			10	10	20	<	U	0.606	0.606	5	<	U	26	0.883	5		
134	PW-MW-134-031203	3-Dec-03	REG	109	0.178	5			10	10	20	U	U	0.606	0.606	5	U	U	9.69	0.883	5		B
134	PW-MW-134QC-031203	3-Dec-03	FD	107	0.178	5			10	10	20	U	U	0.606	0.606	5	U	U	10.3	0.883	5		B
134	PW-MW-134QC-040330	30-Mar-04	FD	107	0.178	5			10	10	20	U	U	0.606	0.606	5	U	U	3.1	0.883	5	J	J
134	PW-MW-134-040330	30-Mar-04	REG	104	0.178	5			10	10	20	U	U	0.606	0.606	5	U	U	2.79	0.883	5	J	J
134	PW-MW-134-040714	14-Jul-04	REG	107	0.178	5			10	10	20	U	U	1.06	0.606	5	J	J	8.94	0.883	5		B
134	PW-MW-134-040714-FD	14-Jul-04	FD	109	0.178	5			10	10	20	U	U	1.18	0.606	5	J	J	9	0.883	5		B

Footnotes are shown on last page.

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Table 3-3
Concentration of Chemicals in Groundwater from Intermediate Depth Wells - Anions

Parameter				Chloride					Nitrate / Nitrite					Nitrate					Nitrite					Sulfate				
Units				mg/L					mg/L					mg/L					mg/L					mg/L				
CAS Number				16887-00-6					39018					14797-55-8					14797-65-0					14808-79-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	8.62	0.0322	0.2			2.7	0.05	0.25			not reported					not reported					10.4	0.193	0.4		
133	PW-MW-133D-030819	19-Aug-03	REG	8.75	0.0322	0.2			3.05	0.05	0.25			not reported					not reported					19.8	0.193	0.4		
133	PW-MW-133-031203	3-Dec-03	REG	9.44	0.0322	0.2			2.24	0.01	0.05			not reported					not reported					13.5	0.193	0.4		
133	PW-MW-133-040330	30-Mar-04	REG	8.76	0.0322	0.2			2.78	0.01	0.05			not reported					not reported					13.6	0.193	0.4		
133	PW-MW-133-040330-FD	30-Mar-04	FD	8.75	0.0322	0.2			not reported					not reported					not reported					13.6	0.193	0.4		
133	PW-MW-133-040714	14-Jul-04	REG	9.08	0.0322	0.2			1.52	0.01	0.05			not reported					not reported					13.5	0.193	0.4		
134	PW-MW-134DD-030618	18-Jun-03	REG	3.42	0.0322	0.2			2.35	0.05	0.25			not reported					not reported					2.58	0.193	0.4		
134	PW-MW-134QCDD-030618	18-Jun-03	FD	3.45	0.0322	0.2			2.6	0.05	0.25			not reported					not reported					2.48	0.193	0.4		
134	PW-MW-134DD-030819	19-Aug-03	REG	3.11	0.0322	0.2			2.5	0.05	0.25			not reported					not reported					1.46	0.193	0.4		
134	PW-MW-134QCDD-030819	19-Aug-03	FD	3.11	0.0322	0.2			2.55	0.05	0.25			not reported					not reported					1.45	0.193	0.4		
134	PW-MW-134-031203	3-Dec-03	REG	3.01	0.0322	0.2			1.6	0.01	0.05			not reported					not reported					2.41	0.193	0.4		
134	PW-MW-134QC-031203	3-Dec-03	FD	2.98	0.0322	0.2			2.06	0.01	0.05			not reported					not reported					2.35	0.193	0.4		
134	134QC-040330-FD	30-Mar-04	FD	2.71	0.0322	0.2			2.24	0.01	0.05			not reported					not reported					4.26	0.193	0.4		
134	PW-MW-134-040330	30-Mar-04	REG	2.81	0.0322	0.2			2.24	0.01	0.05			not reported					not reported					2.88	0.193	0.4		
134	PW-MW-134-040714	14-Jul-04	REG	2.8	0.0322	0.2			1.75	0.05	0.25			not reported					not reported					2.19	0.193	0.4		
134	PW-MW-134-040714-FD	14-Jul-04	FD	2.79	0.0322	0.2			1.75	0.05	0.25			not reported					not reported					2.21	0.193	0.4		

Footnotes are shown on last page.

00045875

Table 3-3
Concentration of Chemicals in Groundwater from Intermediate Depth Wells - Perchlorate

Parameter				Perchlorate				
Units				µg/L				
CAS Number				14797-73-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.989	0.989	4	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.989	0.989	4	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.989	0.989	4	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.989	0.989	4	U	U
133	PW-MW-133-040330-FD	30-Mar-04	FD	0.989	0.989	4	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.538	0.05	0.2		J
134	PW-MW-134DD-030618	18-Jun-03	REG	0.989	0.989	4	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.989	0.989	4	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.989	0.989	4	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.989	0.989	4	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.989	0.989	4	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.989	0.989	4	U	U
134	134QC-040330-FD	30-Mar-04	FD	1.35	0.989	4	J	J
134	PW-MW-134-040330	30-Mar-04	REG	1.84	0.989	4	J	J
134	PW-MW-134-040714	14-Jul-04	REG	0.871	0.05	0.2		J
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.869	0.05	0.2		J

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Explosives

Parameter				1,3,5-Trinitrobenzene					1,3-Dinitrobenzene					2,4,6-Trinitrotoluene					2,4-Dinitrotoluene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				99-35-4					99-65-0					118-96-7					121-14-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.0249	0.0249	0.104	<	U	0.033	0.033	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0349	0.0349	0.104	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.0249	0.0249	0.104	<	U	0.033	0.033	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0349	0.0349	0.104	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.0249	0.0249	0.104	U	U	0.033	0.033	0.104	U	U	0.0779	0.0779	0.104	U	U	0.0349	0.0349	0.104	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.0249	0.0249	0.104	<	U	0.033	0.033	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0349	0.0349	0.104	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.0249	0.0249	0.104	<	U	0.033	0.033	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0349	0.0349	0.104	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.0249	0.0249	0.104	<	U	0.033	0.033	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0349	0.0349	0.104	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.0249	0.0249	0.104	<	U	0.033	0.033	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0349	0.0349	0.104	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.0249	0.0249	0.104	U	U	0.033	0.033	0.104	U	U	0.0779	0.0779	0.104	U	U	0.0349	0.0349	0.104	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.0249	0.0249	0.104	U	U	0.033	0.033	0.104	U	U	0.0779	0.0779	0.104	U	U	0.0349	0.0349	0.104	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.325	0.325	0.974	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.325	0.325	0.974	U	U

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Explosives

Parameter				2,6-Dinitrotoluene					2-Amino-4,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene					HMX				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				606-20-2					35572-78-2					19406-51-0					2691-41-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.0501	0.0501	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0409	0.0409	0.104	<	U	0.0779	0.0779	0.104	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.0501	0.0501	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0409	0.0409	0.104	<	U	0.0779	0.0779	0.104	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.0501	0.0501	0.104	U	U	0.0779	0.0779	0.104	U	U	0.0409	0.0409	0.104	U	U	0.0779	0.0779	0.104	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.0501	0.0501	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0409	0.0409	0.104	<	U	0.0779	0.0779	0.104	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.0501	0.0501	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0409	0.0409	0.104	<	U	0.0779	0.0779	0.104	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.0501	0.0501	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0409	0.0409	0.104	<	U	0.0779	0.0779	0.104	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.0501	0.0501	0.104	<	U	0.0779	0.0779	0.104	<	U	0.0409	0.0409	0.104	<	U	0.0779	0.0779	0.104	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.0501	0.0501	0.104	U	U	0.0779	0.0779	0.104	U	U	0.0409	0.0409	0.104	U	U	0.0779	0.0779	0.104	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.0501	0.0501	0.104	U	U	0.0779	0.0779	0.104	U	U	0.0409	0.0409	0.104	U	U	0.0779	0.0779	0.104	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.182	0.182	0.54	U	U	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Explosives

Parameter				m-Nitrotoluene					Nitrobenzene					o-Nitrotoluene				
Units				µg/L					µg/L					µg/L				
CAS Number				99-08-1					98-95-3					88-72-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.064	0.064	0.104	<	U	0.0131	0.0131	0.104	<	U	0.064	0.064	0.104	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.064	0.064	0.104	<	U	0.0131	0.0131	0.104	<	U	0.064	0.064	0.104	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.064	0.064	0.104	U	U	0.0131	0.0131	0.104	U	U	0.064	0.064	0.104	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.064	0.064	0.104	<	U	0.0131	0.0131	0.104	<	U	0.064	0.064	0.104	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.064	0.064	0.104	<	U	0.0131	0.0131	0.104	<	U	0.064	0.064	0.104	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.064	0.064	0.104	<	U	0.0131	0.0131	0.104	<	U	0.064	0.064	0.104	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.064	0.064	0.104	<	U	0.0131	0.0131	0.104	<	U	0.064	0.064	0.104	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.064	0.064	0.104	U	U	0.0131	0.0131	0.104	U	U	0.064	0.064	0.104	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.064	0.064	0.104	U	U	0.0131	0.0131	0.104	U	U	0.064	0.064	0.104	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.162	0.162	0.486	U	U

Footnotes are shown on last page.

00045879

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - Explosives

Parameter				p-Nitrotoluene					RDX					Tetryl				
Units				µg/L					µg/L					µg/L				
CAS Number				99-99-0					121-82-4					479-45-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.064	0.064	0.104	<	U	0.053	0.053	0.104	<	U	0.032	0.032	0.104	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.064	0.064	0.104	<	U	0.053	0.053	0.104	<	U	0.032	0.032	0.104	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.064	0.064	0.104	U	U	0.053	0.053	0.104	U	U	0.032	0.032	0.104	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.064	0.064	0.104	<	U	0.053	0.053	0.104	<	U	0.032	0.032	0.104	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.064	0.064	0.104	<	U	0.053	0.053	0.104	<	U	0.032	0.032	0.104	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.064	0.064	0.104	<	U	0.0811	0.053	0.104		J	0.032	0.032	0.104	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.064	0.064	0.104	<	U	0.053	0.053	0.104	<	U	0.032	0.032	0.104	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.064	0.064	0.104	U	U	0.053	0.053	0.104	U	U	0.032	0.032	0.104	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.064	0.064	0.104	U	U	0.125	0.053	0.104			0.032	0.032	0.104	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.325	0.325	0.974	U	U	0.162	0.162	0.486	U	U	0.487	0.487	1.46	U	U

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				1,1,1,2-Tetrachloroethane					1,1,1-Trichloroethane					1,1,2,2-Tetrachloroethane					1,1,2-Trichloroethane				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				630-20-6					71-55-6					79-34-5					79-00-5				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.3	0.3	1	<	U	0.34	0.34	1	<	U	0.49	0.49	1	<	U	0.44	0.44	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.3	0.3	1	<	U	0.34	0.34	1	<	U	0.49	0.49	1	<	U	0.44	0.44	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.3	0.3	1	<	U	0.34	0.34	1	<	U	0.49	0.49	1	<	U	0.44	0.44	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.3	0.3	1	<	U	0.34	0.34	1	<	U	0.49	0.49	1	<	U	0.44	0.44	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.3	0.3	1	<	U	0.34	0.34	1	<	U	0.49	0.49	1	<	U	0.44	0.44	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.3	0.3	1	<	U	0.34	0.34	1	<	U	0.49	0.49	1	<	U	0.44	0.44	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.3	0.3	1	U	U	0.34	0.34	1	U	U	0.49	0.49	1	U	U	0.44	0.44	1	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				1,1-Dichloroethane					1,1-Dichloroethene					1,1-Dichloropropene					1,2,3-Trichlorobenzene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				75-34-3					75-35-4					563-58-6					87-61-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.41	0.41	1	<	U	0.41	0.41	1	<	U	not reported					not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	0.41	0.41	1	<	U	0.41	0.41	1	<	U	not reported					not reported				
133	PW-MW-133-031203	3-Dec-03	REG	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				
133	PW-MW-133-040330	30-Mar-04	REG	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				
133	PW-MW-133-040714	14-Jul-04	REG	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	0.41	0.41	1	<	U	0.41	0.41	1	<	U	not reported					not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.41	0.41	1	<	U	0.41	0.41	1	<	U	not reported					not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	0.41	0.41	1	<	U	0.41	0.41	1	<	U	not reported					not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.41	0.41	1	<	U	0.41	0.41	1	<	U	not reported					not reported				
134	PW-MW-134-031203	3-Dec-03	REG	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				
134	134QC-040330-FD	30-Mar-04	FD	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				
134	PW-MW-134-040330	30-Mar-04	REG	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				
134	PW-MW-134-040714	14-Jul-04	REG	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.41	0.41	1	U	U	0.41	0.41	1	U	U	not reported					not reported				

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				1,2,3-Trichloropropane					1,2,4-Trichlorobenzene					1,2,4-Trimethylbenzene					1,2-Dibromo-3-chloropropane				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				96-18-4					120-82-1					95-63-6					96-12-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.6	0.6	1	<	U	0.42	0.42	1	<	U	not reported					0.75	0.75	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.6	0.6	1	<	U	0.42	0.42	1	<	U	not reported					0.75	0.75	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.6	0.6	1	<	U	0.42	0.42	1	<	U	not reported					0.75	0.75	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.6	0.6	1	<	U	0.42	0.42	1	<	U	not reported					0.75	0.75	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.6	0.6	1	<	U	0.42	0.42	1	<	U	not reported					0.75	0.75	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.6	0.6	1	<	U	0.42	0.42	1	<	U	not reported					0.75	0.75	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.6	0.6	1	U	U	0.42	0.42	1	U	U	not reported					0.75	0.75	1	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				1,2-Dibromoethane					1,2-Dichlorobenzene					1,2-Dichloroethane					1,2-Dichloropropane				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				106-93-4					95-50-1					107-06-2					78-87-5				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.25	0.25	1	<	U	0.36	0.36	1	<	U	0.29	0.29	1	<	U	0.25	0.25	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.25	0.25	1	<	U	0.36	0.36	1	<	U	0.29	0.29	1	<	U	0.25	0.25	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.25	0.25	1	<	U	0.36	0.36	1	<	U	0.29	0.29	1	<	U	0.25	0.25	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.25	0.25	1	<	U	0.36	0.36	1	<	U	0.29	0.29	1	<	U	0.25	0.25	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.25	0.25	1	<	U	0.36	0.36	1	<	U	0.29	0.29	1	<	U	0.25	0.25	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.25	0.25	1	<	U	0.36	0.36	1	<	U	0.29	0.29	1	<	U	0.25	0.25	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.25	0.25	1	U	U	0.36	0.36	1	U	U	0.29	0.29	1	U	U	0.25	0.25	1	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				1,2-Dimethylbenzene (o-Xylene)					1,3,5-Trimethylbenzene					1,3-Dichlorobenzene					1,3-Dichloropropane				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				95-47-6					108-67-8					541-73-1					142-28-9				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					not reported					0.33	0.33	1	<	U	not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					not reported					0.33	0.33	1	<	U	not reported				
133	PW-MW-133-031203	3-Dec-03	REG	not reported					not reported					0.33	0.33	1	U	U	not reported				
133	PW-MW-133-040330	30-Mar-04	REG	not reported					not reported					0.33	0.33	1	U	U	not reported				
133	PW-MW-133-040714	14-Jul-04	REG	not reported					not reported					0.33	0.33	1	U	U	not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					not reported					0.33	0.33	1	<	U	not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					not reported					0.33	0.33	1	<	U	not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					not reported					0.33	0.33	1	<	U	not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					not reported					0.33	0.33	1	<	U	not reported				
134	PW-MW-134-031203	3-Dec-03	REG	not reported					not reported					0.33	0.33	1	U	U	not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					not reported					0.33	0.33	1	U	U	not reported				
134	134QC-040330-FD	30-Mar-04	FD	not reported					not reported					0.33	0.33	1	U	U	not reported				
134	PW-MW-134-040330	30-Mar-04	REG	not reported					not reported					0.33	0.33	1	U	U	not reported				
134	PW-MW-134-040714	14-Jul-04	REG	not reported					not reported					0.33	0.33	1	U	U	not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					not reported					0.33	0.33	1	U	U	not reported				

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				1,4-Dichloro-2-butene					1,4-Dichlorobenzene					1,4-Dioxane					2,2-Dichloropropane				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				764-41-0					106-46-7					123-91-1					594-20-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					0.25	0.25	1	<	U	not reported					not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					0.25	0.25	1	<	U	not reported					not reported				
133	PW-MW-133-031203	3-Dec-03	REG	not reported					0.25	0.25	1	U	U	not reported					not reported				
133	PW-MW-133-040330	30-Mar-04	REG	not reported					0.25	0.25	1	U	U	not reported					not reported				
133	PW-MW-133-040714	14-Jul-04	REG	not reported					0.25	0.25	1	U	U	not reported					not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					0.25	0.25	1	<	U	not reported					not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					0.25	0.25	1	<	U	not reported					not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					0.25	0.25	1	<	U	not reported					not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					0.25	0.25	1	<	U	not reported					not reported				
134	PW-MW-134-031203	3-Dec-03	REG	not reported					0.25	0.25	1	U	U	not reported					not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					0.25	0.25	1	U	U	not reported					not reported				
134	134QC-040330-FD	30-Mar-04	FD	not reported					0.25	0.25	1	U	U	not reported					not reported				
134	PW-MW-134-040330	30-Mar-04	REG	not reported					0.25	0.25	1	U	U	not reported					not reported				
134	PW-MW-134-040714	14-Jul-04	REG	not reported					0.25	0.25	1	U	U	not reported					not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					0.25	0.25	1	U	U	not reported					not reported				

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				2-Butanone					2-Chloroethyl vinyl ether					2-Chlorotoluene					2-Hexanone				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				78-93-3					110-75-8					95-49-8					591-78-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	2.31	2.31	5	<	U	1.25	1.25	5	<	U	not reported					1.45	1.45	5	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	2.31	2.31	5	<	U	1.25	1.25	5	<	U	not reported					1.45	1.45	5	<	U
133	PW-MW-133-031203	3-Dec-03	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	UJL	not reported					1.45	1.45	5	U	U
133	PW-MW-133-040330	30-Mar-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U	not reported					1.45	1.45	5	U	U
133	PW-MW-133-040714	14-Jul-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U	not reported					1.45	1.45	5	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	2.31	2.31	5	<	U	1.25	1.25	5	<	U	not reported					1.45	1.45	5	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	2.31	2.31	5	<	U	1.25	1.25	5	<	U	not reported					1.45	1.45	5	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	2.31	2.31	5	<	U	1.25	1.25	5	<	U	not reported					1.45	1.45	5	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	2.31	2.31	5	<	U	1.25	1.25	5	<	U	not reported					1.45	1.45	5	<	U
134	PW-MW-134-031203	3-Dec-03	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	UJL	not reported					1.45	1.45	5	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	2.31	2.31	5	U	U	1.25	1.25	5	U	UJL	not reported					1.45	1.45	5	U	U
134	134QC-040330-FD	30-Mar-04	FD	2.31	2.31	5	U	U	1.25	1.25	5	U	U	not reported					1.45	1.45	5	U	U
134	PW-MW-134-040330	30-Mar-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U	not reported					1.45	1.45	5	U	U
134	PW-MW-134-040714	14-Jul-04	REG	2.31	2.31	5	U	U	1.25	1.25	5	U	U	not reported					1.45	1.45	5	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	2.31	2.31	5	U	U	1.25	1.25	5	U	U	not reported					1.45	1.45	5	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				2-Propenal					4-Chlorotoluene					Acetone					Acetonitrile				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				107-02-8					106-43-4					67-64-1					75-05-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	4.06	4.06	5	<	U	not reported					2.29	2.29	5	<	U	10.4	10.4	25	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	4.06	4.06	5	<	U	not reported					2.29	2.29	5	<	U	10.4	10.4	25	<	U
133	PW-MW-133-031203	3-Dec-03	REG	4.06	4.06	5	U	U	not reported					2.29	2.29	5	U	U	10.4	10.4	25	U	U
133	PW-MW-133-040330	30-Mar-04	REG	4.06	4.06	5	U	U	not reported					2.29	2.29	5	U	U	10.4	10.4	25	U	U
133	PW-MW-133-040714	14-Jul-04	REG	4.06	4.06	5	U	U	not reported					2.29	2.29	5	U	U	10.4	10.4	25	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	4.06	4.06	5	<	U	not reported					2.29	2.29	5	<	U	10.4	10.4	25	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	4.06	4.06	5	<	U	not reported					2.29	2.29	5	<	U	10.4	10.4	25	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	4.06	4.06	5	<	U	not reported					2.29	2.29	5	<	U	10.4	10.4	25	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	4.06	4.06	5	<	U	not reported					2.29	2.29	5	<	U	10.4	10.4	25	<	U
134	PW-MW-134-031203	3-Dec-03	REG	4.06	4.06	5	U	U	not reported					2.29	2.29	5	U	U	10.4	10.4	25	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	4.06	4.06	5	U	U	not reported					2.29	2.29	5	U	U	10.4	10.4	25	U	U
134	134QC-040330-FD	30-Mar-04	FD	4.06	4.06	5	U	U	not reported					2.29	2.29	5	U	U	10.4	10.4	25	U	U
134	PW-MW-134-040330	30-Mar-04	REG	4.06	4.06	5	U	U	not reported					2.29	2.29	5	U	U	10.4	10.4	25	U	U
134	PW-MW-134-040714	14-Jul-04	REG	4.06	4.06	5	U	U	not reported					2.29	2.29	5	U	U	10.4	10.4	25	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	4.06	4.06	5	U	U	not reported					5.71	2.29	5			10.4	10.4	25	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Acrylonitrile					Benzene					Bromobenzene					Bromochloromethane				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				107-13-1					71-43-2					108-86-1					74-97-5				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	2	2	5	<	U	0.33	0.33	1	<	U	not reported					0.5	0.5	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	2	2	5	<	U	0.33	0.33	1	<	U	not reported					0.5	0.5	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	2	2	5	<	U	0.33	0.33	1	<	U	not reported					0.5	0.5	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	2	2	5	<	U	0.33	0.33	1	<	U	not reported					0.5	0.5	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	2	2	5	<	U	0.33	0.33	1	<	U	not reported					0.5	0.5	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	2	2	5	<	U	0.33	0.33	1	<	U	not reported					0.5	0.5	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	2	2	5	U	U	0.33	0.33	1	U	U	not reported					0.5	0.5	1	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Bromodichloromethane					Bromoform					Bromomethane					Carbon disulfide				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				75-27-4					75-25-2					74-83-9					75-15-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.38	0.38	1	<	U	0.636	0.5	1		J	0.5	0.5	1	<	U	1.91	1.91	5	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.38	0.38	1	<	U	0.612	0.5	1		J	0.5	0.5	1	<	U	1.91	1.91	5	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.38	0.38	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.38	0.38	1	U	U	1.73	0.5	1		B	0.5	0.5	1	U	U	1.91	1.91	5	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.38	0.38	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.38	0.38	1	<	U	0.954	0.5	1		J	0.5	0.5	1	<	U	1.91	1.91	5	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.38	0.38	1	<	U	0.5	0.5	1	<	U	0.5	0.5	1	<	U	1.91	1.91	5	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.38	0.38	1	<	U	0.827	0.5	1		J	0.5	0.5	1	<	U	1.91	1.91	5	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.38	0.38	1	<	U	0.5	0.5	1	<	U	0.5	0.5	1	<	U	1.91	1.91	5	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.38	0.38	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.38	0.38	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.38	0.38	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.38	0.38	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.38	0.38	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.38	0.38	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	1.91	1.91	5	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Carbon tetrachloride					Chlorobenzene					Chloroethane					Chloroform				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				56-23-5					108-90-7					75-00-3					67-66-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.29	0.29	1	<	U	0.32	0.32	1	<	U	0.5	0.5	1	<	U	0.36	0.36	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.29	0.29	1	<	U	0.32	0.32	1	<	U	0.5	0.5	1	<	U	0.36	0.36	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.29	0.29	1	<	U	0.32	0.32	1	<	U	0.5	0.5	1	<	U	0.36	0.36	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.29	0.29	1	<	U	0.32	0.32	1	<	U	0.5	0.5	1	<	U	0.36	0.36	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.29	0.29	1	<	U	0.32	0.32	1	<	U	0.5	0.5	1	<	U	0.36	0.36	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.29	0.29	1	<	U	0.32	0.32	1	<	U	0.5	0.5	1	<	U	0.36	0.36	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.29	0.29	1	U	U	0.32	0.32	1	U	U	0.5	0.5	1	U	U	0.36	0.36	1	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Chloromethane					cis-1,2-Dichloroethene					cis-1,3-Dichloropropene					Dibromochloromethane					Dibromomethane				
Units				µg/L					µg/L					µg/L					µg/L					µg/L				
CAS Number				74-87-3					156-59-2					10061-01-5					124-48-1					74-95-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.5	0.5	1	<	U	0.3	0.3	1	<	U	0.3	0.3	1	<	U	0.29	0.29	1	<	U	0.5	0.5	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.5	0.5	1	<	U	0.3	0.3	1	<	U	0.3	0.3	1	<	U	0.29	0.29	1	<	U	0.5	0.5	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.5	0.5	1	U	U	0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.5	0.5	1	U	U	0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	1.86	0.5	1			0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.5	0.5	1	<	U	0.3	0.3	1	<	U	0.3	0.3	1	<	U	0.29	0.29	1	<	U	0.5	0.5	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.5	0.5	1	<	U	0.3	0.3	1	<	U	0.3	0.3	1	<	U	0.29	0.29	1	<	U	0.5	0.5	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.5	0.5	1	<	U	0.3	0.3	1	<	U	0.3	0.3	1	<	U	0.29	0.29	1	<	U	0.5	0.5	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.5	0.5	1	<	U	0.3	0.3	1	<	U	0.3	0.3	1	<	U	0.29	0.29	1	<	U	0.5	0.5	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.5	0.5	1	U	U	0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.5	0.5	1	U	U	0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.5	0.5	1	U	U	0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.5	0.5	1	U	U	0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	2.33	0.5	1			0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	1.29	0.5	1			0.3	0.3	1	U	U	0.3	0.3	1	U	U	0.29	0.29	1	U	U	0.5	0.5	1	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Dichlorodifluoromethane					Ethyl acetate					Ethyl methacrylate					Ethylbenzene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				75-71-8					141-78-6					97-63-2					100-41-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.43	0.43	1	<	U	not reported					1	1	5	<	U	0.21	0.21	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.43	0.43	1	<	U	not reported					1	1	5	<	U	0.21	0.21	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.43	0.43	1	<	U	not reported					1	1	5	<	U	0.21	0.21	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.43	0.43	1	<	U	not reported					1	1	5	<	U	0.21	0.21	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.43	0.43	1	<	U	not reported					1	1	5	<	U	0.21	0.21	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.43	0.43	1	<	U	not reported					1	1	5	<	U	0.21	0.21	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.43	0.43	1	U	U	not reported					1	1	5	U	U	0.21	0.21	1	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Hexachlorobutadiene					Iodomethane					Isobutyl Alcohol					Isopropylbenzene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				87-68-3					74-88-4					78-83-1					98-82-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.31	0.31	1	<	U	1.88	1.88	5	<	U	not reported					not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	0.31	0.31	1	<	U	1.88	1.88	5	<	U	not reported					not reported				
133	PW-MW-133-031203	3-Dec-03	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				
133	PW-MW-133-040330	30-Mar-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				
133	PW-MW-133-040714	14-Jul-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	0.31	0.31	1	<	U	1.88	1.88	5	<	U	not reported					not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.31	0.31	1	<	U	1.88	1.88	5	<	U	not reported					not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	0.31	0.31	1	<	U	1.88	1.88	5	<	U	not reported					not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.31	0.31	1	<	U	1.88	1.88	5	<	U	not reported					not reported				
134	PW-MW-134-031203	3-Dec-03	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				
134	134QC-040330-FD	30-Mar-04	FD	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				
134	PW-MW-134-040330	30-Mar-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				
134	PW-MW-134-040714	14-Jul-04	REG	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.31	0.31	1	U	U	1.88	1.88	5	U	U	not reported					not reported				

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				m,p-Xylenes					Methacrylonitrile					Methyl isobutyl ketone					Methyl Methacrylate				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				136777-61-2					126-98-7					108-10-1					80-62-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					1.01	1.01	5	<	U	1.78	1.78	5	<	U	1.11	1.11	5	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					1.01	1.01	5	<	U	1.78	1.78	5	<	U	1.11	1.11	5	<	U
133	PW-MW-133-031203	3-Dec-03	REG	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U
133	PW-MW-133-040330	30-Mar-04	REG	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U
133	PW-MW-133-040714	14-Jul-04	REG	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					1.01	1.01	5	<	U	1.78	1.78	5	<	U	1.11	1.11	5	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					1.01	1.01	5	<	U	1.78	1.78	5	<	U	1.11	1.11	5	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					1.01	1.01	5	<	U	1.78	1.78	5	<	U	1.11	1.11	5	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					1.01	1.01	5	<	U	1.78	1.78	5	<	U	1.11	1.11	5	<	U
134	PW-MW-134-031203	3-Dec-03	REG	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U
134	134QC-040330-FD	30-Mar-04	FD	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U
134	PW-MW-134-040330	30-Mar-04	REG	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U
134	PW-MW-134-040714	14-Jul-04	REG	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					1.01	1.01	5	U	U	1.78	1.78	5	U	U	1.11	1.11	5	U	U

Footnotes are shown on last page.

00045895

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Methyl tert-butyl ether					Methylene chloride					Naphthalene					n-Buttylbenzene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				1634-04-4					75-09-2					91-20-3					104-51-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					1.9	1.9	2	<	U	0.26	0.26	1	<	U	not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					1.9	1.9	2	<	U	0.26	0.26	1	<	U	not reported				
133	PW-MW-133-031203	3-Dec-03	REG	not reported					1.9	1.9	2	U	U	0.399	0.26	1	J	J	not reported				
133	PW-MW-133-040330	30-Mar-04	REG	not reported					1.9	1.9	2	U	U	0.26	0.26	1	U	U	not reported				
133	PW-MW-133-040714	14-Jul-04	REG	not reported					1.9	1.9	2	U	U	0.26	0.26	1	U	U	not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					1.9	1.9	2	<	U	0.26	0.26	1	<	U	not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					1.9	1.9	2	<	U	0.26	0.26	1	<	U	not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					1.9	1.9	2	<	U	0.26	0.26	1	<	U	not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					1.9	1.9	2	<	U	0.26	0.26	1	<	U	not reported				
134	PW-MW-134-031203	3-Dec-03	REG	not reported					1.9	1.9	2	U	U	0.471	0.26	1	J	J	not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					1.9	1.9	2	U	U	0.474	0.26	1	J	J	not reported				
134	134QC-040330-FD	30-Mar-04	FD	not reported					1.9	1.9	2	U	U	0.26	0.26	1	U	U	not reported				
134	PW-MW-134-040330	30-Mar-04	REG	not reported					1.9	1.9	2	U	U	0.26	0.26	1	U	U	not reported				
134	PW-MW-134-040714	14-Jul-04	REG	not reported					1.9	1.9	2	U	U	0.26	0.26	1	U	U	not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					1.9	1.9	2	U	U	0.26	0.26	1	U	U	not reported				

Footnotes are shown on last page.

00045896

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				n-Propylbenzene					Pentachloroethane					p-Isopropyltoluene					Propionitrile				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				103-65-1					76-01-7					99-87-6					107-12-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					not reported					not reported					1.22	1.22	5	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					not reported					not reported					1.22	1.22	5	<	U
133	PW-MW-133-031203	3-Dec-03	REG	not reported					not reported					not reported					1.22	1.22	5	U	U
133	PW-MW-133-040330	30-Mar-04	REG	not reported					not reported					not reported					1.22	1.22	5	U	U
133	PW-MW-133-040714	14-Jul-04	REG	not reported					not reported					not reported					1.22	1.22	5	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					not reported					not reported					1.22	1.22	5	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					not reported					not reported					1.22	1.22	5	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					not reported					not reported					1.22	1.22	5	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					not reported					not reported					1.22	1.22	5	<	U
134	PW-MW-134-031203	3-Dec-03	REG	not reported					not reported					not reported					1.22	1.22	5	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					not reported					not reported					1.22	1.22	5	U	U
134	134QC-040330-FD	30-Mar-04	FD	not reported					not reported					not reported					1.22	1.22	5	U	U
134	PW-MW-134-040330	30-Mar-04	REG	not reported					not reported					not reported					1.22	1.22	5	U	U
134	PW-MW-134-040714	14-Jul-04	REG	not reported					not reported					not reported					1.22	1.22	5	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					not reported					not reported					1.22	1.22	5	U	U

Footnotes are shown on last page.

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				sec-Butylbenzene					Styrene					tert-Butylbenzene					Tetrachloroethene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				135-98-8					100-42-5					98-06-6					127-18-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					0.25	0.25	1	<	U	not reported					0.33	0.33	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					0.25	0.25	1	<	U	not reported					0.33	0.33	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					0.25	0.25	1	<	U	not reported					0.33	0.33	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					0.25	0.25	1	<	U	not reported					0.33	0.33	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					0.25	0.25	1	<	U	not reported					0.33	0.33	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					0.25	0.25	1	<	U	not reported					0.33	0.33	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					0.25	0.25	1	U	U	not reported					0.33	0.33	1	U	U

Footnotes are shown on last page.

00045898

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Toluene					trans-1,2-Dichloroethene					trans-1,3-Dichloropropene					trans-1,4-Dichloro-2-butene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				108-88-3					156-60-5					10061-02-6					110-57-6				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.39	0.39	1	<	U	0.37	0.37	1	<	U	0.29	0.29	1	<	U	1.17	1.17	5	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.39	0.39	1	<	U	0.37	0.37	1	<	U	0.29	0.29	1	<	U	1.17	1.17	5	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.39	0.39	1	<	U	0.37	0.37	1	<	U	0.29	0.29	1	<	U	1.17	1.17	5	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.39	0.39	1	<	U	0.37	0.37	1	<	U	0.29	0.29	1	<	U	1.17	1.17	5	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.39	0.39	1	<	U	0.37	0.37	1	<	U	0.29	0.29	1	<	U	1.17	1.17	5	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.39	0.39	1	<	U	0.37	0.37	1	<	U	0.29	0.29	1	<	U	1.17	1.17	5	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.39	0.39	1	U	U	0.37	0.37	1	U	U	0.29	0.29	1	U	U	1.17	1.17	5	U	U

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00045899

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - VOCs

Parameter				Trichloroethene					Trichlorofluoromethane					Vinyl acetate					Vinyl chloride					Xylenes, Total				
Units				µg/L					µg/L					µg/L					µg/L					µg/L				
CAS Number				79-01-6					75-69-4					108-05-4					75-01-4					1330-20-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.36	0.36	1	<	U	0.5	0.5	1	<	U	1.32	1.32	5	<	U	0.55	0.55	1	<	U	0.25	0.25	1	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.36	0.36	1	<	U	0.5	0.5	1	<	U	1.32	1.32	5	<	U	0.55	0.55	1	<	U	0.25	0.25	1	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.36	0.36	1	<	U	0.5	0.5	1	<	U	1.32	1.32	5	<	U	0.55	0.55	1	<	U	0.25	0.25	1	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.36	0.36	1	<	U	0.5	0.5	1	<	U	1.32	1.32	5	<	U	0.55	0.55	1	<	U	0.25	0.25	1	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.36	0.36	1	<	U	0.5	0.5	1	<	U	1.32	1.32	5	<	U	0.55	0.55	1	<	U	0.25	0.25	1	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.36	0.36	1	<	U	0.5	0.5	1	<	U	1.32	1.32	5	<	U	0.55	0.55	1	<	U	0.25	0.25	1	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.36	0.36	1	U	U	0.5	0.5	1	U	U	1.32	1.32	5	U	U	0.55	0.55	1	U	U	0.25	0.25	1	U	U

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00045900

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				1,2,4,5-Tetrachloro-benzene					1,2,4-Trichlorobenzene					1,2-Dichlorobenzene					1,3,5-Trinitrobenzene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				95-94-3					120-82-1					95-50-1					99-35-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	1.17	1.17	9.71	<	U	not reported					not reported					not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	1.17	1.17	9.71	<	U	not reported					not reported					not reported				
133	PW-MW-133-031203	3-Dec-03	REG	1.2	1.2	9.9	U	U	not reported					not reported					not reported				
133	PW-MW-133-040330	30-Mar-04	REG	1.14	1.14	9.43	U	U	not reported					not reported					not reported				
133	PW-MW-133-040714	14-Jul-04	REG	1.16	1.16	9.62	U	U	not reported					not reported					not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	1.19	1.19	9.8	<	U	not reported					not reported					not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	1.17	1.17	9.71	<	U	not reported					not reported					not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	1.2	1.2	9.9	<	U	not reported					not reported					not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	1.19	1.19	9.8	<	U	not reported					not reported					not reported				
134	PW-MW-134-031203	3-Dec-03	REG	1.2	1.2	9.9	U	U	not reported					not reported					not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	1.21	1.21	10	U	U	not reported					not reported					not reported				
134	134QC-040330-FD	30-Mar-04	FD	1.14	1.14	9.43	U	U	not reported					not reported					not reported				
134	PW-MW-134-040330	30-Mar-04	REG	1.14	1.14	9.43	U	U	not reported					not reported					not reported				
134	PW-MW-134-040714	14-Jul-04	REG	1.17	1.17	9.71	U	U	not reported					not reported					not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	1.17	1.17	9.71	U	U	not reported					not reported					not reported				

Footnotes are shown on last page.

00045901

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				1,3-Dichlorobenzene					1,3-Dinitrobenzene					1,4-Dichlorobenzene					2,3,4,6-Tetrachlorophenol				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				541-73-1					99-65-0					106-46-7					58-90-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					not reported					not reported					1.35	1.35	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					not reported					not reported					1.35	1.35	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	not reported					not reported					not reported					1.38	1.38	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	not reported					not reported					not reported					1.31	1.31	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	not reported					not reported					not reported					1.34	1.34	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					not reported					not reported					1.36	1.36	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					not reported					not reported					1.35	1.35	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					not reported					not reported					1.38	1.38	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					not reported					not reported					1.36	1.36	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	not reported					not reported					not reported					1.38	1.38	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					not reported					not reported					1.39	1.39	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	not reported					not reported					not reported					1.31	1.31	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	not reported					not reported					not reported					1.31	1.31	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	not reported					not reported					not reported					1.35	1.35	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					not reported					not reported					1.35	1.35	9.71	U	U

Footnotes are shown on last page.

00045902

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				2,4,5-Trichlorophenol					2,4,6-Trichlorophenol					2,4-Dichlorophenol					2,4-Dimethylphenol				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				95-95-4					88-06-2					120-83-2					105-67-9				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.942	0.942	9.71	<	U	0.379	0.379	9.71	<	U	0.456	0.456	9.71	<	U	0.456	0.456	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.942	0.942	9.71	<	U	0.379	0.379	9.71	<	U	0.456	0.456	9.71	<	U	0.456	0.456	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.96	0.96	9.9	U	U	0.386	0.386	9.9	U	U	0.465	0.465	9.9	U	U	0.465	0.465	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.915	0.915	9.43	U	U	0.368	0.368	9.43	U	U	0.443	0.443	9.43	U	U	0.443	0.443	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.933	0.933	9.62	U	U	0.375	0.375	9.62	U	U	0.452	0.452	9.62	U	U	0.452	0.452	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.951	0.951	9.8	<	U	0.382	0.382	9.8	<	U	0.461	0.461	9.8	<	U	0.461	0.461	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.942	0.942	9.71	<	U	0.379	0.379	9.71	<	U	0.456	0.456	9.71	<	U	0.456	0.456	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.96	0.96	9.9	<	U	0.386	0.386	9.9	<	U	0.465	0.465	9.9	<	U	0.465	0.465	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.951	0.951	9.8	<	U	0.382	0.382	9.8	<	U	0.461	0.461	9.8	<	U	0.461	0.461	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.96	0.96	9.9	U	U	0.386	0.386	9.9	U	U	0.465	0.465	9.9	U	U	0.465	0.465	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.97	0.97	10	U	U	0.39	0.39	10	U	U	0.47	0.47	10	U	U	0.47	0.47	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.915	0.915	9.43	U	U	0.368	0.368	9.43	U	U	0.443	0.443	9.43	U	U	0.443	0.443	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.915	0.915	9.43	U	U	0.368	0.368	9.43	U	U	0.443	0.443	9.43	U	U	0.443	0.443	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.942	0.942	9.71	U	U	0.379	0.379	9.71	U	U	0.456	0.456	9.71	U	U	0.456	0.456	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.942	0.942	9.71	U	U	0.379	0.379	9.71	U	U	0.456	0.456	9.71	U	U	0.456	0.456	9.71	U	U

Footnotes are shown on last page.

00045903

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				2,4-Dinitrophenol					2,4-Dinitrotoluene					2,6-Dichlorophenol					2,6-Dinitrotoluene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				51-28-5					121-14-2					87-65-0					606-20-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	4.85	4.85	19.4 <		U	0.68	0.68	9.71 <		U	0.854	0.854	9.71 <		U	0.485	0.485	9.71 <		U
133	PW-MW-133D-030819	19-Aug-03	REG	4.85	4.85	19.4 <		U	0.68	0.68	9.71 <		U	0.854	0.854	9.71 <		U	0.485	0.485	9.71 <		U
133	PW-MW-133-031203	3-Dec-03	REG	4.95	4.95	19.8 U		U	0.693	0.693	9.9 U		U	0.871	0.871	9.9 U		U	0.495	0.495	9.9 U		U
133	PW-MW-133-040330	30-Mar-04	REG	4.72	4.72	18.9 U		U	0.66	0.66	9.43 U		U	0.83	0.83	9.43 U		U	0.472	0.472	9.43 U		U
133	PW-MW-133-040714	14-Jul-04	REG	4.81	4.81	19.2 U		U	0.673	0.673	9.62 U		U	0.846	0.846	9.62 U		U	0.481	0.481	9.62 U		U
134	PW-MW-134DD-030618	18-Jun-03	REG	4.9	4.9	19.6 <		U	0.686	0.686	9.8 <		U	0.863	0.863	9.8 <		U	0.49	0.49	9.8 <		U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	4.85	4.85	19.4 <		U	0.68	0.68	9.71 <		U	0.854	0.854	9.71 <		U	0.485	0.485	9.71 <		U
134	PW-MW-134DD-030819	19-Aug-03	REG	4.95	4.95	19.8 <		U	0.693	0.693	9.9 <		U	0.871	0.871	9.9 <		U	0.495	0.495	9.9 <		U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	4.9	4.9	19.6 <		U	0.686	0.686	9.8 <		U	0.863	0.863	9.8 <		U	0.49	0.49	9.8 <		U
134	PW-MW-134-031203	3-Dec-03	REG	4.95	4.95	19.8 U		U	0.693	0.693	9.9 U		U	0.871	0.871	9.9 U		U	0.495	0.495	9.9 U		U
134	PW-MW-134QC-031203	3-Dec-03	FD	5	5	20 U		U	0.7	0.7	10 U		U	0.88	0.88	10 U		U	0.5	0.5	10 U		U
134	134QC-040330-FD	30-Mar-04	FD	4.72	4.72	18.9 U		U	0.66	0.66	9.43 U		U	0.83	0.83	9.43 U		U	0.472	0.472	9.43 U		U
134	PW-MW-134-040330	30-Mar-04	REG	4.72	4.72	18.9 U		U	0.66	0.66	9.43 U		U	0.83	0.83	9.43 U		U	0.472	0.472	9.43 U		U
134	PW-MW-134-040714	14-Jul-04	REG	4.85	4.85	19.4 U		U	0.68	0.68	9.71 U		U	0.854	0.854	9.71 U		U	0.485	0.485	9.71 U		U
134	PW-MW-134-040714-FD	14-Jul-04	FD	4.85	4.85	19.4 U		U	0.68	0.68	9.71 U		U	0.854	0.854	9.71 U		U	0.485	0.485	9.71 U		U

Footnotes are shown on last page.

00045904

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				2-Chloronaphthalene					2-Chlorophenol					2-Methylnaphthalene					2-Methylphenol				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				91-58-7					95-57-8					91-57-6					95-48-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.388	0.388	0.971	<	U	0.398	0.398	9.71	<	U	0.485	0.485	0.971	<	U	0.437	0.437	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.388	0.388	0.971	<	U	0.398	0.398	9.71	<	U	0.485	0.485	0.971	<	U	0.437	0.437	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.396	0.396	0.99	U	U	0.406	0.406	9.9	U	U	0.495	0.495	0.99	U	U	0.446	0.446	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.377	0.377	0.943	U	U	0.387	0.387	9.43	U	U	0.472	0.472	0.943	U	U	0.425	0.425	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.385	0.385	0.962	U	U	0.394	0.394	9.62	U	U	0.481	0.481	0.962	U	U	0.433	0.433	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.392	0.392	0.98	<	U	0.402	0.402	9.8	<	U	0.49	0.49	0.98	<	U	0.441	0.441	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.388	0.388	0.971	<	U	0.398	0.398	9.71	<	U	0.485	0.485	0.971	<	U	0.437	0.437	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.396	0.396	0.99	<	U	0.406	0.406	9.9	<	U	0.495	0.495	0.99	<	U	0.446	0.446	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.392	0.392	0.98	<	U	0.402	0.402	9.8	<	U	0.49	0.49	0.98	<	U	0.441	0.441	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.396	0.396	0.99	U	U	0.406	0.406	9.9	U	U	0.495	0.495	0.99	U	U	0.446	0.446	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.4	0.4	1	U	U	0.41	0.41	10	U	U	0.5	0.5	1	U	U	0.45	0.45	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.377	0.377	0.943	U	U	0.387	0.387	9.43	U	U	0.472	0.472	0.943	U	U	0.425	0.425	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.377	0.377	0.943	U	U	0.387	0.387	9.43	U	U	0.472	0.472	0.943	U	U	0.425	0.425	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.388	0.388	0.971	U	U	0.398	0.398	9.71	U	U	0.485	0.485	0.971	U	U	0.437	0.437	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.388	0.388	0.971	U	U	0.398	0.398	9.71	U	U	0.485	0.485	0.971	U	U	0.437	0.437	9.71	U	U

Footnotes are shown on last page.

00045905

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				2-Nitroaniline					2-Nitrophenol					3,3'-Dichlorobenzidine					3,3'-Dimethylbenzidine				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				88-74-4					88-75-5					91-94-1					119-93-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.621	0.621	9.71	<	U	0.573	0.573	9.71	<	U	0.495	0.495	9.71	<	U	1.66	1.66	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.621	0.621	9.71	<	U	0.573	0.573	9.71	<	U	0.495	0.495	9.71	<	U	1.66	1.66	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.634	0.634	9.9	U	U	0.584	0.584	9.9	U	U	0.505	0.505	9.9	U	U	1.69	1.69	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.604	0.604	9.43	U	U	0.557	0.557	9.43	U	U	0.481	0.481	9.43	U	U	1.61	1.61	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.615	0.615	9.62	U	U	0.567	0.567	9.62	U	U	0.49	0.49	9.62	U	U	1.64	1.64	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.627	0.627	9.8	<	U	0.578	0.578	9.8	<	U	0.5	0.5	9.8	<	U	1.68	1.68	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.621	0.621	9.71	<	U	0.573	0.573	9.71	<	U	0.495	0.495	9.71	<	U	1.66	1.66	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.634	0.634	9.9	<	U	0.584	0.584	9.9	<	U	0.505	0.505	9.9	<	U	1.69	1.69	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.627	0.627	9.8	<	U	0.578	0.578	9.8	<	U	0.5	0.5	9.8	<	U	1.68	1.68	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.634	0.634	9.9	U	U	0.584	0.584	9.9	U	U	0.505	0.505	9.9	U	U	1.69	1.69	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.64	0.64	10	U	U	0.59	0.59	10	U	U	0.51	0.51	10	U	U	1.71	1.71	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.604	0.604	9.43	U	U	0.557	0.557	9.43	U	U	0.481	0.481	9.43	U	U	1.61	1.61	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.604	0.604	9.43	U	U	0.557	0.557	9.43	U	U	0.481	0.481	9.43	U	U	1.61	1.61	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.621	0.621	9.71	U	U	0.573	0.573	9.71	U	U	0.495	0.495	9.71	U	U	1.66	1.66	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.621	0.621	9.71	U	U	0.573	0.573	9.71	U	U	0.495	0.495	9.71	U	U	1.66	1.66	9.71	U	U

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00045906

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				3-Methylphenol and 4-Methylphenol					3-Nitroaniline					4,6-Dinitro-2-methylphenol					4-Bromophenyl phenyl ether				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				65794-96-9					99-09-2					534-52-1					101-55-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					0.971	0.971	9.71	<	U	0.971	0.971	9.71	<	U	1.18	1.18	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					0.971	0.971	9.71	<	U	0.971	0.971	9.71	<	U	1.18	1.18	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	not reported					0.99	0.99	9.9	U	U	0.99	0.99	9.9	U	U	1.21	1.21	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	not reported					0.943	0.943	9.43	U	U	0.943	0.943	9.43	U	U	1.15	1.15	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	not reported					0.962	0.962	9.62	U	U	0.962	0.962	9.62	U	U	1.17	1.17	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					0.98	0.98	9.8	<	U	0.98	0.98	9.8	<	U	1.2	1.2	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					0.971	0.971	9.71	<	U	0.971	0.971	9.71	<	U	1.18	1.18	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					0.99	0.99	9.9	<	U	0.99	0.99	9.9	<	U	1.21	1.21	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					0.98	0.98	9.8	<	U	0.98	0.98	9.8	<	U	1.2	1.2	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	not reported					0.99	0.99	9.9	U	U	0.99	0.99	9.9	U	U	1.21	1.21	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					1	1	10	U	U	1	1	10	U	U	1.22	1.22	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	not reported					0.943	0.943	9.43	U	U	0.943	0.943	9.43	U	U	1.15	1.15	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	not reported					0.943	0.943	9.43	U	U	0.943	0.943	9.43	U	U	1.15	1.15	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	not reported					0.971	0.971	9.71	U	U	0.971	0.971	9.71	U	U	1.18	1.18	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					0.971	0.971	9.71	U	U	0.971	0.971	9.71	U	U	1.18	1.18	9.71	U	U

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00045907

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				4-Chloro-3-methylphenol					4-Chloroaniline					4-Chlorophenyl phenyl ether					4-Methylphenol				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				59-50-7					106-47-8					7005-72-3					106-44-5				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.67	0.67	9.71	<	U	1.07	1.07	9.71	<	U	0.816	0.816	9.71	<	U	0.573	0.573	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.67	0.67	9.71	<	U	1.07	1.07	9.71	<	U	0.816	0.816	9.71	<	U	0.573	0.573	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.683	0.683	9.9	U	U	1.09	1.09	9.9	U	U	0.832	0.832	9.9	U	U	0.584	0.584	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.651	0.651	9.43	U	U	1.04	1.04	9.43	U	U	0.792	0.792	9.43	U	U	0.557	0.557	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.663	0.663	9.62	U	U	1.06	1.06	9.62	U	U	0.808	0.808	9.62	U	U	0.567	0.567	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.676	0.676	9.8	<	U	1.08	1.08	9.8	<	U	0.824	0.824	9.8	<	U	0.578	0.578	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.67	0.67	9.71	<	U	1.07	1.07	9.71	<	U	0.816	0.816	9.71	<	U	0.573	0.573	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.683	0.683	9.9	<	U	1.09	1.09	9.9	<	U	0.832	0.832	9.9	<	U	0.584	0.584	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.676	0.676	9.8	<	U	1.08	1.08	9.8	<	U	0.824	0.824	9.8	<	U	0.578	0.578	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.683	0.683	9.9	U	U	1.09	1.09	9.9	U	U	0.832	0.832	9.9	U	U	0.584	0.584	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.69	0.69	10	U	U	1.1	1.1	10	U	U	0.84	0.84	10	U	U	0.59	0.59	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.651	0.651	9.43	U	U	1.04	1.04	9.43	U	U	0.792	0.792	9.43	U	U	0.557	0.557	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.651	0.651	9.43	U	U	1.04	1.04	9.43	U	U	0.792	0.792	9.43	U	U	0.557	0.557	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.67	0.67	9.71	U	U	1.07	1.07	9.71	U	U	0.816	0.816	9.71	U	U	0.573	0.573	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.67	0.67	9.71	U	U	1.07	1.07	9.71	U	U	0.816	0.816	9.71	U	U	0.573	0.573	9.71	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				4-Nitroaniline					4-Nitrophenol					Acenaphthene					Acenaphthylene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				100-01-6					100-02-7					83-32-9					208-96-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.65	0.65	9.71	<	U	4.85	4.85	9.71	<	U	not reported					0.485	0.485	0.971	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.65	0.65	9.71	<	U	4.85	4.85	9.71	<	U	not reported					0.485	0.485	0.971	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.663	0.663	9.9	U	U	4.95	4.95	9.9	U	U	not reported					0.495	0.495	0.99	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.632	0.632	9.43	U	UJ	4.72	4.72	9.43	U	U	not reported					0.472	0.472	0.943	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.644	0.644	9.62	U	U	4.81	4.81	9.62	U	U	not reported					0.481	0.481	0.962	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.657	0.657	9.8	<	U	4.9	4.9	9.8	<	U	not reported					0.49	0.49	0.98	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.65	0.65	9.71	<	U	4.85	4.85	9.71	<	U	not reported					0.485	0.485	0.971	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.663	0.663	9.9	<	U	4.95	4.95	9.9	<	U	not reported					0.495	0.495	0.99	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.657	0.657	9.8	<	U	4.9	4.9	9.8	<	U	not reported					0.49	0.49	0.98	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.663	0.663	9.9	U	U	4.95	4.95	9.9	U	U	not reported					0.495	0.495	0.99	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.67	0.67	10	U	U	5	5	10	U	U	not reported					0.5	0.5	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.632	0.632	9.43	U	UJ	4.72	4.72	9.43	U	U	not reported					0.472	0.472	0.943	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.632	0.632	9.43	U	UJ	4.72	4.72	9.43	U	U	not reported					0.472	0.472	0.943	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.65	0.65	9.71	U	U	4.85	4.85	9.71	U	U	not reported					0.485	0.485	0.971	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.65	0.65	9.71	U	U	4.85	4.85	9.71	U	U	not reported					0.485	0.485	0.971	U	U

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00045909

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Acetophenone					Aniline					Anthracene					Benzidine				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				98-86-2					62-53-3					120-12-7					92-87-5				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.359	0.359	9.71	<	U	1.56	1.56	9.71	<	U	0.485	0.485	0.971	<	U	not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	0.359	0.359	9.71	<	U	1.56	1.56	9.71	<	U	0.485	0.485	0.971	<	U	not reported				
133	PW-MW-133-031203	3-Dec-03	REG	0.366	0.366	9.9	U	U	1.59	1.59	9.9	U	U	0.495	0.495	0.99	U	U	not reported				
133	PW-MW-133-040330	30-Mar-04	REG	0.349	0.349	9.43	U	U	1.52	1.52	9.43	U	U	0.472	0.472	0.943	U	U	not reported				
133	PW-MW-133-040714	14-Jul-04	REG	0.356	0.356	9.62	U	U	1.55	1.55	9.62	U	U	0.481	0.481	0.962	U	U	not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	0.363	0.363	9.8	<	U	1.58	1.58	9.8	<	U	0.49	0.49	0.98	<	U	not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.359	0.359	9.71	<	U	1.56	1.56	9.71	<	U	0.485	0.485	0.971	<	U	not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	0.366	0.366	9.9	<	U	1.59	1.59	9.9	<	U	0.495	0.495	0.99	<	U	not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.363	0.363	9.8	<	U	1.58	1.58	9.8	<	U	0.49	0.49	0.98	<	U	not reported				
134	PW-MW-134-031203	3-Dec-03	REG	0.366	0.366	9.9	U	U	1.59	1.59	9.9	U	U	0.495	0.495	0.99	U	U	not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	0.37	0.37	10	U	U	1.61	1.61	10	U	U	0.5	0.5	1	U	U	not reported				
134	134QC-040330-FD	30-Mar-04	FD	0.349	0.349	9.43	U	U	1.52	1.52	9.43	U	U	0.472	0.472	0.943	U	U	not reported				
134	PW-MW-134-040330	30-Mar-04	REG	0.349	0.349	9.43	U	U	1.52	1.52	9.43	U	U	0.472	0.472	0.943	U	U	not reported				
134	PW-MW-134-040714	14-Jul-04	REG	0.359	0.359	9.71	U	U	1.56	1.56	9.71	U	U	0.485	0.485	0.971	U	U	not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.359	0.359	9.71	U	U	1.56	1.56	9.71	U	U	0.485	0.485	0.971	U	U	not reported				

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00045910

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Benzo(a)anthracene					Benzo(a)pyrene					Benzo(b)fluoranthene					Benzo(ghi)perylene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				56-55-3					50-32-8					205-99-2					191-24-2				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.495	0.495	0.99	<	U	0.495	0.495	0.99	<	U	0.495	0.495	0.99	<	U	0.495	0.495	0.99	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.5	0.5	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U

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00045911

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Benzo(k)fluoranthene					Benzoic Acid					Benzyl Alcohol					bis(2-Chloroethoxy)methane					bis(2-Chloroethyl)ether				
Units				µg/L					µg/L					µg/L					µg/L					µg/L				
CAS Number				207-08-9					65-85-0					100-51-6					111-91-1					111-44-4				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.485	0.485	0.971	<	U	not reported					0.883	0.883	9.71	<	U	0.466	0.466	9.71	<	U	1.33	1.33	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.485	0.485	0.971	<	U	not reported					0.883	0.883	9.71	<	U	0.466	0.466	9.71	<	U	1.33	1.33	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.495	0.495	0.99	U	U	not reported					0.901	0.901	9.9	U	U	0.475	0.475	9.9	U	U	1.36	1.36	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	not reported					0.858	0.858	9.43	U	U	0.453	0.453	9.43	U	U	1.29	1.29	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.481	0.481	0.962	U	U	not reported					0.875	0.875	9.62	U	U	0.462	0.462	9.62	U	U	1.32	1.32	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.49	0.49	0.98	<	U	not reported					0.892	0.892	9.8	<	U	0.471	0.471	9.8	<	U	1.34	1.34	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.485	0.485	0.971	<	U	not reported					0.883	0.883	9.71	<	U	0.466	0.466	9.71	<	U	1.33	1.33	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.495	0.495	0.99	<	U	not reported					0.901	0.901	9.9	<	U	0.475	0.475	9.9	<	U	1.36	1.36	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.49	0.49	0.98	<	U	not reported					0.892	0.892	9.8	<	U	0.471	0.471	9.8	<	U	1.34	1.34	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.495	0.495	0.99	U	U	not reported					0.901	0.901	9.9	U	U	0.475	0.475	9.9	U	U	1.36	1.36	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.5	0.5	1	U	U	not reported					0.91	0.91	10	U	U	0.48	0.48	10	U	U	1.37	1.37	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.472	0.472	0.943	U	U	not reported					0.858	0.858	9.43	U	U	0.453	0.453	9.43	U	U	1.29	1.29	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	not reported					0.858	0.858	9.43	U	U	0.453	0.453	9.43	U	U	1.29	1.29	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.485	0.485	0.971	U	U	not reported					0.883	0.883	9.71	U	U	0.466	0.466	9.71	U	U	1.33	1.33	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.485	0.485	0.971	U	U	not reported					0.883	0.883	9.71	U	U	0.466	0.466	9.71	U	U	1.33	1.33	9.71	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				bis(2-Chloroisopropyl)ether					bis(2-Ethylhexyl)phthalate					Butyl benzyl phthalate					Carbazole				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				108-60-1					117-81-7					85-68-7					86-74-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					1.83	1.26	9.71		J	0.66	0.66	9.71	<	U	not reported				
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					5.35	1.26	9.71		J	0.66	0.66	9.71	<	U	not reported				
133	PW-MW-133-031203	3-Dec-03	REG	not reported					1.29	1.29	9.9	U	U	0.673	0.673	9.9	U	U	not reported				
133	PW-MW-133-040330	30-Mar-04	REG	not reported					1.23	1.23	9.43	U	U	0.642	0.642	9.43	U	U	not reported				
133	PW-MW-133-040714	14-Jul-04	REG	not reported					1.25	1.25	9.62	U	U	0.654	0.654	9.62	U	U	not reported				
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					4.23	1.27	9.8		J	0.667	0.667	9.8	<	U	not reported				
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					3.84	1.26	9.71		J	0.66	0.66	9.71	<	U	not reported				
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					1.98	1.29	9.9		J	0.673	0.673	9.9	<	U	not reported				
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					1.77	1.27	9.8		J	0.667	0.667	9.8	<	U	not reported				
134	PW-MW-134-031203	3-Dec-03	REG	not reported					1.29	1.29	9.9	U	U	0.673	0.673	9.9	U	U	not reported				
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					1.3	1.3	10	U	U	0.68	0.68	10	U	U	not reported				
134	134QC-040330-FD	30-Mar-04	FD	not reported					1.23	1.23	9.43	U	U	0.642	0.642	9.43	U	U	not reported				
134	PW-MW-134-040330	30-Mar-04	REG	not reported					1.23	1.23	9.43	U	U	0.642	0.642	9.43	U	U	not reported				
134	PW-MW-134-040714	14-Jul-04	REG	not reported					1.26	1.26	9.71	U	U	0.66	0.66	9.71	U	U	not reported				
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					1.26	1.26	9.71	U	U	0.66	0.66	9.71	U	U	not reported				

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Chlorobenzilate					Chrysene					Dibenzo(a,h)anthracene					Dibenzofuran				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				510-15-6					218-01-9					53-70-3					132-64-9				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.612	0.612	9.71	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.408	0.408	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.612	0.612	9.71	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.408	0.408	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.624	0.624	9.9	U	U	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U	0.416	0.416	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.594	0.594	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.396	0.396	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.606	0.606	9.62	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U	0.404	0.404	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.618	0.618	9.8	<	U	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U	0.412	0.412	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.612	0.612	9.71	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U	0.408	0.408	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.624	0.624	9.9	<	U	0.495	0.495	0.99	<	U	0.495	0.495	0.99	<	U	0.416	0.416	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.618	0.618	9.8	<	U	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U	0.412	0.412	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.624	0.624	9.9	U	U	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U	0.416	0.416	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.63	0.63	10	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U	0.42	0.42	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.594	0.594	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.396	0.396	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.594	0.594	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U	0.396	0.396	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.612	0.612	9.71	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U	0.408	0.408	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.612	0.612	9.71	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U	0.408	0.408	9.71	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Diethyl phthalate					Dimethyl phthalate					di-n-Butyl phthalate					di-n-Octyl phthalate				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				84-66-2					131-11-3					84-74-2					117-84-0				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.864	0.864	9.71	<	U	0.515	0.515	9.71	<	U	0.971	0.971	9.71	<	U	0.845	0.845	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.864	0.864	9.71	<	U	0.515	0.515	9.71	<	U	0.971	0.971	9.71	<	U	0.845	0.845	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.881	0.881	9.9	U	U	0.525	0.525	9.9	U	U	0.99	0.99	9.9	U	U	0.861	0.861	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.84	0.84	9.43	U	U	0.5	0.5	9.43	U	U	0.943	0.943	9.43	U	U	0.821	0.821	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.856	0.856	9.62	U	U	0.51	0.51	9.62	U	U	0.962	0.962	9.62	U	U	0.837	0.837	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.873	0.873	9.8	<	U	0.52	0.52	9.8	<	U	0.98	0.98	9.8	<	U	0.853	0.853	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.864	0.864	9.71	<	U	0.515	0.515	9.71	<	U	0.971	0.971	9.71	<	U	0.845	0.845	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.881	0.881	9.9	<	U	0.525	0.525	9.9	<	U	0.99	0.99	9.9	<	U	0.861	0.861	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.873	0.873	9.8	<	U	0.52	0.52	9.8	<	U	0.98	0.98	9.8	<	U	0.853	0.853	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.881	0.881	9.9	U	U	0.525	0.525	9.9	U	U	0.99	0.99	9.9	U	U	0.861	0.861	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.89	0.89	10	U	U	0.53	0.53	10	U	U	1	1	10	U	U	0.87	0.87	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.84	0.84	9.43	U	U	0.5	0.5	9.43	U	U	0.943	0.943	9.43	U	U	0.821	0.821	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.84	0.84	9.43	U	U	0.5	0.5	9.43	U	U	0.943	0.943	9.43	U	U	0.821	0.821	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.864	0.864	9.71	U	U	0.515	0.515	9.71	U	U	0.971	0.971	9.71	U	U	0.845	0.845	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.864	0.864	9.71	U	U	0.515	0.515	9.71	U	U	0.971	0.971	9.71	U	U	0.845	0.845	9.71	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Diphenylamine					Ethyl methanesulfonate					Fluoranthene					Fluorene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				122-39-4					62-50-0					206-44-0					86-73-7				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.767	0.767	9.71	<	U	0.951	0.951	9.71	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.767	0.767	9.71	<	U	0.951	0.951	9.71	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.782	0.782	9.9	U	U	0.97	0.97	9.9	U	U	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.745	0.745	9.43	U	U	0.925	0.925	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.76	0.76	9.62	U	U	0.942	0.942	9.62	U	U	0.481	0.481	0.962	U	U	0.481	0.481	0.962	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.775	0.775	9.8	<	U	0.961	0.961	9.8	<	U	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.767	0.767	9.71	<	U	0.951	0.951	9.71	<	U	0.485	0.485	0.971	<	U	0.485	0.485	0.971	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.782	0.782	9.9	<	U	0.97	0.97	9.9	<	U	0.495	0.495	0.99	<	U	0.495	0.495	0.99	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.775	0.775	9.8	<	U	0.961	0.961	9.8	<	U	0.49	0.49	0.98	<	U	0.49	0.49	0.98	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.782	0.782	9.9	U	U	0.97	0.97	9.9	U	U	0.495	0.495	0.99	U	U	0.495	0.495	0.99	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.79	0.79	10	U	U	0.98	0.98	10	U	U	0.5	0.5	1	U	U	0.5	0.5	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.745	0.745	9.43	U	U	0.925	0.925	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.745	0.745	9.43	U	U	0.925	0.925	9.43	U	U	0.472	0.472	0.943	U	U	0.472	0.472	0.943	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.767	0.767	9.71	U	U	0.951	0.951	9.71	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.767	0.767	9.71	U	U	0.951	0.951	9.71	U	U	0.485	0.485	0.971	U	U	0.485	0.485	0.971	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Hexachlorobenzene					Hexachlorobutadiene					Hexachlorocyclopentadiene					Hexachloroethane				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				118-74-1					87-68-3					77-47-4					67-72-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.631	0.631	9.71	<	U	not reported					0.971	0.971	9.71	<	U	0.417	0.417	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.631	0.631	9.71	<	U	not reported					0.971	0.971	9.71	<	U	0.417	0.417	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.644	0.644	9.9	U	U	not reported					0.99	0.99	9.9	U	U	0.426	0.426	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.613	0.613	9.43	U	U	not reported					0.943	0.943	9.43	U	U	0.406	0.406	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.625	0.625	9.62	U	U	not reported					0.962	0.962	9.62	U	U	0.413	0.413	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.637	0.637	9.8	<	U	not reported					0.98	0.98	9.8	<	U	0.422	0.422	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.631	0.631	9.71	<	U	not reported					0.971	0.971	9.71	<	U	0.417	0.417	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.644	0.644	9.9	<	U	not reported					0.99	0.99	9.9	<	U	0.426	0.426	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.637	0.637	9.8	<	U	not reported					0.98	0.98	9.8	<	U	0.422	0.422	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.644	0.644	9.9	U	U	not reported					0.99	0.99	9.9	U	U	0.426	0.426	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.65	0.65	10	U	U	not reported					1	1	10	U	U	0.43	0.43	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.613	0.613	9.43	U	U	not reported					0.943	0.943	9.43	U	U	0.406	0.406	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.613	0.613	9.43	U	U	not reported					0.943	0.943	9.43	U	U	0.406	0.406	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.631	0.631	9.71	U	U	not reported					0.971	0.971	9.71	U	U	0.417	0.417	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.631	0.631	9.71	U	U	not reported					0.971	0.971	9.71	U	U	0.417	0.417	9.71	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Indeno(1,2,3-cd)pyrene					Isophorone					m-Cresol					Methyl methanesulfonate				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				193-39-5					78-59-1					108-39-4					66-27-3				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.485	0.485	0.971	<	U	not reported					not reported					0.786	0.786	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.485	0.485	0.971	<	U	not reported					not reported					0.786	0.786	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.495	0.495	0.99	U	U	not reported					not reported					0.802	0.802	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	not reported					not reported					0.764	0.764	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.481	0.481	0.962	U	U	not reported					not reported					0.779	0.779	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.49	0.49	0.98	<	U	not reported					not reported					0.794	0.794	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.485	0.485	0.971	<	U	not reported					not reported					0.786	0.786	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.495	0.495	0.99	<	U	not reported					not reported					0.802	0.802	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.49	0.49	0.98	<	U	not reported					not reported					0.794	0.794	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.495	0.495	0.99	U	U	not reported					not reported					0.802	0.802	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.5	0.5	1	U	U	not reported					not reported					0.81	0.81	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.472	0.472	0.943	U	U	not reported					not reported					0.764	0.764	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.472	0.472	0.943	U	U	not reported					not reported					0.764	0.764	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.485	0.485	0.971	U	U	not reported					not reported					0.786	0.786	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.485	0.485	0.971	U	U	not reported					not reported					0.786	0.786	9.71	U	U

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Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Naphthalene					Nitrobenzene					n-Nitrosodiethylamine					n-Nitrosodimethylamine				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				91-20-3					98-95-3					55-18-5					62-75-9				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	not reported					0.612	0.612	9.71	<	U	4.85	4.85	9.71	<	U	4.85	4.85	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	not reported					0.612	0.612	9.71	<	U	4.85	4.85	9.71	<	U	4.85	4.85	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	not reported					0.624	0.624	9.9	U	U	4.95	4.95	9.9	U	U	4.95	4.95	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	not reported					0.594	0.594	9.43	U	U	4.72	4.72	9.43	U	U	4.72	4.72	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	not reported					0.606	0.606	9.62	U	U	0.76	0.76	9.62	U	U	4.81	4.81	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	not reported					0.618	0.618	9.8	<	U	4.9	4.9	9.8	<	U	4.9	4.9	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	not reported					0.612	0.612	9.71	<	U	4.85	4.85	9.71	<	U	4.85	4.85	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	not reported					0.624	0.624	9.9	<	U	4.95	4.95	9.9	<	U	4.95	4.95	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	not reported					0.618	0.618	9.8	<	U	4.9	4.9	9.8	<	U	4.9	4.9	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	not reported					0.624	0.624	9.9	U	U	4.95	4.95	9.9	U	U	4.95	4.95	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	not reported					0.63	0.63	10	U	U	5	5	10	U	U	5	5	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	not reported					0.594	0.594	9.43	U	U	4.72	4.72	9.43	U	U	4.72	4.72	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	not reported					0.594	0.594	9.43	U	U	4.72	4.72	9.43	U	U	4.72	4.72	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	not reported					0.612	0.612	9.71	U	U	0.767	0.767	9.71	U	U	4.85	4.85	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	not reported					0.612	0.612	9.71	U	U	0.767	0.767	9.71	U	U	4.85	4.85	9.71	U	U

Footnotes are shown on last page.

00045919

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				n-Nitrosodi-n-butylamine					n-Nitroso-di-n-propylamine					n-Nitrosodiphenylamine					Pentachlorobenzene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				924-16-3					621-64-7					86-30-6					608-93-5				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	1.04	1.04	9.71	<	U	0.728	0.728	9.71	<	U	not reported					1.17	1.17	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	1.04	1.04	9.71	<	U	0.728	0.728	9.71	<	U	not reported					1.17	1.17	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	1.06	1.06	9.9	U	U	0.743	0.743	9.9	U	U	not reported					1.19	1.19	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	1.01	1.01	9.43	U	U	0.708	0.708	9.43	U	U	not reported					1.13	1.13	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	1.03	1.03	9.62	U	U	0.721	0.721	9.62	U	U	not reported					1.15	1.15	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	1.05	1.05	9.8	<	U	0.735	0.735	9.8	<	U	not reported					1.18	1.18	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	1.04	1.04	9.71	<	U	0.728	0.728	9.71	<	U	not reported					1.17	1.17	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	1.06	1.06	9.9	<	U	0.743	0.743	9.9	<	U	not reported					1.19	1.19	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	1.05	1.05	9.8	<	U	0.735	0.735	9.8	<	U	not reported					1.18	1.18	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	1.06	1.06	9.9	U	U	0.743	0.743	9.9	U	U	not reported					1.19	1.19	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	1.07	1.07	10	U	U	0.75	0.75	10	U	U	not reported					1.2	1.2	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	1.01	1.01	9.43	U	U	0.708	0.708	9.43	U	U	not reported					1.13	1.13	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	1.01	1.01	9.43	U	U	0.708	0.708	9.43	U	U	not reported					1.13	1.13	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	1.04	1.04	9.71	U	U	0.728	0.728	9.71	U	U	not reported					1.17	1.17	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	1.04	1.04	9.71	U	U	0.728	0.728	9.71	U	U	not reported					1.17	1.17	9.71	U	U

Footnotes are shown on last page.

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Pentachloronitrobenzene					Pentachlorophenol					Phenacetin					Phenanthrene				
Units				µg/L					µg/L					µg/L					µg/L				
CAS Number				82-68-8					87-86-5					62-44-2					85-01-8				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	1.92	1.92	9.71	<	U	4.85	4.85	9.71	<	U	1.72	1.72	9.71	<	U	0.485	0.485	0.971	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	1.92	1.92	9.71	<	U	4.85	4.85	9.71	<	U	1.72	1.72	9.71	<	U	0.485	0.485	0.971	<	U
133	PW-MW-133-031203	3-Dec-03	REG	1.96	1.96	9.9	U	U	4.95	4.95	9.9	U	U	1.75	1.75	9.9	U	U	0.495	0.495	0.99	U	U
133	PW-MW-133-040330	30-Mar-04	REG	1.87	1.87	9.43	U	U	4.72	4.72	9.43	U	U	1.67	1.67	9.43	U	U	0.472	0.472	0.943	U	U
133	PW-MW-133-040714	14-Jul-04	REG	1.9	1.9	9.62	U	U	4.81	4.81	9.62	U	U	1.7	1.7	9.62	U	U	0.481	0.481	0.962	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	1.94	1.94	9.8	<	U	4.9	4.9	9.8	<	U	1.74	1.74	9.8	<	U	0.49	0.49	0.98	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	1.92	1.92	9.71	<	U	4.85	4.85	9.71	<	U	1.72	1.72	9.71	<	U	0.485	0.485	0.971	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	1.96	1.96	9.9	<	U	4.95	4.95	9.9	<	U	1.75	1.75	9.9	<	U	0.495	0.495	0.99	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	1.94	1.94	9.8	<	U	4.9	4.9	9.8	<	U	1.74	1.74	9.8	<	U	0.49	0.49	0.98	<	U
134	PW-MW-134-031203	3-Dec-03	REG	1.96	1.96	9.9	U	U	4.95	4.95	9.9	U	U	1.75	1.75	9.9	U	U	0.495	0.495	0.99	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	1.98	1.98	10	U	U	5	5	10	U	U	1.77	1.77	10	U	U	0.5	0.5	1	U	U
134	134QC-040330-FD	30-Mar-04	FD	1.87	1.87	9.43	U	U	4.72	4.72	9.43	U	U	1.67	1.67	9.43	U	U	0.472	0.472	0.943	U	U
134	PW-MW-134-040330	30-Mar-04	REG	1.87	1.87	9.43	U	U	4.72	4.72	9.43	U	U	1.67	1.67	9.43	U	U	0.472	0.472	0.943	U	U
134	PW-MW-134-040714	14-Jul-04	REG	1.92	1.92	9.71	U	U	4.85	4.85	9.71	U	U	1.72	1.72	9.71	U	U	0.485	0.485	0.971	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	1.92	1.92	9.71	U	U	4.85	4.85	9.71	U	U	1.72	1.72	9.71	U	U	0.485	0.485	0.971	U	U

Footnotes are shown on last page.

00045921

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Phenol					Pyrene					Pyridine				
Units				µg/L					µg/L					µg/L				
CAS Number				108-95-2					129-00-0					110-86-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.291	0.291	9.71	<	U	0.485	0.485	0.971	<	U	4.85	4.85	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.291	0.291	9.71	<	U	0.485	0.485	0.971	<	U	4.85	4.85	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.297	0.297	9.9	U	U	0.495	0.495	0.99	U	U	4.95	4.95	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.283	0.283	9.43	U	U	0.472	0.472	0.943	U	U	4.72	4.72	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.288	0.288	9.62	U	U	0.481	0.481	0.962	U	U	4.81	4.81	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.294	0.294	9.8	<	U	0.49	0.49	0.98	<	U	4.9	4.9	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.291	0.291	9.71	<	U	0.485	0.485	0.971	<	U	4.85	4.85	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.297	0.297	9.9	<	U	0.495	0.495	0.99	<	U	4.95	4.95	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.294	0.294	9.8	<	U	0.49	0.49	0.98	<	U	4.9	4.9	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.297	0.297	9.9	U	U	0.495	0.495	0.99	U	U	4.95	4.95	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.3	0.3	10	U	U	0.5	0.5	1	U	U	5	5	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.283	0.283	9.43	U	U	0.472	0.472	0.943	U	U	4.72	4.72	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.283	0.283	9.43	U	U	0.472	0.472	0.943	U	U	4.72	4.72	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.291	0.291	9.71	U	U	0.485	0.485	0.971	U	U	4.85	4.85	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.291	0.291	9.71	U	U	0.485	0.485	0.971	U	U	4.85	4.85	9.71	U	U

Footnotes are shown on last page.

00045922

Table 3-3
Concentrations of Chemicals in Groundwater from Intermediate Depth Wells - SVOCs

Parameter				Phenol					Pyrene					Pyridine				
Units				µg/L					µg/L					µg/L				
CAS Number				108-95-2					129-00-0					110-86-1				
Location	Sample	Date	Type	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ	Result	MDL	RLimit	LQ	VQ
133	PW-MW-133D-030618	18-Jun-03	REG	0.291	0.291	9.71	<	U	0.485	0.485	0.971	<	U	4.85	4.85	9.71	<	U
133	PW-MW-133D-030819	19-Aug-03	REG	0.291	0.291	9.71	<	U	0.485	0.485	0.971	<	U	4.85	4.85	9.71	<	U
133	PW-MW-133-031203	3-Dec-03	REG	0.297	0.297	9.9	U	U	0.495	0.495	0.99	U	U	4.95	4.95	9.9	U	U
133	PW-MW-133-040330	30-Mar-04	REG	0.283	0.283	9.43	U	U	0.472	0.472	0.943	U	U	4.72	4.72	9.43	U	U
133	PW-MW-133-040714	14-Jul-04	REG	0.288	0.288	9.62	U	U	0.481	0.481	0.962	U	U	4.81	4.81	9.62	U	U
134	PW-MW-134DD-030618	18-Jun-03	REG	0.294	0.294	9.8	<	U	0.49	0.49	0.98	<	U	4.9	4.9	9.8	<	U
134	PW-MW-134QCDD-030618	18-Jun-03	FD	0.291	0.291	9.71	<	U	0.485	0.485	0.971	<	U	4.85	4.85	9.71	<	U
134	PW-MW-134DD-030819	19-Aug-03	REG	0.297	0.297	9.9	<	U	0.495	0.495	0.99	<	U	4.95	4.95	9.9	<	U
134	PW-MW-134QCDD-030819	19-Aug-03	FD	0.294	0.294	9.8	<	U	0.49	0.49	0.98	<	U	4.9	4.9	9.8	<	U
134	PW-MW-134-031203	3-Dec-03	REG	0.297	0.297	9.9	U	U	0.495	0.495	0.99	U	U	4.95	4.95	9.9	U	U
134	PW-MW-134QC-031203	3-Dec-03	FD	0.3	0.3	10	U	U	0.5	0.5	1	U	U	5	5	10	U	U
134	134QC-040330-FD	30-Mar-04	FD	0.283	0.283	9.43	U	U	0.472	0.472	0.943	U	U	4.72	4.72	9.43	U	U
134	PW-MW-134-040330	30-Mar-04	REG	0.283	0.283	9.43	U	U	0.472	0.472	0.943	U	U	4.72	4.72	9.43	U	U
134	PW-MW-134-040714	14-Jul-04	REG	0.291	0.291	9.71	U	U	0.485	0.485	0.971	U	U	4.85	4.85	9.71	U	U
134	PW-MW-134-040714-FD	14-Jul-04	FD	0.291	0.291	9.71	U	U	0.485	0.485	0.971	U	U	4.85	4.85	9.71	U	U

Notes and Abbreviations:

Shading indicates background metal

< - chemical concentration is less than amount reported

B	chemical detected in laboratory blank
CAS	chemical abstracts service
FD	field duplicate
J	estimated concentration
LQ	data qualifier reported by laboratory
L	value contains low bias
MDL	analytical method detection limit reported by laboratory
REG	regular sample
Rlimit	analytical reporting limit reported by laboratory
SVOC	semivolatile organic compound
U	undetected concentration
UJ	undetected concentration
UJL	undetected concentration
ug/L	micrograms per liter
VOC	volatile organic compound
VQ	data qualifier applied during data validation with same meanings as LQ

00045923

Table 3-4
Detection of Chemicals Not Related to Background in Groundwater from Shallow Wells

Chemical Name				Acetone			Nitrate/Nitrite			o-Nitrotoluene			m-Nitrotoluene			Chloromethane			Methylene chloride			di-n-Butyl phthalate		
CAS No.				95-50-1			39018			88-72-2			99-08-01			74-87-3			75-09-2			84-74-2		
Units = µg/L																								
Location	Sample	Date	Type	Detected	J-Qualified	MCL	Detected	J-Qualified	MCL	Detected	J-Qualified	MCL	Detected	J-Qualified	MCL	Detected	J-Qualified	MCL	Detected	J-Qualified	MCL	Detected	J-Qualified	MCL
110	PW-MW-110-031203	12/03/2003	REG																					
110	PW-MW-110-040331	03/31/2004	REG																					
110	PW-MW-110-040715	07/15/2004	REG	9.57		NE				0.774		NE				1.3		NE						
110	PW-MW-110-040915	09/15/2004	REG																					
110	PW-MW-110-041216	12/16/2004	REG																					
111	PW-MW-111-031204	12/04/2003	REG																			1.36		NE
111	PW-MW-111-040331	03/31/2004	REG																					
111	PW-MW-111-040715	07/15/2004	REG				10		10,000				0.521		NE	1.21		NE						
111	PW-MW-111-041216	12/16/2004	REG																					
112	PW-MW-112-031204	12/04/2003	REG																					
112	PW-MW-112-040330	03/30/2004	REG																					
112	PW-MW-112-040714	07/14/2004	REG	10.3		NE											0.948	NE		3.29	5			
112	PW-MW-112-040915	09/15/2004	REG																					
112	PW-MW-112-041216	12/16/2004	REG																					

Notes and Abbreviations:

CAS chemical abstracts service
J-Qualified estimated concentration
MCL Maximum Contaminant Level established by the Safe Drinking Water Act
NE not established

00045924

Table 5-1

Summary Statistics for Perimeter Well Groundwater Data - Unfiltered Samples [a]

Chemical	Detection Frequency	Percent Detections	Range of Values, µg/L: Detected Concentrations Minimum - Maximum	Range of Values, µg/L: Reporting Limits Minimum - Maximum	Statistical Distribution [b]	Mean µg/L	Median µg/L	95% UCL µg/L [c]	95% UTL µg/L [d]
Total Metals									
Aluminum	12 / 13	92	98.9 - 1990	100 - 2000	L	4.53E+02	2.72E+02	7.16E+02	2.68E+03
Antimony	3 / 13	23	2.79 - 11.5	10 - 10	NP	5.49E+00	5.08E+00	6.65E+00	1.15E+01
Arsenic [e,f]	1 / 13	8	0.167 - 0.167	5 - 100	NP	2.08E+00	2.24E+00	2.24E+00	1.67E-01
Barium	13 / 13	100	14.5 - 128	5 - 5	NP	4.05E+01	2.56E+01	6.07E+01	1.28E+02
Beryllium	6 / 13	46	0.202 - 0.851	5 - 5	NP	2.88E-01	1.58E-01	3.97E-01	8.51E-01
Cadmium	8 / 13	62	0.368 - 2.29	2 - 2	NP	6.39E-01	4.49E-01	8.67E-01	2.29E+00
Calcium	13 / 13	100	2980 - 302000	100 - 100	NP	1.68E+05	2.05E+05	2.04E+05	3.02E+05
Chromium	9 / 13	69	0.634 - 8.09	5 - 5	L	1.98E+00	9.69E-01	3.25E+00	1.58E+01
Cobalt	13 / 13	100	1.26 - 32.1	5 - 5	L	1.28E+01	7.43E+00	1.92E+01	1.51E+02
Copper	5 / 13	38	1.26 - 3.22	5 - 5	NP	1.55E+00	1.39E+00	1.83E+00	3.22E+00
Iron	13 / 13	100	147 - 2310	100 - 2000	L	7.00E+02	5.56E+02	8.87E+02	4.01E+03
Magnesium	13 / 13	100	3000 - 331000	100 - 100	N	1.64E+05	1.41E+05	2.19E+05	4.62E+05
Manganese	13 / 13	100	67.7 - 5570	10 - 10	N	2.90E+03	3.35E+03	3.81E+03	7.82E+03
Mercury	1 / 13	8	0.0793 - 0.0793	0.2 - 0.2	NP	4.97E-02	4.72E-02	5.21E-02	7.93E-02
Nickel	13 / 13	100	4.84 - 92	5 - 5	L	3.05E+01	2.66E+01	3.95E+01	2.11E+02
Potassium	13 / 13	100	128 - 2740	100 - 2000	NP	1.71E+03	2.04E+03	2.19E+03	2.74E+03
Selenium [e]	6 / 13	46	13.6 - 46.1	5 - 100	NP	1.33E+01	2.81E+00	2.01E+01	4.61E+01
Silver	4 / 13	31	0.901 - 1.91	5 - 5	NP	9.94E-01	8.35E-01	1.21E+00	1.91E+00
Strontium	13 / 13	100	101 - 7330	5 - 5	NP	4.26E+03	5.18E+03	5.17E+03	7.33E+03
Vanadium	7 / 13	54	0.86 - 3.99	5 - 5	NP	1.13E+00	8.60E-01	1.66E+00	3.99E+00
Zinc	11 / 13	85	3.61 - 22.9	5 - 5	N	1.09E+01	1.16E+01	1.44E+01	3.02E+01
Anions									
Chloride	13 / 13	100	2070 - 1930000	200 - 20000	N	9.74E+05	1.03E+06	1.28E+06	2.64E+06
Nitrate / Nitrite [e]	1 / 13	8	10 - 10	20 - 250	NP	6.77E+00	1.00E+01	8.38E+00	1.00E+01
Sulfate	13 / 13	100	18400 - 2400000	400 - 40000	N	1.06E+06	1.01E+06	1.43E+06	3.06E+06

Notes and Abbreviations:

[a] Groundwater samples were not filtered before analysis.

[b] L = Lognormal distribution; N = Normal distribution; NP = Nonparametric distribution for those samples that fail normal and lognormal distribution.

[c] 95% Upper confidence limit (UCL) calculated for chemicals with lognormal, normal, or nonparametric statistical distribution.
UCLs for lognormal and nonparametric distributions are calculated using bootstrapping (2000 replications); UCLs for normal distribution are calculated using the Student's T-test.

[d] 95% Upper tolerance limit (UTL) calculated using EPA, 1989, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,* Interim Final Guidance, Office of Solid Waste Management, Washington, DC, April. If greater than 15% of the data are nondetects, or if the data distribution is undefined, the maximum detected concentration is used as the UTL.

[e] Samples analyzed for arsenic, selenium, and nitrate/nitrite had dilution factors greater than the dilution factor of the maximum detected concentration (MDC), which would cause the 95% UCL to exceed the MDC. Therefore, the 95% UCL was calculated using the lowest method detection limit of nondiluted samples as the surrogate value for the nondetected diluted samples. The mean, median, UCL, and UTL represent those of the revised dataset.

[f] The mean, median, and UCL are higher than the MDC for arsenic because the undiluted method detection limit used as the surrogate value for the 12 nondetect samples (2.24 µg/L; see footnote "e") is higher than the MDC (0.167 µg/L).

µg/L microgram per liter

00045925

Table 5-2

Summary Statistics for Perimeter Well Groundwater Data - Filtered Samples[a]

Chemical	Detection Frequency	Percent Detections	Range of Values, µg/L: Detected Concentrations Minimum - Maximum	Range of Values, µg/L: Reporting Limits Minimum - Maximum	Statistical Distribution[b]	Mean µg/L	Median µg/L	95% UCL µg/L[c]	95% UTL µg/L[d]
Dissolved Metals									
Aluminum	12 / 13	92	40.4 - 821	100 - 2000	L	2.32E+02	1.17E+02	3.72E+02	1.86E+03
Antimony	8 / 13	62	3.55 - 10.5	10 - 10	N	6.74E+00	6.84E+00	7.75E+00	1.22E+01
Arsenic	3 / 13	23	0.685 - 62.1	5 - 100	L	1.64E+01	1.12E+01	2.90E+01	3.42E+02
Barium	13 / 13	100	13.4 - 120	5 - 5	NP	3.88E+01	2.64E+01	5.04E+01	1.20E+02
Beryllium	4 / 13	31	0.26 - 0.813	5 - 5	NP	2.58E-01	1.58E-01	3.66E-01	8.13E-01
Cadmium	10 / 13	77	0.32 - 5.1	2 - 2	NP	9.32E-01	4.39E-01	1.62E+00	5.10E+00
Calcium	13 / 13	100	2950 - 301000	100 - 100	NP	1.68E+05	2.05E+05	2.03E+05	3.01E+05
Chromium	10 / 13	77	0.599 - 4.02	5 - 5	L	1.17E+00	8.04E-01	1.71E+00	5.12E+00
Cobalt	12 / 13	92	1.79 - 29.9	5 - 5	L	1.21E+01	5.97E+00	1.81E+01	1.87E+02
Copper	6 / 13	46	1.46 - 2.39	5 - 5	NP	1.59E+00	1.39E+00	1.76E+00	2.39E+00
Iron	11 / 13	85	25 - 1010	100 - 2000	L	3.26E+02	2.23E+02	5.13E+02	4.23E+03
Lead[e]	1 / 13	8	2.4 - 2.4	4 - 100	NP	1.77E+00	1.72E+00	1.82E+00	2.40E+00
Magnesium	13 / 13	100	2710 - 330000	100 - 100	N	1.63E+05	1.45E+05	2.18E+05	4.59E+05
Manganese	13 / 13	100	64 - 5860	10 - 10	N	2.87E+03	2.93E+03	3.79E+03	7.84E+03
Nickel	13 / 13	100	4.68 - 93	5 - 5	L	3.05E+01	2.48E+01	3.72E+01	2.29E+02
Potassium	13 / 13	100	120 - 2980	100 - 2000	NP	1.70E+03	2.20E+03	2.09E+03	2.98E+03
Selenium	9 / 13	69	2.86 - 58.7	5 - 100	N	1.93E+01	2.24E+01	2.75E+01	6.35E+01
Silver	3 / 13	23	0.984 - 1.92	5 - 5	NP	9.56E-01	8.35E-01	1.11E+00	1.92E+00
Strontium	13 / 13	100	97.6 - 7200	5 - 5	NP	4.31E+03	5.23E+03	5.25E+03	7.20E+03
Vanadium	5 / 13	38	0.84 - 1.16	5 - 5	NP	7.55E-01	6.06E-01	8.51E-01	1.16E+00
Zinc	12 / 13	92	5.67 - 54.3	5 - 5	N	2.02E+01	1.84E+01	2.74E+01	5.92E+01

Notes and Abbreviations:

[a] Groundwater samples were filtered for analysis of dissolved concentrations.

[b] L = Lognormal distribution; N = Normal distribution; NP = Nonparametric distribution for those samples that fail normal and lognormal distribution.

[c] 95% Upper confidence limit (UCL) calculated for chemicals with lognormal, normal, or nonparametric statistical distribution.

UCLs for lognormal and nonparametric distributions are calculated using bootstrapping (2000 replications); UCLs for normal distribution are calculated using the Student's T-test.

[d] 95% Upper tolerance limit (UTL) calculated using EPA, 1989, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,* Interim Final Guidance, Office of Solid Waste Management, Washington, DC, April. If greater than 15% of the data are nondetects, or if the data distribution is undefined, the maximum detected concentration is used as the UTL.

[e] Samples analyzed for lead had dilution factors greater than the dilution factor of the maximum detected concentration (MDC), which would cause the 95% UCL to exceed the MDC. Therefore, the 95% UCL was calculated using the lowest method detection limit of nondiluted samples as the surrogate value for the nondetected diluted samples. The mean, median, UCL, and UTL represent those of the revised dataset.

µg/L micrograms per liter

00045926

Table 5-3
Calculations of Upper Confidence Limits and Upper Tolerance Limits
for Unfiltered Perimeter Well Groundwater Concentrations[a]

	Aluminum (Undissolved) Concentration (µg/L)	Antimony (Undissolved) Concentration (µg/L)	Arsenic (Undissolved) Concentration (µg/L)	Barium (Undissolved) Concentration (µg/L)
Results	147	5.08	2.24	128
	1990	5.08	2.24	95
	769	5.08	2.24	92.4
	652	5.08	2.24	29.7
	459	5.08	2.24	27.1
	324	5.08	2.24	26.9
	323	5.08	2.24	25.6
	272	5.08	2.24	25.5
	252	5.08	2.24	16.3
	243	5.08	2.24	16
	195	11.5	2.24	15.4
	159	6.27	2.24	14.6
	98.9	2.79	0.167	14.5
Distribution Type	Lognormal	Nonparametric	Nonparametric	Nonparametric
Sample size	13	13	13	13
Median (µg/L)	2.72E+02	5.08E+00	2.24E+00	2.56E+01
95% UCL (µg/L)- Bootstrapping [b]	7.16E+02	6.65E+00	2.24E+00	6.07E+01
95% UCL (µg/L)- T-test [c]	NA	NA	NA	NA
95% UTL (µg/L) [d]	2.68E+03	Nonparametric distribution; use MDL	Nonparametric distribution; use MDL	Nonparametric distribution; use MDC
Maximum detected concentration (µg/L) [e]	1.99E+03	5.08E+00	2.24E+00	1.28E+02

See footnotes at end of table.

00045927

Table 5-3
Calculations of Upper Confidence Limits and Upper Tolerance Limits
for Unfiltered Perimeter Well Groundwater Concentrations[a]

	Beryllium (Undissolved) Concentration (µg/L)	Cadmium (Undissolved) Concentration (µg/L)	Calcium (Undissolved) Concentration (µg/L)	Chromium (Undissolved) Concentration (µg/L)
Results	0.158	0.313	302000	0.503
	0.158	0.313	233000	0.503
	0.158	0.313	223000	0.503
	0.158	0.313	221000	0.503
	0.158	0.313	210000	8.09
	0.158	2.29	209000	3.94
	0.158	1.41	205000	3.94
	0.851	0.642	191000	2.68
	0.584	0.622	190000	1.34
	0.426	0.502	186000	1.34
	0.322	0.46	4970	0.969
	0.258	0.449	3710	0.738
	0.202	0.368	2980	0.634
Distribution Type	Nonparametric	Nonparametric	Nonparametric	Lognormal
Sample size	13	13	13	13
Median (µg/L)	1.58E-01	4.49E-01	2.05E+05	9.69E-01
95% UCL (µg/L)- Bootstrapping [b]	3.97E-01	8.67E-01	2.04E+05	3.25E+00
95% UCL (µg/L)- T-test [c]	NA	NA	NA	NA
95% UTL (µg/L) [d]	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	1.58E+01
Maximum detected concentration (µg/L) [e]	8.51E-01	2.29E+00	3.02E+05	8.09E+00

See footnotes at end of table.

00045928

Table 5-3
Calculations of Upper Confidence Limits and Upper Tolerance Limits
for Unfiltered Perimeter Well Groundwater Concentrations[a]

	Cobalt (Undissolved) Concentration (µg/L)	Copper (Undissolved) Concentration (µg/L)	Iron (Undissolved) Concentration (µg/L)	Magnesium (Undissolved) Concentration (µg/L)
Results	32.1	1.39	2310	331000
	30	1.39	1230	292000
	29.1	1.39	952	263000
	27.7	1.39	938	252000
	12.1	1.39	586	234000
	7.59	1.39	561	210000
	7.43	1.39	556	141000
	6.45	1.39	523	137000
	4.09	3.22	467	130000
	3.58	1.63	375	128000
	2.86	1.46	240	4600
	1.79	1.41	214	3340
	1.26	1.26	147	3000
Distribution Type	Lognormal	Nonparametric	Lognormal	Normal
Sample size	13	13	13	13
Median (µg/L)	7.43E+00	1.39E+00	5.56E+02	1.41E+05
95% UCL (µg/L)- Bootstrapping [b]	1.92E+01	1.83E+00	8.87E+02	NA
95% UCL (µg/L)- T-test [c]	NA	NA	NA	2.19E+05
95% UTL (µg/L) [d]	1.51E+02	Nonparametric distribution; use MDC	4.01E+03	4.62E+05
Maximum detected concentration (µg/L) [e]	3.21E+01	3.22E+00	2.31E+03	3.31E+05

See footnotes at end of table.

00045929

Table 5-3
Calculations of Upper Confidence Limits and Upper Tolerance Limits
for Unfiltered Perimeter Well Groundwater Concentrations[a]

	Manganese (Undissolved) Concentration (µg/L)	Mercury (Undissolved) Concentration (µg/L)	Nickel (Undissolved) Concentration (µg/L)	Potassium (Undissolved) Concentration (µg/L)
Results	5570	0.0472	92	2740
	4750	0.0472	70.9	2710
	4540	0.0472	33.1	2670
	4220	0.0472	28.5	2470
	4050	0.0472	27	2350
	3460	0.0472	26.8	2260
	3350	0.0472	26.6	2040
	2910	0.0472	25.1	1840
	2320	0.0472	24.4	1790
	2160	0.0472	21.3	517
	171	0.0472	8.45	419
	145	0.0472	6.86	250
	67.7	0.0793	4.84	128

Distribution Type	Normal	Nonparametric	Lognormal	Nonparametric
Sample size	13	13	13	13
Median (µg/L)	3.35E+03	4.72E-02	2.66E+01	2.04E+03
95% UCL (µg/L)- Bootstrapping [b]	NA	5.21E-02	3.95E+01	2.19E+03
95% UCL (µg/L)- T-test [c]	3.81E+03	NA	NA	NA
95% UTL (µg/L) [d]	7.82E+03	Nonparametric distribution; use MDC	2.11E+02	Nonparametric distribution; use MDC
Maximum detected concentration (µg/L) [e]	5.57E+03	7.93E-02	9.20E+01	2.74E+03

See footnotes at end of table.

00045930

Table 5-3
Calculations of Upper Confidence Limits and Upper Tolerance Limits
for Unfiltered Perimeter Well Groundwater Concentrations[a]

	Selenium (Undissolved) Concentration (µg/L)	Silver (Undissolved) Concentration (µg/L)	Strontium (Undissolved) Concentration (µg/L)	Vanadium (Undissolved) Concentration (µg/L)
Results	2.81	0.835	7330	0.606
	2.81	0.835	5980	0.606
	2.81	0.835	5960	0.606
	2.81	0.835	5600	0.606
	2.81	0.835	5580	0.606
	2.81	0.835	5190	0.606
	2.81	0.835	5180	3.99
	46.1	0.835	4960	1.6
	27.3	0.835	4890	1.21
	23.6	1.91	4390	1.15
	21.8	1.53	143	1.1
	20.4	1.06	115	1.1
	13.6	0.901	101	0.86
Distribution Type	Nonparametric	Nonparametric	Nonparametric	Nonparametric
Sample size	13	13	13	13
Median (µg/L)	2.81E+00	8.35E-01	5.18E+03	8.60E-01
95% UCL (µg/L)- Bootstrapping [b]	2.01E+01	1.21E+00	5.17E+03	1.66E+00
95% UCL (µg/L)- T-test [c]	NA	NA	NA	NA
95% UTL (µg/L) [d]	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC
Maximum detected concentration (µg/L) [e]	4.61E+01	1.91E+00	7.33E+03	3.99E+00

See footnotes at end of table.

00045931

Table 5-3
Calculations of Upper Confidence Limits and Upper Tolerance Limits
for Unfiltered Perimeter Well Groundwater Concentrations[a]

	Zinc (Undissolved) Concentration (µg/L)	Chloride Concentration (µg/L)	Nitrate / Nitrite Concentration (µg/L)	Sulfate Concentration (µg/L)
Results	0.883	1930000	3	2400000
	0.883	1640000	10	1880000
	22.9	1560000	10	1690000
	20.1	1330000	3	1620000
	18.9	1160000	3	1530000
	14.6	1070000	10	1040000
	14.1	1030000	3	1010000
	12.4	999000	10	873000
	11.6	986000	10	854000
	9.83	933000	10	783000
	6.63	10200	3	30300
	4.73	5910	3	26600
	3.61	2070	10	18400
Distribution Type	Normal	Normal	Nonparametric	Normal
Sample size	13	13	13	13
Median (µg/L)	1.16E+01	1.03E+06	1.00E+01	1.01E+06
95% UCL (µg/L)- Bootstrapping [b]	NA	NA	8.38E+00	NA
95% UCL (µg/L)- T-test [c]	1.44E+01	1.28E+06	NA	1.43E+06
95% UTL (µg/L) [d]	3.02E+01	2.64E+06	Nonparametric distribution; use MDC	3.06E+06
Maximum detected concentration (µg/L) [e]	2.29E+01	1.93E+06	1.00E+01	2.40E+06

See footnotes at end of table.

00045932

Table 5-3
Calculations of Upper Confidence Limits and Upper Tolerance Limits
for Unfiltered Perimeter Well Groundwater Concentrations[a]

	m-Nitrotoluene Concentration (µg/L)	o-Nitrotoluene Concentration (µg/L)	di-n-Butyl phthalate Concentration (µg/L)	Acetone Concentration (µg/L)
Results	0.064	0.064	1	2.29
	0.325	0.162	0.952	2.29
	0.325	0.162	0.962	2.29
	0.325	0.162	0.98	2.29
	0.325	0.064	0.943	2.29
	0.064	0.162	0.971	2.29
	0.325	0.162	0.98	2.29
	0.325	0.162	0.943	2.29
	0.064	0.064	0.962	2.29
	0.325	0.162	0.935	2.29
	0.325	0.162	1.36	2.29
	0.325	0.162		2.29
	0.325	0.162		10.3
	0.521	0.774		9.57
Distribution Type	Nonparametric	Nonparametric	Nonparametric	Nonparametric
Sample size	14	14	11	14
Median (µg/L)	3.25E-01	1.62E-01	9.62E-01	2.29E+00
95% UCL (µg/L)- Bootstrapping [b]	3.20E-01	2.28E-01	1.04E+00	4.53E+00
95% UCL (µg/L)- T-test [c]	NA	NA	NA	NA
95% UTL (µg/L) [d]	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC
Maximum detected concentration (µg/L) [e]	5.21E-01	7.74E-01	1.36E+00	1.03E+01

See footnotes at end of table.

00045933

Table 5-3
Calculations of Upper Confidence Limits and Upper Tolerance Limits
for Unfiltered Perimeter Well Groundwater Concentrations[a]

	Chloromethane Concentration (µg/L)	Methylene chloride Concentration (µg/L)
Results	0.5	1.9
	0.5	1.9
	0.5	1.9
	0.5	1.9
	0.5	1.9
	0.5	1.9
	0.5	1.9
	0.5	1.9
	0.5	1.9
	0.5	1.9
	0.5	1.9
	1.3	1.9
	1.21	1.9
	0.948	3.29
Distribution Type	Nonparametric	Nonparametric
Sample size	14	14
Median (µg/L)	5.00E-01	1.90E+00
95% UCL (µg/L)- Bootstrapping [b]	7.98E-01	2.10E+00
95% UCL (µg/L)- T-test [c]	NA	NA
95% UTL (µg/L) [d]	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC
Maximum detected concentration (µg/L) [e]	1.30E+00	3.29E+00

Notes and Abbreviations:

[a] Groundwater includes all undissolved groundwater samples from perimeter wells.

[b] 95% upper confidence limit determined using bootstrapping (2000 replications).

[c] 95% upper confidence limit determined using the Student's T method. This UCL calculation is only performed for data with normal distributions.

[d] A UTL with 79% coverage (13 samples) at 95% confidence is calculated for normally or lognormally distributed data with 15% or fewer nondetects.

If greater than 15% of the data are nondetects, or if the data distribution is undefined, the maximum detected concentration is used as the UTL.

A nonparametric data set with 13 samples has 79.4% coverage with 95% confidence, and a data set with 11 samples has 76% coverage with 95% confidence.

[e] The value presented is the highest quantified detection for the chemical. For antimony and arsenic, a concentration was reported as detected below the MDL, and the MDL is shown as the UTL.

MDC maximum detected concentration

MDL method detection limit

NA not applicable

UCL upper confidence limit

UTL upper tolerance limit

µg/L micrograms per liter

00045934

Table 5-4
Calculations of Upper Confidence Limits and Upper Tolerance Limits for Filtered Perimeter Well Groundwater Concentrations [a]

	Aluminum (Dissolved) Concentration (µg/L)	Antimony (Dissolved) Concentration (µg/L)	Arsenic (Dissolved) Concentration (µg/L)	Barium (Dissolved) Concentration (µg/L)	Beryllium (Dissolved) Concentration (µg/L)
Results	294	5.08	22.4	120	0.158
	821	5.08	22.4	85	0.158
	568	5.08	2.24	82.8	0.158
	299	5.08	2.24	30.6	0.158
	252	5.08	2.24	28	0.158
	221	10.5	2.24	27.5	0.158
	117	8.95	11.2	26.4	0.158
	110	8.43	11.2	26.3	0.158
	98.8	8.16	22.4	17.8	0.158
	85.7	8.03	2.24	16.2	0.813
	57	7.73	62.1	15.8	0.496
	52.9	6.84	49	14	0.357
	40.4	3.55	0.685	13.4	0.26

Distribution Type	Lognormal	Normal	Lognormal	Nonparametric	Nonparametric
Sample size	13	13	13	13	13
Median (µg/L)	1.17E+02	6.84E+00	1.12E+01	2.64E+01	1.58E-01
95% UCL (µg/L)- Bootstrapping [b]	3.72E+02	NA	2.90E+01	5.04E+01	3.66E-01
95% UCL (µg/L)- T-test [c]	NA	7.75E+00	NA	NA	NA
79%, 95% UTL (µg/L) [d]	1.86E+03	1.22E+01	3.42E+02	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC
Maximum detected concentration (µg/L) [e]	8.21E+02	1.05E+01	6.21E+01	1.20E+02	8.13E-01

See footnotes at end of table.

00045935

Table 5-4
Calculations of Upper Confidence Limits and Upper Tolerance Limits for Filtered Perimeter Well Groundwater Concentrations [a]

	Cadmium (Dissolved) Concentration (µg/L)	Calcium (Dissolved) Concentration (µg/L)	Chromium (Dissolved) Concentration (µg/L)	Cobalt (Dissolved) Concentration (µg/L)
Results	0.313	301000	0.503	0.541
	0.313	230000	0.503	29.9
	0.313	226000	0.503	29.8
	5.1	224000	4.02	28.4
	1.59	212000	1.99	26.7
	1.35	207000	1.55	12.3
	0.605	205000	1.38	6.4
	0.525	193000	1.17	5.97
	0.479	190000	0.941	5.95
	0.439	187000	0.804	3.78
	0.423	5020	0.658	3.77
	0.352	3890	0.632	2.58
	0.32	2950	0.599	1.79
Distribution Type	Nonparametric	Nonparametric	Lognormal	Lognormal
Sample size	13	13	13	13
Median (µg/L)	4.39E-01	2.05E+05	8.04E-01	5.97E+00
95% UCL (µg/L)- Bootstrapping [b]	1.62E+00	2.03E+05	1.71E+00	1.81E+01
95% UCL (µg/L)- T-test [c]	NA	NA	NA	NA
79%, 95% UTL (µg/L) [d]	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	5.12E+00	1.87E+02
Maximum detected concentration (µg/L) [e]	5.10E+00	3.01E+05	4.02E+00	2.99E+01

See footnotes at end of table.

00045936

Table 5-4
Calculations of Upper Confidence Limits and Upper Tolerance Limits for Filtered Perimeter Well Groundwater Concentrations [a]

	Copper (Dissolved) Concentration (µg/L)	Iron (Dissolved) Concentration (µg/L)	Lead (Dissolved) Concentration (µg/L)	Magnesium (Dissolved) Concentration (µg/L)
Results	1.39	252	1.72	330000
	1.39	126	1.72	295000
	1.39	1010	1.72	270000
	1.39	968	1.72	237000
	1.39	787	1.72	227000
	1.39	279	1.72	206000
	1.39	232	1.72	145000
	2.39	223	1.72	134000
	1.98	125	1.72	133000
	1.86	116	1.72	130000
	1.8	56.5	1.72	4600
	1.5	37.2	1.72	3210
	1.46	25	2.4	2710

Distribution Type	Nonparametric	Lognormal	Nonparametric	Normal
Sample size	13	13	13	13
Median (µg/L)	1.39E+00	2.23E+02	1.72E+00	1.45E+05
95% UCL (µg/L)- Bootstrapping [b]	1.76E+00	5.13E+02	1.82E+00	NA
95% UCL (µg/L)- T-test [c]	NA	NA	NA	2.18E+05
79%, 95% UTL (µg/L) [d]	Nonparametric distribution; use MDC	4.23E+03	Nonparametric distribution; use MDC	4.59E+05
Maximum detected concentration (µg/L) [e]	2.39E+00	1.01E+03	2.40E+00	3.30E+05

See footnotes at end of table.

00045937

Table 5-4
Calculations of Upper Confidence Limits and Upper Tolerance Limits for Filtered Perimeter Well Groundwater Concentrations [a]

	Manganese (Dissolved) Concentration (µg/L)	Nickel (Dissolved) Concentration (µg/L)	Potassium (Dissolved) Concentration (µg/L)	Selenium (Dissolved) Concentration (µg/L)
Results	5860	93	2980	2.81
	4680	75.3	2660	2.81
	4350	31.8	2480	2.81
	4220	31.4	2310	28.1
	4020	27.1	2230	58.7
	3540	26	2230	33.9
	2930	24.8	2200	29.6
	2910	24.3	2190	23.2
	2270	22.1	1860	22.9
	2190	21.5	325	22.4
	158	8.99	283	15.8
	131	5.3	177	4.84
	64	4.68	120	2.86

Distribution Type	Normal	Lognormal	Nonparametric	Normal
Sample size	13	13	13	13
Median (µg/L)	2.93E+03	2.48E+01	2.20E+03	2.24E+01
95% UCL (µg/L)- Bootstrapping [b]	NA	3.72E+01	2.09E+03	NA
95% UCL (µg/L)- T-test [c]	3.79E+03	NA	NA	2.75E+01
79%, 95% UTL (µg/L) [d]	7.84E+03	2.29E+02	Nonparametric distribution; use MDC	6.35E+01
Maximum detected concentration (µg/L) [e]	5.86E+03	9.30E+01	2.98E+03	5.87E+01

See footnotes at end of table.

00045938

Table 5-4
Calculations of Upper Confidence Limits and Upper Tolerance Limits for Filtered Perimeter Well Groundwater Concentrations [a]

	Silver (Dissolved) Concentration (µg/L)	Strontium (Dissolved) Concentration (µg/L)	Vanadium (Dissolved) Concentration (µg/L)	Zinc (Dissolved) Concentration (µg/L)
Results	0.835	7200	0.606	0.883
	0.835	5950	0.606	54.3
	0.835	5920	0.606	38.7
	0.835	5900	0.606	30.6
	0.835	5750	0.606	22.5
	0.835	5350	0.606	22.1
	0.835	5230	0.606	21.7
	0.835	5210	0.606	18.4
	0.835	4820	1.16	16.7
	0.835	4360	0.997	15.7
	1.92	143	0.985	9.29
	1.17	114	0.981	5.97
	0.984	97.6	0.84	5.67

Distribution Type	Nonparametric	Nonparametric	Nonparametric	Normal
Sample size	13	13	13	13
Median (µg/L)	8.35E-01	5.23E+03	6.06E-01	1.84E+01
95% UCL (µg/L)- Bootstrapping [b]	1.11E+00	5.25E+03	8.51E-01	NA
95% UCL (µg/L)- T-test [c]	NA	NA	NA	2.74E+01
79%, 95% UTL (µg/L) [d]	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	Nonparametric distribution; use MDC	5.92E+01
Maximum detected concentration (µg/L) [e]	1.92E+00	7.20E+03	1.16E+00	5.43E+01

Notes and Abbreviations:

A nonparametric data set with 13 samples has 79.4% coverage with 95% confidence.

[a] Groundwater includes all dissolved groundwater samples from perimeter wells.

[b] 95% upper confidence limit determined using bootstrapping (2000 replications).

[c] 95% upper confidence limit determined using the Student's T method. This UCL calculation is only performed for data with normal distributions.

[d] A UTL with 79% coverage at 95% confidence is calculated for normally or lognormally distributed data with 15% or fewer nondetects.

If greater than 15% of the data are nondetects, or if the data distribution is undefined, the maximum detected concentration is used as the UTL.

[e] The value presented is the highest quantified detection for the chemical.

MDC maximum detected concentration
NA not applicable
UCL upper confidence limit
UTL upper tolerance limit
µg/L micrograms per liter

00045939

Table 5-5
Maximum Contaminant Level (MCL) Concentrations for Background Metals in Groundwater from Perimeter Wells

Chemical	Maximum Contaminant Level (MCL) [a] Concentration (µg/L)	Detected Concentrations (µg/L) [b] Minimum - Maximum
Metals		
Aluminum	NE	98.9 - 1990
Antimony	6	2.79 - 11.5
Arsenic	10	0.167 - 0.167
Barium	2000	14.5 - 128
Beryllium	4	0.202 - 0.851
Cadmium	5	0.368 - 2.29
Calcium	NE	2980 - 302000
Chromium (Total) [c]	100	0.634 - 8.09
Cobalt	NE	1.26 - 32.1
Copper	1,300	1.26 - 3.22
Iron	NE	147 - 2310
Lead [d]	15	2.4 - 2.4
Magnesium	NE	3000 - 331000
Manganese	NE	67.7 - 5570
Mercury	2	0.0793 - 0.0793
Nickel	NE	4.84 - 92
Potassium	NE	128 - 2740
Selenium	50	13.6 - 46.1
Silver	NE	0.901 - 1.91
Strontium	NE	101 - 7330
Vanadium	NE	0.86 - 3.99
Zinc	NE	3.61 - 22.9
Anions		
Chloride	NE	2070 - 1930000
Nitrate / Nitrite [e]	1,000	10 - 10
Sulfate	NE	18400 - 2400000

[a] Maximum contaminant level for chemical specified in the Safe Drinking Water Act and available in *List of Contaminants and Their MCLs*, EPA 816-F-02-013, U. S. Environmental Protection Agency, Washington, DC, July 2002.

[b] Concentrations detected in unfiltered samples and reported in Table 5-1, unless stated otherwise.

[c] Total concentration includes both chromium(III) and chromium (VI) species.

[d] Lead was not detected in unfiltered samples. Value shown is concentration detected in 1 of 13 filtered samples (Table 5-2).

[e] Value shown is for nitrite. The MCL for nitrate ion is 10,000 ug/L.

NE = not established

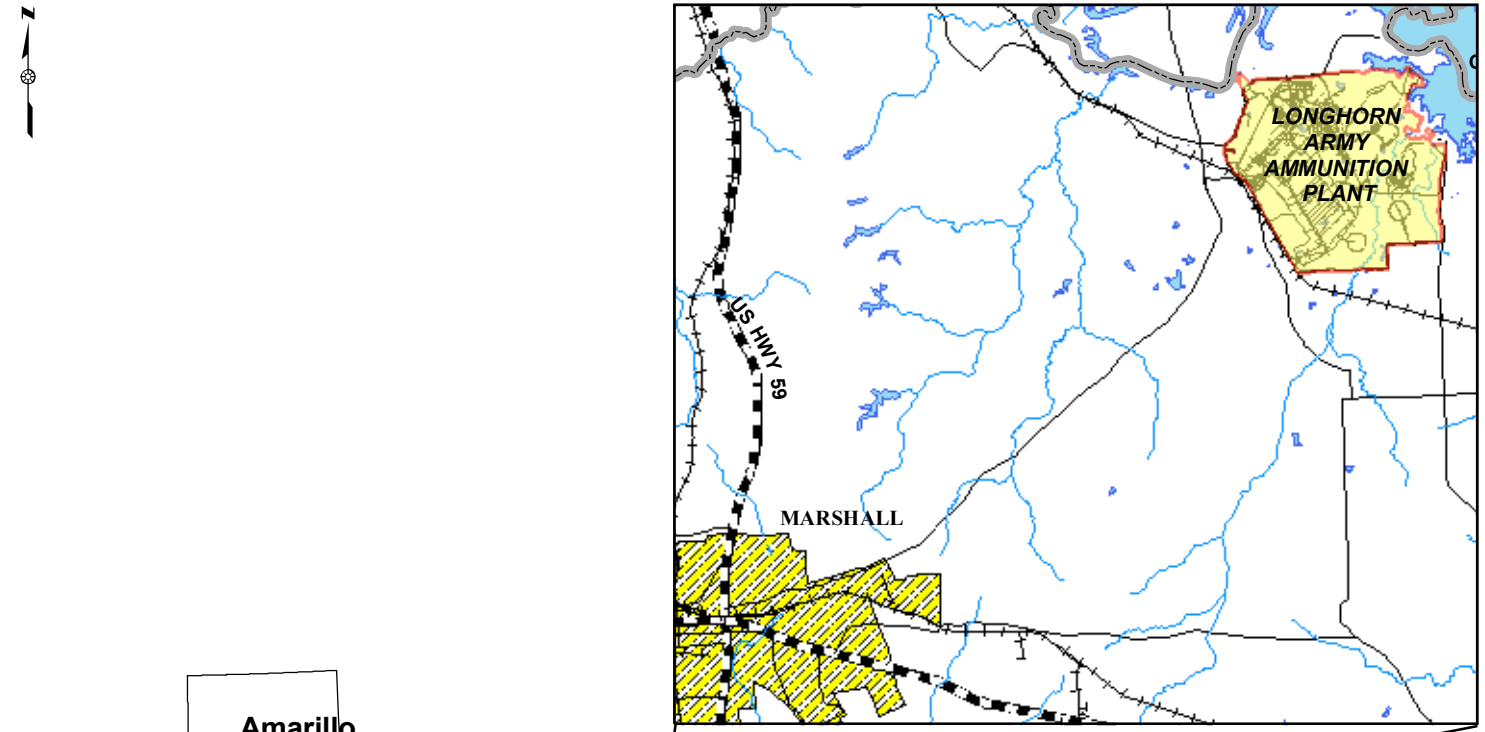
µg/L = micrograms per liter

Figures

Plot Date: 07/12/05

OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		FILE PATH
Houston, TX	S. Brown	11/08/04	A. Willmore	11/08/04	J. Lindberg	11/08/04	X:\Longhorn\GISW\Bing_Lu\MyWS\Changes\1-2_LHAAP.mxd

00045941



Legend

- Major Texas City
- Road
- Railroad
- Creek/River
- Lake
- County Boundary
- City/Municipal Boundary
- LHAAP Boundary

0 5,000 10,000 20,000 Feet

Shaw

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

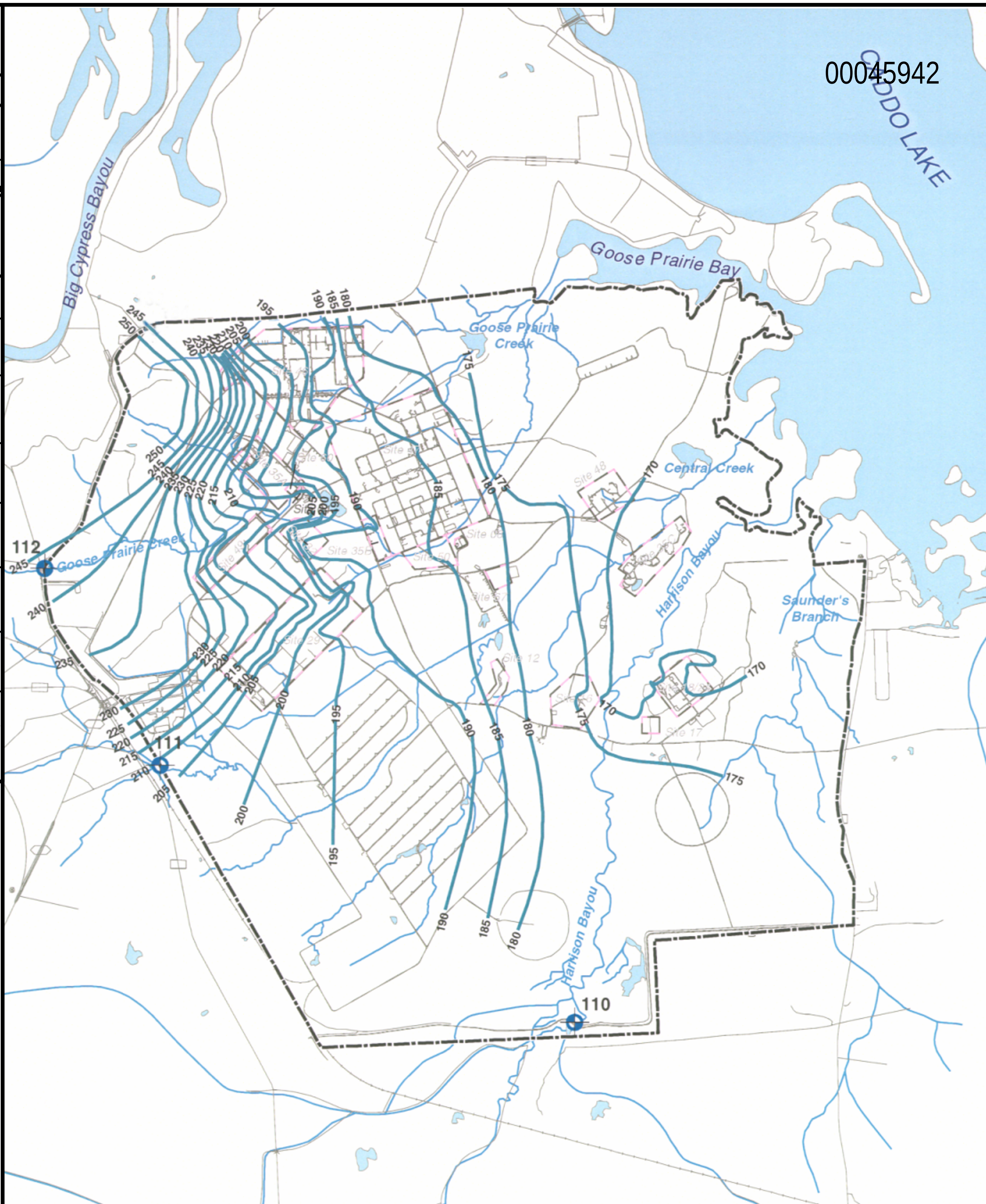
Figure 1-1

Longhorn Army Ammunition Plant Area Map
Perimeter Well Groundwater Study Report

Karnack, Texas

OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	FILE PATH
Houston, TX	B. Lu 05/23/05	K. Everett 05/23/05	P. Srivastav 05/23/05	X:\Longhorn\GIS\W\Bing_Lu\MyWS\Changes\Fig1-2.mxd

00045942



Legend

Longhorn AAP Boundary

Group Sites

Surface Water

Perimeter Monitoring Well

195 Potentiometric Surface (feet above mean sea level)
Contour interval = 5 feet
Water Elevation Data from 2000

N

2000 1000 0 2000
Feet
Scale 1:48,000

Shaw

Longhorn Army Ammunition Plant
Karnack, Texas

Figure 1-2

Site and Potentiometric Surface Map
Perimeter Well Groundwater Study Report

Longhorn Army Ammunition Plant
Karnack, Texas

PLOT DATE: 7/12/05
FORMAT REVISION 11/12/04

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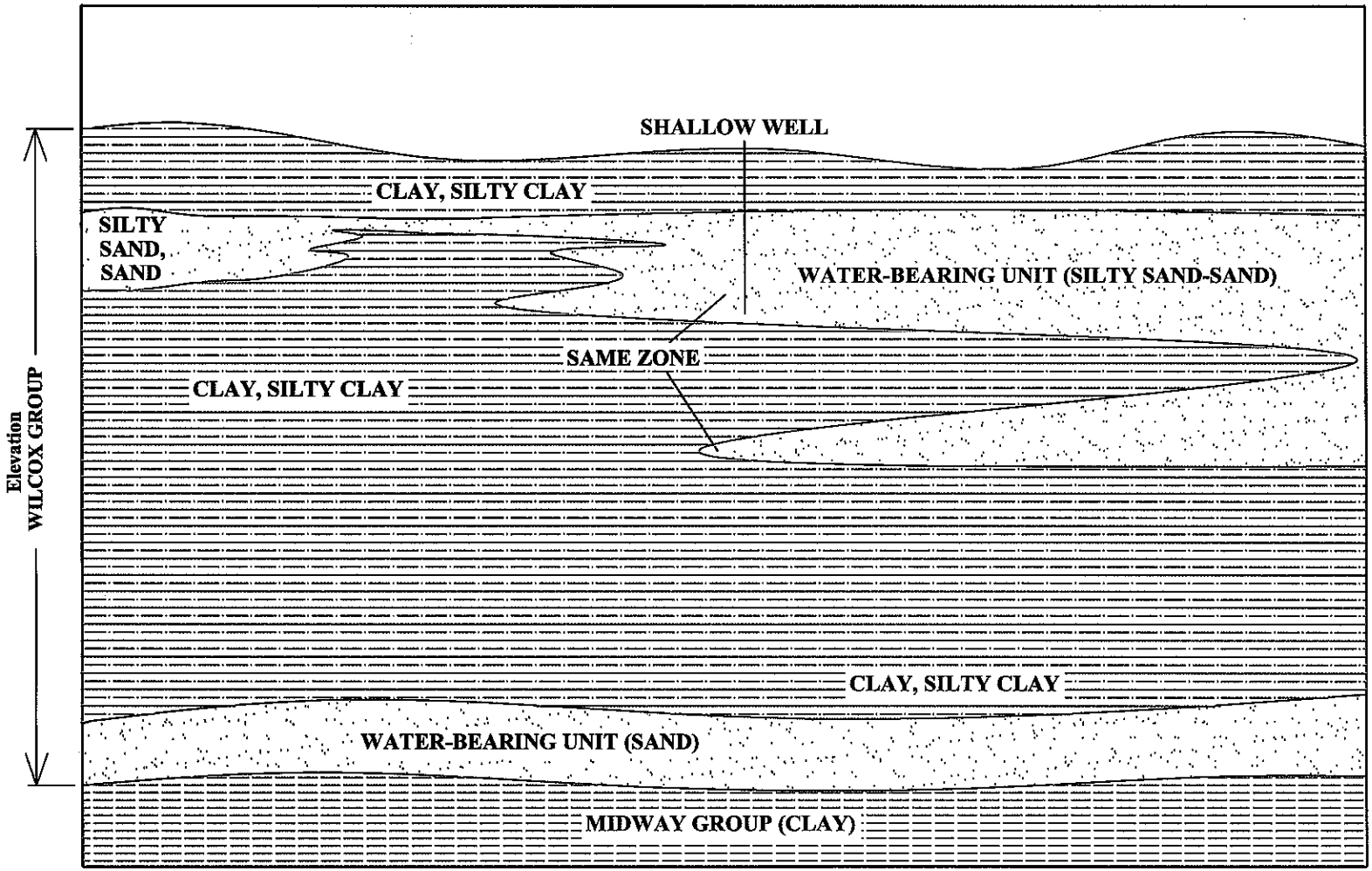


THIS FIGURE IS CONCEPTUAL AND IS NOT TO SCALE

Shaw

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

FIGURE 1-3
CONCEPTUAL SUBSURFACE GEOLOGY
PERIMETER WELL GROUNDWATER
STUDY REPORT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Figure 1-4
Perimeter Groundwater Monitoring Well 110

Figure 1-5
Perimeter Groundwater Monitoring Well 111

Figure 1-6
Perimeter Groundwater Monitoring Well 112

Appendix A

Well Boring and Completion Logs

Reproduced from

Longhorn Army Ammunition Plant, Marshall, Texas, Final Groundwater Background Concentration Report, U. S. Army Corps of Engineers, Tulsa District, June 1995.

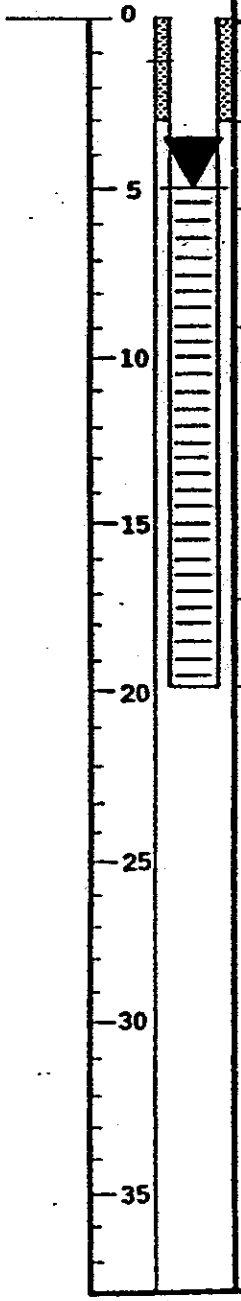
Appendix A contains copies of handwritten reports, which are the best available.

Appendix A

Boring Logs and Completion Logs for Wells 110, 111 and 112.

Boring Logs, Completion Logs, Geophysical Logs and Drilling Narrative for Wells 133 and 134.

00045949
012964



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SC	5/6 6/8	Clayey sand Yellowish brown	15	
SM		Slightly clayey 60% fine sand silty sand	40	
SM	1/3 4/7	Silty sand Grey mottled w/yellowish brown	30	
SM	9/9 9/9	Silty sand Grey mottled w/brownish yellow	20	
	11/9 5/5			
SM+CL	9/14 32/26	Silty sand & clay layers Grey to very dark grey		

*BLOWS PER 6 INCH USING 18, 24, or 36 SPLITSPOON

VERTICAL SCALE 1" = 5.0'

WELL 110 DATE DRILLED 7/1/82

STUDY AREA Southern Boundary

ELEVATION TOP OF STEEL CASING = 189.22 ft

ELEVATION TOP OF PVC RISER = 188.38 ft

ELEVATION OF GROUND SURFACE = 186.32 ft

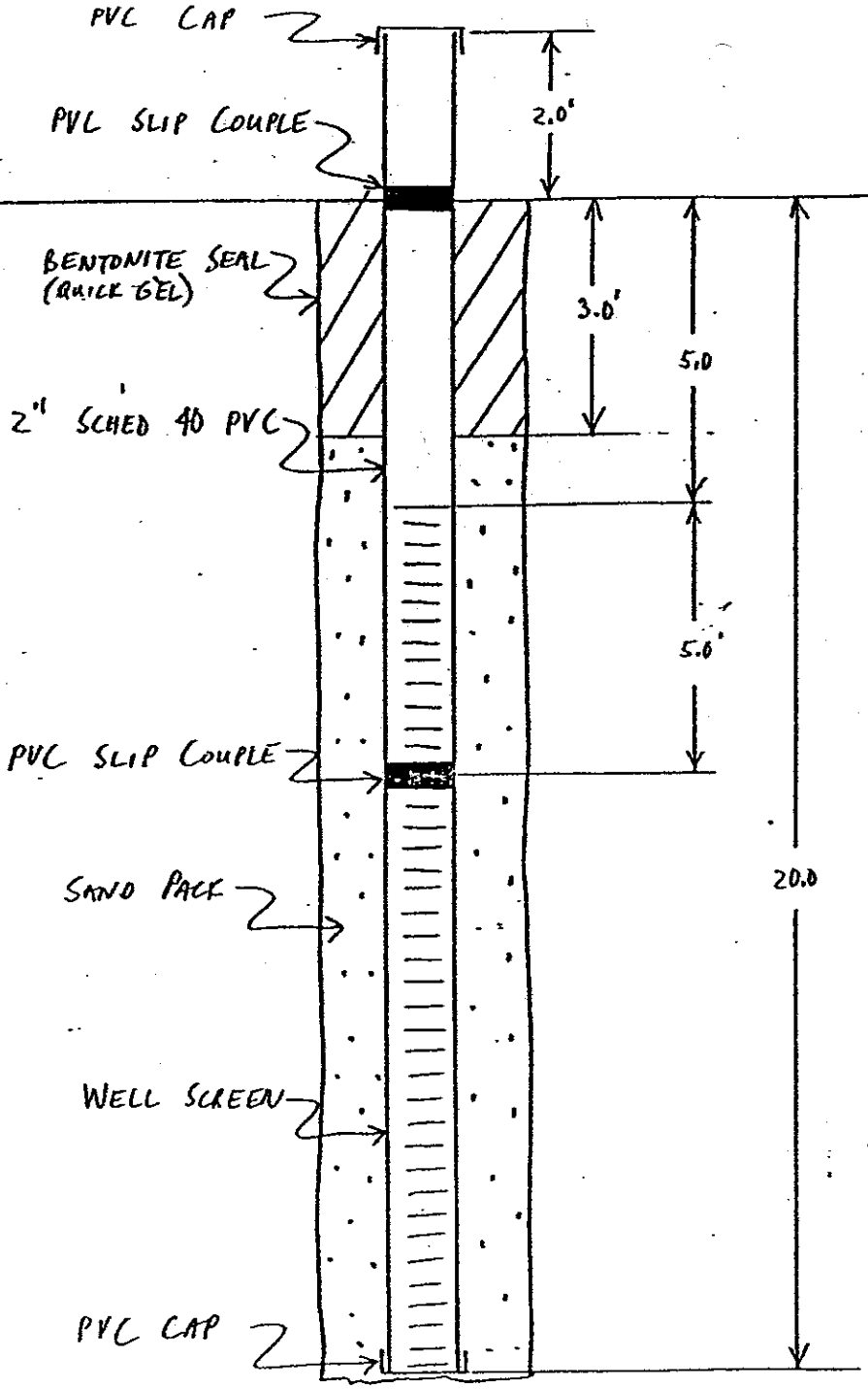
SOURCE: ENVIRONMENTAL PROTECTION SYSTEMS, INC. - 1981

CONTAMINATION SURVEY
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS

U. S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MARYLAND

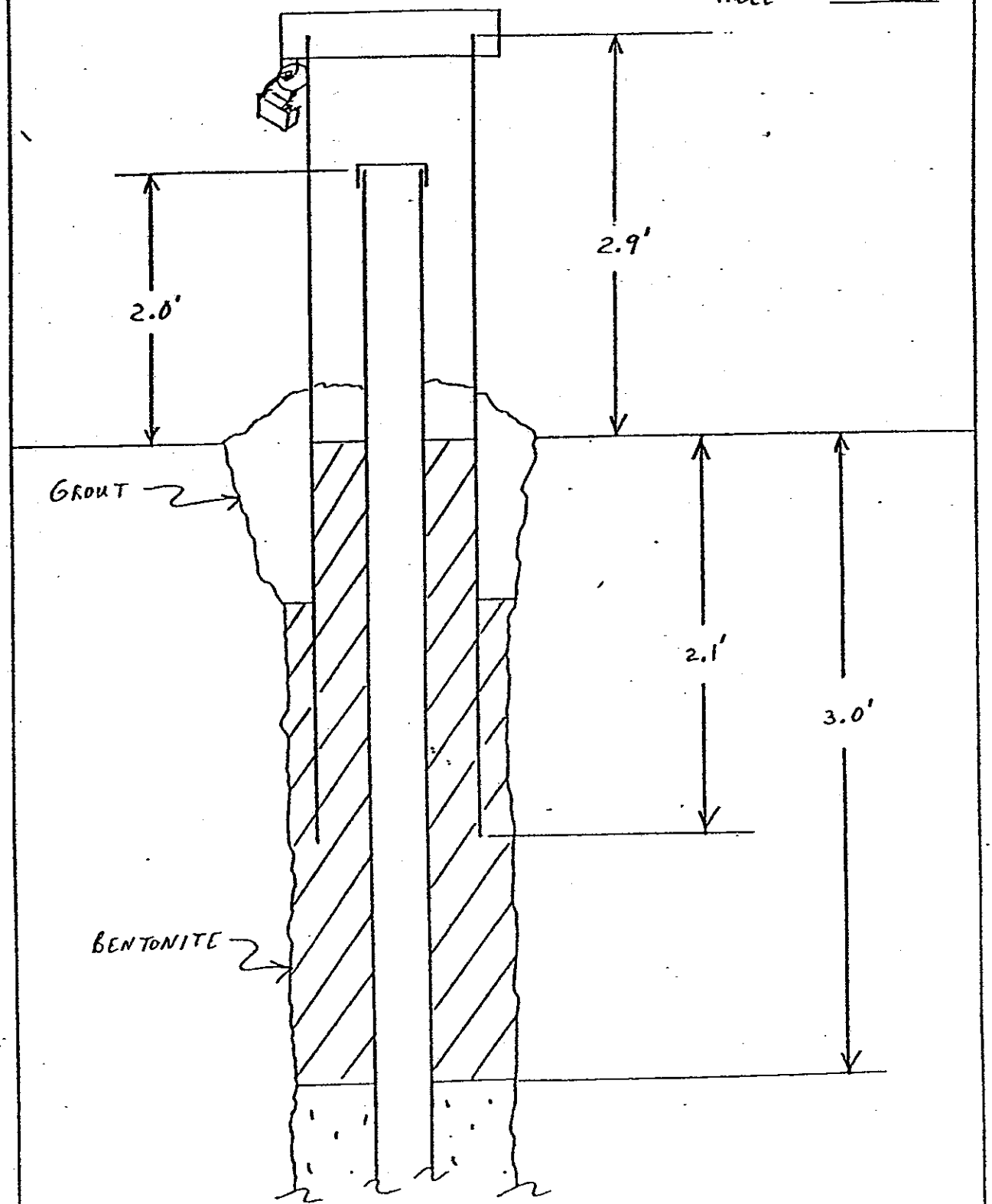
WELL SKETCH

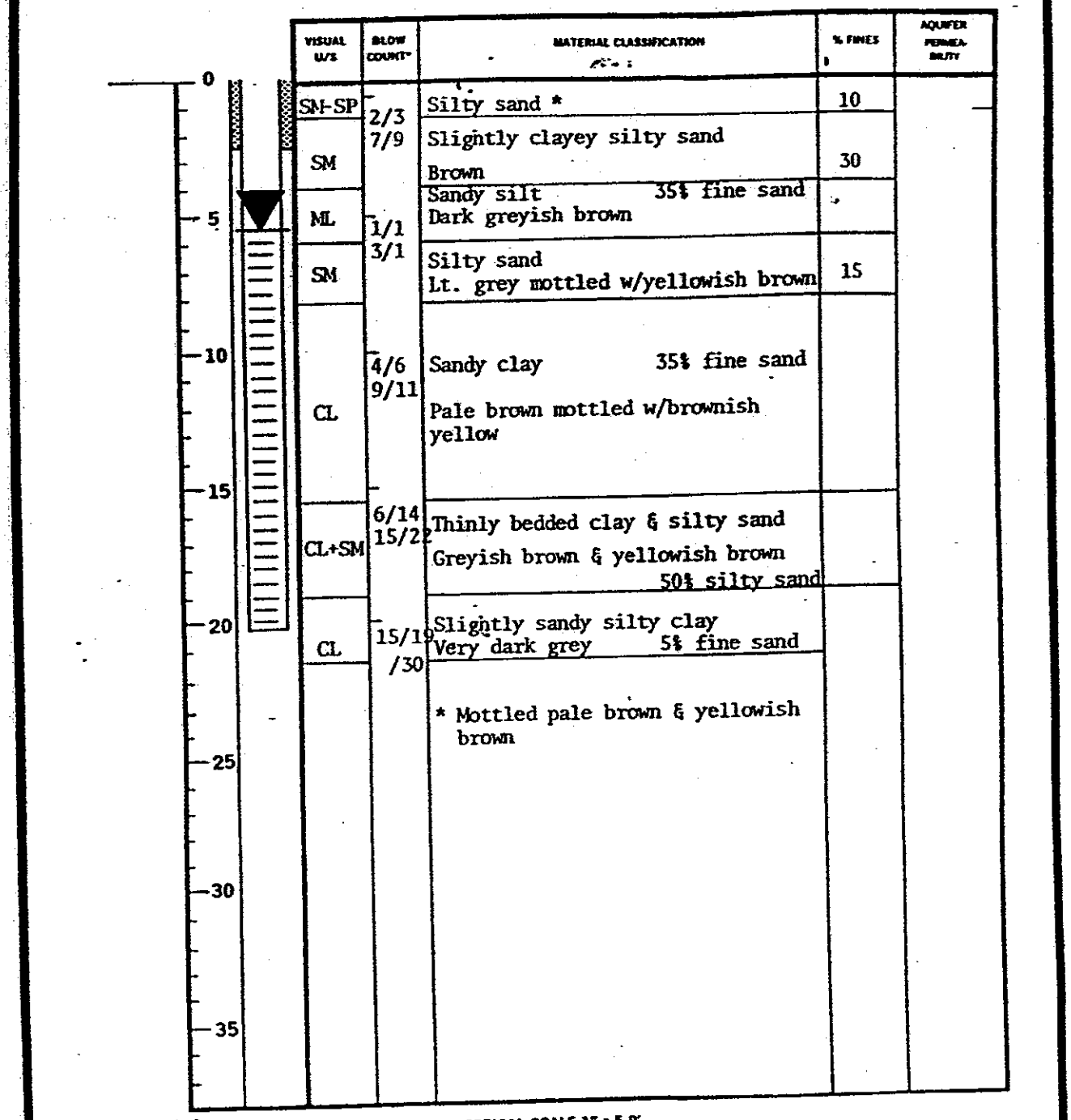
WELL # 110



PROTECTIVE CASING DETAIL

WELL # 110





WELL 111 DATE DRILLED 7/11/82
STUDY AREA Southwestern Boundary
ELEVATION TOP OF STEEL CASING = 221.50 ft
ELEVATION TOP OF PVC RISER = 220.13 ft
ELEVATION OF GROUND SURFACE = 218.00 ft

SOURCE: ENVIRONMENTAL PROTECTION SYSTEMS, INC. - 1983

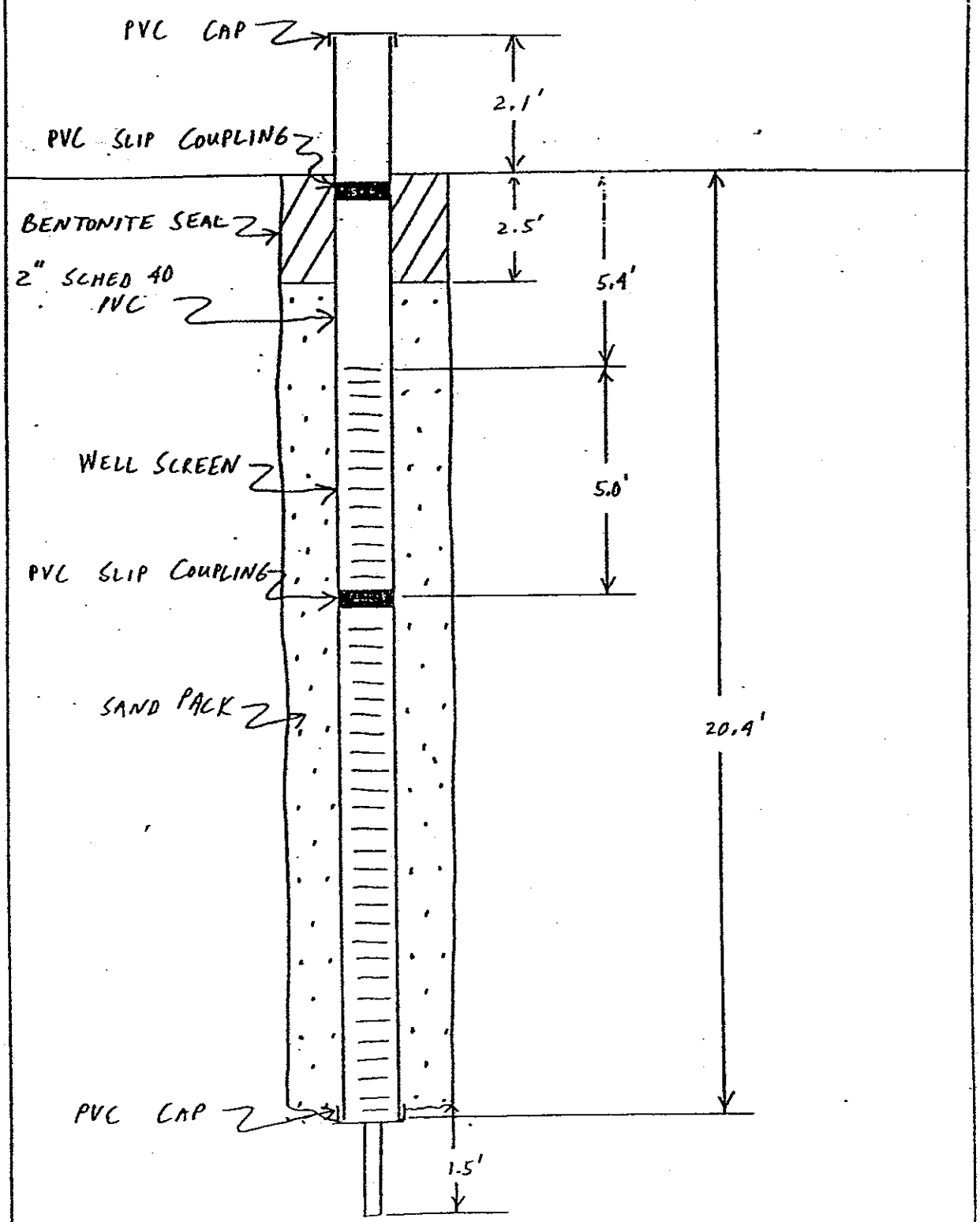
CONTAMINATION SURVEY
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS

U. S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MARYLAND

012968
00045953

WELL SKETCH

WELL # 111 A

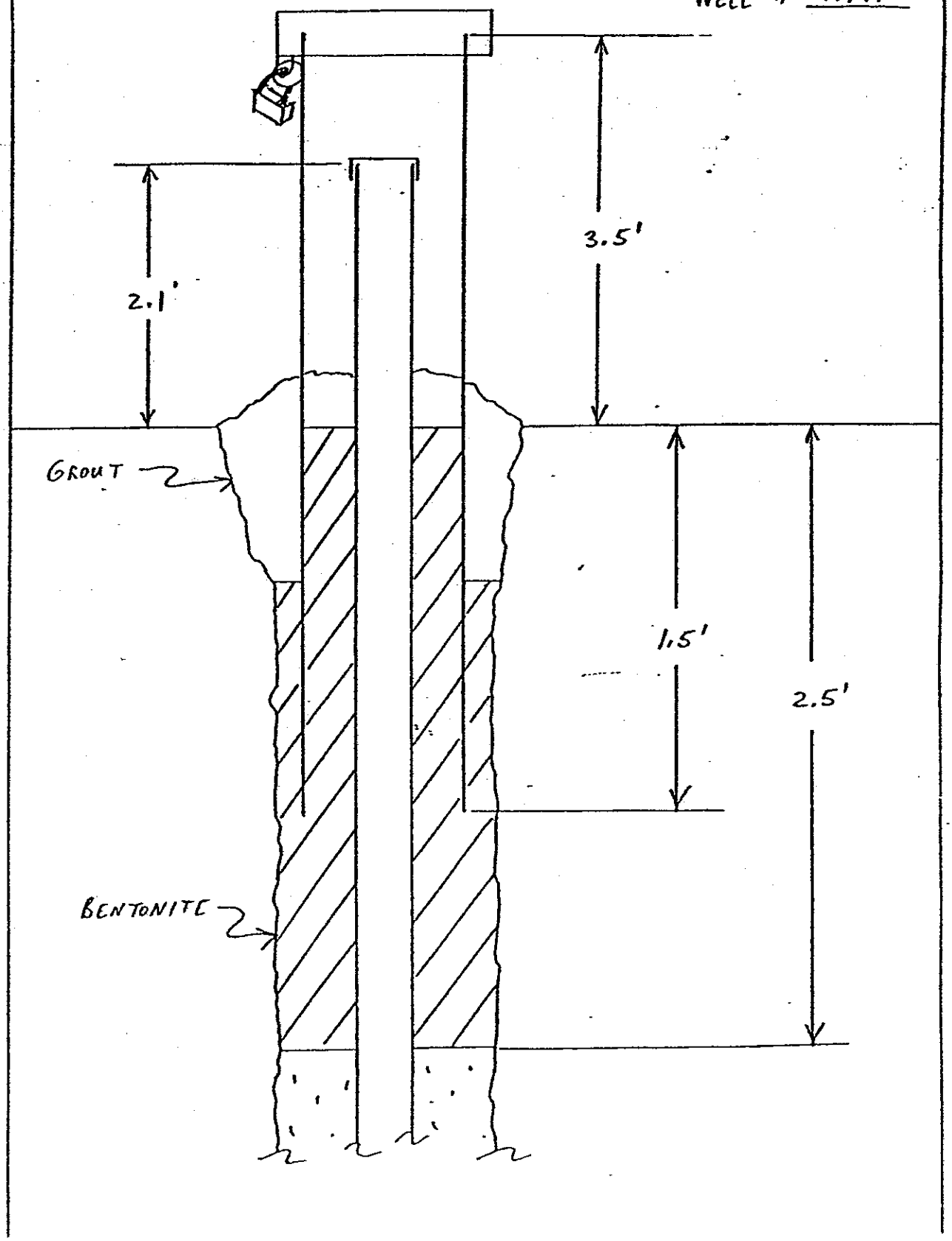


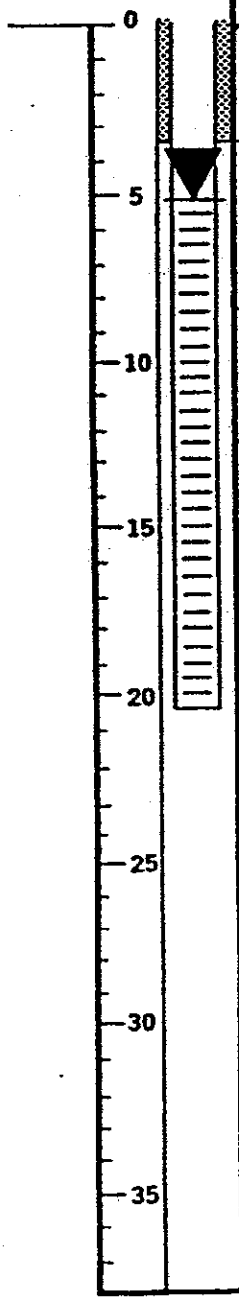
00045954

PROTECTIVE CASING DETAIL

012969

WELL # 111A





VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM	7/8 /9	Silty sand Pale brown & yellowish brown	15	
SM	1/1 1/1	Silty sand Brown	15	
SC+CL	4/7 10/12	Sandy clay & slightly clayey sand Grey mottled w/yellowish brown *		
CL	5/8	Slighlty sandy clay 5% fine sand Light yellowish brown mottled w/brownish yellow		
SM	11/11	Silty sand seam		
CL		Slightly sandy clay Light yellowish brown mottled w/brownish yellow		
CL-ML + SM	7/12 15/20	Thinly bedded silty sand and silty clay Light grey to brown		
		* 55% clayey sand		

*BLOWS PER 6 INCH USING 18, 24 or 36 SPLIT SPOON

VERTICAL SCALE 1" = 5.0'

WELL 112 DATE DRILLED 7/13/82
STUDY AREA Northwestern Boundary
ELEVATION TOP OF STEEL CASING = 252.34 ft
ELEVATION TOP OF PVC RISER = 251.55 ft
ELEVATION OF GROUND SURFACE = 248.98 ft

SOURCE: ENVIRONMENTAL PROTECTION SYSTEMS, INC. - 1983

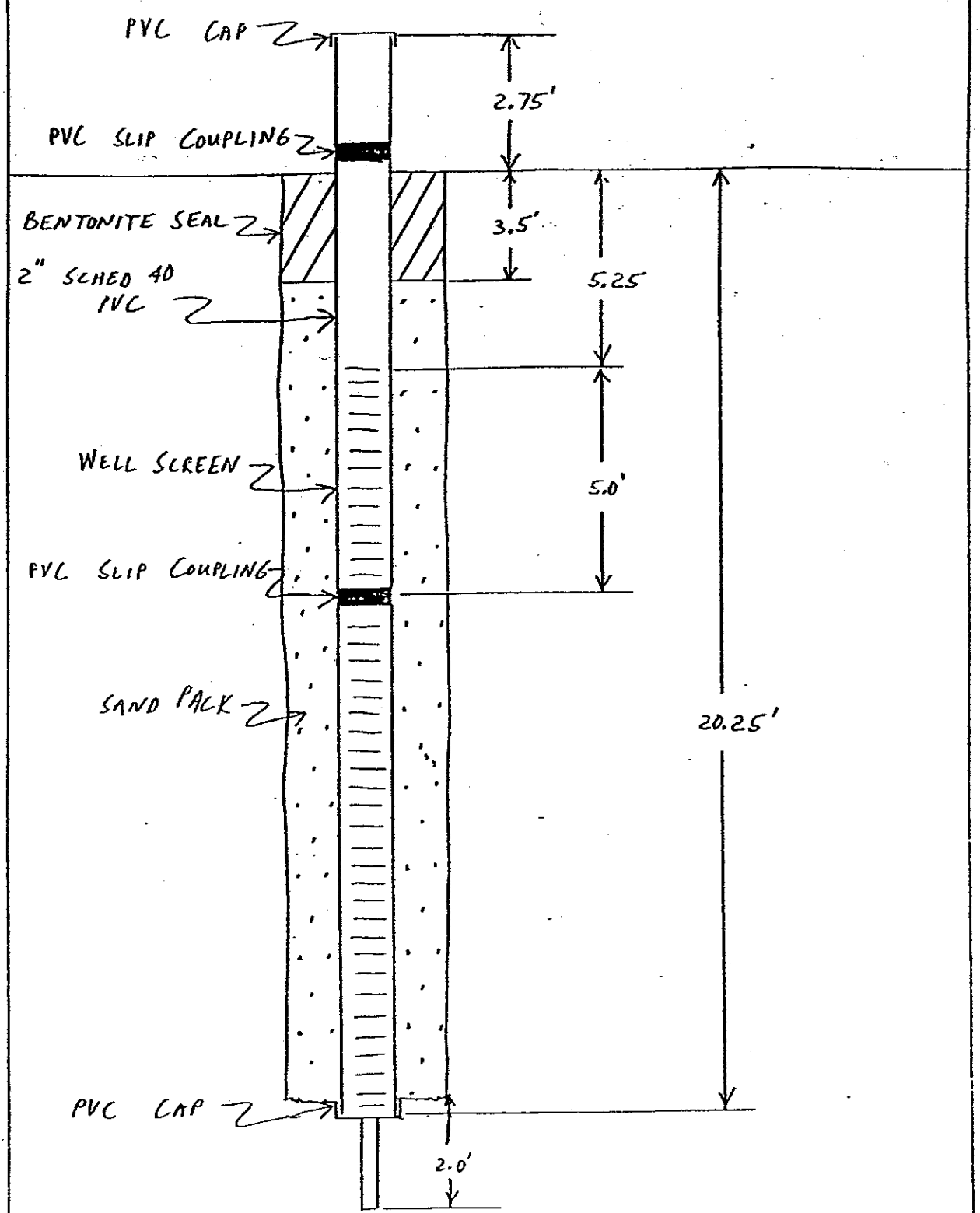
CONTAMINATION SURVEY
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS

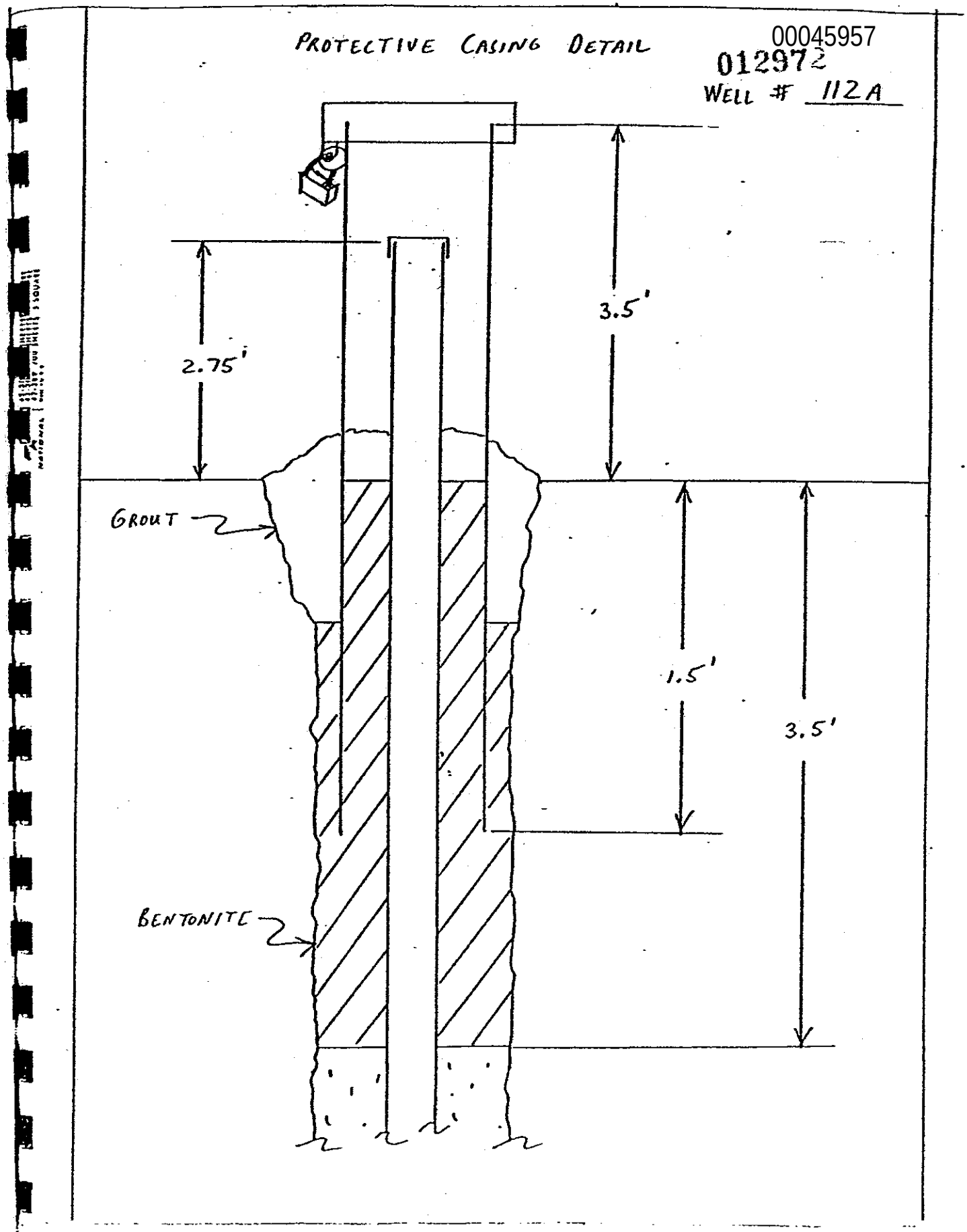
U. S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
ABERDEEN PROVING GROUND, MARYLAND

WELL SKETCH

012571

WELL # 112A




PROTECTIVE CASING DETAIL
00045957
012972
WELL # 112A
2.75'
3.5'
GROUT
1.5'
3.5'
BENTONITE

Drilling Narrative for Monitoring Wells Drilled Summer 1994

To provide additional background groundwater sampling locations at the perimeter of the Plant, two monitoring wells were clustered at the northwest corner of the Plant. Those wells are identified as 133 and 134 on Figure 2-1. The intent of the clustered wells is to provide a sampling point in the uppermost aquifer and to test a lower water bearing zone. A factor of concern in drilling the deeper monitoring well was to avoid penetration of the interval screened in the public water supply well which offsets this location by approximately 400 feet. This well is the Caddo Lake Water Supply Corporation Well # 1 which is completed in the Cypress Aquifer and was screened from 152' to 220'.

Well 133 was drilled to a total depth of 90 feet. As shown on the boring logs for this well (included in Appendix A), the soil was predominantly clay with varying amounts of sand and occasional gravel. In the interval from 70' to 75', the moisture content of the soil increased and indicated saturated soils of a perched aquifer. The sand content remained fairly constant in samples from 70' to approximately 80' with the sand content and moisture content decreasing in the interval from 80' to 85'. Due to the decreasing apparent moisture content in the samples, it was decided that the clay layer was an aquitard and most probably represents the base of the perched aquifer at this location. To verify the base of the perched aquifer, this well was drilled from 85' to 90' with the moisture content appearing to increase. Since the intent prior to drilling the well was to test the base of the aquifer without leaving a pathway through the underlying confining clay layer, the well was plugged back with a bentonite plug from 85' to 90'. A 20' screen placed from 65' to 85'. The annular volume around the screen and casing was filled with a 16/30 sand to a depth of 63'. A 3 foot thick layer of bentonite pellets was used to seal the top of the sand interval. A grout with 5% bentonite was used to seal the remainder of the open borehole as shown in the completion log included in Appendix A.

A gamma ray/resistivity log was run in the borehole prior to installing the screen and casing. That log is also included in Appendix A. A gamma ray logging tool detects the natural gamma ray radiation emitted by the materials penetrated by the borehole. In sedimentary materials, as those encountered here, gamma ray activity as measured in API-GR units increases with clay content. As shown by the highly irregular gamma ray curve for this well, the interval from about 60' to the bottom of the hole contains numerous sandy lenses one foot

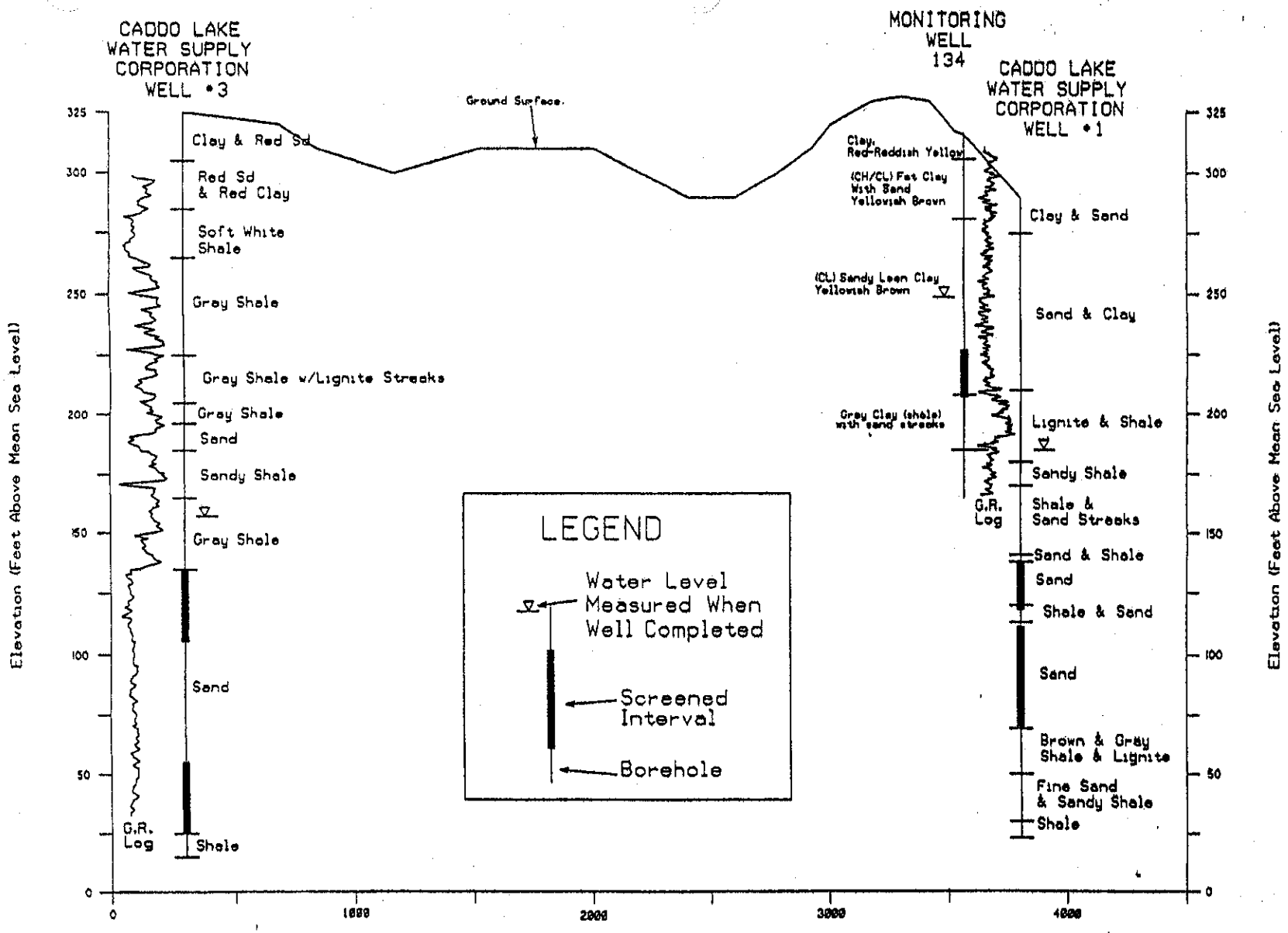


Fig. A-2: Cross Section Showing the Relationship of Screened Intervals In Monitoring Well 134 to Public Water Supply Wells.

or less in thickness. It should be noted that the gamma ray log run in conjunction with a conductivity measuring instrument after the well was completed indicates clay layer from 60' to 63'. That deflection in the gamma ray curve is caused by the presence of the bentonite plug placed above the screened interval behind the casing.

Well 134 was drilled approximately 10' to the southwest of well 133. The well was drilled to a depth of 85' using a rockbit with a natural water/mud drilling fluid, at which point 8-inch casing was set to isolate the upper aquifer from subsequent drilling operations. Lithologies encountered were primarily evaluated by drill bit and drill rig behavior and confirmed by materials contained in the drilling mud circulated up the hole. Significantly sandy soils were detected in the interval from 85' to approximately 110'. The hole was drilled to a total depth of 151' with no significant sands detected. Several sandy intervals were detected in the interval from 120' to 151' but none of the intervals were deemed to have sufficient sand to yield a permeable strata that would be considered an aquifer. A gamma ray/resistivity log was run in this hole from 151' to surface. The gamma ray log showed sand development in the interval from 124' to the bottom of the hole. The gamma ray intensity was higher in the sands interval below 108'. The higher gamma ray intensity indicates a higher clay content than the upper sands which would infer poorer permeability characteristics than the upper sands. Drilling was terminated at a depth of 151' to prevent penetration of the aquifer from which water is produced from the Caddo Lake Water Supply Corporation Well #1. Figure A-2 is a cross section incorporating the sample descriptions and gamma ray logs from well 134 and CaddoLake Water Supply Corporation Well #3, and sample descriptions from Caddo Lake Water Supply Well #1. These wells are identified on Figure 2-1 of the text of this document. As shown in that cross section, monitoring well 134 is within 70 ' of the public water supply aquifer. After consulting with personnel from EPA Region VI and the Tyler office of TNRCC, it was decided to plug back the borehole and complete the wellbore in the sandy interval below the interval screened in monitoring well 133. The borehole of monitoring well 134 was filled with clean sand from 130' to 151' below ground level. Approximately twenty-one feet of bentonite pellets were used to seal the lower borehole with the top of the bentonite seal being measured at 109.5' below ground level. A twenty foot screen was placed from 109' to 89'. The annular volume around the screen and casing was filled with a 16/30 sand to a depth of 84.2'. A 3 foot thick layer of bentonite pellets was used to seal the top of the sand interval. A

grout with 5% bentonite was used to seal the remainder of the open borehole as shown in the completion log included in Appendix A.

The State Plane Coordinates and elevation for well 133 and 134 are given in Table 2-1 below.

Table 2-1. State Plane Coordinates and Elevations of Monitoring Wells Installed During Summer 1994.

	State Plane Coordinates		Reference Elevation -Top of PVC Casing- (feet above Mean Sea Level)
Well	Northing	Easting	
133	390839.02	3026097.33	321.14
134	390832.00	3026089.88	322.09

HOLE NO. 133

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION Longhorn Army Ammunition Plant	SHEET 1 of 3 SHEETS
1. PROJECT Groundwater Background Study		10. SIZE AND TYPE OF BIT 8" Flight	
2. LOCATION (Coordinates or Station) 350844.10 3028092.10		11. DATUM FOR ELEVATION SHOWN (MSL or MSL) MSL	
3. DRILLING AGENCY U.S.Army COE		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) MW133		13. OVERBURDEN SAMPLES DISTURBED 12	UNDISTURBED
5. NAME OF DRILLER Volis, Loquement		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN 0.0		16. DATE HOLE STARTED 08/13/94	COMPLETED
8. DEPTH DRILLED INTO ROCK 0.0		17. ELEVATION TOP OF HOLE 318.6	
9. TOTAL DEPTH OF HOLE 90.0		18. TOTAL CORE RECOVERY FOR BORING 0.0 %	
		M.W.Dean	INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(CL) (0.0 – 4.0) Est.LL 25–30, Red, Silty, Sandy, Firm, Moist.		J–1	
					J–2	TYPE Flight Augr ZONE 0.0– 90.0
314.6	4		(CL) (4.0 – 6.0) Est.LL 25–30, Light Tan, Silty, Slightly Sandy, Firm, Moist.			SAMPLE DEPTH J–1 0.0– 0.5 J–2 1.0– 2.0 J–3 9.0– 10.0 J–4 10.0– 15.0 J–5 15.0– 20.0 J–6 20.0– 25.0 J–7 25.0– 30.0 J–8 30.0– 34.5 J–9 34.5– 35.0 J–10 35.0– 40.0 J–11 40.0– 45.0 J–12 45.0– 50.0 J–13 50.0– 55.0 J–14 55.0– 60.0 J–15 60.0– 65.0 J–16 65.0– 70.0 J–17 70.0– 75.0 J–18 80.0– 85.0
312.6			(CL) (6.0 – 7.0) Est.LL 25–30, Light Tan, Silty, Firm, Moist.			
311.6	8		(CL) (7.0 – 10.0) Est.LL 25–30, Tan, Clay & Sand lenses, Moderately Firm, Moist.		J–3	
308.6			(CL) (10.0 – 15.0) Est.LL 25–30, Silty, Clay & Sand lenses, Moderately Firm, Moist.			
	12				J–4	
303.6						
	16		(CL) (15.0 – 30.0) Est.LL 25–30, Light Tan, Silty, Sandy, Firm, Moist.		J–5	
	20				J–6	
	24					
					J–7	
	28					
288.6						
	32		(CL) (30.0 – 34.5) Est.LL 25–30, Tan, Silty, Sandy, Few Gravel, Moderately Firm, Moist.		J–8	
283.6					J–9	
	36		(CL) (34.5 – 35.0) Est.LL 30–35, Blue-Grey, Silty Firm, Moist.			
			(CL) (35.0 – 50.0) Est.LL 25–30, Tan, Sandy, Slightly Firm, Moist.		J–10	
278.6	40					

PROJECT HOLE NO.

HOLE NO. 133

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION Longhorn Army Ammunition Plant	SHEET 2 OF 3 SHEETS
1. PROJECT Groundwater Background Study		10. SIZE AND TYPE OF BIT 8" Flight	
2. LOCATION (Coordinates or Station) 390644.10 3028092.10		11. DATUM FOR ELEVATION SHOWN (GS or MSL) MSL	
3. DRILLING AGENCY U.S.Army COE		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) MW133		13. OVERBURDEN SAMPLES DISTURBED 12	UNDISTURBED
5. NAME OF DRILLER Volls, Loquement		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN 0.0		16. DATE HOLE STARTED 08/13/94	COMPLETED "
8. DEPTH DRILLED INTO ROCK 0.0		17. ELEVATION TOP OF HOLE 318.6	
9. TOTAL DEPTH OF HOLE 90.0		18. TOTAL CORE RECOVERY FOR BORING 0.0 %	
		M.W.Dean	INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOV-ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			(CL) (35.0 – 50.0) Est.LL 25–30, Tan, Sandy, Slightly Firm, Moist.		J–11	
	44					
					J–12	
	48					
268.6			(CL) (50.0 – 60.0) Est.LL 30–35, Silty, Slightly Sandy, Some Gravel, Moderately Soft, Moist.		J–13	
	52					
					J–14	
	56					
258.6	60		(CL) (60.0 – 70.0) Est.LL 25–30, Sandy, Some Gravel, Firm, Moist.		J–15	
	64					
					J–16	
	68					
248.6			(CL) (70.0 – 80.0) Est.LL 25–30, Tan, Sandy, Slightly Wet.		J–17	
	72					
	76					
238.6	80					

PROJECT HOLE NO.

HOLE NO. MW133

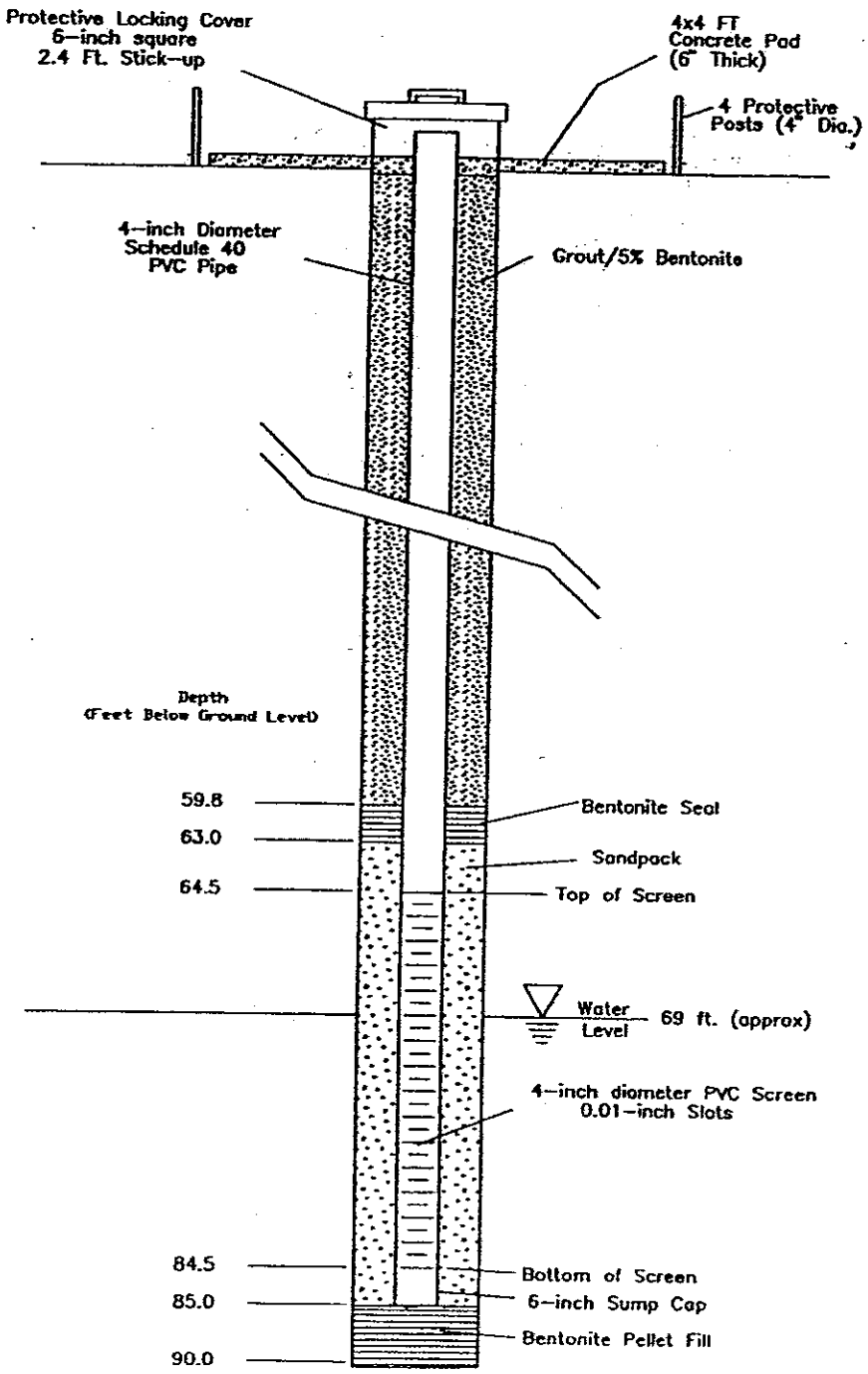
DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION Longhorn Army Ammunition Plant	SHEET 3 of 3 SHEETS
1. PROJECT Groundwater Background Study		10. SIZE AND TYPE OF BIT 8" Flight	
2. LOCATION (Coordinates or Station) 390844.10 3026092.10		11. DATUM FOR ELEVATION SHOWN (GS or MSL) MSL	
3. DRILLING AGENCY U.S.Army COE		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and this number) MW133		13. OVERBURDEN SAMPLES DISTURBED 12	UNDISTURBED
5. NAME OF DRILLER Voils, Loquement		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN 0.0		16. DATE HOLE STARTED 08/13/94	COMPLETED
8. DEPTH DRILLED INTO ROCK 0.0		17. ELEVATION TOP OF HOLE 318.6	
9. TOTAL DEPTH OF HOLE 90.0		18. TOTAL CORE RECOVERY FOR BORING 0.0 %	
		M.W.Deon	INSPECTOR

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
238.6						
	84		(CL) (80.0 – 85.0) Est.Lt. 25–30, Tan, Sandy, Sandstone & Iron Oxide Gravel, Firm, Slightly Wet.		J–18	
233.6						
	88		(CL) (85.0 – 90.0) Est.Lt. 25–30, Tan, Very Sandy, Few Gravel, Moderately Soft, Very Moist.			
228.6						
	92					
	96					
	100					
	104					
	108					
	112					
	116					
	120					

PROJECT HOLE NO.

Completed Well Schematic: 133 00045965

Completed 9-23-94 012980



00045966
012981

U.S. ARMY

CORPS OF ENGINEERS

TULSA DISTRICT

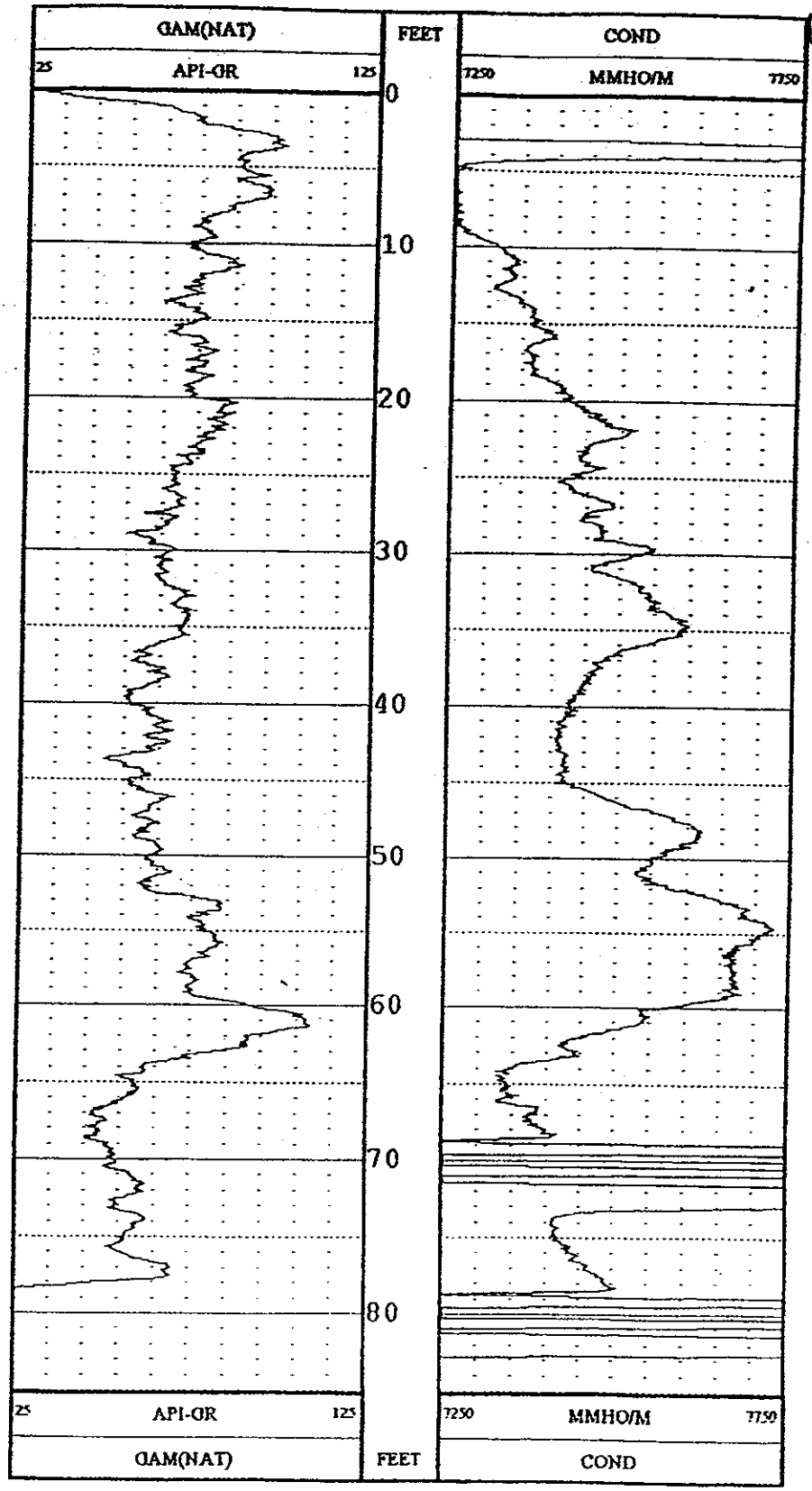
Monitoring Well 133

COMPANY	: U.S. Army Corps of Engineers			OTHER SERVICES:	
WELL	: Monitoring Well 133				
LOCATION/FIELD	: Longhorn Army Ammunition Plant				
COUNTY	: Harrison				
STATE	: Texas				
SECTION	:	TOWNSHIP	:	RANGE :	
DATE	: 09/08/94	PERMANENT DATUM	:	ELEVATIONS:	
DEPTH DRILLER	:	ELEV. PERM. DATUM	:	KB	:
LOG BOTTOM	: 83.00	LOG MEASURED FROM:	T/Casing	DF	:
LOG TOP	: -1.40	DRL MEASURED FROM :	G.L.	GL	:
CASING DRILLER	:	LOGGING UNIT	:		
CASING TYPE	: 4"PVC	FIELD OFFICE	:		
CASING THICKNESS:		RECORDED BY	: M.C.Murray		
BIT SIZE	: 7" auger	BOREHOLE FLUID	:	FILE	: ORIGINAL
MAGNETIC DECL.	:	RM	:	TYPE	: 9510A
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 133slnd
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	: 8sepind.
NEUTRON MATRIX	:	FLUID DELTA T	:	THRESH:	

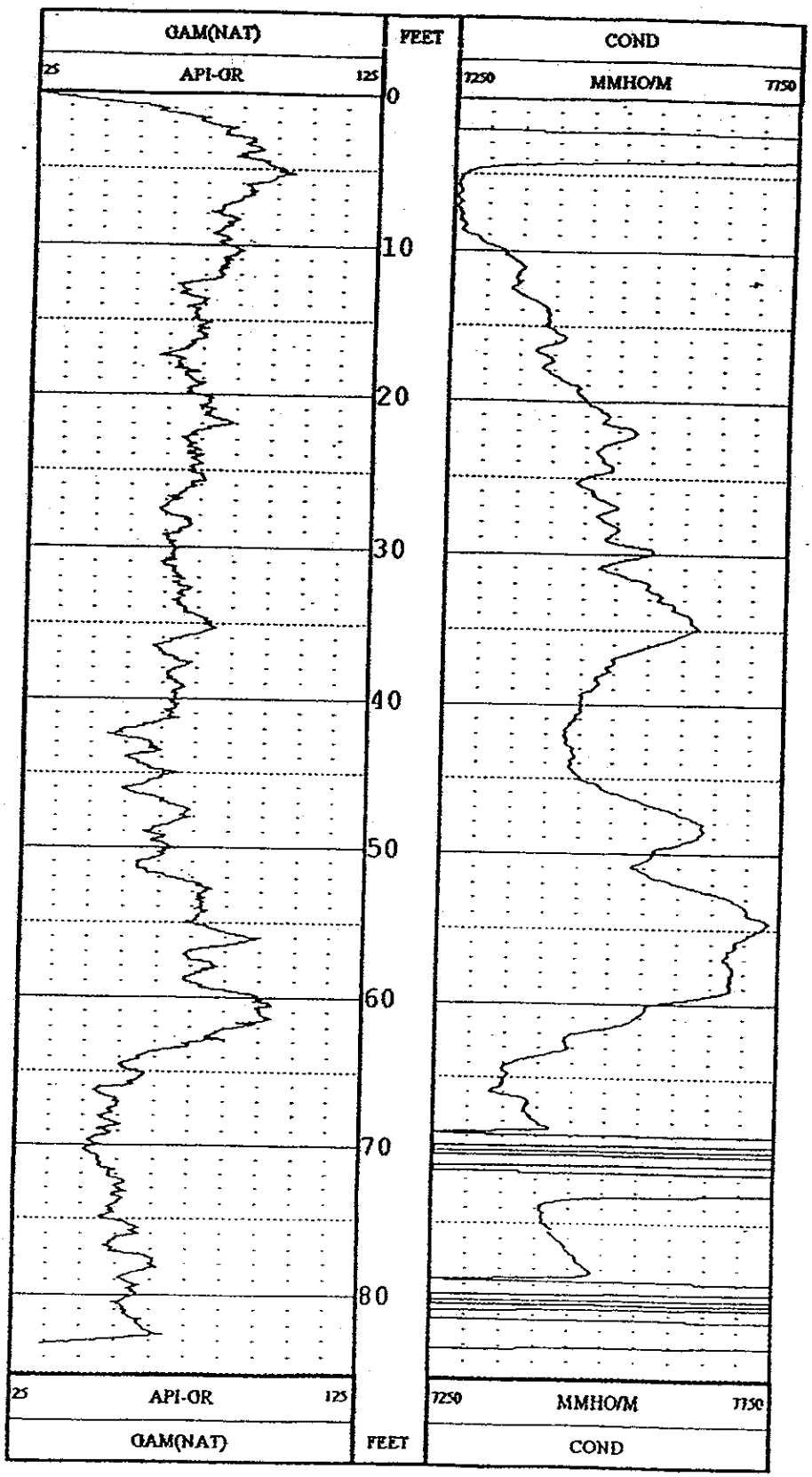
REMARKS:

Water Level at Approx. 69'.

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS


GAM(NAT)
FEET
COND
25
API-GR
125
7250
MMHO/M
7750
0
10
20
30
40
50
60
70
80
25
API-GR
125
7250
MMHO/M
7750
GAM(NAT)
FEET
COND

00045968
012983



2

00045969
012984

U.S. ARMY

CORPS OF ENGINEERS

TULSA DISTRICT

MW133

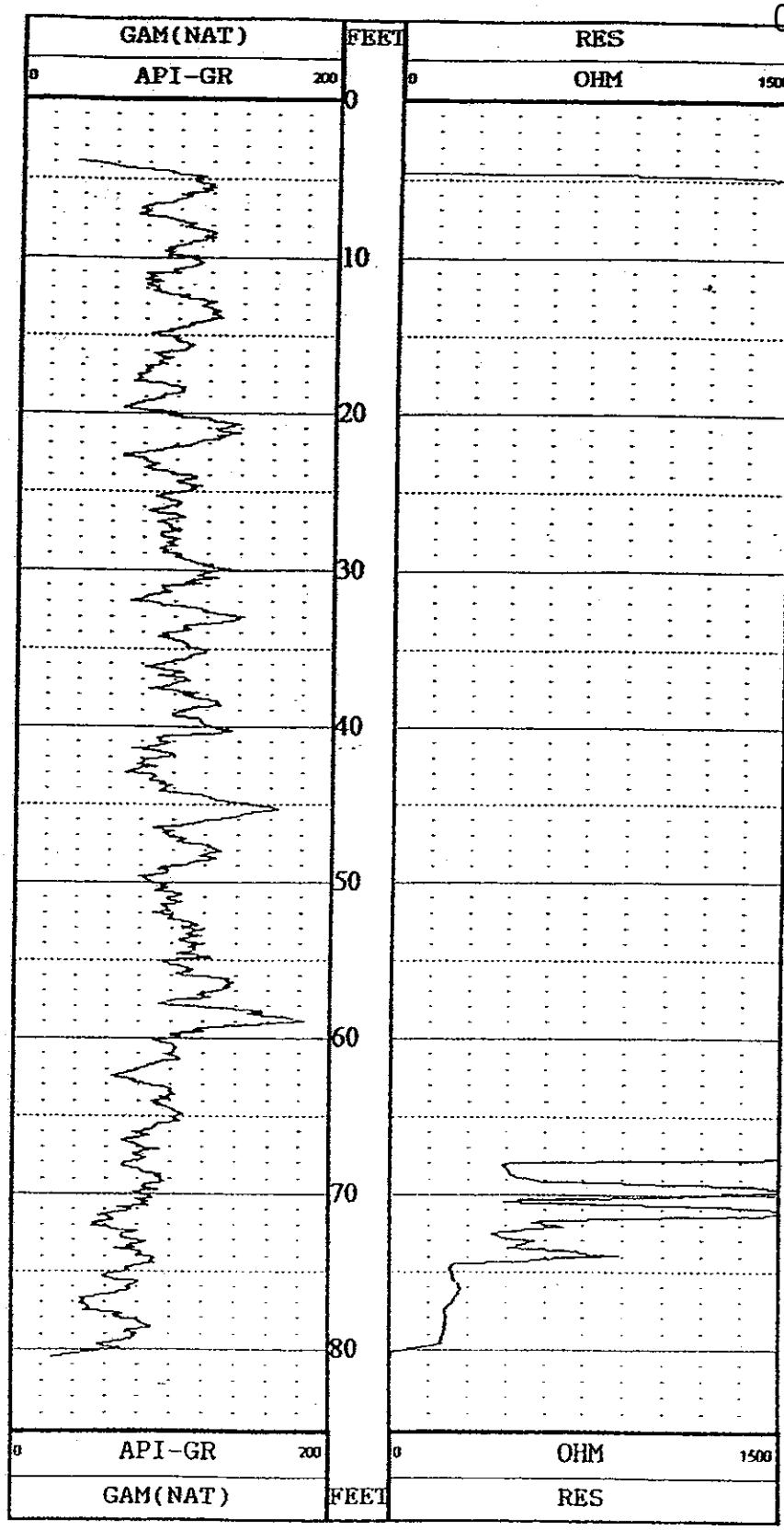
COMPANY	: U.S.ARMY CORPS OF ENGINEERS			OTHER SERVICES:	
WELL	: MW133				
LOCATION/FIELD	: TULSA				
COUNTY	: HARRISON				
STATE	: TEXAS				
SECTION	:	TOWNSHIP	:	RANGE	:
DATE	: 08/18/94	PERMANENT DATUM	:	ELEVATIONS:	
DEPTH DRILLER	: 85	ELEV. PERM. DATUM	:	KB	:
LOG BOTTOM	: 80.70	LOG MEASURED FROM:	G.L.	DF	:
LOG TOP	: 3.90	DRL MEASURED FROM :	G.L.	GL	:
CASING DRILLER	: 0	LOGGING UNIT	:		
CASING TYPE	:	FIELD OFFICE	:		
CASING THICKNESS:		RECORDED BY	: MURRAY,M.C.		
BIT SIZE	:	BOREHOLE FLUID	:	FILE	: Repeat
MAGNETIC DECL.	:	RM	:	TYPE	: 9060A
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: mw133a
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	: Reepres.
NEUTRON MATRIX	:	FLUID DELTA T	:	THRESH:	

REMARKS:

WTR LVL MEASURED AT 68.1 FEET BELOW G.L.

Openhole, form. wtr/air. Logged at 13:05.

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS


GAM(NAT)
API-GR
0
200
FEET
RES
OHM
0
1500
0
10
20
30
40
50
60
70
80
API-GR
GAM(NAT)
FEET
OHM
RES

HOLE NO. MW134 00045971

012986

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION Longhorn Army Ammunition Plant	SHEET 1 OF 2 SHEETS
1. PROJECT Groundwater Background Study		10. SIZE AND TYPE OF BIT Rockbit	
2. LOCATION (Coordinates or Station) 390832.00 3026089.90		11. DATUM FOR ELEVATION SHOWN (GS or MSL) MSL	
3. DRILLING AGENCY U.S.Army COE		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) MW134		13. OVERBURDEN SAMPLES DISTURBED	UNDISTURBED
5. NAME OF DRILLER Scott		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN 0.0		16. DATE HOLE STARTED 09/23/94 COMPLETED 09/28/94	
8. DEPTH DRILLED INTO ROCK 0.0		17. ELEVATION TOP OF HOLE 316.0	
9. TOTAL DEPTH OF HOLE 151.0		18. TOTAL CORE RECOVERY FOR BORING 0.0 %	
		M.W.Dean INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	10					9-23-94 Flight auger to 10' with 9.5" rockbit to 31. Mixed drilling gel
	20					9-24-94 9.5" rockbit to 85'. Tried to install 8" casing but hole was too tight or too crooked. Driller then changed to 9 5/8" rockbit & reamed hole.
	30					9-25-94 Reamed hole. Casing hung up @ 25'. Removed casing & reamed again with 14" rockbit to 85'. Installed 86' of 8" casing.
	40					9-26-94 7" rockbit inside casing to 95'. Split spoon 95-97.5 Split spoon 108-108.7
	50					9-27-94 Drilled with rockbit to 151. Occasional sand stringer.
	60					9-28-94 Backfilled hole with bentonite pellets. Bottom of screen at 109.5 20' screen.
	70					TYPE ZONE Rockbit 0.0- 85.0 Rockbit 85.0-151.0
	80					
	90					
218.5			(CL) (95.0 - 97.5) Tan, very sandy, moist, moderately soft.			
216.0	100					

PROJECT HOLE NO.

00045972

HOLE NO. MW134

012987

DRILLING LOG	DIVISION SOUTHWEST	INSTALLATION Longhorn Army Ammunition Plant	SHEET 2 OF 2 SHEETS
1. PROJECT Groundwater Background Study		10. SIZE AND TYPE OF BIT Rockbit	
2. LOCATION (Coordinates or Station) 390832.00 3026089.90		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
3. DRILLING AGENCY U.S.Army COE		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number) MW134		13. OVERBURDEN SAMPLES DISTURBED	UNDISTURBED
5. NAME OF DRILLER Scott		14. TOTAL NUMBER CORE BOXES 0	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN 0.0		16. DATE HOLE STARTED 09/23/94 COMPLETED 09/28/94	
8. DEPTH DRILLED INTO ROCK 0.0		17. ELEVATION TOP OF HOLE 318.0	
9. TOTAL DEPTH OF HOLE 151.0		18. TOTAL CORE RECOVERY FOR BORING 0.0 %	
		M.W.Dean	INSPECTOR

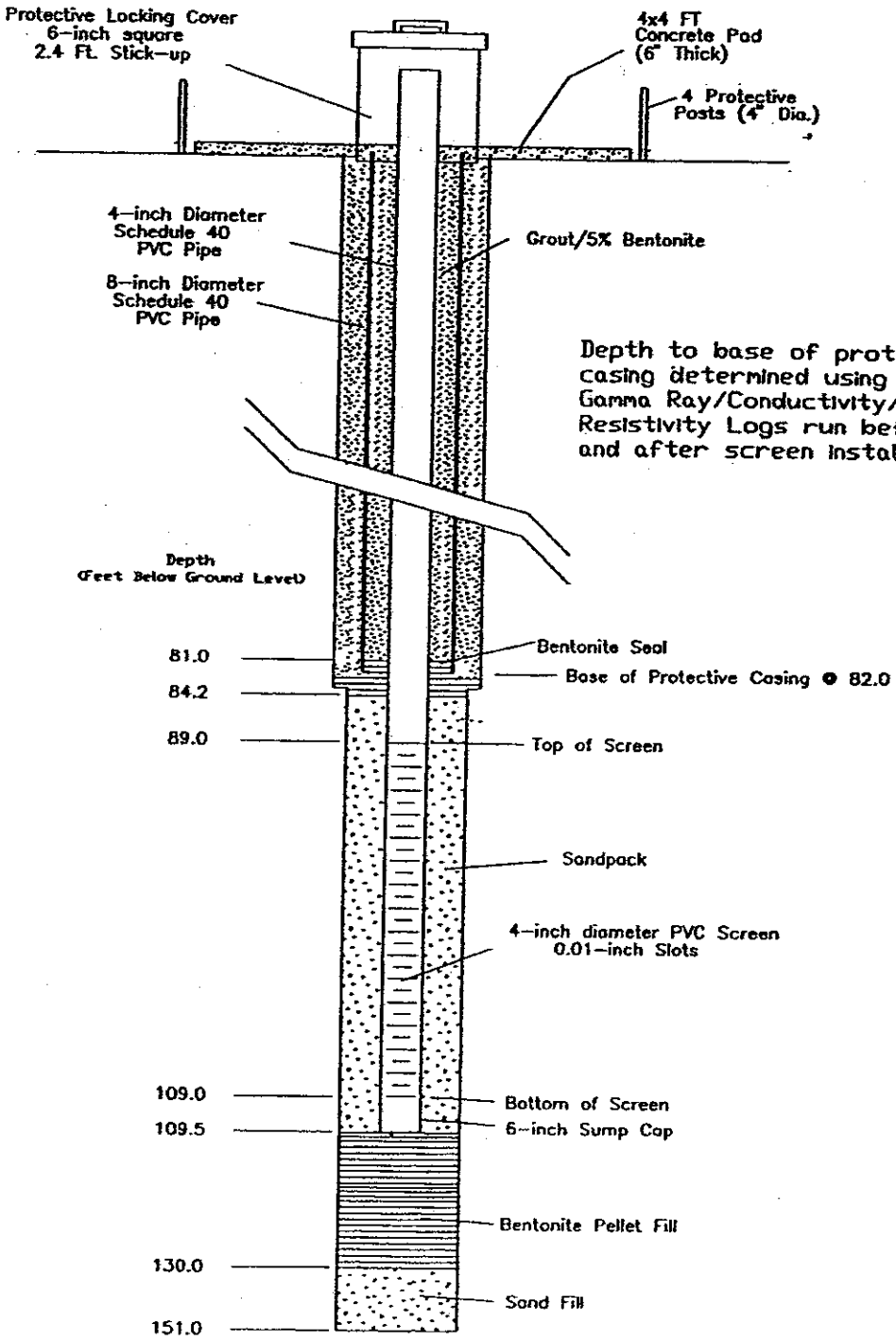
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
208.0						
207.3	110		(CL) (108.0 – 108.7) shale(?),Black, moist, moderately soft.			
	120					
	130					
	140					
165.0	150					
	160					
	170					
	180					
	190					
	200					

PROJECT HOLE NO.

Completed Well Schematic: No. 00045473 124

Completed 9-30-94

012988



00129889

U.S. ARMY

CORPS OF ENGINEERS

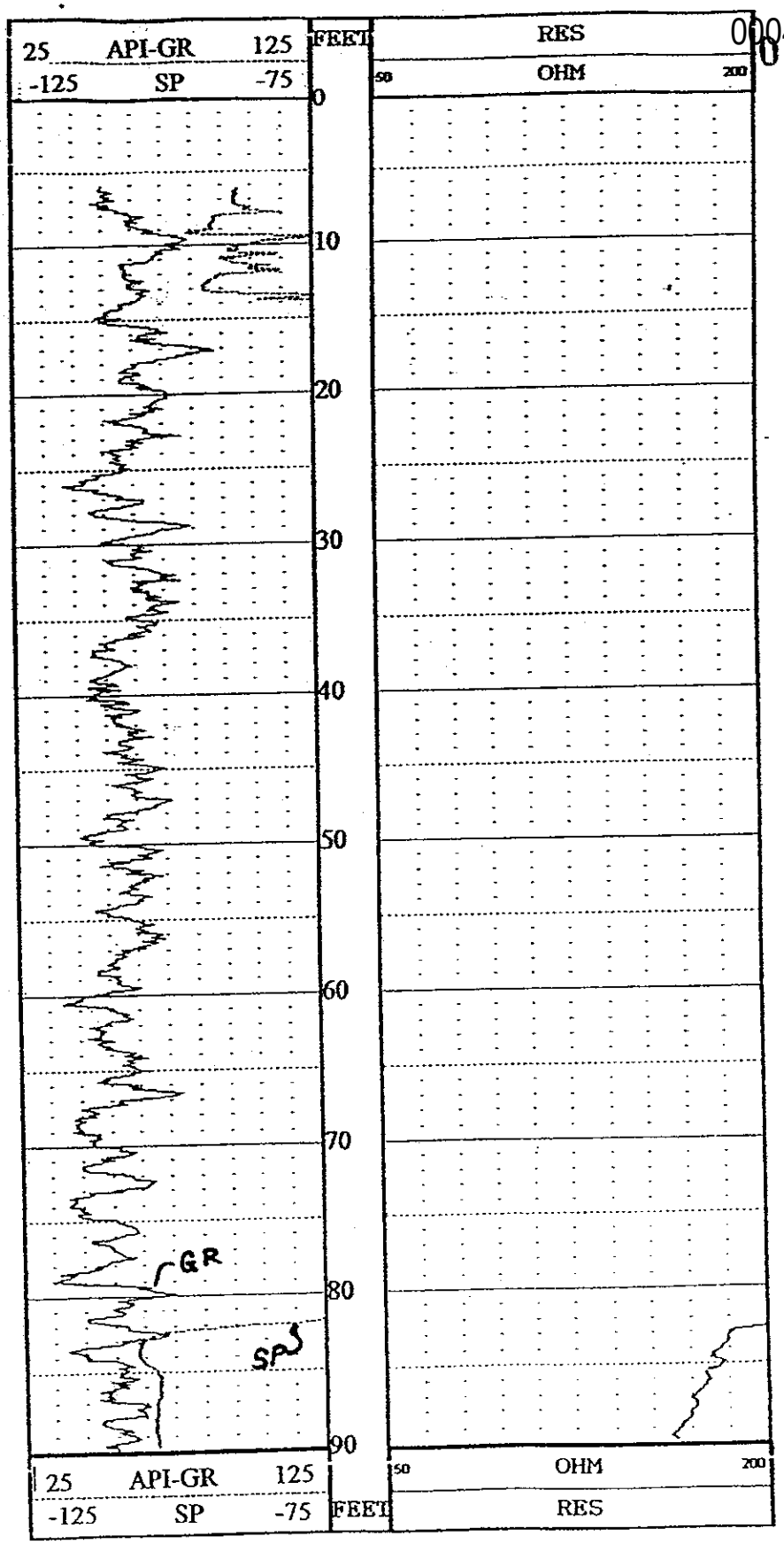
TULSA DISTRICT

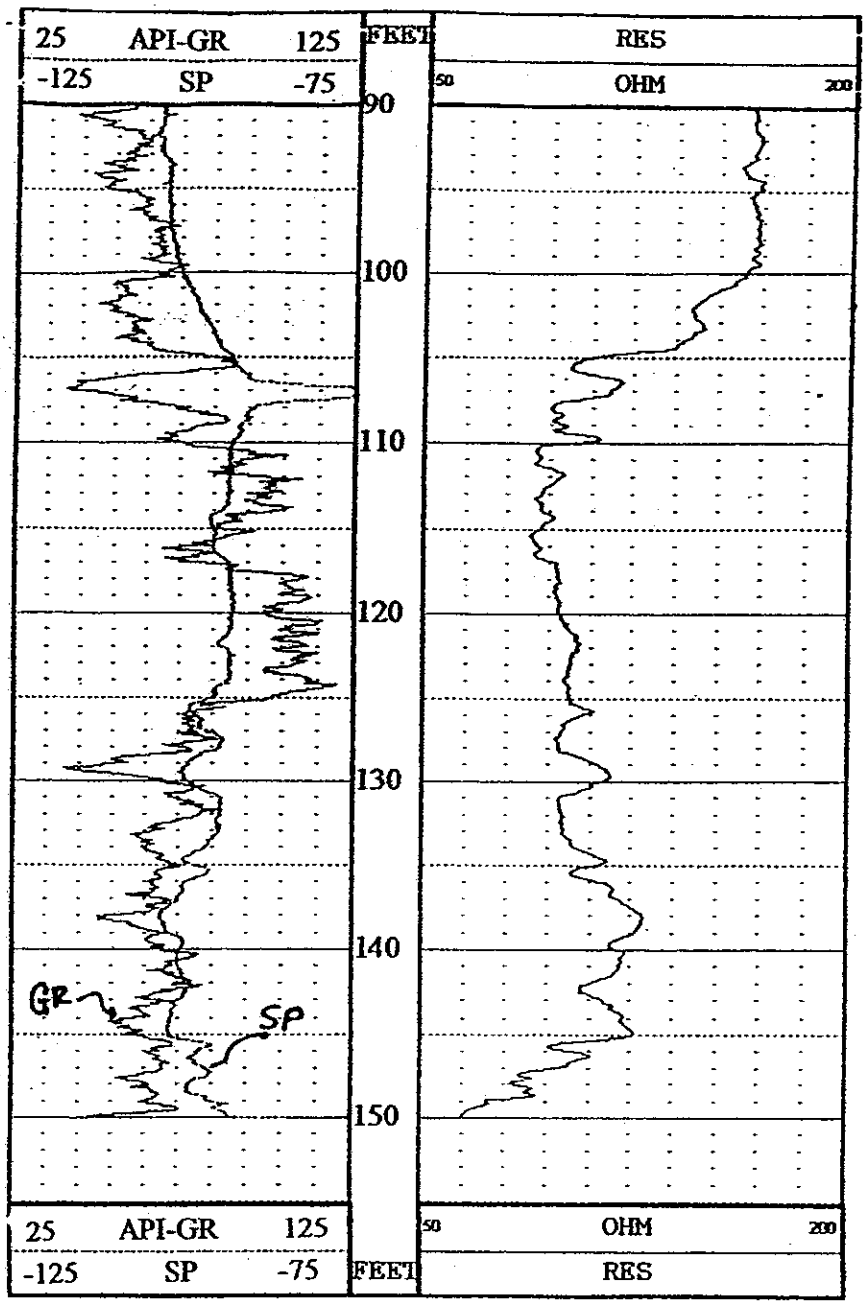
Monitoring Well 134

COMPANY	: U.S. Army COE			OTHER SERVICES:	
WELL	: Monitoring Well 134				
LOCATION/FIELD	: Longhorn AAP				
COUNTY	: Harrison				
STATE	: Texas				
SECTION	:	TOWNSHIP	:	RANGE	:
DATE	: 03/28/94	PERMANENT DATUM	:	ELEVATIONS:	
DEPTH DRILLER	:	ELEV. PERM. DATUM	:	KB	:
LOG BOTTOM	: 154.20	LOG MEASURED FROM	: G.L.	DF	:
LOG TOP	: 6.20	DRL MEASURED FROM	: G.L.	GL	:
CASING DRILLER	:	LOGGING UNIT	:		
CASING TYPE	:	FIELD OFFICE	:		
CASING THICKNESS	:	RECORDED BY	:		
BIT SIZE	:	BOREHOLE FLUID	:	FILE	: REPEAT
MAGNETIC DECL.	:	RM	:	TYPE	: 9050A
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 0
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	: Ihoepres.
NEUTRON MATRIX	:	FLUID DELTA T	:	THRESH:	

REMARKS:

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS


25 API-GR 125
-125 SP -75
FEET
RES
50 OHM 200
0
10
20
30
40
50
60
70
80
90
GR
SP
25 API-GR 125
-125 SP -75
FEET
50 OHM 200
RES


25 API-GR 125
-125 SP -75
FEET
RES
50 OHM 200
90
100
110
120
130
140
150
GR
SP
25 API-GR 125
-125 SP -75
FEET
50 OHM 200
RES

00045977
012992

U.S. ARMY
CORPS OF ENGINEERS
TULSA DISTRICT

Monitoring Well 134

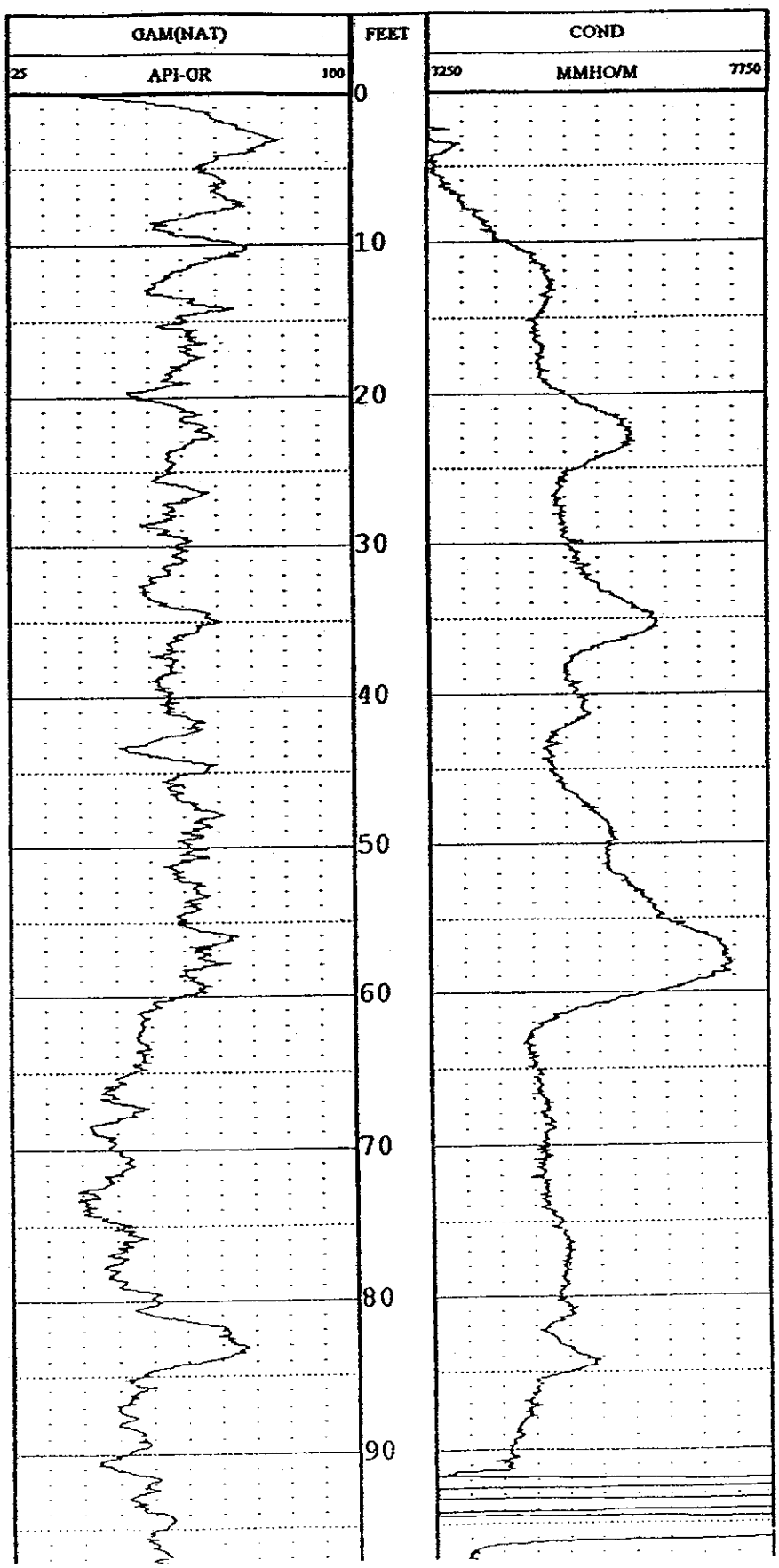
COMPANY	: U.S. Army COE			OTHER SERVICES:	
WELL	: Monitoring Well 134				
LOCATION/FIELD	: Longhorn AAP				
COUNTY	: Harrison				
STATE	: Texas				
SECTION	:	TOWNSHIP	:	RANGE :	
DATE	: 03/30/94	PERMANENT DATUM	:	ELEVATIONS:	
DEPTH DRILLER	:	ELEV. PERM. DATUM	:	KB	:
LOG BOTTOM	: 198.50	LOG MEASURED FROM:	G.L.	DF	:
LOG TOP	: -2.00	DRL MEASURED FROM:	G.L.	GL	:
CASING DRILLER	:	LOGGING UNIT	:		
CASING TYPE	:	FIELD OFFICE	:		
CASING THICKNESS:		RECORDED BY	: M.C. Murray		
BIT SIZE	:	BOREHOLE FLUID	:	FILE	: ORIGINAL
MAGNETIC DECL.	:	RM	:	TYPE	: 9518A
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 134blind
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	: lheapind.
NEUTRON MATRIX	:	FLUID DELTA T	:	THRESH:	

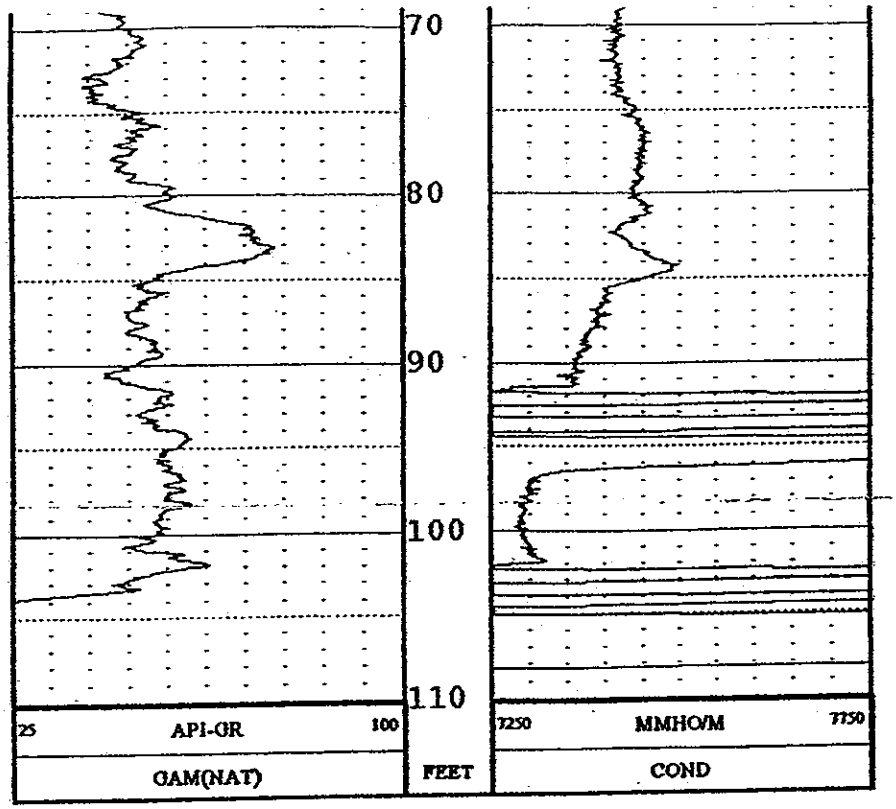
REMARKS:

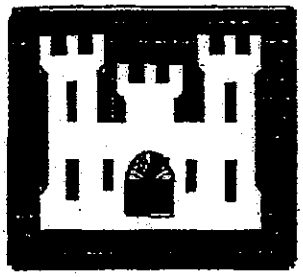
Top screen at approx. 85'. GR deflection from approx. 91-94' indicate

Logged at 9734. Plugged back from total depth of 151'.

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS


GAM(NAT)
FEET
COND
25
API-GR
100
7250
MMHO/M
7750
0
10
20
30
40
50
60
70
80
90


70
80
90
100
110
25
API-GR
100
GAM(NAT)
FEET
7250
MMHO/M
7750
COND



U.S. ARMY

CORPS OF ENGINEERS

TULSA DISTRICT

Monitoring Well 134

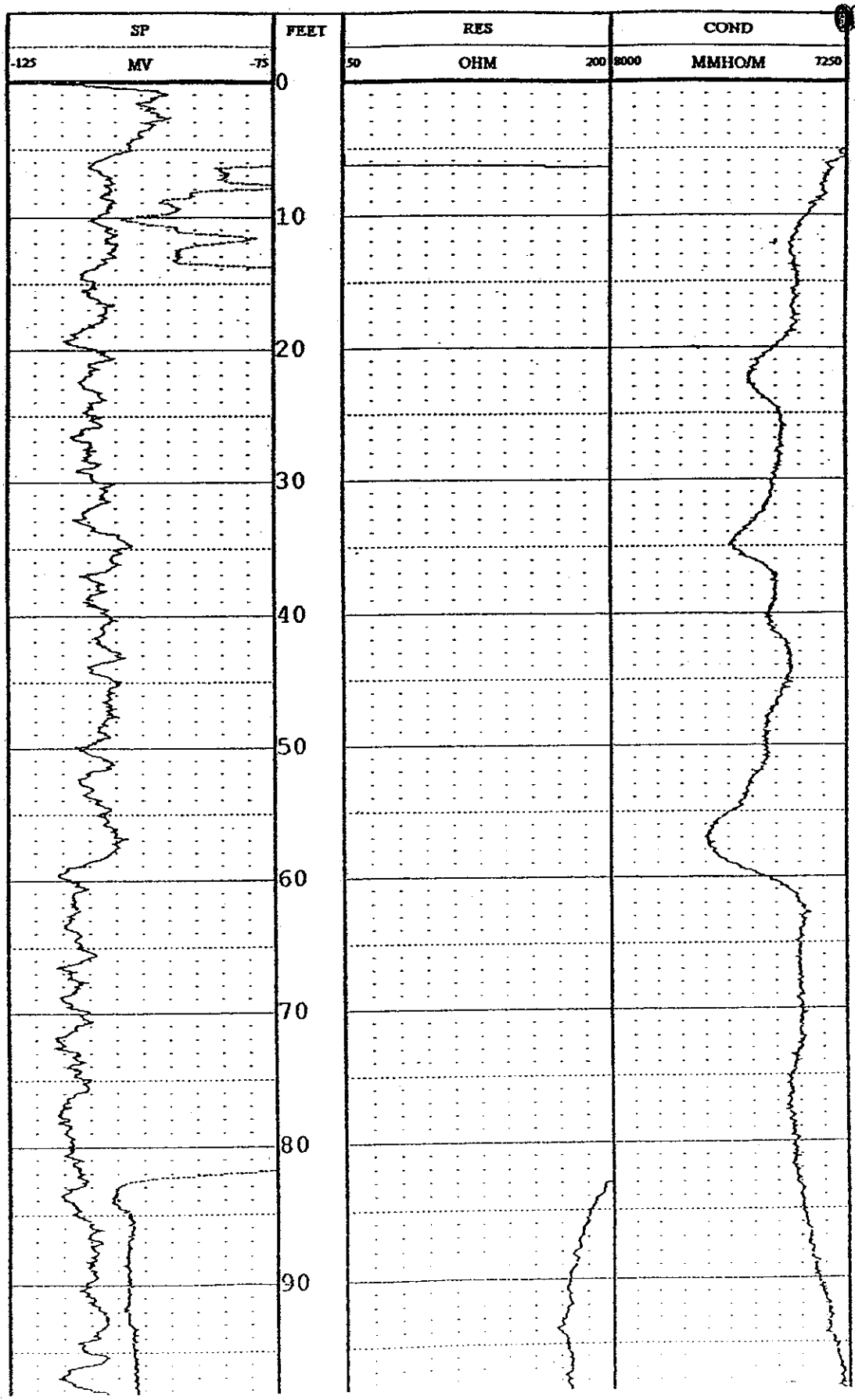
COMPANY	: U.S. Army COE			OTHER SERVICES:	
WELL	: Monitoring Well 134			IND/GR	
LOCATION/FIELD	: Longhorn AAP			Res/SP/G	
COUNTY	: Harrison				
STATE	: Texas				
SECTION	:	TOWNSHIP	:	RANGE	:
DATE	: 09/28/94	PERMANENT DATUM	:	ELEVATIONS:	
DEPTH DRILLER	: 151'	ELEV. PERM. DATUM	:	KB	:
LOG BOTTOM	: 145.10	LOG MEASURED FROM:	G.L.	DF	:
LOG TOP	: 0.10	DRL MEASURED FROM:	G.L.	GL	:
CASING DRILLER	:	LOGGING UNIT	:		
CASING TYPE	:	FIELD OFFICE	:		
CASING THICKNESS:		RECORDED BY	:		
BIT SIZE	:	BOREHOLE FLUID	:	FILE	: ORIGINAL
MAGNETIC DECL.	:	RM	:	TYPE	: 9610A
MATRIX DENSITY	:	RM TEMPERATURE	:	LOG	: 134and
FLUID DENSITY	:	MATRIX DELTA T	:	PLOT	: combo.
NEUTRON MATRIX	:	FLUID DELTA T	:	THRESH:	

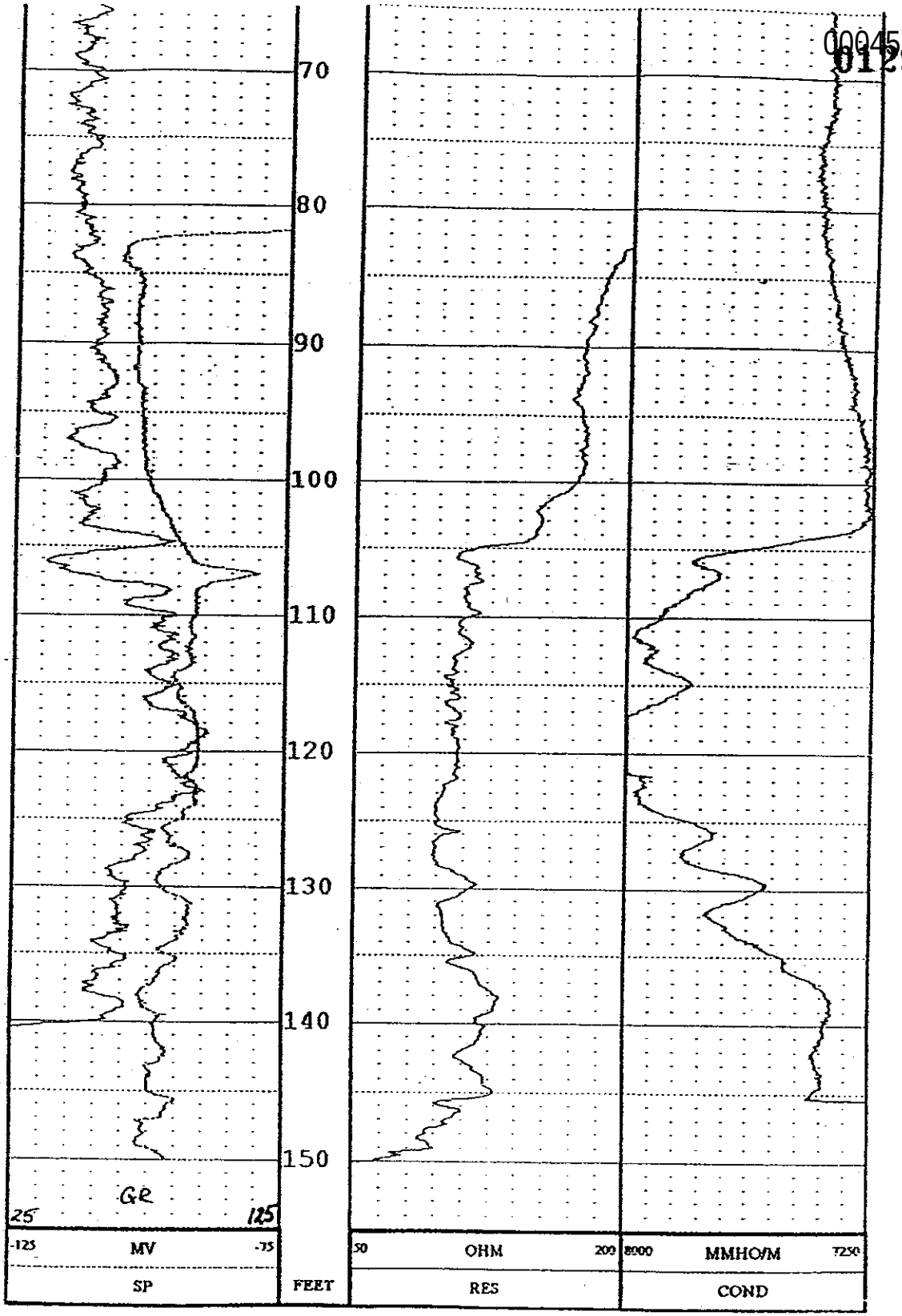
REMARKS:

Base casing set to 86' (Driller's depth).

Gamma Ray/Cond. logged in separate run from SP/Res.

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS


SP
-125
MV
-75
FEET
0
10
20
30
40
50
60
70
80
90
RES
50
OHM
200
COND
8000
MMHO/M
7250


70
80
90
100
110
120
130
140
150
GR
25
125
-125
MV
-75
SP
FEET
50
OHM
200
RES
8000
MMHO/M
7250
COND

Appendix B

Statistical Analysis of Water Quality Parameters and Ion Concentrations

Appendix B also contains copies of handwritten field data reports, which are the best available.

1.0 Statistical Evaluation of Perimeter Well Groundwater Data

Groundwater quality measurements and chemical analysis data of samples collected from perimeter monitoring wells (MW) MW110, MW111, and MW112 between December 2003 and December 2004 were evaluated to describe the groundwater zone located upgradient from LHAAP sites and to evaluate use of perimeter well data in risk assessments. Data used in the evaluation (**Table B-1**) were taken from tables in **Sections 2.0** and **3.0** of the main body of the report.

1.1 Groundwater Quality Parameters

The groundwater quality parameters temperature, pH, conductivity, dissolved oxygen (DO) concentration, oxidation-reduction potential (ORP), and turbidity measured in nephelometric turbidity units (NTU), indicate properties related to groundwater interactions with metals that are of interest to human health and environmental risk assessments.

The oxidation parameters DO and ORP reflect the conditions of the groundwater that govern oxidation-reduction (redox) reactions involving oxygen, O_2, such as, Fe(II) oxidation to Fe(III), Mn(II) oxidation to Mn(IV), Cr(III) oxidation to Cr(VI), ammonium ion (NH_4^+) oxidation (as reflected in total nitrate [NO_3] and nitrite [NO_2^-] concentration in **Table B-1**), and hydrogen sulfide (HS) oxidation to sulfate (SO_4^{2-}). ORP and DO are complementary properties that reflect the redox properties of the groundwater, but they are not redundant. ORP reflects electrochemical oxidation potential of the groundwater and DO reflects concentration of oxygen available for oxidizing reactions, or the oxidizing capacity of the medium.

Conductivity and turbidity are complementary measures of colloid and suspended solids formation in groundwater. Conductivity is a measure of the ability of water to conduct electricity, and is expected to be correlated with concentrations of ionic species, such as chloride (Cl^-), sulfate (SO_4^{2-}), total nitrate and nitrite (NO_3^-/NO_2^-) and metal ions, and including charged colloids or suspended solids. Turbidity is a relative measure of groundwater turbidity as shown by its ability to scatter light, indicating the presence of suspended solids or colloids. These properties relate to the availability of colloidal adsorption sites for metal ions, and the mobility of free or adsorbed metals in the medium.

The pH measurements from the three perimeter wells indicate acidic conditions in this groundwater zone. Correlations between pH, ORP and DO are difficult to predict because hydrogen (H^+) is either a reactant or a product in various redox reactions. All correlations are based on the H^+ concentration as calculated from observed pH values (**Table B-1**).

Because temperature is transient and is not expected to significantly influence the chemical oxidation-reduction processes or formation of suspended solids over the observed range (16.44°C to 24.21°C), the groundwater temperature was not evaluated further in this study.

The above discussion suggests two properties of groundwater that relate to concentrations of metals and their oxidation states: (1) its oxidizing or reducing properties that determine the oxidation state of metals having more than one oxidation state (e.g., iron [Fe], chromium [Cr], mercury [Hg]), and (2) the proportion of metals that might be in colloidal form or adsorbed to colloids or suspended solids. The second property is less important for risk assessment than the first because at a low colloid concentration, the dissolved or colloidal state of metals does not influence the groundwater's suitability as drinking water.

1.2 Selected Metals and Ions

Anions involved in redox reactions (SO42-, total NO3-/NO2-) and Cl- were selected for evaluation (**Table B-1**), as were metal ions usually associated with water hardness or suspended solids (aluminum [Al], calcium [Ca], magnesium [Mg], and potassium [K], and metals involved in redox reactions [Fe and manganese (Mn)]). Because risk assessments for exposure to groundwater are based on unfiltered samples, the chemical concentrations used (**Table B-1**) do not distinguish species associated with suspended solids from free ion concentrations, and do not indicate oxidation states of redox metals, such as Fe(II) and Fe(III).

1.3 Correlation Analysis

The properties of groundwater from the three perimeter wells were evaluated for use in risk assessments at LHAAP by evaluating the five water quality parameters (DO, ORP, conductivity, turbidity, and pH) to describe the groundwater zone. The analysis includes evaluation of correlations of these properties with concentrations of selected metals and anions related to chemical properties of the groundwater (Al, Ca, Mg, K, Fe, Mn, Cl^-, SO_4^{2-}, and total NO_3^-/NO_2^-) (**Table B-1**).

Because the water quality parameters are closely interrelated, correlation analysis was applied as a statistical method to identify important variables in the data and to classify their roles in the description of the groundwater zone sampled by the perimeter wells. Because some of the water quality parameters or chemical species concentrations are not normally distributed, nonparametric methods were used for all statistical analysis. Correlations between variables were evaluated using the Spearman R rank correlation coefficient. Comparisons of parameters measured among samples from the three wells were made using the nonparametric Kruskal-Wallis test. All statistical analyses were made using the Statistica© software program (StatSoft, 2004). All correlations and comparisons were considered significant at the 95 percent confidence level ($p<0.05$).

The correlations of the five water quality parameters indicate that H^+ concentration, ORP, and turbidity are not significantly correlated with any other groundwater property or ion concentration in water from the three perimeter wells (**Table B-2**). Conductivity is negatively correlated with DO, indicating that increased dissolved oxygen concentration is accompanied by a decrease in conductivity (**Figure B-1**). Conductivity is positively correlated with SO_4^{2-} and K ion concentrations (**Table B-2**). DO is positively correlated with Al, and negatively correlated with Cl^-, Ca, and Mg ion concentrations (**Table B-2**), as consistent with the negative correlation of conductivity and DO.

Significant positive correlations between ion concentrations (**Table B-2**) indicate that Ca, Mg, K, Mn, Cl^-, SO_4^{2-}, are variable and often correlated, although none of the ion concentrations are significantly correlated with turbidity. Concentrations of Fe, total NO_3^-/ NO_2^- are not correlated with any groundwater property of ion concentration.

1.4 Statistical Comparisons of Water Quality Parameters and Concentrations of Selected Metals and Ions

Because some of the water quality parameters or chemical species concentrations are not normally distributed, nonparametric methods were used for statistical analysis. Comparisons of parameters measured among samples from the three wells were made using the nonparametric Kruskal-Wallis test at a confidence level of 95 percent.

Results of nonparametric comparisons are illustrated using box and whisker plots, which provide a quick, robust graphical method to visually compare two or more groups of data and a summary view of the entire data set, including the overall location and degree of symmetry. For a nonparametric Kruskal-Wallis test, the box encloses the central 50 percent of the data points so that the top of the box represents the 75^{th} percentile and the bottom of the box represents the 25^{th} percentile. The median of the data set is located in the center of this box. The whiskers extend outward from the box to the maximum and minimum points. Where only three values are plotted, the central 50 percent of the data points also include the minimum and maximum values, and no whiskers are plotted.

1.4.1 Comparisons of Water Quality Parameters

Comparisons of the four water quality parameters (**Figures B-2** through **B-6**) show that pH, ORP, DO, and turbidity properties of samples from the three wells are not statistically different with 95 percent confidence, and that differences in conductivity are marginally significant ($p=0.0493$, **Figure B-3**). (**Figure B-3** shows the marginal differences between conductivity measurements in water from the three wells, in which the conductivity of water from MW110 is statistically different from water from MW111, but not from MW112 water, and water from MW111 is not different from MW112 water.)

1.4.2 Comparisons of Concentrations of Selected Metals and Ions

Comparisons of anions, cations, and selected metal concentrations (**Figures B-7** through **B-9**) show that aluminum, iron, and nitrate/nitrite concentrations are not significantly different in groundwater from the three perimeter wells. However, concentrations of manganese, sulfate, calcium, magnesium, and potassium in water from MW111 are significantly different from the other two wells, and chloride, with p ~0.05 is judged to be significantly different in water from MW111 based on the box-and-whisker plot (**Figures B-10** through **B-15**).

1.4.3 Summary

Water quality parameters indicate that groundwater from all three wells reflects acidic oxidizing conditions that favor formation of Fe(II) or Fe(III), Mn(II), and Cr(III) species. The concentrations of anions and cations that are components of hard water are variable and are significantly lower in water from MW111 compared to MW110 and MW112.

2.0 References

StatSoft, Inc. (2004). STATISTICA (data analysis software system), version 7. Tulsa, OK, www.statsoft.com.

Tables

00045989

Table B-1
Water Quality Parameters and Selected Anions and Metal Concentrations in Groundwater from Perimeter Wells
Longhorn Army Ammunition Plant
Karnack, Texas

Location	Sampling Date[a]	Temperature (deg. C) (+/- 0.5)	pH (+/- 0.1)	Specific Conductivity (mS/cm) (+/- 3%)	Dissolved Oxygen (mg/L) (+/- 10%)	Oxidation Reduction Potential (mV) (+/- 10 mV)	Turbidity (NTU) (+/- 10%)
Well 110	3-Dec-03	19.13	5.96	6.24	1.3	238	3.9
Well 110	31-Mar-04	18.00	5.95	6.667	0.21	184	18.7
Well 110	15-Jul-04	19.23	5.90	2.781	1.75	194	12.9
Well 110	16-Dec-04	17.28	6.45	5.511	1.99	395	10.3
Well 111	31-Mar-04	16.45	4.54	0.07	2.31	326	42.3
Well 111	15-Jul-04	24.21	5.91	1.88	2.17	166	43.6
Well 111	16-Dec-04	18.62	6.49	0.0922	1.97	876	3.1
Well 112	31-Mar-04	16.44	5.73	4.78	0.3	169	0.7
Well 112	14-Jul-04	19.87	5.94	3.391	1.16	34	53
Well 112	16-Dec-04	18.57	6.72	0.985	1.71	470	50.9

Table B-1
Water Quality Parameters and Selected Anions and Metal Concentrations in Groundwater from Perimeter Wells
Longhorn Army Ammunition Plant
Karnack, Texas

00045990

Location	Sampling Date[a]	Groundwater Concentration (mg/L)								
		Aluminum	Iron	Manganese	Chloride	Nitrate-Nitrite	Sulfate	Calcium	Magnesium	Potassium
Well 110	3-Dec-03	0.252	0.561	4.22	1070	0.05	1690	205	128	2.74
Well 110	31-Mar-04	0.272	0.214	4.75	1930	0.01	2400	302	210	2.04
Well 110	15-Jul-04	0.459	0.586	5.57	1330	0.01	1880	221	141	1.84
Well 110	16-Dec-04	0.769	0.952	2.32	986	0.003	1530	190	130	2.47
Well 111	31-Mar-04	0.652	0.523	0.0677	10.2	0.01	26.6	3.71	3.34	0.25
Well 111	15-Jul-04	1.99	2.31	0.145	2.07	0.01	18.4	2.98	3	0.419
Well 111	16-Dec-04	0.243	0.467	0.171	5.91	0.003	30.3	4.97	4.6	0.128
Well 112	31-Mar-04	0.159	0.24	2.16	1640	0.01	1040	223	292	1.79
Well 112	14-Jul-04	0.0989	0.938	3.46	1160	0.01	873	210	263	0.517
Well 112	16-Dec-04	0.324	1.23	4.05	1560	0.003	1010	233	331	2.67

Notes:

[a] Because of insufficient sample volume, water samples collected from MW111 and MW112 in December 2003 were not analyzed for metals or anions.

deg. C: degrees Celsius

mg/L: milligrams per liter

mV: millivolts

NTU: nephelometric turbidity units

µS/cm: microsiemens per centimeter

Table B-2
Correlations of Groundwater Properties and Selected Ion Concentrations in Samples from Perimeter Wells
Longhorn Army Ammunition Plant
Karnack, Texas [a]

	Well No.	H+	Conductivity	DO	ORP	NTU	Aluminum	Iron	Manganese	Chloride	Nitrate-Nitrite	Sulfate	Calcium	Magnesium	Potassium
Well No.	1.000000														
H+	0.070630	1.000000													
Conductivity	-0.468729	-0.103030	1.000000												
DO	-0.115577	0.103030	**-0.672727**	1.000000											
ORP	-0.179787	-0.587879	-0.369697	0.381818	1.000000										
NTU	0.314627	-0.006061	-0.260606	0.127273	-0.296970	1.000000									
Aluminum	-0.423783	0.090909	-0.212121	**0.733333**	0.187879	0.224242	1.000000								
Iron	0.147682	-0.248485	-0.248485	0.478788	-0.030303	0.575758	0.515152	1.000000							
Manganese	-0.430204	-0.260606	0.600000	-0.624242	-0.078788	0.018182	-0.212121	-0.090909	1.000000						
Chloride	0.070630	0.018182	0.527273	**-0.842424**	-0.212121	-0.030303	-0.430303	-0.406061	**0.684848**	1.000000					
Nitrate-Nitrite	-0.220433	0.582575	0.388384	-0.291288	-0.631123	-0.027742	-0.166450	-0.242740	0.214998	0.131773	1.000000				
Sulfate	-0.597148	-0.139394	**0.769697**	-0.624242	-0.006061	-0.321212	-0.163636	-0.369697	**0.878788**	**0.721212**	0.214998	1.000000			
Calcium	0.070630	-0.175758	0.490909	**-0.842424**	-0.103030	0.006061	-0.442424	-0.333333	**0.745455**	**0.975758**	0.006935	**0.721212**	1.000000		
Magnesium	0.404520	-0.200000	0.321212	**-0.745455**	-0.115152	0.103030	-0.527273	-0.103030	0.539394	**0.866667**	-0.166450	0.466667	**0.890909**	1.000000	
Potassium	-0.346731	-0.418182	**0.648485**	-0.418182	0.115152	-0.030303	0.042424	0.175758	**0.709091**	0.527273	0.124838	**0.709091**	0.563636	0.478788	1.000000

Notes:

[a] Spearman R rank correlation coefficient for correlations of nonparametric data

H^+ = Hydrogen ion concentration calculated from observed pH values (Table B-1)
Conductivity (microsiemens per centimeter)
DO = Dissolved oxygen concentration (mg/L)
ORP = Oxidation reduction potential (mV)
NTU = turbidity in nephelometric turbidity units
Shaded values indicate correlations are significant at 5% confidence ($p<0.05$).

Figures

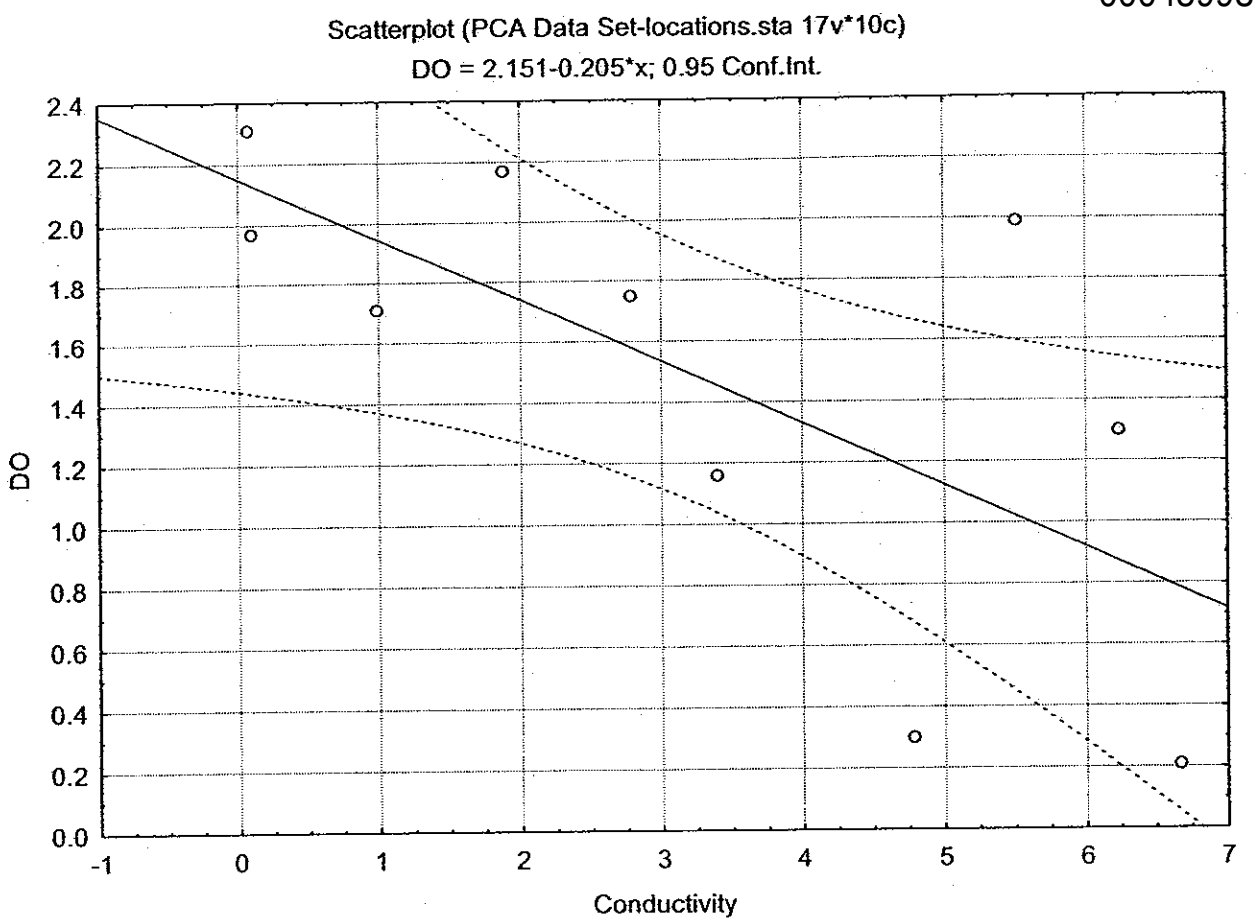
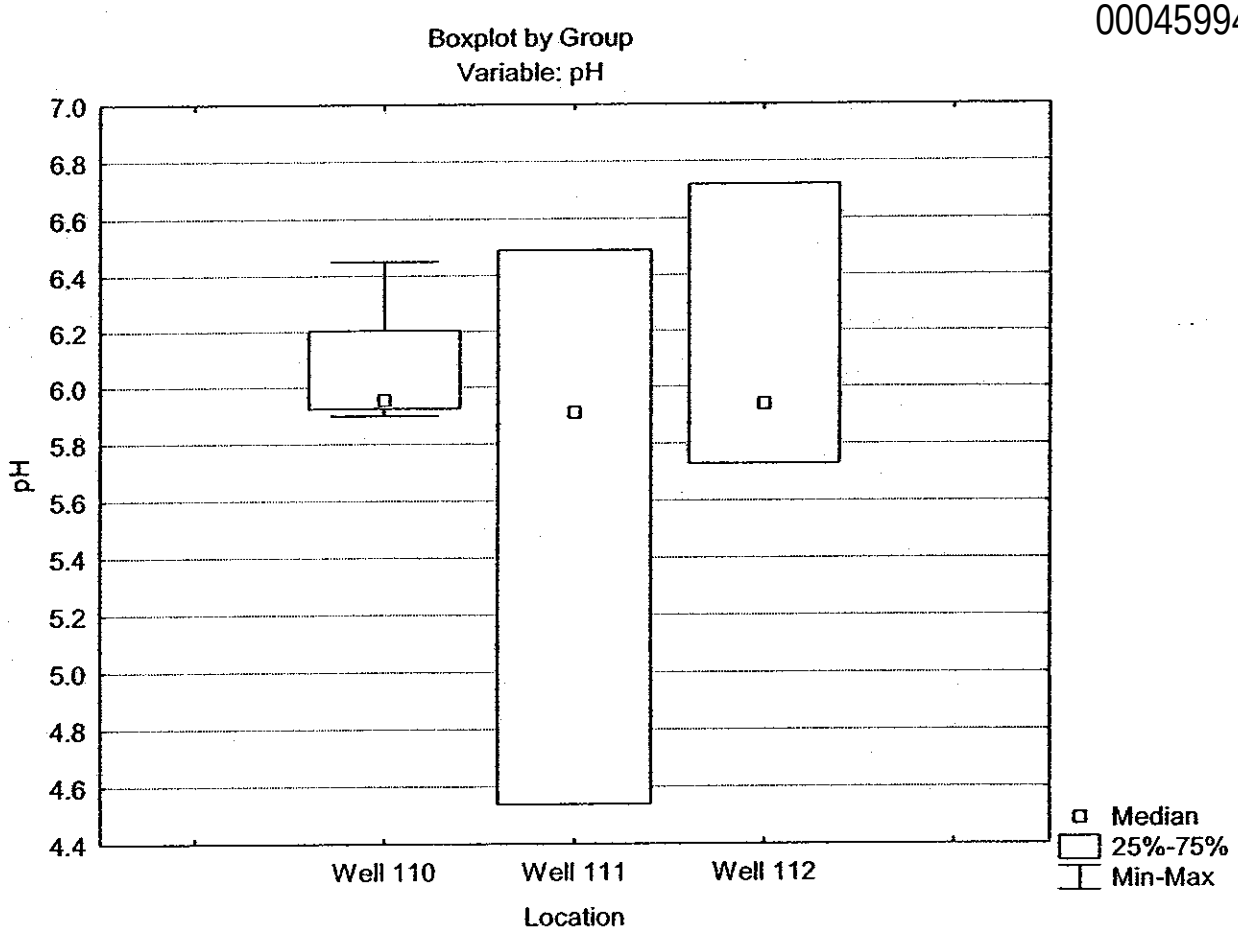
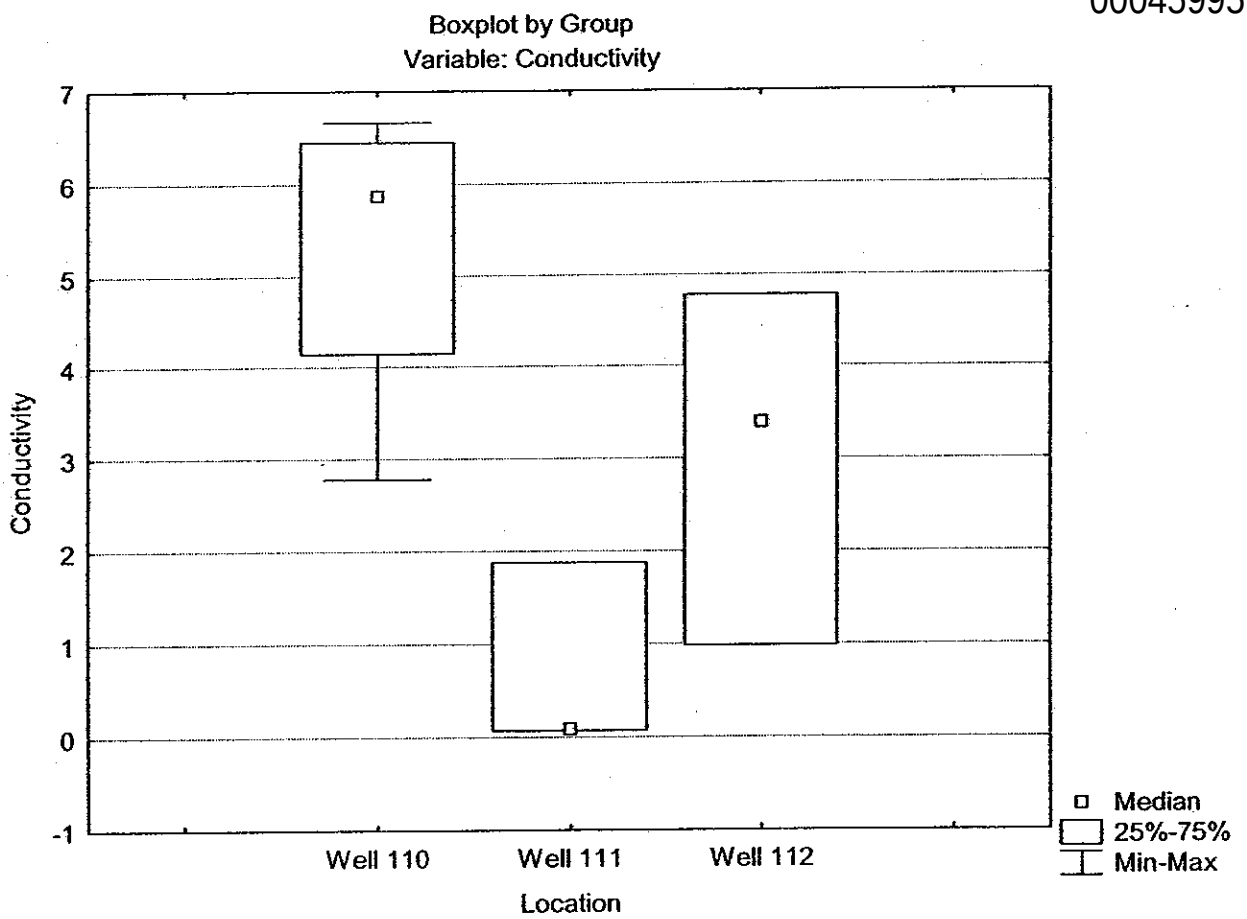

Scatterplot (PCA Data Set-locations.sta 17v*10c)
DO = 2.151-0.205*x; 0.95 Conf.Int.
DO
Conductivity
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-1
0
1
2
3
4
5
6
7

Figure B-1



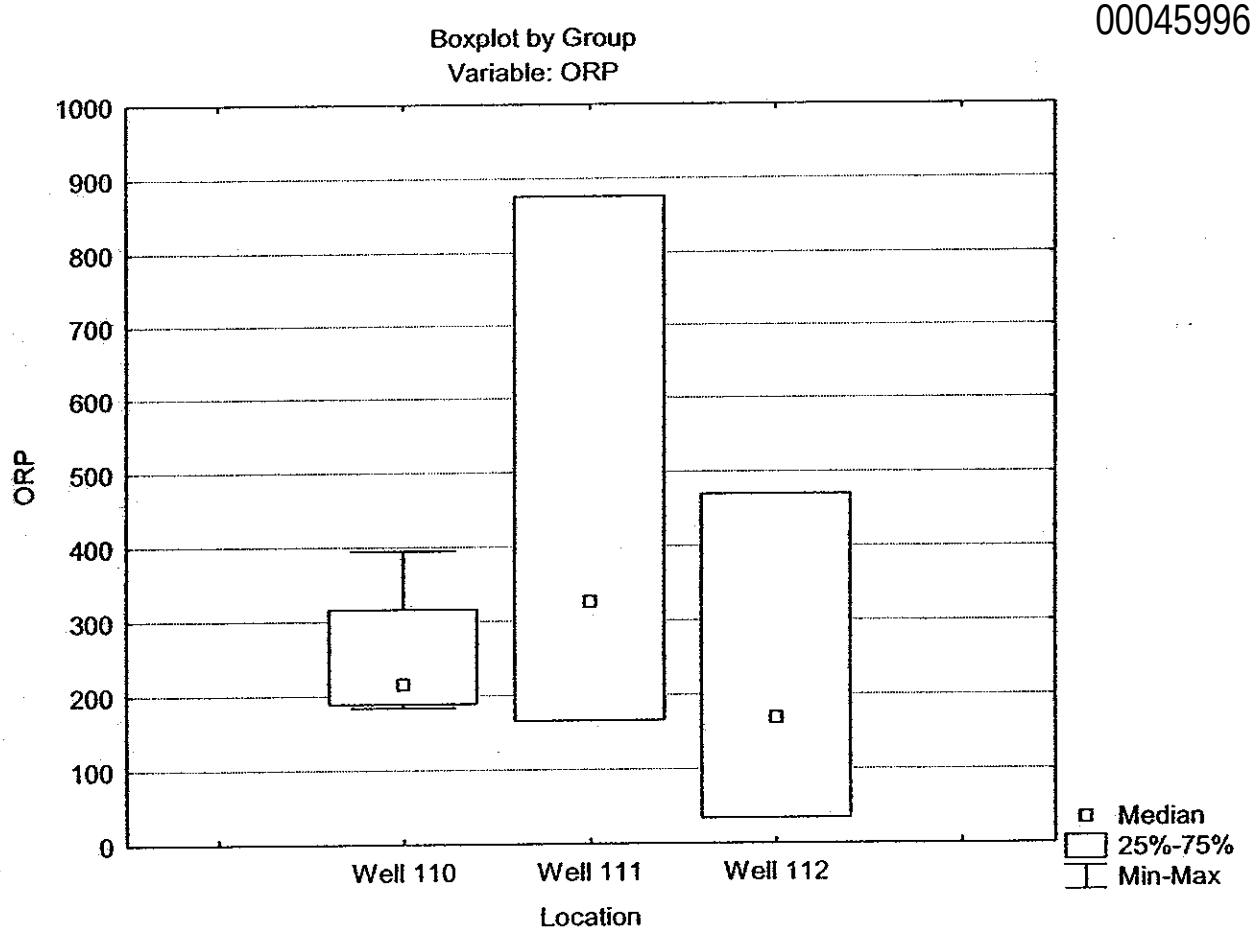
Depend.: pH	Code	Valid N	Sum of Ranks
Kruskal-Wallis ANOVA by Ranks; pH (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =.3454545 p =.8414			
Well 110	101	4	24.00000
Well 111	102	3	14.00000
Well 112	103	3	17.00000

Figure B-2



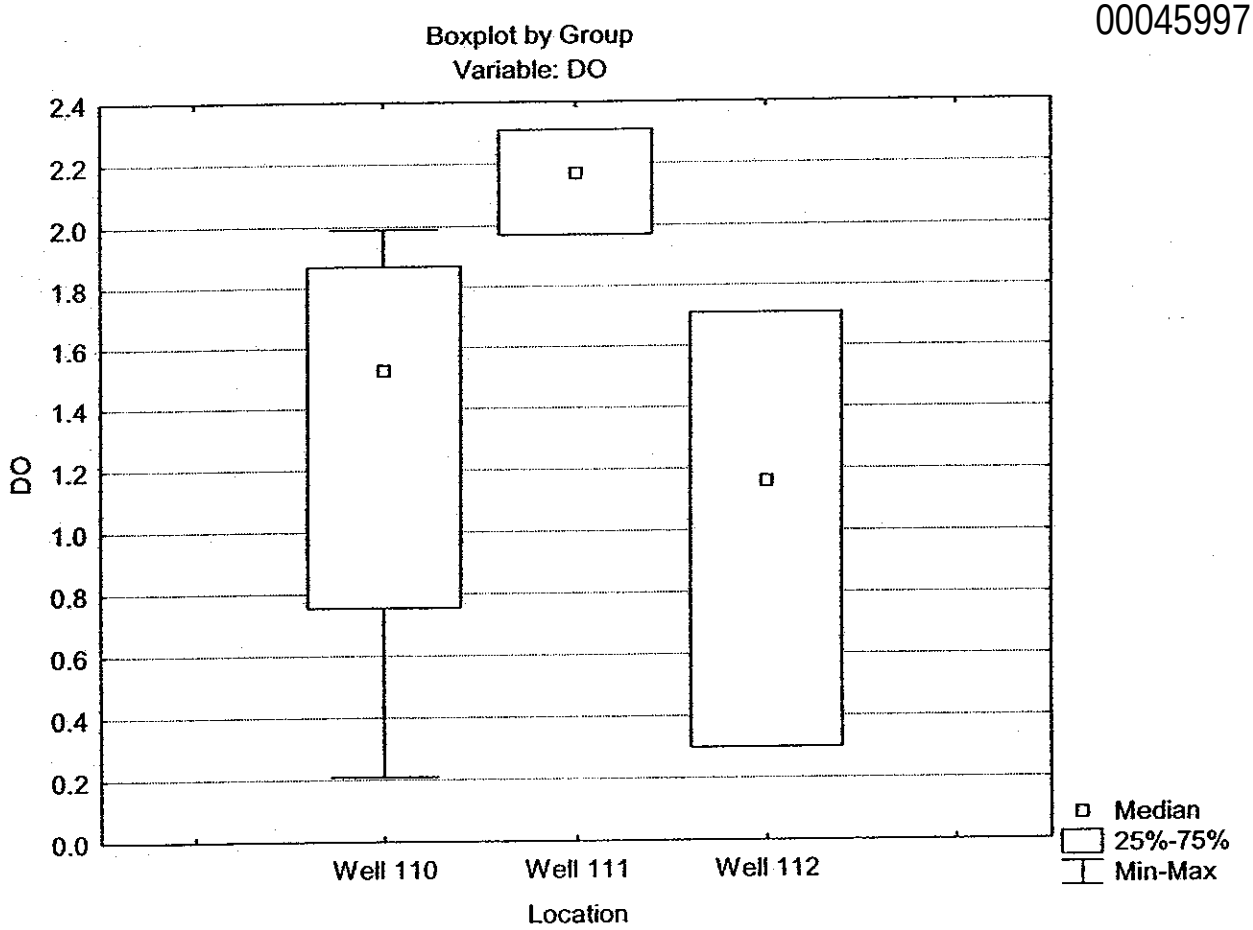
	Kruskal-Wallis ANOVA by Ranks; Conductivity (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =6.018182 p =.0493		
Depend.: Conductivity	Code	Valid N	Sum of Ranks
Well 110	101	4	32.00000
Well 111	102	3	7.00000
Well 112	103	3	16.00000

Figure B-3



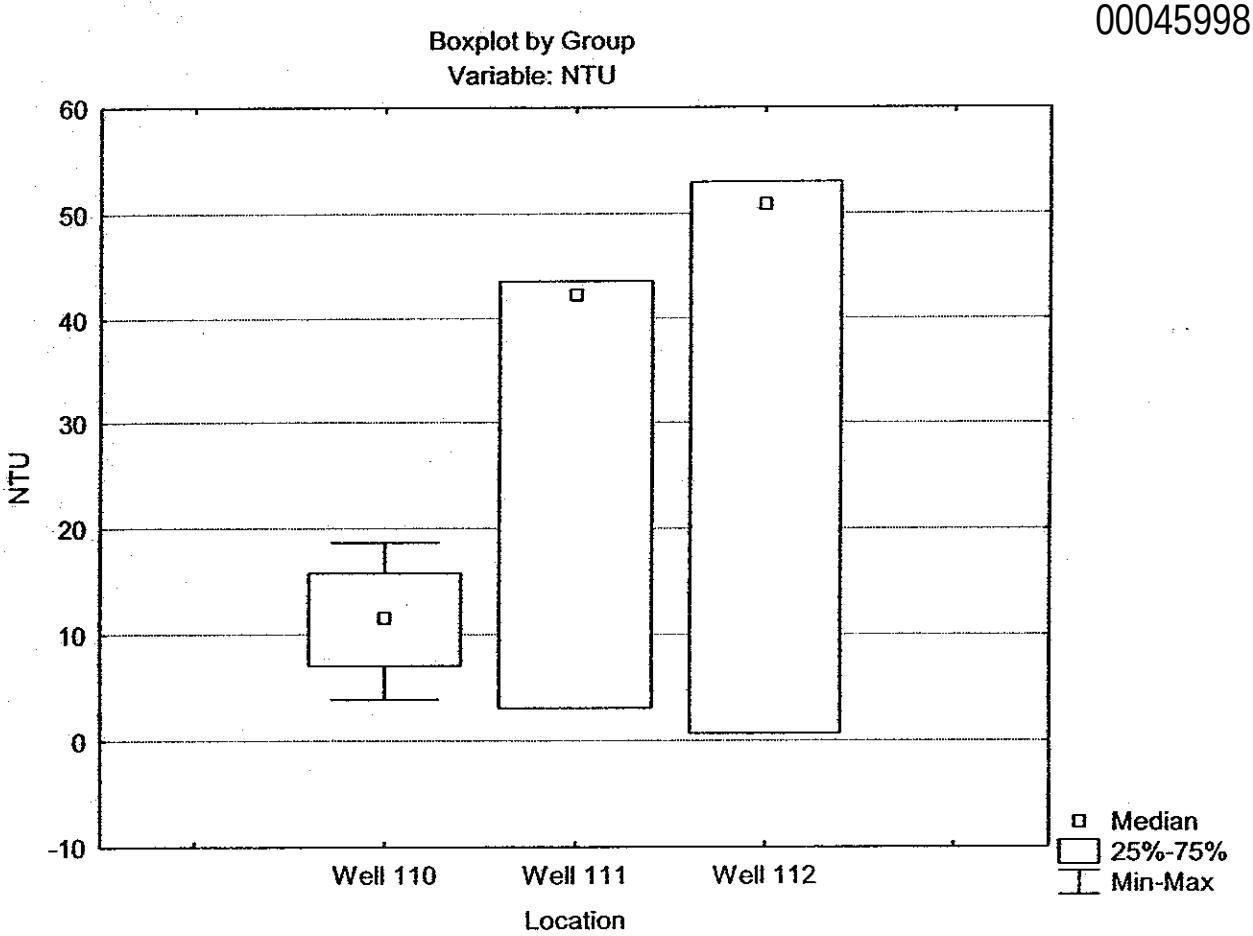
	Kruskal-Wallis ANOVA by Ranks; ORP (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =.7000000 p =.7047		
Depend.: ORP	Code	Valid N	Sum of Ranks
Well 110	101	4	23.00000
Well 111	102	3	19.00000
Well 112	103	3	13.00000

Figure B-4



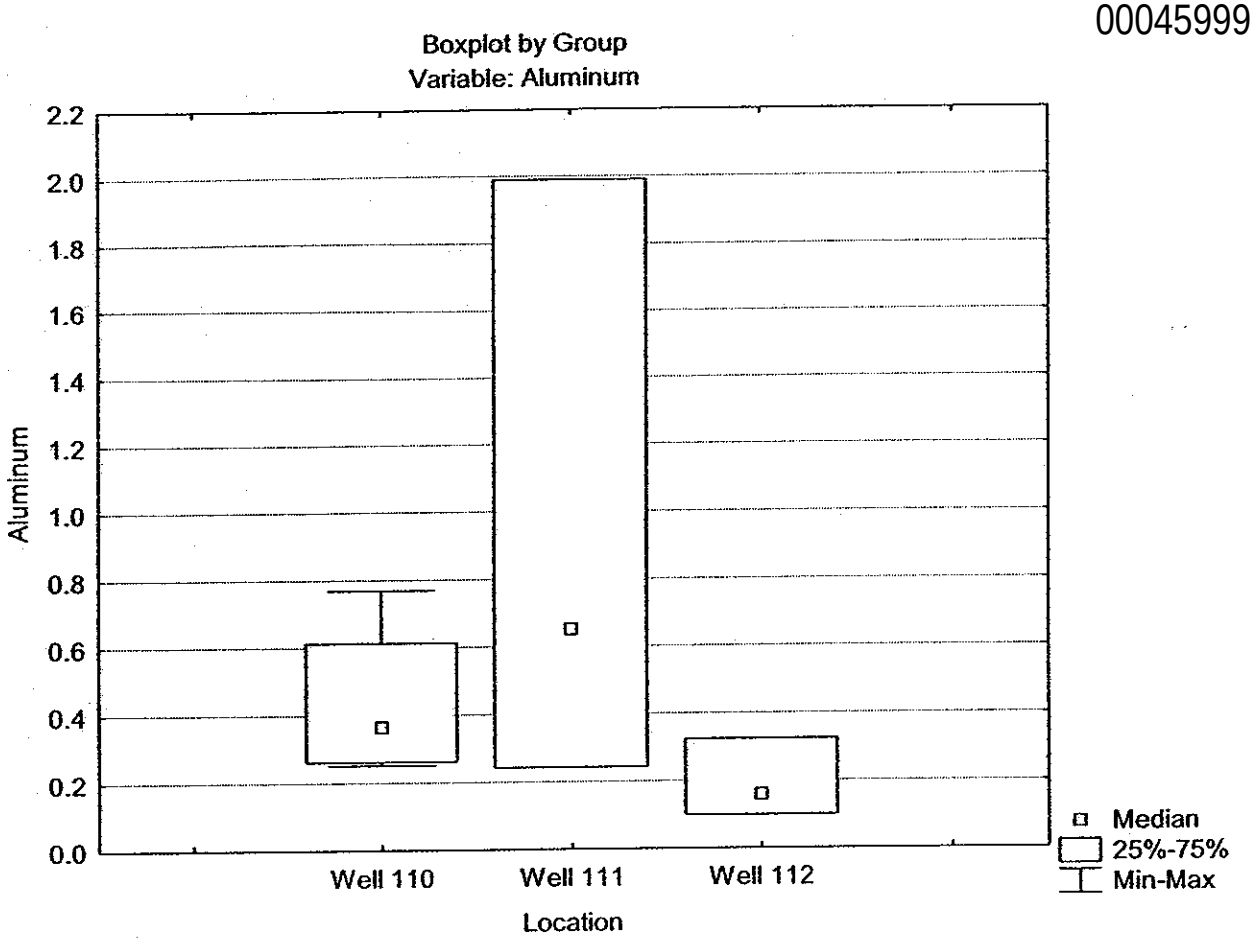
	Kruskal-Wallis ANOVA by Ranks; DO (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =5.063636 p =.0795		
Depend.: DO	Code	Valid N	Sum of Ranks
Well 110	101	4	19.00000
Well 111	102	3	26.00000
Well 112	103	3	10.00000

Figure B-5



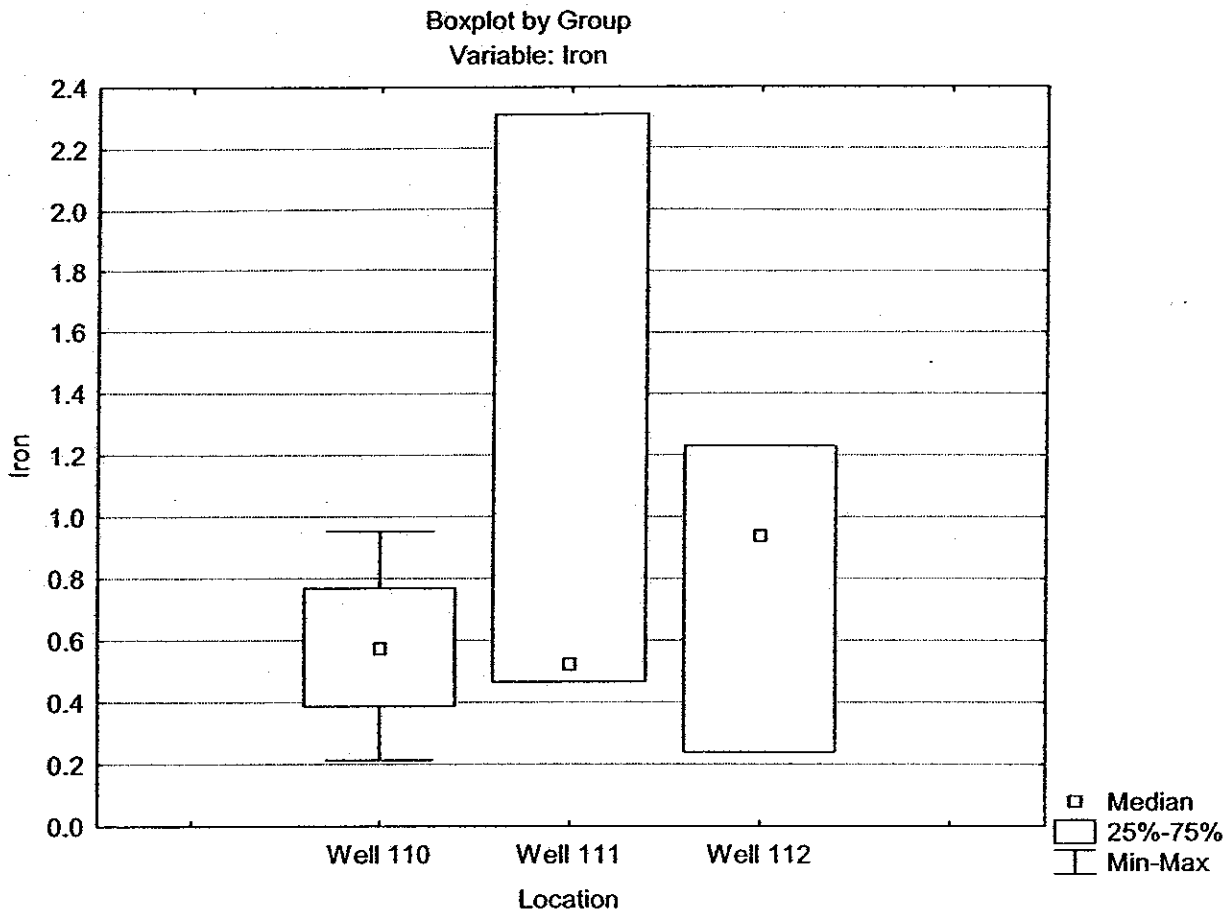
Depend.: NTU	Kruskal-Wallis ANOVA by Ranks; NTU (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =.8909091 p =.6405		
	Code	Valid N	Sum of Ranks
Well 110	101	4	18.00000
Well 111	102	3	17.00000
Well 112	103	3	20.00000

Figure B-6



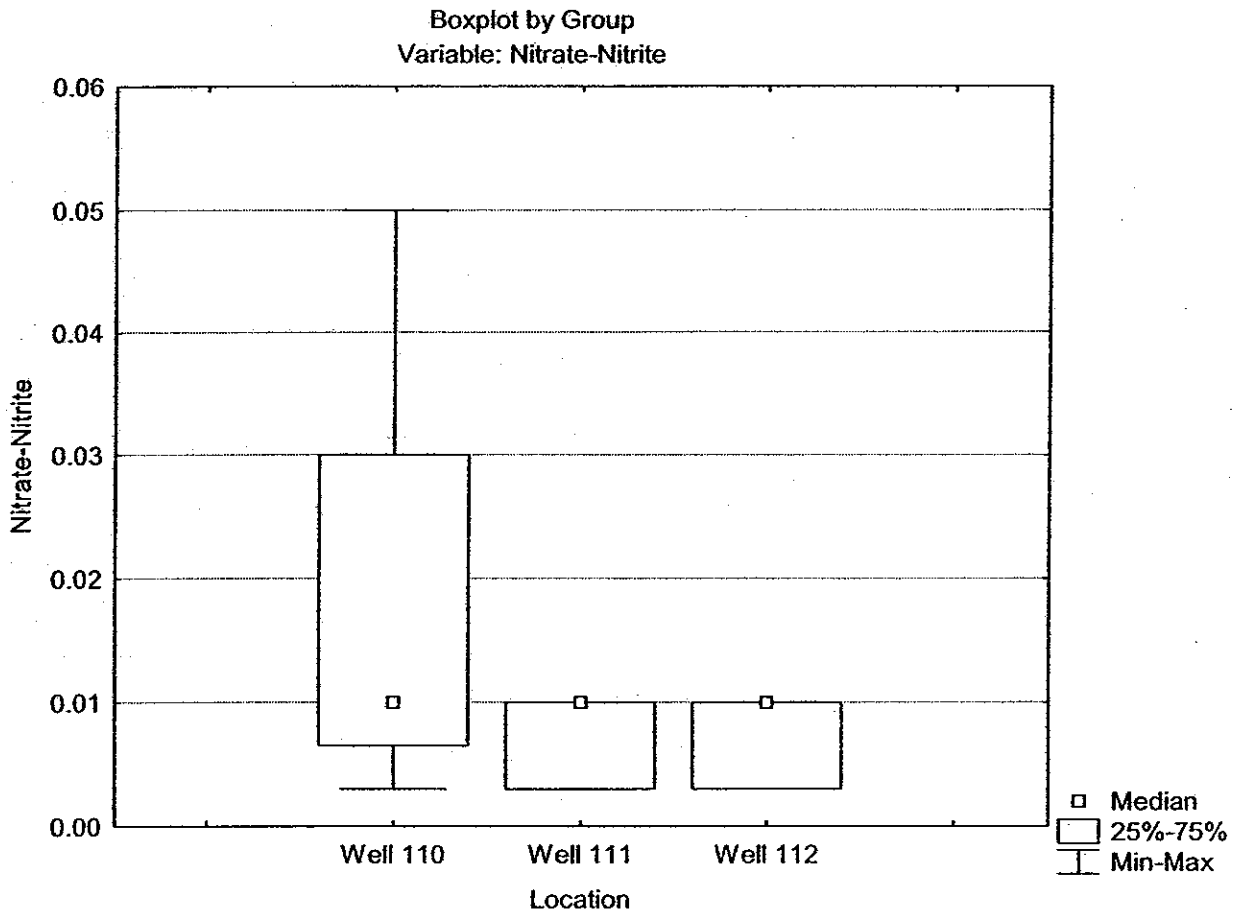
	Kruskal-Wallis ANOVA by Ranks; Aluminum (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =3.027273 p =.2201		
Depend.: Aluminum	Code	Valid N	Sum of Ranks
Well 110	101	4	25.00000
Well 111	102	3	21.00000
Well 112	103	3	9.00000

Figure B-7



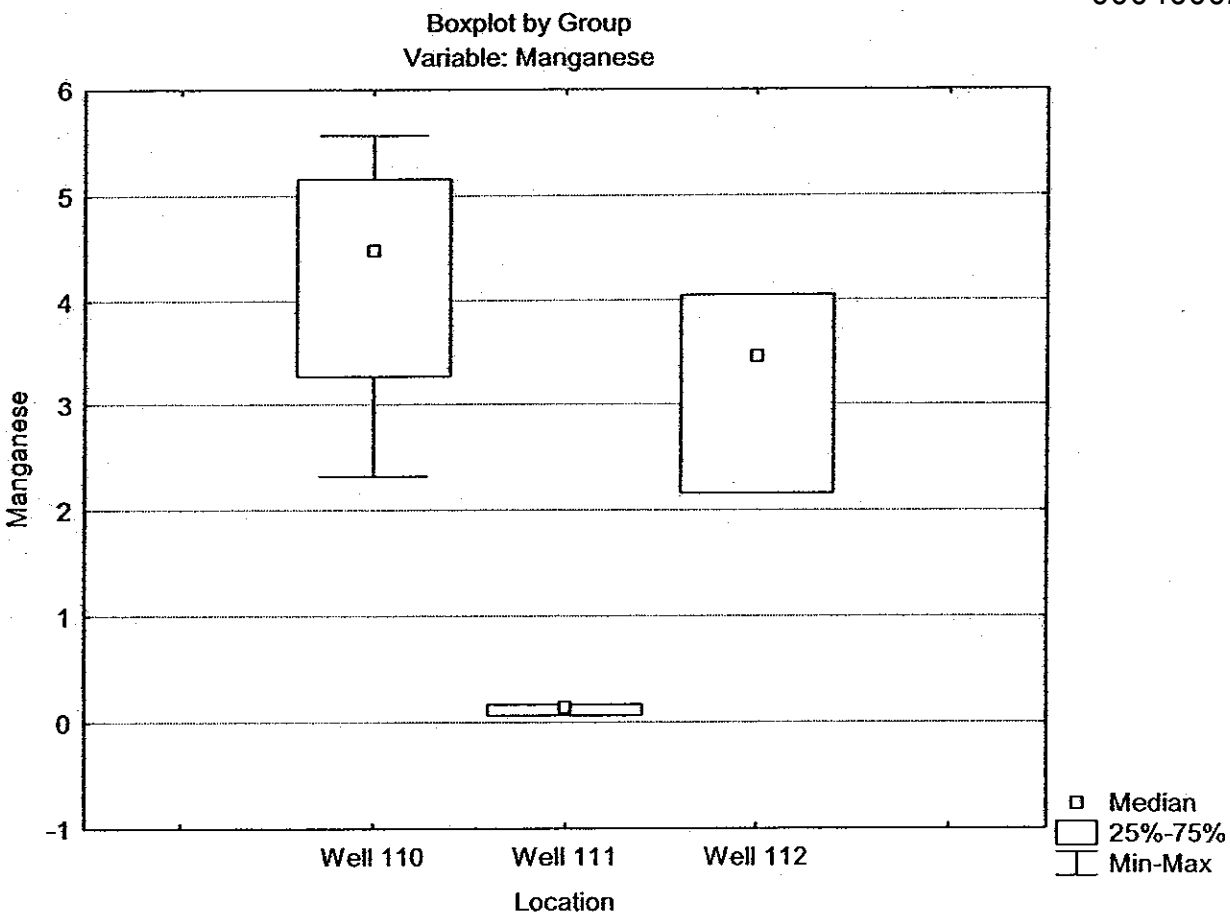
	Kruskal-Wallis ANOVA by Ranks; Iron (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =.2000000 p =.9048		
Depend.: Iron	Code	Valid N	Sum of Ranks
Well 110	101	4	20.00000
Well 111	102	3	17.00000
Well 112	103	3	18.00000

Figure B-8



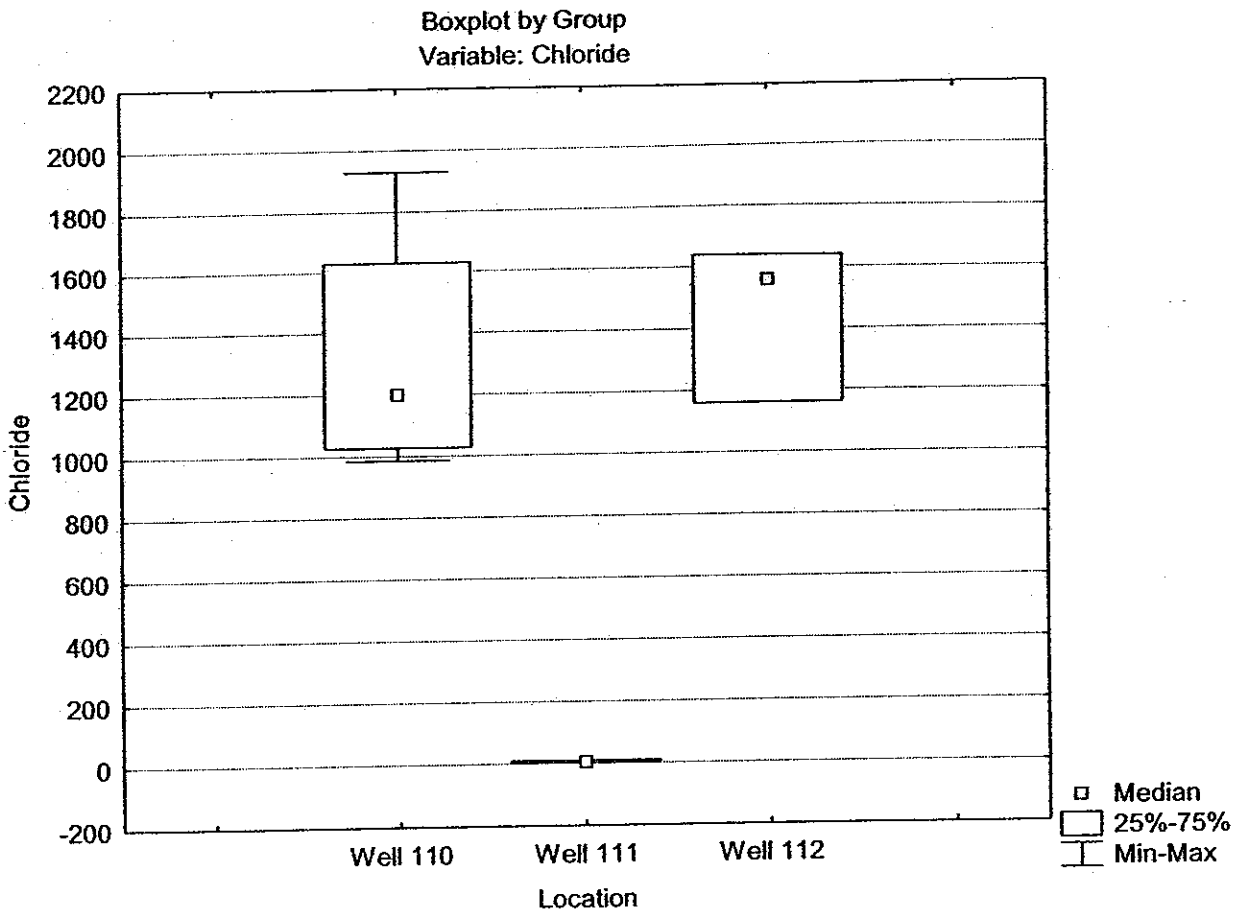
Depend.: Nitrate-Nitrite	Code	Valid N	Sum of Ranks
Kruskal-Wallis ANOVA by Ranks; Nitrate-Nitrite (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =.5357143 p =.7650			
Well 110	101	4	25.00000
Well 111	102	3	15.00000
Well 112	103	3	15.00000

Figure B-9



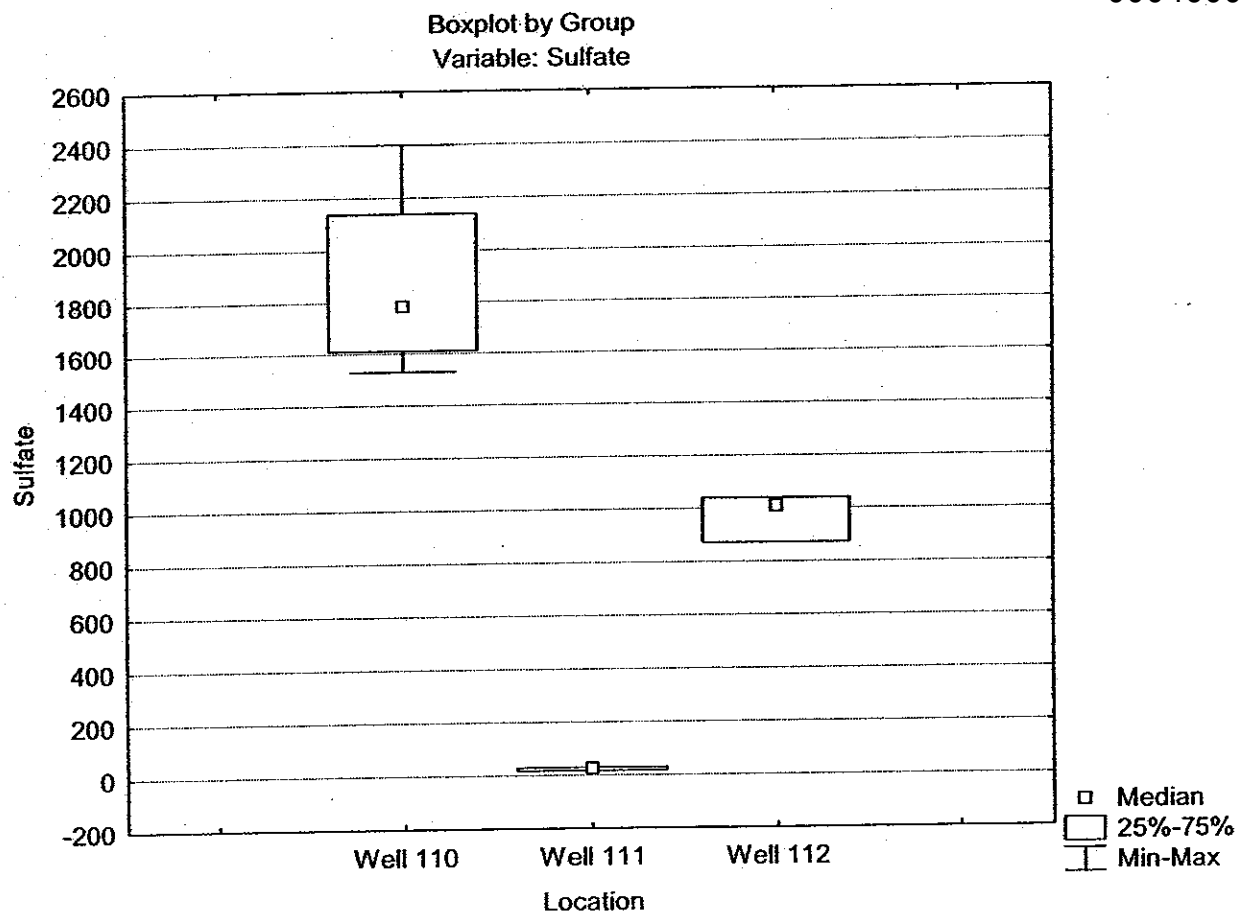
	Kruskal-Wallis ANOVA by Ranks; Manganese (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =6.745455 p =.0343		
Depend.: Manganese	Code	Valid N	Sum of Ranks
Well 110	101	4	32.00000
Well 111	102	3	6.00000
Well 112	103	3	17.00000

Figure B-10



	Kruskal-Wallis ANOVA by Ranks; Chloride (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =5.981818 p =.0502		
Depend.: Chloride	Code	Valid N	Sum of Ranks
Well 110	101	4	26.00000
Well 111	102	3	6.00000
Well 112	103	3	23.00000

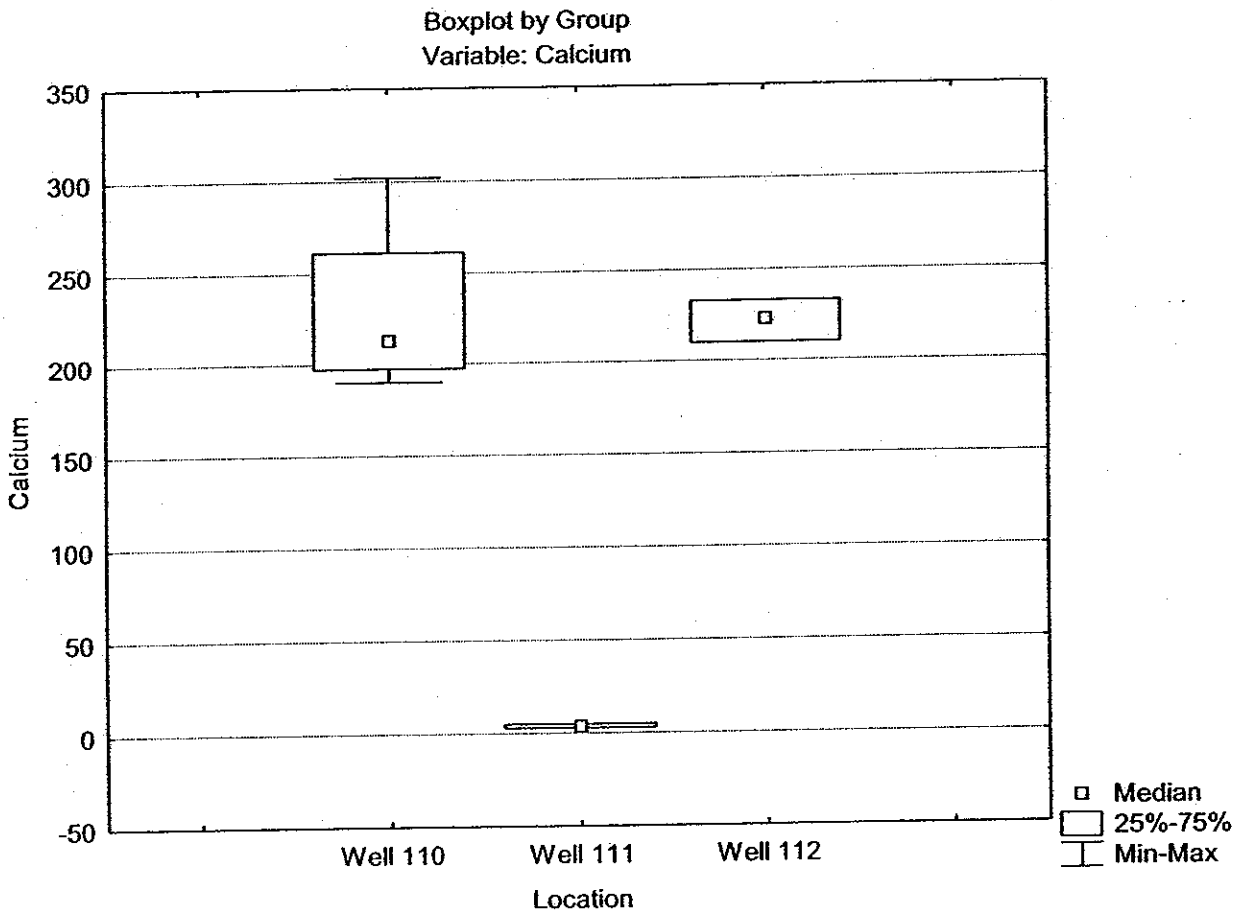
Figure B-11



Depend.: Sulfate	Code	Valid N	Sum of Ranks
Well 110	101	4	34.00000
Well 111	102	3	6.00000
Well 112	103	3	15.00000

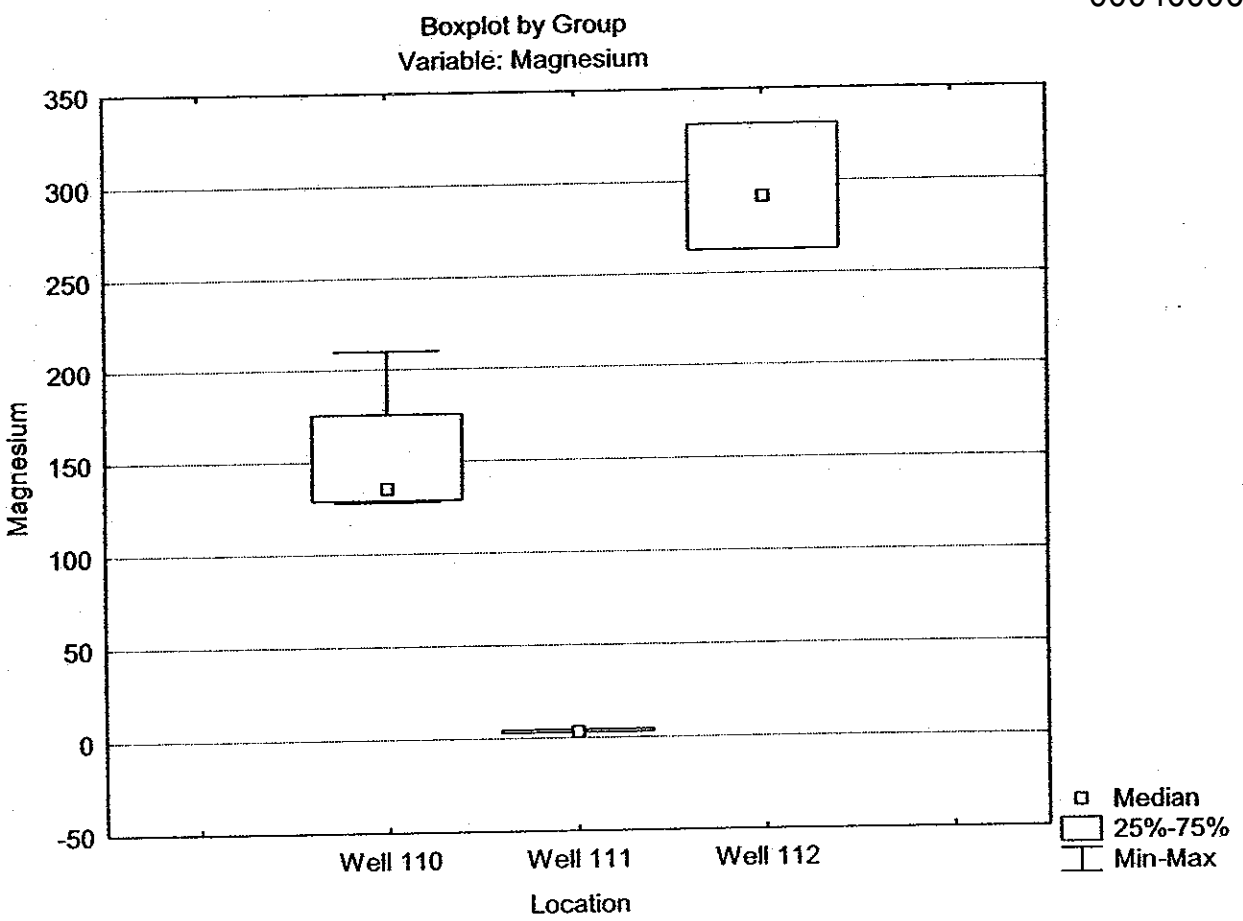
Kruskal-Wallis ANOVA by Ranks; Sulfate (PCA Data Set.sta)
Independent (grouping) variable: Location
Kruskal-Wallis test: H (2, N= 10) =8.018182 p =.0182

Figure B-12



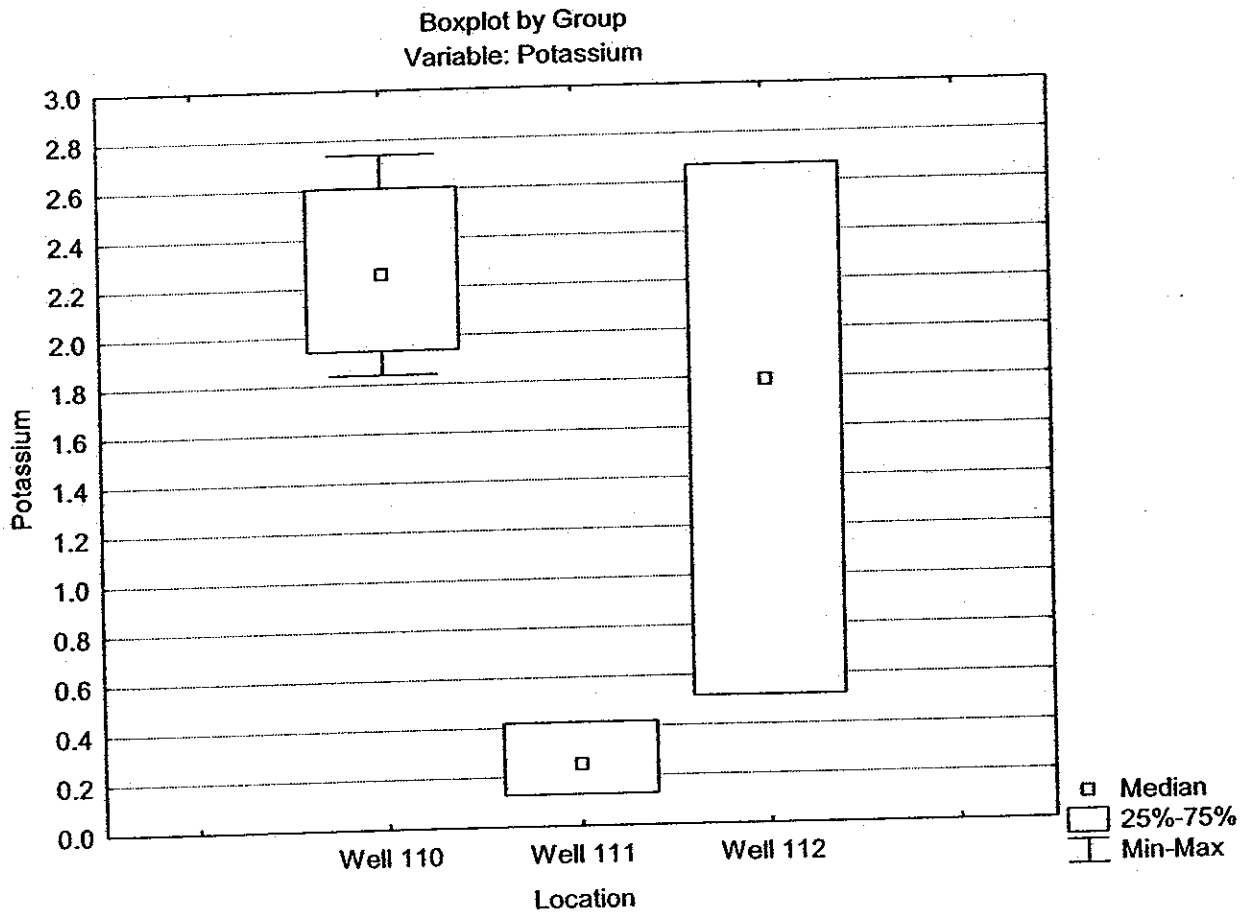
	Kruskal-Wallis ANOVA by Ranks; Calcium (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =5.981818 p =.0502		
Depend.: Calcium	Code	Valid N	Sum of Ranks
Well 110	101	4	26.00000
Well 111	102	3	6.00000
Well 112	103	3	23.00000

Figure B-13



	Kruskal-Wallis ANOVA by Ranks; Magnesium (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =8.018182 p =.0182		
Depend.: Magnesium	Code	Valid N	Sum of Ranks
Well 110	101	4	22.00000
Well 111	102	3	6.00000
Well 112	103	3	27.00000

Figure B-14



	Kruskal-Wallis ANOVA by Ranks; Potassium (PCA Data Set.sta) Independent (grouping) variable: Location Kruskal-Wallis test: H (2, N= 10) =6.300000 p =.0429		
Depend.: Potassium	Code	Valid N	Sum of Ranks
Well 110	101	4	31.00000
Well 111	102	3	6.00000
Well 112	103	3	18.00000

Figure B-15

00046009

FIELD DATA FORM – GROUNDWATER MONITORING WELLS

Project: Longhorn Army Ammunition Plant Site: Perimeter

Purge Date: 8-20-03 Sample Date: 8-20-03

Sample ID#: MW110

Csg/Diameter: 2" Csg/Type: PVC

Depth of Water from Top of Casing: 1.72 Time: 0835

Total Well Depth: 22.06 Rate of Recharge: [illegible]

Depth to Water at Time of Sampling: 2.85 Time: 1153

Purging Device: dedicated bailer Sampling Device: disposable teflon bailer

No. Well Volumes: 3 - 5

Gallons to Purge: 6.3 Actual Gallons Purged: 3 dry

Water Quality Meter Type: Horiba U-10 Meter #: 604007

Meter Calibration Date: 8-20-03 Time: 0630

Time:

	1st Vol	2nd Vol	3rd Vol	4th Vol	Sample/ 5th Vol
Time:	0838				1009
pH:	6.32				6.42
Cond: mS/cm	6.98				[illegible]
Temp: °C	20.3				[illegible]
Turb: NTU	17				17
DO mg/l	3.39				4.23

Ferrous Iron (mg/L)

Chest#: CB16 Seal#: 82016 FedEx#: 8402 1805 [illegible]

VOC#: V137 Seal#: 82037 FedEx#:

Well seal: # 152126 Comments: Wasps in well

Necessary Maintenance:

Crew Members: R. Roberts, B. Johnson

00046010

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

PROJECT:	LHAAP		SITE:	Perimeter		
MONITOR WELL #	110					
Date Purged	8/20/03					
Casing Size / Type	2" PVC					
Total Well Depth (FtBTOC)	22.06					
Depth to Water (FtBTOC)	8.72					
Water in Feet (casing)	13.34		Date:	8/20/03	Sample H2O Quality	
Gallons to Purge	2.1/6.3	1 vol / 3 - 5 vol	Time:	1009		
Purging Started	0835		pH		6.42	
Purging Stopped	0842		Cond (mS/cm)		6.81	
Avg Flow Rate (gpm)			Temp (°C)		3	
Amount Purged (gal)	2 dry		Turbidity (NTU)		219	
Purging System Used	dedicated bailer		DO (mg/L)		4.23	
Date Sampled	8/20/03					
New Depth to Water (FtBTOC) ** recharge	8.85	Time: 0953	Comments: Wasps			
Started Sampling	1000					
Stopped Sampling						
Sampling Method	disposable teflon bailer					

Purge H2O Quality	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5
Time	0838				
pH	6.32				
Cond (mS/cm)	6.98				
Temperature (°C)	20.3				
Turbidity (NTU)	17				
DO (mg/L)	3.39				

Sample Chest #	~~LR2~~ CB10	QC Chest #	QA Chest #	
Custody Seal #	82076			QA FedEx Bill #
VOC Sample Chest #	VC37	QC Custody Seal #	QA Custody Seal #	
VOC Custody Seal	82037			
FedEx Bill #	840218056727			
Date Shipped	8/20/03		Time Shipped	

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 8/20/03 Calibration Time: 0630 SN: 604001

Calibration Date: / / Calibration Time: _____ SN: _____

Well Security Seal Number: 152726 Lock #: _____

Crew Leader: Roberts Crew Members: Johnson

00046011

FIELD DATA FORM – GROUNDWATER MONITORING WELLS

Project: Longhorn Army Ammunition Plant Site: Perimeter

Purge Date: 8-17-03 Sample Date: 8-20-03

Sample ID#: MW111

Csg/Diameter: 2" Csg/Type: PVC

Depth of Water from Top of Casing: 12.88 Time: 1330

Total Well Depth: 22.43 Rate of Recharge: slow

Depth to Water at Time of Sampling: 14.31 Time: 1210

Purging Device: Dedicated bailer Sampling Device: disposable Teflon bailer

No. Well Volumes: 3 - 5

Gallons to Purge: 4.5 Actual Gallons Purged: bailed dry

Water Quality Meter Type: Horiba U-10 Meter #: 604009

Meter Calibration Date: 8-1-03 Time: 1230

8-20-03 Time: 1200

	1st Vol	2nd Vol	3rd Vol	4th Vol	Sample/5th Vol
Time:	1358				1210
pH:	5.65				5.52
Cond: mS/cm	.443				.447
Temp: °C	21.0				20.7
Turb: NTU	504				61
DO mg/l	3.01				4.04

Ferrous Iron (mg/L) ______

Chest#: SB11 Seal#: 620116 FedEx#: 840211305 6727

VOC#: V134 Seal#: 2037 FedEx#:

Well seal: # 152715 Comments: roots in bottom of well

Necessary Maintenance:

Crew Members R. Roberts, B. Johnson

00046012

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

PROJECT:	LHAAP	**SITE:**	Perimeter		
MONITOR WELL #	MW 111				
Date Purged	8/19/03				
Casing Size / Type	2" PVS				
Total Well Depth (FtBTOC)	22.73				
Depth to Water (FtBTOC)	12.88				
Water in Feet (casing)	9.85	Date: 8/20/03		**Sample H2O Quality**	
Gallons to Purge	1.5/4.5 1 vol / 3 - 5 vol	Time:	1210		
Purging Started	1350	pH		5.52	
Purging Stopped	1358	Cond (mS/cm)		.447	
Avg Flow Rate (gpm)		Temp (°C)		20.7	
Amount Purged (gal)	1 ½ dry	Turbidity (NTU)		61	
Purging System Used	dedicated bailer	DO (mg/L)		4.04	
Date Sampled	8/20/03				
New Depth to Water (FtBTOC) ** recharge	14.31	Time:	1200	Comments:	
Started Sampling	1210			cuts in bottom of well.	
Stopped Sampling					
Sampling Method	disposable Teflon				

Purge H2O Quality	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5
Time	1358				
pH	5.65				
Cond (mS/cm)	.873				
Temperature (°C)	21.0				
Turbidity (NTU)	504				
DO (mg/L)	3.01				
Sample Chest #	CB16		QC Chest #	QA Chest #	[redacted]
Custody Seal #	82016				QA FedEx Bill #
VOC Sample Chest #	VC37		QC Custody Seal #	QA Custody Seal #	
VOC Custody Seal	82037				
FedEx Bill #	840218056727				
Date Shipped	8/20/03	[redacted]		Time Shipped	

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 8/19/03 Calibration Time: 1230 SN: 604007

alibration Date: 8/20/03 Calibration Time: 1200 SN: "

Well Security Seal Number: 152715 Lock #: 2502

Crew Leader: Roberts Crew Members: Johnson

00046013

FIELD DATA FORM – GROUNDWATER MONITORING WELLS

Project: Longhorn Army Ammunition Plant Site: Perimeter

Purge Date: 8-19-03 Sample Date: 8-20-03

Sample ID#: MW112

Csg/Diameter: 2" Csg/Type: PVC

Depth of Water from Top of Casing: 1.17 Time: 1414

Total Well Depth: 23.23 Rate of Recharge: slow

Depth to Water at Time of Sampling: 1.62 Time: 1630

Purging Device: Distilled water Sampling Device: Disposable bailer bottom loader

No. Well Volumes: 3 - 5

Gallons to Purge: 6.9 Actual Gallons Purged: 2 bailers

Water Quality Meter Type: Horiba U-10 Meter #: 604007

Meter Calibration Date: 8.19.03 Time: 1330

8-20-03 Time: 1630

	1st Vol	2nd Vol	3rd Vol	4th Vol	Sample/ 5th Vol
Time:	1434				1040
pH:	6.40				6.43
Cond: mS/cm	4.19				4.21
Temp: °C	21.6				20.2
Turb: NTU	62				4
DO mg/l	2.46				1.18

Ferrous Iron (mg/L) _____

Chest#: LR2 Seal#: 8202 FedEx#: 840218056727

VOC#: VC37 Seal#: 82037 FedEx#: "

Well seal: # 132075 Comments: _____

Necessary Maintenance: _____

Crew Members: R. Roberts, B. Johnson

00046014

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

34

PROJECT: LHAAP.		SITE: Perimeter		
MONITOR WELL #	MW112			
Date Purged	8/19/03			
Casing Size / Type	"1			
Total Well Depth (FtBTOC)	22.03			
Depth to Water (FtBTOC)	9.59			
Water in Feet (casing)	14.44		Date: 8/20/03	Sample H2O Quality
Gallons to Purge	2.3/6.9 1 vol / 3 - 5 vol		Time: 1040	
Purging Started	1419		pH	6.43
Purging Stopped	1424		Cond (mS/cm)	4.99
Avg Flow Rate (gpm)			Temp (°C)	20.3
Amount Purged (gal)	2½ dry		Turbidity (NTU)	4
Purging System Used	dedicated bailer		DO (mg/L)	1.68
Date Sampled	8/20/03			
New Depth to Water (FtBTOC) ** recharge	9.64	Time: 1025	Comments:	
Started Sampling	1030			
Stopped Sampling				
Sampling Method	disposable teflon			

Purge H2O Quality	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5
Time	1424				
pH	6.40				
Cond (mS/cm)	4.79				
Temperature (°C)	21.6				
Turbidity (NTU)	62				
DO (mg/L)	3.16				

Sample Chest #	LR2	QC Chest #	QA Chest #	
Custody Seal #	8202			QA FedEx Bill #
VOC Sample Chest #	VC37	QC Custody Seal #	QA Custody Seal #	
VOC Custody Seal	8203			
FedEx Bill #	840218056737			
Date Shipped	8/20/03		Time Shipped	

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 8/19/03 Calibration Time: 1230 SN: 604007

alibration Date: 8/20/03 Calibration Time: 0630 SN: "

Well Security Seal Number: 152705 Lock #: 1502

Crew Leader: Roberts Crew Members: Johnson

00046015

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

PROJECT:	LHAAP	**SITE:**	Perimeter
MONITOR WELL #	MW 118		
Date Purged	2/14/03		
Casing Size / Type	2" PVC		
Total Well Depth (FtBTOC)	22.08		
Depth to Water (FtBTOC)	4.88		
Water in Feet (casing)	17.20	Date: 2/14/03	**Sample H2O Quality**
Gallons to Purge	2.8 / 8.4 1 vol / 3 - 5 vol	Time: 1100	
Purging Started	~~1030~~ 1010	pH	6.27
Purging Stopped	1020	Cond (mS/cm)	7.86
Avg Flow Rate (gpm)	volumetric	Temp (°C)	15.1
Amount Purged (gal)	1e dry	Turbidity (NTU)	7
Purging System Used	dedicated bailer	DO (mg/L)	1.91
Date Sampled	2/14/03		
New Depth to Water (FtBTOC) ** recharge	4.85 Time: 1043	Comments:	HB @ 0700
Started Sampling	1050		
Stopped Sampling			
Sampling Method	dis teflon		

Purge H2O Quality	Volume 1	Volume 2	Volume 3
Time	1016	~~1030~~ 1020	
pH	6.28	6.43	
Cond (mS/cm)	7.77	7.88	
Temperature (°C)	16.0	16.0	
Turbidity (NTU)	31	34	
DO (mg/L)	3.09	4.02	

Sample Chest #	VC26	QC Chest #	QA Chest #	[redacted]
Custody Seal #	21420			QA FedEx Bill #
VOC Sample Chest #	VC38	QC Custody Seal #	QA Custody Seal #	
VOC Custody Seal	21438			
FedEx Bill #	835789221791			
Date Shipped	2/14/03 [redacted]		Time Shipped	

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 2/14/03 Calibration Time: 0800 SN: 505044

Calibration Date: / / Calibration Time: _____ SN: _____

Well Security Seal Number: 11125 Lock #: 2502

Crew Leader: Roberts Crew Members: Wofford

00046016

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

PROJECT: LHAAP		**SITE:** Perimeter		
MONITOR WELL #	MW 111			
Date Purged	2/14/03			
Casing Size / Type	2" PVC			
Total Well Depth (FtBTOC)	22.79			
Depth to Water (FtBTOC)	7.85			
Water in Feet (casing)	14.94	Date: 2/14/03	**Sample H2O Quality**	
Gallons to Purge	2.4/7.2 1 vol / 3 - 5 vol	Time: 1512		
Purging Started	1423	pH	4.97	
Purging Stopped	1435	Cond (mS/cm)	.100	
Avg Flow Rate (gpm)	volumetric	Temp (°C)	14.2	
Amount Purged (gal)	3 3/4 gal dry	Turbidity (NTU)	81	
Purging System Used	dedicated bailer	DO (mg/L)	2.03	
Date Sampled	2/14/03			
New Depth to Water (FtBTOC) ** recharge	8.29 Time: 1457	Comments:		
Started Sampling	1500			
Stopped Sampling				
Sampling Method	dis teflon			

Purge H2O Quality	Volume 1	Volume 2	Volume 3
Time	1427		
pH	5.01		
Cond (mS/cm)	.170		
Temperature (°C)	16.7		
Turbidity (NTU)	1999		
DO (mg/L)	3.05		

Sample Chest #	VC76	QC Chest #	QA Chest #	
Custody Seal #	21426			QA FedEx Bill #
VOC Sample Chest #	VC38	QC Custody Seal #	QA Custody Seal #	
VOC Custody Seal	21438			
FedEx Bill #	835789221791			
Date Shipped	2/14/03	[redacted]	Time Shipped	

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 2/14/03 Calibration Time: 1230 SN: 583014

Calibration Date: / / Calibration Time: _____ SN: _____

Well Security Seal Number: 11120 Lock #: 2502

Crew Leader: Roberts Crew Members: Wofford

00046017

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

PROJECT:	LHAAP	**SITE:**	Perimeter
MONITOR WELL #	MW112		
Date Purged	2/14/03		
Casing Size / Type	2" PVC		
Total Well Depth (FtBTOC)	23.03		
Depth to Water (FtBTOC)	5.60		
Water in Feet (casing)	17.43	Date: 2/14/03	**Sample H2O Quality**
Gallons to Purge	2.8 / 8.4 1 vol / 3 - 5 vol	Time: 1349	
Purging Started	1244	pH	6.10
Purging Stopped	12:53	Cond (mS/cm)	7.15
Avg Flow Rate (gpm)	volumetric	Temp (°C)	14.4
Amount Purged (gal)	4 3/4 dry	Turbidity (NTU)	38
Purging System Used	dedicated bailer	DO (mg/L)	2.35
Date Sampled	2/14/03		
New Depth to Water (FtBTOC) ** recharge	7.47 Time: 1321	Comments:	
Started Sampling	1335		
Stopped Sampling			
Sampling Method	dis tef		

Purge H2O Quality	Volume 1	Volume 2	Volume 3
Time	1249		
pH	6.13		
Cond (mS/cm)	6.49		
Temperature (°C)	15.8		
Turbidity (NTU)	111		
DO (mg/L)	4.13		

Sample Chest #	VC 26	QC Chest #	QA Chest #	[redacted]
Custody Seal #	21426			QA FedEx Bill #
VOC Sample Chest #	VC 38	QC Custody Seal #	QA Custody Seal #	
VOC Custody Seal	21438			
FedEx Bill #	8357 8922 1791			
Date Shipped	2/14/03 [redacted]		Time Shipped	

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 2/14/03 Calibration Time: 1230 SN: 505014

Calibration Date: / / Calibration Time: _____ SN: _____

Well Security Seal Number: 11150 Lock #: 2502

Crew Leader: Roberts Crew Members: Wofford

1" well (0.04 gal per ft) 2" well (0.163

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046018

Well Data

Well ID: 110
Date: 12-3-03
Purge Method: Dedicated Bladder

Initial Depth to Water (FtBTOC): 8.25
Total Depth (FtBTOC): 21.71
Gallons per well volume: 2

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S1716
Calibration Date: 12-3-03

Horriba U10: N/A
Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
1328	500	18.80	5.87	5.597	2.16	237	0.9	9.41
1331	220	19.03	5.97	6.230	1.64	238	0.8	9.14
1333	200	19.03	5.97	6.237	1.61	239	0.0	9.06
1336	200	19.05	5.97	6.239	1.60	240	2.6	9.15
1339	200	19.07	5.97	6.240	1.60	240	2.7	9.20
1342	200	19.10	5.97	6.241	1.59	239	2.8	9.20
1345	300	19.14	5.95	6.242	1.34	240	3.6	9.40
1348	200	19.14	5.96	6.243	1.31	239	3.9	9.20
1351	200	19.13	5.96	6.244	1.30	238	3.9	9.20

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): 9.20

Total Volume Purged (gallons): 1.5

Sample ID: MW110

Sample Date: 12-3-03 Sample Time: 1355

Sample Chest: CB17 VOC Chest: VC37

QA Chest: N/A QC Chest: N/A

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046019

Well Data

Well ID: MW111
Date: 12-3-03
Purge Method: Dedicated Bladder

Initial Depth to Water (FtBTOC): 16.30
Total Depth (FtBTOC): 22.21
Gallons per well volume: 1

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S1716
Calibration Date: 12-3-03

Horriba U10: N/A
Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
1012	400	17.49	5.87	1.970	2.24	246	26.7	18.21
1015	410	18.04	5.88	2.306	1.48	242	33.0	18.81
1018	110	18.15	5.90	2.397	1.02	237	27.8	19.42
1021	110	18.17	5.89	2.409	1.00	237	28.4	20.10
1024	110	18.18	5.90	2.410	1.01	240	27.3	DRY
	Went dry low flow, sampled next day.							
Horriba #S0S014 Cal @ 0700 12-4-03								
12-4-03	N/A	15.5	5.74	2.46	2.98	N/A	8	16.72
HE SVOC VOC	only paramaters sampled - went dry during sampling							

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): Dry

Total Volume Purged (gallons): 1

Sample ID: MW111

Sample Date: 12-4-03 Sample Time: 0745

Sample Chest: VA13 VOC Chest: VC55

QA Chest: N/A QC Chest: N/A

GEL Task Order # 5 CRC Task Order # 01-15	Lab #	Chest/Temp 00046020

GROUNDWATER MONITORING WELL

CHAIN OF CUSTODY

U.S. Army Corps of Engineers

Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 111 Date: 12-4-03 Time: 0745

Sampling POC: Greg Snider (918) 605-9341

Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
2			VA13	12413

VOA Vials	Chest #	Sampler Initials
3	VA55	RR

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO & Turbidity	EPA Method	(0)
✓	Semi Volatile Organics	8270 C	(1)
✓	High Explosives	8330	(1)
	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
	Perchlorate	314	<1>
	Anions (Sulfate & Chloride)	300.0	<1>
	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

not enough water

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
Rusty Roberts	→	12-4-03	1900

Fed Ex Shipping Bill No: 8402 2034 8760

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046021

Well Data

Well ID: MW 112
Date: 12-3-03
Purge Method: Dedicated Bladder

Initial Depth to Water (FtBTOC): 8.80
Total Depth (FtBTOC): 22.96
Gallons per well volume: 2

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S1716
Calibration Date: 12-3-03

Horriba U10: N/A
Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (MS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
1224	280	17.63	5.90	3.491	2.68	216	53.6	9.23
1227	150	18.07	5.92	4.074	2.27	217	31.9	9.55
1230	140	18.38	5.93	4.443	1.51	220	14.6	9.77
1233	120	18.55	5.94	4.617	1.03	224	3.3	15.03
1236	120	18.56	5.95	4.627	0.90	224	2.7	16.10
1239	110	18.58	5.95	4.629	0.87	225	1.6	17.32
1242	110	18.59	5.95	4.653	0.70	226	1.4	18.10
1245	110	18.60	5.95	4.652	0.73	227	1.4	DRY
	Went dry low flow sampling, sampled next day							
12-4-03	N/A	15.4	7.04	5.10	2.74	N/A	0	8.92
Horriba # 505014 cal 12-4-03 @						0700		

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): Dry

Total Volume Purged (gallons): 3

Sample ID: MW 112

Sample Date: 12-4-03 Sample Time: 0820

Sample Chest: LR25 VOC Chest: VC 55

QA Chest: N/A QC Chest: N/A

00046022

FIELD DATA FORM – GROUNDWATER MONITORING WELLS

Project: Longhorn Army Ammunition Plant

Sample ID: [illegible] Site: [illegible]

Purge Date: 6-17-03 Sample Date: 6-18-03

Csg/Diameter: 2" Csg/Type: PVC

Initial Water Level (FtBTOC): 5.71 Date: 6 17 03 Time: 1625

Total Depth (FtBTOC): 22.30 Rate of Recharge: good

Water Level at Sampling (FtBTOC): 5.47 Date: 6-18 03 Time: 1415

Purging Device: Peristaltic Pump Volumes Purged: 3 - 5

Gallons to Purge: 7.8 Actual Gallons Purged: 8

Water Quality Meter Type: Horiba U-10 Meter #: 600907

Meter Calibration Date: 6 17 03 Time: 1430

6 18 03 Time: 0800

	1st Vol	2nd Vol	3rd Vol	4th Vol	Sample/ 5th Vol
Date:	6 17 03	6 17 03	6 18 03		6 18 03
Time:	1627	1633	1640		1415
pH:	6.47	6.50	6.64		6.27
Cond: mS/cm	1.76	1.88	1.83		1.71
Temp: °C	18.7	17.2	17.1		20.2
Turb: NTU	15	4	2		2
DO mg/l	5.63	5.64	6.78		2.21

Chest#: A1 2 Seal#: 61122 FedEx#: 840220349035

VOC#: VC-30 Seal#: 61830 FedEx#: 00

Well seal #: 152420

Comments:

Necessary Maintenance:

Crew Members: Roberts, Wofford

00046023

FIELD DATA FORM – GROUNDWATER MONITORING WELLS

Project: Longhorn Army Ammunition Plant

Sample ID: FW MW-111 Site: Smith

Purge Date: 6-17-03 Sample Date: 6-18-03

Csg/Diameter: 2" Csg/Type: PVC

Initial Water Level (FtBTOC): 10.61 Date: 6-17-03 Time: 1445

Total Depth (FtBTOC): 22.72 Rate of Recharge: Low

Water Level at Sampling (FtBTOC): 10.49 Date: 6-18-03 Time: 1300

Purging Device: Dedicated tubing Volumes Purged: 3 - 5

Gallons to Purge: 5.7 Actual Gallons Purged: 1.1 3rd

Water Quality Meter Type: Horiba U-10 Meter #: 660407

Meter Calibration Date: 6-17-03 Time: 1430

6-18-03 Time: 1300

	1st Vol	2nd Vol	3rd Vol	4th Vol	Sample/ 5th Vol
Date:	6-17-03				6-18-03
Time:	1442				1310
pH:	5.14 ~~4.24~~				5.15
Cond: mS/cm	.121				.143
Temp: °C	19.0				17.3
Turb: NTU	301				6.4
DO mg/l	2.49				3.51

Chest#: B4 Seal#: 61641 FedEx#: 840220341035

VOC#: V30 Seal#: 61630 FedEx#:

Well seal #: 152443

Comments:

Necessary Maintenance:

Crew Members: Roberts, Wofford

00046024

FIELD DATA FORM – GROUNDWATER MONITORING WELLS

Project: Longhorn Army Ammunition Plant

Sample ID: PW-MW 112 Site: Burn Pit

Purge Date: 6-17-03 Sample Date: 6-18-03

Csg/Diameter: 2" Csg/Type: PVC

Initial Water Level (FtBTOC): 7.99 Date: 6-17-03 Time: 1524

Total Depth (FtBTOC): 22.77 Rate of Recharge: slow

Water Level at Sampling (FtBTOC): 7.62 Date: 6-18-03 Time: 1335

Purging Device: Limited bailer Volumes Purged: 3 - 5

Gallons to Purge: 7.2 Actual Gallons Purged: 3 dry

Water Quality Meter Type: Horiba U-10 Meter #: 604007

Meter Calibration Date: 6-17-03 Time: 1430

6-18-03 Time: 0800

	1st Vol	2nd Vol	3rd Vol	4th Vol	Sample/ 5th Vol
Date:	6-17-03				6-18-03
Time:	1032				1340
pH:	6.35				6.32
Cond: mS/cm	4.67				4.62
Temp: °C	16.6				17.7
Turb: NTU	36				9
DO mg/l	1.77				3.04

Chest#: AI 2 Seal#: 6182 FedEx#: 840220347035

VOC#: VC 30 Seal#: 618230 FedEx#:

Well seal #: 152433

Comments:

Necessary Maintenance:

Crew Members: Roberts, Wofford

00046025

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

PROJECT:	LHAAP		**SITE:**	Perimeter		
MONITOR WELL #	110					
Date Purged	6/17/03					
Casing Size / Type	2" PVC					
Total Well Depth (FtBTOC)	223					
Depth to Water (FtBTOC)	5.79					
Water in Feet (casing)	16.51		Date: 6/18/03	**Sample H2O Quality**		
Gallons to Purge	2.6/7.8 1 vol / 3 - 5 vol		Time: 1425			
Purging Started	~~1625~~ 1625		pH	6.27		
Purging Stopped	1640		Cond (mS/cm)	6.79		
Avg Flow Rate (gpm)	8		Temp (° C)	20.2		
Amount Purged (gal)	8		Turbidity (NTU)	2		
Purging System Used	dedicated bailer		DO (mg/L)	2.27		
Date Sampled	6/18/03					
New Depth to Water (FtBTOC) ** recharge	5.99	Time: 1410	Comments:			
Started Sampling	1415					
Stopped Sampling						
Sampling Method	dis teflon					
Purge H2O Quality	**Volume 1**	**Volume 2**	**Volume 3**	**Volume 4**	**Volume 5**	
Time	1627	1633	1640			
pH	6.47	6.50	6.64			
Cond (mS/cm)	696	6.88	6.83			
Temperature (° C)	18.9	19.2	19.1			
Turbidity (NTU)	15	4	12			
DO (mg/L)	3.68	5.04	6.98			
Sample Chest #	AF-2		QC Chest #	QA Chest #		
Custody Seal #	6182				QA FedEx Bill #	
VOC Sample Chest #	VC30		QC Custody Seal #	QA Custody Seal #		
VOC Custody Seal	61820					
FedEx Bill #	8402 2034 9035					
Date Shipped	6/18/03			Time Shipped		

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 6/17/03 Calibration Time: 1430 SN: 604007

Calibration Date: 6/18/03 Calibration Time: 1300 SN: 11

Well Security Seal Number: 152420 Lock #: _____

Crew Leader: Roberts Crew Members: Wofford

00046026

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

PROJECT: Longhorn AAP			**SITE:** Perimeter			
MONITOR WELL #	M.W 111					
Date Purged	6/17/03					
Casing Size / Type	2" / PVC					
Total Well Depth (FtBTOC)	22.72					
Depth to Water (FtBTOC)	10.67					
Water in Feet (casing)	12.05			Date: 6/18/03	Sample H2O Quality	
Gallons to Purge	1.9/5.7	1 vol / 3 - 5 vol		Time: 1310		
Purging Started	1445			pH	5.15	
Purging Stopped	1448			Cond (mS/cm)	.143	
Avg Flow Rate (gpm)	volumetric			Temp (°C)	19.0	
Amount Purged (gal)	1.9 Dry			Turbidity (NTU)	64	
Purging System Used	Dedicated bailer			DO (mg/L)	3.51	
Date Sampled	6/18/03					
New Depth to Water (FtBTOC) ** recharge	10.49	Time: 1300		Comments:		
Started Sampling	1300			~~Ferrous iron (mg/L):~~		
Stopped Sampling						
Sampling Method	disp bail					

Purge H2O Quality	**Volume 1**	**Volume 2**	**Volume 3**	**Volume 4**	**Volume 5**
Time	14.48				
pH	5.14				
Cond (mS/cm)	.121				
Temperature (°C)	19.0				
Turbidity (NTU)	801				
DO (mg/L)	3.49				

Sample Chest #	CB4	QC Chest #	QA Chest #	
Custody Seal #	6184			QA FedEx Bill #
VOC Sample Chest #	VC30	QC Custody Seal #	QA Custody Seal #	
VOC Custody Seal	6183			
FedEx Bill #	846220349035			
Date Shipped	6/18/03		Time Shipped	

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 6/17/03 Calibration Time: 1430 SN: 604007

Calibration Date: 6/18/03 Calibration Time: 1300 SN: "

Well Security Seal Number: 152443 Lock #: _____

Crew Leader: Roberts Crew Members: ~~Watson~~, Wofford

00046027

US ARMY CORPS OF ENGINEERS – TULSA DISTRICT
GROUNDWATER MONITORING WELL PURGING & SAMPLING
FIELD WORKSHEET

PROJECT: Longhorn AAP		**SITE:** Perimeter		
MONITOR WELL # 112				
Date Purged	6/17/03			
Casing Size / Type	2" PVC			
Total Well Depth (FtBTOC)	22.97			
Depth to Water (FtBTOC)	7.99			
Water in Feet (casing)	14.9	Date: 6/18/03	**Sample H2O Quality**	
Gallons to Purge	2.4/7.2 1 vol / 3 - 5 vol	Time: 1348		
Purging Started	1528	pH	6.30	
Purging Stopped	1534	Cond (mS/cm)	4.68	
Avg Flow Rate (gpm)		Temp (°C)	17.9	
Amount Purged (gal)	3. GAL Dry	Turbidity (NTU)	9	
Purging System Used	Dedicated bailer	DO (mg/L)	3.08	
Date Sampled	6/18/03			
New Depth to Water (FtBTOC) ** recharge	7.67 Time: 1335	Comments:		
Started Sampling	1335			
Stopped Sampling				
Sampling Method	disteflon			

Purge H2O Quality	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5
Time	1532				
pH	6.35				
Cond (mS/cm)	4.69				
Temperature (°C)	18.6				
Turbidity (NTU)	36				
DO (mg/L)	1.77				

Sample Chest #	AF-2	QC Chest #	QA Chest #	
Custody Seal #	6182			QA FedEx Bill #
VOC Sample Chest #	VC30	QC Custody Seal #	QA Custody Seal #	
VOC Custody Seal	61830			
FedEx Bill #	840210349035			
Date Shipped	6/18/03		Time Shipped	

Water Quality Instrument Used: Horriba U-10 Other Meter Type(s): _____

Calibration Date: 6/17/03 Calibration Time: 1430 SN: 604807

Calibration Date: 6/18/03 Calibration Time: 1300 SN: "

Well Security Seal Number: 152423 Lock #: 2502

Crew Leader: Roberts Crew Members: wofford

US Army Corps of Engineers-Tulsa District
LONGHORN ARMY AMMUNITION PLANT
Low Flow Groundwater Sampling Field Data Form

00046028

Well ID: MW10 | Total Well Depth: 21.10
Date: 3-31-04 | Static Water Level: 4.85
PURGE METHOD: LOW FLOW DEDICATED PUMP | Ft. water: 16.25
Flow Cell Meter #: 37123 | Casing Size: 2" | Gal/ Vol:
Sonde #: 31865 | VOLUME PURGED: 4 gal
Flow Cell: 10546 | Horiba U10:
Calibration Date: 3-31-04 Time: 0730 | Calibration Date: N/A Time:
Project Chemist: | Sampling Crew:

Purge Data

Time	Flow (mL/min)	Temp (°C) +/- 0.5	pH +/- 0.1	SP (mS) +/- 3 %	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	Turbidity (NTU) +/- 10 %	WATER Level (ft)
1040								
1043	489	16.64	5.69	7.937	0.90	253	13.0	6.28
1046	353	16.34	5.69	8.024	0.73	242	22.2	6.40
1049	483	16.23	5.70	8.022	0.54	232	22.1	6.50
1053	483	16.09	5.73	7.600	0.44	220	24.1	6.50
1056	510	16.03	5.82	7.331	0.41	213	22.7	6.55
1059	500	16.02	5.86	7.178	0.35	206	20.7	6.65
1102	510	16.01	5.89	6.960	0.29	197	18.2	6.55
1105	490	16.00	5.91	6.857	0.27	194	18.8	6.65
1108	500	16.00	5.93	6.669	0.24	189	17.9	6.65
1111	500	16.00	5.95	6.666	0.21	184	18.7	6.60

Sample ID: MW10 | Sample Time: 1112 | Sample Stop Time: 1120
Sample Date: 3-31-04 | Post Sample Water Level Prior to Pump Shutoff: 6.68
Chest #: VA2 | Custody Seal #: 3317 | VOC Chest #: VC52 | Custody Seal #: 33152
QC Chest #: | Custody Seal #: | QA Chest #: | Custody Seal #:
Airbill #: 846220328705 | Lab: APEX
QA Airbill #: | Lab: | Well seal #: 43035
Comments: Sunny

GEL Task Order # 5 CRC Task Order # 01-15	Lab #	Chest/Temp.

GROUNDWATER MONITORING WELL

00046029

CHAIN OF CUSTODY

U.S. Army Corps of Engineers

Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 110 Date: 3-31-04 Time: 1112

Sampling POC: Greg Snider (918) 605-9341

Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
2	5		VA2	3312

VOA Vials	Chest #	Sampler Initials
3	VC52	RR

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Method	(0)
✓	Semi Volatile Organics	8270 C	(1)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorate	314	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
Rusty Roberts	→	3-31-04	1900

Fed Ex Shipping Bill No: 846220348705

US Army Corps of Engineers-Tulsa District
LONGHORN ARMY AMMUNITION PLANT
Low Flow Groundwater Sampling Field Data Form

00046030

Well ID: MW111 | Total Well Depth: 22.21
Date: 3-31-04 | Static Water Level: 8.20
PURGE METHOD: LOW FLOW DEDICATED PUMP | Ft. water: 14.01
Flow Cell Meter #: S1723 | Casing Size: 2" | Gal/ Vol:
Sonde #: 37865 | VOLUME PURGED: 2gal
Flow Cell: 10546 | Horiba U10: NA
Calibration Date: 3-31-04 Time: 0730 | Calibration Date: Time:
Project Chemist: | Sampling Crew:

Purge Data

Time	Flow (mL/min)	Temp (°C) +/- 0.5	pH +/- 0.1	SP (mS) +/- 3 %	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	Turbidity (NTU) +/- 10 %	WATER Level (ft)
1310								
1313		17.92	5.55	.2683	2.82	230	152.4	8.80
1316	343	17.34	4.93	.1016	2.48	263	87.6	8.90
1319	373	17.05	4.67	.0761	2.43	291	66.1	8.90
1322	320	16.84	4.61	.0714	2.43	303	59.9	8.90
1325	290	16.70	4.59	.0716	2.37	310	56.8	9.00
1328	326	16.54	4.55	.0708	2.31	318	44.0	9.00
1331	323	16.44	4.54	.0704	2.41	322	42.0	9.06
1334	330	16.45	4.54	.0700	2.31	326	42.3	9.10

Sample ID: MW111 | Sample Time: 1335 | Sample Stop Time:
Sample Date: 3-31-04 | Post Sample Water Level Prior to Pump Shutoff: 9.20
Chest #: LR46 | Custody Seal #: | VOC Chest #: VC57 | Custody Seal #:
QC Chest #: | Custody Seal #: | QA Chest #: | Custody Seal #:
Airbill #: 8402 [redacted] 2037 8705 | Lab: MEL
QA Airbill #: | Lab: | Well seal #: 41320
Comments: Sunny

GEL Task Order # 5 CRC Task Order # 01-15	Lab #	Chest/Temp.

GROUNDWATER MONITORING WELL

00046031

CHAIN OF CUSTODY
U.S. Army Corps of Engineers
Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 111 Date: 3-31-04 Time: 1335

Sampling POC: Greg Snider (918) 605-9341
Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
2	5		LR46	33146

VOA Vials	Chest #	Sampler Initials
3	YC52	AR

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Method	(0)
✓	Semi Volatile Organics	8270 C	(1)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorate	314	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
Rusty Roberts	→	3-31-04	1900

Fed Ex Shipping Bill No: 840220348705

US Army Corps of Engineers-Tulsa District
LONGHORN ARMY AMMUNITION PLANT
Low Flow Groundwater Sampling Field Data Form

00046032

Well ID: MW 112 | Total Well Depth: 22.96
Date: 3-30-04 | Static Water Level: 6.63
PURGE METHOD: LOW FLOW DEDICATED PUMP | Ft. water: 16.33
Flow Cell Meter #: S1723 | Casing Size: 2" | Gal/ Vol:
Sonde #: 37865 | VOLUME PURGED:
Flow Cell: 10546 | Horiba U10: N/A
Calibration Date: 3-30-04 Time: 0700 | Calibration Date: Time:
Project Chemist: | Sampling Crew: Roberts - Sloan

Purge Data

Time	Flow (mL/min)	Temp (°C) +/- 0.5	pH +/- 0.1	SP (mS) +/- 3 %	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	Turbidity (NTU) +/- 10 %	WATER Level (ft)
1233								
1236	160	17.13	5.74	4.551	1.48	193	0.7	7.30
1240	93	17.23	5.74	4.639	1.04	185	0.9	7.24
1243	230	16.75	5.72	4.704	0.66	181	0.3	7.46
1246	70	16.89	5.72	4.715	0.62	180	0.1	7.55
1249	110	16.63	5.73	4.725	0.51	178	0.1	7.68
1252	150	16.61	5.73	4.729	0.47	177	0.0	7.69
1255	160	16.47	5.73	4.732	0.40	175	0.0	7.89
1258	196	16.34	5.73	4.738	0.33	174	0.1	7.90
1302	88	16.52	5.73	4.745	0.37	172	0.0	7.79
1305	180	16.45	5.74	4.753	0.34	171	0.4	7.92
1308	173	16.45	5.74	4.766	0.31	170	0.5	8.04
1311	180	16.44	5.73	4.780	0.30	169	0.7	8.12

Sample ID: MW112 | Sample Time: 1312 | Sample Stop Time: 8.95
Sample Date: 3-30-04 | Post Sample Water Level Prior to Pump Shutoff: 1327
Chest #: CB13 | Custody Seal #: 33013 | VOC Chest #: VC-56 | Custody Seal #: 33056
QC Chest #: | Custody Seal #: | QA Chest #: | Custody Seal #:
Airbill #: 840 2 1805 6896 | Lab: MEL
QA Airbill #: | Lab: | Well seal #: 43348
Comments:

GEL Task Order # 5 CRC Task Order # 01-15	Lab #	Chest/Temp.

GROUNDWATER MONITORING WELL

00046033

CHAIN OF CUSTODY

U.S. Army Corps of Engineers

Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 112 Date: 3-30-04 Time: 1312

Sampling POC: Greg Snider (918) 605-9341

Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
2	5		CB13	33013

VOA Vials	Chest #	Sampler Initials
3	VC56	RR

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Method	(0)
✓	Semi Volatile Organics	8270 C	(1)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorate	314	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
Kristy Roberts	→	3-30-04	1900

Fed Ex Shipping Bill No: 840218056896

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046034

Well Data

Well ID: MW110 Initial Depth to Water (FtBTOC): 6.78
Date: 7-15-04 Total Depth (FtBTOC): 22.06
Purge Method: Dedicated Bladder Pump Gallons per well volume: 2

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S16060 Horriba U10: N/A
Calibration Date: 7-15-04 Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
1000	570	22.79	5.56	2.432	1.97	197	24.0	7.50
1003	490	19.94	5.88	2.782	1.77	196	16.9	7.80
1006	420	19.21	5.90	2.780	1.75	194	13.1	7.83
1009	350	19.22	5.91	2.779	1.74	194	13.0	7.83
1012	350	19.23	5.90	2.781	1.75	194	12.9	7.83

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): 7.83

Total Volume Purged (gallons): 1.0

Sample ID: PW-MW110

Sample Date: 7-15-04 Sample Time: 1012

Sample Chest: LR56 VOC Chest: CJ1

QA Chest: N/A QC Chest: N/A

83054

GEL (GEL Task Order # 5) APCL (CRC Task Order # 01-15)	Lab #	Chest/Temp.

GROUNDWATER MONITORING WELL

CHAIN OF CUSTODY

00046035

U.S. Army Corps of Engineers
Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 110 Date: 7-15-04 Time: 1612

Sampling POC: Greg Snider (918) 605-9341
Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
3	5		CRS6	71556

VOA Vials	Chest #	Sampler Initials
3	CJ1	GS

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Field Method	(0)
✓	Semi Volatile Organics	8270 C	(2)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorate	8321	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
[signature]	→	7-15-04	1600

Fed Ex Shipping Bill No: 842787366133

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046036

Well Data

Well ID: MW111
Date: 7-15-04
Purge Method: Dedicated Bladder Pump
Initial Depth to Water (FtBTOC): 8.82
Total Depth (FtBTOC): 22.81
Gallons per well volume: 2

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S16160
Calibration Date: 7-15-04
Horriba U10: N/A
Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
0830	470	24.21	5.91	1.880	2.17	166	43.6	9.20
0833	300	20.42	5.38	0.5855	1.61	163	39.5	9.30
0836	300	19.48	5.25	0.5850	1.59	166	39.2	9.40
0839	310	19.45	5.21	0.5849	1.57	165	39.2	9.42
0842	310	19.40	5.22	0.5851	1.58	165	39.2	9.42
0845	310	19.43	5.22	0.5852	1.56	166	39.1	9.42

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): 9.42

Total Volume Purged (gallons): 1.0

Sample ID: PW-MW111

PW-MW111-TB @ 0800

Sample Date: 7-15-04 Sample Time: 0845

Sample Chest: VC27 VOC Chest: CJ1

QA Chest: N/A QC Chest: N/A

#83045

GEL (GEL Task Order # 5) APCL (CRC Task Order # 01-15)	Lab #	Chest/Temp.

GROUNDWATER MONITORING WELL

00046037

CHAIN OF CUSTODY

U.S. Army Corps of Engineers

Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW-111 Date: 7-15-04 Time: 0845

Sampling POC: Greg Snider (918) 605-9341

Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
3	5		VC77	71527

VOA Vials	Chest #	Sampler Initials
3	CJ1	GS

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Field Method	(0)
✓	Semi Volatile Organics	8270 C	(2)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorate	8321	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
[signature]	→	7-15-04	1600

Fed Ex Shipping Bill No: 842287366133

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046038

Well Data

Well ID: MW112 Initial Depth to Water (FtBTOC): 7.42
Date: 7-14-04 Total Depth (FtBTOC): 23.01
Purge Method: Ded Bladder Pump Gallons per well volume: 3

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S16060 Horriba U10: N/A
Calibration Date: 7-14-04 Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (uS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
1030	320	21.67	6.04	2.957	1.96	44	43.6	8.10
1033	310	20.52	5.98	3.258	1.44	41	58.7	8.50
1036	270	19.90	5.96	3.382	1.20	37	53.3	8.60
1039	220	19.84	5.93	3.393	1.17	35	53.1	8.63
1042	220	19.87	5.94	3.391	1.16	34	53.0	8.63

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): 8.62

Total Volume Purged (gallons): 0.5

Sample ID: PW-MW112

Sample Date: 7-14-04 Sample Time: 1045

Sample Chest: LRZ VOC Chest: VC32

QA Chest: N/A QC Chest: N/A

83063

GEL (GEL Task Order # 5) APCL (CRC Task Order # 01-15)	Lab #	Chest/Temp.

GROUNDWATER MONITORING WELL

00046039

CHAIN OF CUSTODY

U.S. Army Corps of Engineers

Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 112 Date: 7-14-04 Time: 1045

Sampling POC: Greg Snider (918) 605-9341

Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
3	5		LR2	7142

VOA Vials	Chest #	Sampler Initials
3	VC32	GS

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Field Method	(0)
✓	Semi Volatile Organics	8270 C	(2)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorate	8321	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
[signature]	→	7-14-04	1600

Fed Ex Shipping Bill No: 842787366155

GEL (GEL Task Order # 5) APCL (CRC Task Order # 01-15)	Lab ID#	Chest/Temp.

CHAIN OF CUSTODY FOR VOLATILE ORGANCIS

U.S. Army Corps of Engineers
Tulsa District

00046040

Project: Longhorn Army Ammunition Plant Site: Perimeter Wells

TRAVEL BLANK DATA

Sample ID: PW-MW111-TB Date: 7-15-05 Time: 0800

Water Source: PSAP Millipore System ASTM Type II Water
Analysis Requested: Volatile Organics / **Method 8260 B**
Date Mfg: 7-12-04 Custody Seal #: 71264 Meter Type: Horiba U-10 #: S.5014
pH: 6.99 Cond: 0.62 mS/cm Turb: 0 NTU Temp: 17.2 °C

Signature of Sampler: [signature]

SAMPLES CONTAINED IN THIS SHIPMENT

Sample ID Number	Vials	Site	X-Chest #	Lab #
PW MW111-TB	3			
PW-MW111	3	Perimeter	VC27	
PW-MW110	3	Perimeter	LR56	
PW-MW108	3	Perimeter	VA19	
Total Samples Shipped	12			

CUSTODY RECORD

Relinquished By: [signature]			Date 7-15-04	Time 1600
Chest #: CJ1	C/Seal #: 7151	Fed Ex #: 842787366133		
Received By:			Date	Time

US Army Corps of Engineers-Tulsa District
LONGHORN ARMY AMMUNITION PLANT
Low Flow Groundwater Sampling Field Data Form

00046041

Well ID: MW110 | Total Well Depth:
Date: 9-15-04 | Static Water Level: 9.94
PURGE METHOD: LOW FLOW DEDICATED PUMP | Ft. water: 2 3/4 gal
Flow Cell Meter #: S1660 | Casing Size: 2" | Gal/ Vol:
Sonde #: 37471 | VOLUME PURGED:
Flow Cell: 10546 | Horiba U10:
Calibration Date: 9-15-04 Time: 0800 | Calibration Date: NA Time:
Project Chemist: | Sampling Crew:

Purge Data

Time	Flow (mL/min)	Temp (°C) +/- 0.5	pH +/- 0.1	SP (mS) +/- 3%	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	Turbidity (NTU) +/- 10 %	WATER Level (ft)	
1509									
1512	150	22.34	5.88	4.801	2.36	138	44.6	10.75	
1515	280	21.17	5.81	4.709	1.64	143	21.9	11.49	
1518	300	20.83	5.80	4.671	1.17	148	13.7	12.29	
1521	290	20.83	5.81	4.661	1.06	152	16.9	13.08	
1524	333	20.87	5.82	4.650	0.93	153	19.1	14.00	
1527	330	20.98	5.85	4.615	0.92	154	14.8	15.10	
1530	333	21.04	5.87	4.546	1.12	154	8.2	16.16	
1533	333	21.12	5.91	4.510	1.76	154	7.1	17.20	
1536	410	21.12	5.97	4.462	2.75	155	12.8	18.57	
1539	383	21.09	6.04	4.434	3.40	154	15.9	19.20	
1542	245	21.48	6.08	4.423	5.03	152	36.9		water below top of pump
1545	103	22.15	6.10	4.427	5.21	151	37.4		/

Sample ID: MW110 | Sample Time: 1546 | Sample Stop Time: 1625
Sample Date: 9-15-04 | Post Sample Water Level Prior to Pump Shutoff: water below top of pump
Chest #: VAG | Custody Seal #: | VOC Chest #: VC32 | Custody Seal #: Can't measure
QC Chest #: | Custody Seal #: | QA Chest #: | Custody Seal #:
Airbill #: 847300910015 | Lab: MEL
QA Airbill #: | Lab: | Well seal #: 152895
Comments: Only 1 semi-Vol sent - not enough water

F/QC: GEL (GEL Task Order # 5) QA: APCL (CRC Task Order # 01-15)	Lab #	Chest/Temp.

GROUNDWATER MONITORING WELL

00046042

CHAIN OF CUSTODY

U.S. Army Corps of Engineers

Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 110 Date: 7-15-04 Time: 1546

Sampling POC: Greg Snider (918) 605-9341

Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
2	5		VA2	1162

VOA Vials	Chest #	Sampler Initials
3	VC32	RR

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Field Method	(0)
✓	Semi Volatile Organics	8270 C	~~(2)~~ 1
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorate	8321	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
Cindy Jones	→	7-16-04	1800

Fed Ex Shipping Bill No: 7925 0071 0015

US Army Corps of Engineers-Tulsa District
LONGHORN ARMY AMMUNITION PLANT
Low Flow Groundwater Sampling Field Data Form

00046043

Well ID: MW111 | Total Well Depth:
Date: 9-15-04 | Static Water Level: 13.57
PURGE METHOD: LOW FLOW DEDICATED PUMP | FL water:
Flow Cell Meter #: 516600 | Casing Size: 2" | Gal/ Vol:
Sonde #: 37411 | VOLUME PURGED: 1½ gal
Flow Cell: 10546 | Horiba U10: NA
Calibration Date: 9-15-04 Time: 0800 | Calibration Date: Time:
Project Chemist: | Sampling Crew:

Purge Data

Time	Flow (mL/min)	Temp (°C) +/- 0.5	pH +/- 0.1	SP (mS) +/- 3 %	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	Turbidity (NTU) +/- 10 %	WATER Level (ft)	
1742									
1745		21.56	4.70	.3460	2.22	172	117.9	14.89	
1748	283	20.63	4.65	.2689	1.59	177	86.1	15.80	
1751	163	20.66	4.70	.1945	1.27	176	69.0	16.15	
1754	93	21.18	4.77	.1726	1.23	175	64.3	16.30	
1757	123	21.04	4.80	.1440	1.05	175	68.2	16.68	
1800		21.04	4.82	.1501	0.96	177	416.7		Water below top of Pump
1806	101	19.88	4.77	0992	1.02	179	475.0		
1809	197	20.15	4.78	1048	1.33	180	746.0		
1812									

No Sample

Sample ID: MW111 | Sample Time: None | Sample Stop Time: 1662
Sample Date: 9-15-04 | Post Sample Water Level Prior to Pump Shutoff: 16.72 below pump
Chest #: ~~VH13~~ | Custody Seal #: | VOC Chest #: VC32 | Custody Seal #:
QC Chest #: | Custody Seal #: | QA Chest #: | Custody Seal #:
Airbill #: 847300910015 | Lab: MEL
QA Airbill #: | Lab: | Well seal #: 152893
Comments: didn't Stabalize before dry.

US Army Corps of Engineers-Tulsa District
LONGHORN ARMY AMMUNITION PLANT
Low Flow Groundwater Sampling Field Data Form

00046044

Well ID: MW112 | Total Well Depth:
Date: 9-15-04 | Static Water Level: 9.68
PURGE METHOD: LOW FLOW DEDICATED PUMP | Ft. water:
Flow Cell Meter #: S16660 | Casing Size: 2" | Gal/ Vol:
Sonde #: 37471 | VOLUME PURGED: 1921
Flow Cell: 10546 | Horiba U10:
Calibration Date: 9-15-04 Time: 0800 | Calibration Date: Time:
Project Chemist: | Sampling Crew: Roberta-Sloan

Purge Data

Time	Flow (mL/min)	Temp (°C) +/- 0.5	pH +/- 0.1	SP (mS) +/- 3 %	DO (mg/L) +/- 10%	ORP (mV) +/- 10 mV	Turbidity (NTU) +/- 10 %	WATER Level (ft)
1857								
1900	120	21.00	5.77	3.477	1.82	196	30.3	10.72
1903	200	20.70	5.80	3.403	1.17	193	20.5	11.15
1906	166	20.69	5.83	3.373	1.04	192	14.3	11.35
1909	137	20.81	5.87	3.362	1.00	190	7.7	11.45
1912	111	20.99	5.89	3.355	0.87	188	3.5	11.47
1915	120	21.06	5.89	3.349	0.84	187	1.9	11.50
1918	100	21.20	5.90	3.347	0.89	185	0.0	11.52
1921	100	21.31	5.91	3.341	0.90	184	0.0	11.52

Sample ID: MW112 | Sample Time: 1922 | Sample Stop Time: 2009
Sample Date: 9-15-04 | Post Sample Water Level Prior to Pump Shutoff: below top of pump
Chest #: VAC8 | Custody Seal #: | VOC Chest #: Y132 | Custody Seal #:
QC Chest #: | Custody Seal #: | QA Chest #: | Custody Seal #:
Airbill #: 847[illegible] | Lab: MEL
QA Airbill #: | Lab: | Well seal #: 152888
Comments:

F/QC: GEL (GEL Task Order # 5) QA: APCL (CRC Task Order # 01-15)	Lab #	Chest/Temp.

GROUNDWATER MONITORING WELL

00046045

CHAIN OF CUSTODY

U.S. Army Corps of Engineers

Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 112 Date: 9-15-04 Time: 1922

Sampling POC: Greg Snider (918) 605-9341

Technical Manager: Cliff Murray (918) 669-7573 **Due Date: 30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
3	5		VA13	11613

VOA Vials	Chest #	Sampler Initials
3	VC32	SR

PARAMETERS SAMPLED

✓	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Field Method	(0)
✓	Semi Volatile Organics	8270 C	(2)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorate	8321	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
[signature]	→	9.16.04	1200

Fed Ex Shipping Bill No: 871.2015

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046046

Well Data

Well ID: MW110
Date: 12-16-04
Purge Method: Ded Bladder

Initial Depth to Water (FtBTOC): 7.12
Total Depth (FtBTOC): 22.06
Gallons per well volume:

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S16060
Calibration Date: 12-16-04

Horriba U10: N/A
Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (uS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
1250	150	18.72	6.77	6.121	2.27	462	1.7	7.97
1253	150	17.27	6.47	5.511	2.09	391	21.2	8.17
1256	100	17.28	6.45	5.509	1.97	389	15.6	8.22
1259	100	17.29	6.46	5.510	1.95	390	10.7	8.25
1302	100	17.27	6.45	5.512	1.97	392	10.2	8.26
1305	100	17.28	6.45	5.511	1.99	395	10.3	8.25

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): 8.25

Total Volume Purged (gallons): 1

Sample ID: MW110

Sample Date: 12-16-04 Sample Time: 1305

Sample Chest: LR44 VOC Chest: VC37

QA Chest: N/A QC Chest: N/A

F/QC: GEL (GEL Task Order # 5) QA: AML (AML Task Order # 19)	Lab #	Chest/Temp. 00046047

GROUNDWATER MONITORING WELL

CHAIN OF CUSTODY

U.S. Army Corps of Engineers

Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 110 Date: 12-16-04 Time: 1305

Sampling POC: Greg Snider (918) 605-9341

Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
2	5		LR44	121644

VOA Vials	Chest #	Sampler Initials
3	VC37	GS

PARAMETERS SAMPLED

	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Field Method	(0)
✓	Semi Volatile Organics	8270 C	(2)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorates	8321	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
[signature]	→	12-16-04	1800

Fed Ex Shipping Bill No: 8473 0090 9950

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046048

Well Data

Well ID: MW111
Date: 12-16-04
Purge Method: Ded Bladder

Initial Depth to Water (FtBTOC): 9.57
Total Depth (FtBTOC): 22.81
Gallons per well volume: 2

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S16660
Calibration Date: 12-16-04

Horriba U10: N/A
Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (us/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
1027	200	19.82	6.91	0.0911	2.50	925	27.5	10.11
1030	150	18.71	6.51	0.0921	1.97	880	21.6	10.27
1033	150	18.57	6.52	0.0922	1.95	879	15.8	10.32
1036	100	18.61	6.49	0.0920	1.99	875	9.7	10.35
1039	100	18.62	6.50	0.0919	1.99	874	5.4	10.37
1042	100	18.64	6.52	0.0921	2.00	875	3.2	10.38
1045	100	18.62	6.49	0.0922	1.97	876	3.1	10.38

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): 10.37

Total Volume Purged (gallons): 1

Sample ID: MW111

Sample Date: 12-16-04 Sample Time: 1045

Sample Chest: MP7 VOC Chest: VC37

QA Chest: N/A QC Chest: N/A

F/QC: GEL (GEL Task Order # 5) QA: AML (AML Task Order # 19)	Lab #	Chest/Temp. 00046049

GROUNDWATER MONITORING WELL

CHAIN OF CUSTODY

U.S. Army Corps of Engineers
Tulsa District

Project: **Longhorn Army Ammunition Plant** Site: **Perimeter Wells**

Sample ID: PW-MW- 111 Date: 12-16-04 Time: 1045

Sampling POC: Greg Snider (918) 605-9341
Technical Manager: Cliff Murray (918) 669-7573 Due Date: **30 days**

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
2	5		MP7	17167

VOA Vials	Chest #	Sampler Initials
3	VC37	GS

PARAMETERS SAMPLED

	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Field Method	(0)
✓	Semi Volatile Organics	8270 C	(2)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorates	8321	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
[signature]		12-16-04	1800

Fed Ex Shipping Bill No: 847300909950

US Army Corps of Engineers – Tulsa District
Longhorn Army Ammunition Plant
Low Flow Groundwater Sampling Field Data Form

00046050

Well Data

Well ID: MW112
Date: 12-16-04
Purge Method: Ded Bladder
Initial Depth to Water (FtBTOC): 8.39
Total Depth (FtBTOC): 23.01
Gallons per well volume: 2

Sampling POC: Greg Snider (918) 605-9340

Flow Cell QED FC 5000: S16660
Calibration Date: 12-16-04
Horriba U10: N/A
Calibration Time: 0700

Purge Data

Time	Flow (ml/min)	Temp (°C)	pH	SP (uS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (FtBTOC)
	Zero drawdown	±0.5	±0.1	±3%	±10%	±10mV	±10%	
1148	150	19.11	6.92	0.997	2.31	520	200.1	8.47
1151	100	18.57	6.71	0.982	1.67	480	75.7	8.49
1154	100	18.57	6.72	0.980	1.70	472	50.2	8.51
1157	100	18.59	6.73	0.983	1.69	476	50.7	8.52
1200	100	18.57	6.72	0.985	1.71	470	50.9	8.52

Final (post sample) depth to groundwater prior to pump shutoff (FtBTOC): 8.52

Total Volume Purged (gallons): 1

Sample ID: MW112

Sample Date: 12-16-04 Sample Time: 1200

Sample Chest: MP7 VOC Chest: VC37

QA Chest: N/A QC Chest: N/A

F/QC: GEL (GEL Task Order # 5) QA: AML (AML Task Order # 19)	Lab #	Chest/Temp. 00046051

GROUNDWATER MONITORING WELL

CHAIN OF CUSTODY

U.S. Army Corps of Engineers
Tulsa District

Project: Longhorn Army Ammunition Plant Site: Perimeter Wells

Sample ID: PW-MW- 112 Date: 12-16-04 Time: 1200

Sampling POC: Greg Snider (918) 605-9341
Technical Manager: Cliff Murray (918) 669-7573 Due Date: 30 days

CONTAINERS

Glass	Plastic	Vials	Chest #	Custody Seal #
2	5		MP7	12167

VOA Vials	Chest #	Sampler Initials
3	4637	GS

PARAMETERS SAMPLED

	pH, Conductivity, Temperature, DO, Turbidity, ORP	EPA Low Flow Field Method	(0)
✓	Semi Volatile Organics	8270 C	(2)
✓	High Explosives	8330	(1)
✓	Total TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010/7000 series	<1>
✓	Filtered TAL Metals (Al, As, Ag, Ba, Ca, Co, Cr, Cd, Cu, Fe, Hg, K, Mg, Mn, Ni, Pb, Se, Sr, Sb, Tl, Zn, Be & V)	6010 / 7000 series	<1>
✓	Perchlorates	8321	<1>
✓	Anions (Sulfate & Chloride)	300.0	<1>
✓	Nitrate / Nitrite	353.3	<1>
✓	Volatile Organics	8260 B	{3}

* Containers: ( ) = 1 L Amber Glass < > = 250 ml HDPE { } = 40 mL Vials

CUSTODY RECORD

Relinquished By	Received By	Date	Time
[signature]	→	12-16-04	1800

Fed Ex Shipping Bill No: 847300909950