LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

ADMINISTRATIVE RECORD

VOLUME 2 of 5

1993

Bate Stamp Numbers
005766 - 006305

Prepared for:

Department of the Army
Longhorn Army Ammunition Plant
Marshall, Texas 75671-1059

1995

VOLUME 2 of 5

1993

E. **Title:** **Final Analytical Data - Data Summary Report Of Investigation Results From 1976 Through 1992 For Burning Ground 3 & The Unlined Evaporation Pond**
Group(s): **2 (Partial)**
Site(s): **LHAAP-18 & LHAAP-24 Burning Ground / Washout Pond & Evaporation Pond**
Location: **Longhorn Army Ammunition Plant, Marshall, Texas**
Agency: **U.S. Army Corps Of Engineer, Tulsa District**
Author(s): **U.S. Army Corps Of Engineers**
Recipient: **U.S. Army, Longhorn Army Ammunition Plant**
Date: **May, 1993**
Bate Stamp: **005766 - 006305**

005766

DATA SUMMARY REPORT

OF INVESTIGATION RESULTS

FROM 1976 THROUGH 1992

FOR

BURNING GROUND 3 & THE UNLINED EVAPORATION POND

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

MAY 1993

PREPARED BY
US ARMY CORPS OF ENGINEERS
TULSA DISTRICT

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1. INTRODUCTION.

This document contains a summary of the data that has been collected at the Longhorn Army Ammunition Plant, Burning Ground 3 and the Unlined Evaporation Pond, LHAAP 18 & 24, from 1976 through 1992. High concentrations of solvents (primarily trichloroethylene and methylene chloride) and heavy metals (primarily barium) have been detected in the upper saturated water table and buried waste at the site. The contamination is due to waste management practices dating back to the early 1950's. Based on past investigations at the site, an interim remedial action to remove or control the contaminants in the upper groundwater and vadose zone present at the site appears to be necessary.

1.1. Purpose & Objectives. Since 1976 several investigations have been performed and several reports have been generated in regards to this site. The result has been a large amount of data that has been virtually impossible to comprehend without a laborious and time consuming search of a "library" of information. To facilitate upcoming remedial action efforts and decision making, a single document was needed that gave the reader the significant information/data in a format that was readily accessible. The purpose of this Summary Report is to provide this single document.

1.2. Report Organization. All data presented in this report other then the discussion of the 1992 groundwater sampling (in section 4.) has been taken from historical reports. Laboratory reports containing the November 1992 sampling results were submitted to the EPA and TWC in January 1993.

All of the information could not be repeated exactly as in the original documents or this report would have been too bulky to meet the objectives as previously stated. Therefore, judgement has been used in determining which parameters were to be included in this summary. All investigations were included but only those parameters that appeared to be significant in terms of concentration, type, overall detection, or historical significance were included in the summary tables.

For the groundwater and soil data, volatile organic compounds (VOC)s, semi-volatile organic compounds (SVOC)s, metals, and

explosive tables were included.

The sediment and surface water sampling parameters were not as consistent as the groundwater and soil parameters, therefore, separate tables were required for each sampling event of sediment/surface water. In some cases, the tables have common parameters but not in all.

For the complete list of parameters and results the reader should refer to the original document as referenced in the Table 1. The references used and the type of data that was collected for this report are also listed in Table 1.

The data has been summarized into tables that are contained in the appendixes by sampling matrix or data type. A description of the contents of each appendix is given in Section 3.

APPENDIXES

A - SITE DRAWINGS
B - GROUNDWATER INVESTIGATION RESULTS
C - SOIL/SOLID SAMPLE INVESTIGATION RESULTS
D - SEDIMENT/SURFACE WATER INVESTIGATIONS RESULTS
E - AERIAL PHOTOGRAPHS
F - ENGINEERING PROPERTIES TABLE
G - SOIL GAS SURVEY
H - BORE HOLE LOGS AND WELL SCHEMATICS
I - CROSS-SECTIONS
J - GROUNDWATER ELEVATION AND SURVEY COORDINATES/SURFACE ELEVATIONS DATA

Table 1

LIST OF DOCUMENTS AND SAMPLE MATRIX DATA PROVIDED IN EACH REFERENCE

DOCUMENTS a. Title - Date b. Prepared for c. Prepared by	VOL.	A. GROUNDWATER DATA	B. SOIL CHEMICAL DATA	C. SOIL PHYSICAL DATA	D. SEDIMENT DATA	E. SURFACE WATER DATA	F. UEP WATER DATA	G. UEP RESIDUE/ SEDIMENT DATA	H. HISTORICAL OPERATIONS INFO.
(1) a. RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES, BURNING GROUND, LONGHORN AAP - JANUARY 1993 b. Fort Worth District, USACE c. SWD Laboratory, USACE	1	(11/92)							
	2	(11/92)							
	3	(11/92)							
	4	(11/92)							
(2) a. 1990 ANNUAL GROUNDWATER REPORT - JULY 1991 b. LHAAP c. Morton Thiokol, Inc. Longhorn Div.		(2/90) (6/90) (9/90) (12/90)							
(3) a. PROPOSED PERMIT NO. HW-50195 - November 30, 1989 b. LHAAP c. Texas Water Commission		(5/88) only MW-6							
(4) a. RFI, ACTIVE BURNING GROUND AND UNLINED EVAPORATION POND, PHASE II FIELD DATA - SEPTEMBER 1989 b. Huntsville Division, USACE c. Fort Worth District, USACE			(7/89)				(9/89)		

035710

Table 1

LIST OF DOCUMENTS AND SAMPLE MATRIX DATA PROVIDED IN EACH REFERENCE

DOCUMENTS a. Title - Date b. Prepared for c. Prepared by	VOL.	A. GROUNDWATER DATA	B. SOIL CHEMICAL DATA	C. SOIL PHYSICAL DATA	D. SEDIMENT DATA	E. SURFACE WATER DATA	F. UEP WATER DATA	G. UEP RESIDUE/ SEDIMENT DATA	H. HISTORICAL OPERATIONS INFO.
(5) a. RFI, ACTIVE BURNING GROUND AND UNLINED EVAPORATION POND, PHASE I - JULY 1989 b. Huntsville Division, USACE c. Fort Worth District, USACE	1			Table 7 Table 8					
	2			Cross-sect's					
	3	App H (5/88)	App E (5/88) App G (8/88) App J (8/88)	App B SGS (10/87)					
	4	App N (9/88)	App P (9/87) App S (7/88)	App L App N App O App U App AA App BB					
	5	Part D (9/88)	Part D (10/87) (3/88) (4/88) (8/88)						

Table 1

LIST OF DOCUMENTS AND SAMPLE MATRIX DATA PROVIDED IN EACH REFERENCE

DOCUMENTS a. Title - Date b. Prepared for c. Prepared by	VOL.	A. GROUNDWATER DATA	B. SOIL CHEMICAL DATA	C. SOIL PHYSICAL DATA	D. SEDIMENT DATA	E. SURFACE WATER DATA	F. UEP WATER DATA	G. UEP RESIDUE/ SEDIMENT DATA	H. HISTORICAL OPERATIONS INFO.
(6) a. LHAAP NPL HAZARDOUS RANKING SCORE (HRS) DOCUMENT - MARCH 1989 b. EPA c EPA									X
(7) a. GROUNDWATER QUALITY ASSESSMENT PHASE I - FEBRUARY 1989 b. Huntsville Division, USACE c. Fort Worth District, USACE	1								X
	2			X					
	3	App.H (5/88)	App E (3/88) (4/88) App G (8/88) App J (8/88)	App B (Soil Gas) App K (survey)					
	4	(9/88)		App AA+BB					
(8) a. A STUDY OF SUSPECTED TNT BURIAL SITES AT LHAAP - MAY 1988 b. Morton Thiokol, Inc. Longhorn Div. c. Environmental Protection Systems		(5/88) 3 samples-Exp only			Table 7 (no date given)				X

005493

Table 1

LIST OF DOCUMENTS AND SAMPLE MATRIX DATA PROVIDED IN EACH REFERENCE

DOCUMENTS a. Title - Date b. Prepared for c. Prepared by	VOL.	A. GROUNDWATER DATA	B. SOIL CHEMICAL DATA	C. SOIL PHYSICAL DATA	D. SEDIMENT DATA	E. SURFACE WATER DATA	F. UEP WATER DATA	G. UEP RESIDUE/ SEDIMENT DATA	H. HISTORICAL OPERATIONS INFO.
(9) a. GROUNDWATER CONTAMINATION SURVEY NO. 38-26-0851-88, EVALUATION OF SOLID WASTE MANAGEMENT UNITS LHAAP, INTERIM FINAL REPORT - MAY 1987 b. USA Materials Command c. USAEHA, Aberdeen Proving Ground, Md.									X
(10) a. CLOSURE REPORT OF UNLINED EVAPORATION POND - JUNE 1986 b. TWC c. Fort Worth District, USACE							App I (6/84)	App II (11/85)	
(11) a. ADDENDUM TO GROUNDWATER QUALITY ASSESSMENT LHAAP, GROUNDWATER CONTAMINATION RELATED TO SEEPAGE FROM AN UNLINED EVAPORATION POND - MAY 1986 b. Huntsville Division, USACE C. Camp Dresser & McKee, Inc.		(2/86) (4/86) (11/86)	App			(2/86)			
(12) a. EPA GROUNDWATER MONITORING EVALUATION - JANUARY 1986 b. EPA		(11/85)							

Table 1

LIST OF DOCUMENTS AND SAMPLE MATRIX DATA PROVIDED IN EACH REFERENCE

DOCUMENTS a. Title - Date b. Prepared for c. Prepared by	VOL.	A. GROUNDWATER DATA	B. SOIL CHEMICAL DATA	C. SOIL PHYSICAL DATA	D. SEDIMENT DATA	E. SURFACE WATER DATA	F. UEP WATER DATA	G. UEP RESIDUE/ SEDIMENT DATA	H. HISTORICAL OPERATIONS INFO.
(13) a. GROUNDWATER QUALITY ASSESSMENT LHAAP, GROUNDWATER CONTAMINATION RELATED TO SEEPAGE FROM AN UNLINED EVAPORATION POND - MARCH 1985 b. Huntsville Division, USACE C. Camp Dresser & McKee, Inc.	1	(4/83)							X
	2		App G + H		App F (81)		App E (82)	App E (82)	
	3	App L (11/81) (2/82) (5/82) (8/82) (1/83) (7/83) (7/84) (9/84)		App K	App O (7/83)	App O (7/83)			
(14) a. LHAAP CONTAMINATION SURVEY - JUNE 1984 b. Thiokol Corp. Longhorn Div., LHAAP, & USATHMA c. Environmental Protection Systems Inc.		Table A-7 (11/82)	App F		(11/82)	(11/82)			X

037474

Table 1

LIST OF DOCUMENTS AND SAMPLE MATRIX DATA PROVIDED IN EACH REFERENCE

DOCUMENTS a. Title - Date b. Prepared for c. Prepared by	VOL.	A. GROUNDWATER DATA	B. SOIL CHEMICAL DATA	C. SOIL PHYSICAL DATA	D. SEDIMENT DATA	E. SURFACE WATER DATA	F. UEP WATER DATA	G. UEP RESIDUE/ SEDIMENT DATA	H. HISTORICAL OPERATIONS INFO.
(15) a. CONTAMINATION ANALYSIS REPORT FOR ENVIRONMENTAL CONTAMINATION SURVEY OF LHAAP - MARCH 1983, MAY 1984 b. Thiokol Corp. Longhorn Div., LHAAP, & USATHMA c. Environmental Protection Systems Inc.		App A (11/82)			(11/82)	(11/82)			X
(16) a. WASTEWATER ENGINEERING SPECIAL STUDY NO. 32-62-0182-82 - SEPTEMBER 1981 b. DRCSG-DARCOM C. UAEHA Regional Div., South							(81)	(81)	X
(17) a. LAND DISPOSAL STUDY NO. 38-26-0104-81, LHAAP - February 1980 b. c. USAEHA, Aberdeen Proving Ground Md.		(80)					(80)		
(18) a. WATER QUALITY SPECIAL STUDY NO. 24-0586-77 - AUGUST 1976 b. LHAAP c. USAEHA, Aberdeen Proving Ground, Md.						(8/76)	(8/76)	(8/76)	X

005745

Table 1

LIST OF DOCUMENTS AND SAMPLE MATRIX DATA PROVIDED IN EACH REFERENCE

DOCUMENTS a. Title - Date b. Prepared for c. Prepared by	VOL.	A. GROUNDWATER DATA	B. SOIL CHEMICAL DATA	C. SOIL PHYSICAL DATA	D. SEDIMENT DATA	E. SURFACE WATER DATA	F. UEP WATER DATA	G. UEP RESIDUE/ SEDIMENT DATA	H. HISTORICAL OPERATIONS INFO.
(19) a. Hazardous Waste Special Study No. 37-26-0291-84 - November 1982 b. DRCSG, LHAAP c. USAEHA, Aberdeen Proving Ground, Md.									
(20) a. Hazardous Waste Special Study No. 39-26-0215-83 - July 1982 b. US Army Materials Development and Readiness Command c. USAEHA, Aberdeen Proving Ground, Md.									

0 0 5 4 7 8

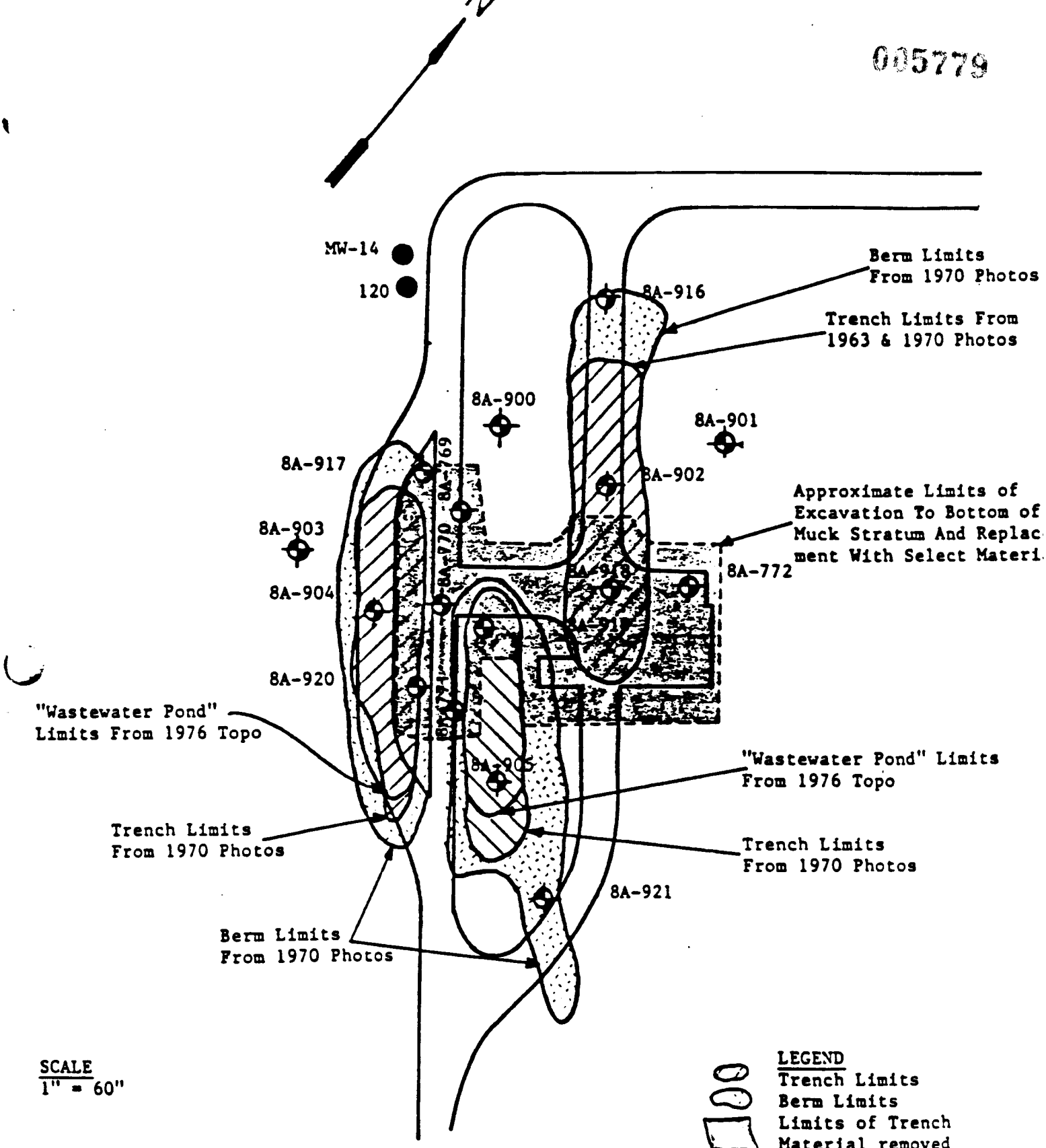
2. SITE DESCRIPTION. The site consists of a burning ground that has been actively used to burn, bury, and evaporate production waste from Longhorn Army Ammunition Plant (LHAAP) since the 1950's.

2.1. Location. Burning Ground 3 and Unlined Evaporation Pond (UEP) are located in the east central section of the Longhorn Army Ammunition Plant (LHAAP) adjacent to Karnack, Texas and the western shore of Caddo Lake in the northeast section of Texas. It is 14 miles northeast of Marshall, Tx. and 40 miles west of Shreveport, Louisiana.

2.2. Burning Ground 3 or Active Burning Ground (ABG) LHAAP-18. The Burning Ground 3 incorporates several waste units that have been used in various way since the 1950's depending on the need of the ongoing production waste production. The waste units at the site include ~~past~~ various past burn/demolition burial pits, a row of 18 past burn pits, a past heavy propellant pit, past locations of burn pans, active burn cages, a liquid waste sump, and the unlined evaporation pit and air curtain destroyer trenches that are discussed in more detail below.

2.3. Unlined Evaporation Pond (UEP) LHAAP-24. The UEP was built in the late 1950's to dispose of the liquid waste collected from the sumps through out the facility. A truck ramp was located near the south corner to allow the trucks to discharge into the pond and a rocket motor wash out was located near the north corner. This pond was closed in 1985 when the water was pumped out and sent for disposal at a deep injection well. The sludge was mixed with portland cement to achieve a workable consistency. A total volume of 8,116 cy was removed and sent to a permitted landfill owned and operated by Chemical Waste Management, Inc. in Carlyss, Louisiana. It has been verified from existing data documenting the 1986 closure of the UEP that VOCs were not parameters for determining clean closure of the unit although testing of the UEP water and sediments for VOC's was performed before closure. It is known that the UEP was used for 30 years to dispose of all types of process wastes containing very high concentrations of VOCs. Therefore, it is likely contaminated soil continues to act as a source for the high concentrations of VOCs detected in the ground water adjacent to the unit.

2.4. Trenches at the Air Curtain Destructor (ACD) LHAAP-21. From aerial photos and record search it is apparent the trenches near the current ACD were used to dispose of waste from the early 1950's. When foundation investigation were on going for the ACD design a "muck" was encountered. The "muck was removed and suitable material was backfilled (see Figure 2.4) Previous soil borings around the ACD and through its foundation (to confirm this) indicate that trench fill material was removed during construction of the ACD to the limits of excavation shown on the as-built drawings. Four soil borings encountered evidence of trench fill material outside the limits of excavation for the ACD and within the extent of trenches shown on aerial photos. The limits of the former trenches are also in question because other maps for the site show varying locations.



SCALE
1" = 60"

LEGEND
Trench Limits
Berm Limits
Limits of Trench
Material removed
Soil Borings
Monitoring Well

Notes
1. Base map from Explosive Contaminated Waste Incinerator(AS-BUILT)22 JUL 1980.
2. For logs of Borings, See Sheets 6 thru 17.
3. Borings 8A-769 thru 8A-872 drilled 1976.
   Borings 8A-900 thru 8A-921 drilled 1988.

Figure 3.4 Trench Detail Beneath Air Curtain Destructor.

3. SITE INVESTIGATION HISTORY.
Several investigations have been performed on this site since 1976. These investigations are listed in Table 1. These investigations include record searches, sediment, surface water (on site and off), groundwater, geological/geohydrologic borings and soil/waste solid. The field and laboratory data from these investigations are provided in the appendixes attached to this report and discussed below. There are currently 50 groundwater monitoring wells at LHAAP 18 & 24, as shown on Figure A-3 in Appendix A.

3.1. Site Figures. The site figures are located in Appendix A. A description of each figure is provided below.

Figure A-1. Geology and Topography of the ABG Area. Includes a portion of the USGS from 1978 and Geologic Atlas of Texas from the Bureau of Economic Geology, 1965 showing the site.

Figure A-2. Past Investigations. This drawing shows site features with the locations of all past soil and groundwater investigations combined on one map.

Figure A-3. Past Groundwater Investigations. This drawing shows site features with the locations of all past groundwater investigations. The source units shown by the dashed lines are where waste was known or suspected to be disposed.

Figure A-4. Past Soil Investigations. This drawing shows site features with the locations of all past soil and groundwater investigations. The source units shown by the dashed lines are where waste was known or suspected to be disposed.

Figure A-5. Unlined Evaporation Pond (UEP) Soil Test Locations. This drawing shows the locations of the sediment sampling performed in the clean-out and capping of the UEP.

Figure A-6. Surface Water/Sediment Sample Sites. This map shows the locations of the sampling performed in conjunction with the investigations of surface drainage pathways into Caddo Lake.

Figure A-7. Past Sediment/Surface Water Sample Locations. This

drawing shows the location of sediment (or surface soil) and surface water sampling. The locations of sampling where a specific location is known are shown with a dot. The sampling where only general locations are known are either shown with an arrow or the label is put over the general location. The source units shown by the dashed lines are where waste was known or suspected to be disposed.

Figure A-8. TCE Concentrations in the Soil Samples. This drawing shows the location of soil samples where TCE concentrations were over 100 ug/kg. As is shown on the drawing, the locations of the highest TCE soil contamination is in the area of the ACD. The next highest TCE concentration is from the trench located in the middle between the ACD and the UEP.

Figure A-9. MEC Concentrations in the Soil Samples. This drawing shows the location of soil samples where MEC concentrations were over 100 ug/kg. The highest MEC concentration is from the trench located in the middle between the ACD and the UEP. The locations of the next highest MEC soil contamination is in the area of the ACD.

3.2. GROUNDWATER INVESTIGATION RESULTS. These investigation data tables are located in Appendix B. The tables provide a summary of the results of laboratory testing of groundwater samples.

There have been a total of 57 wells at one time or another on or around the site. Seven of those wells have previously been plugged. The location of all of the wells are shown on Figure A-3.

The date, method, and reference of the sampling is provided in the tables. The reference numbers refer to the number of the document as listed in Table 1. The detection limit is indicated by the "<" symbol for each parameter and each sample results.

The data is organized according to analytical type. Table B-1 is a summary of the most significant metal testing results. Table B-2 is a summary of the most significant volatile organic compound test results. Table B-3 is a summary of the most significant explosive testing results. Table B-4 is a summary of the most significant semi-volatile organic compound test results.

The first groundwater sampling was performed in 1980 and the latest data included in this report is from November 1992 sampling. The maximum concentration was at well 125, September 1984 sampling, barium concentration was 9,200 ug/l.

3.3. SOIL/SOLID SAMPLE INVESTIGATION RESULTS. These tables are located in Appendix C. These tables contain a summary of the results of laboratory testing of soil samples.

There have been a total of 58 soil borings on or around the site, including the "MW-#" wells, which had soil samples taken for laboratory analysis. The location of all of the borings are shown on Figure A-4.

The date, method, and reference of the sampling is provided in the tables. The reference numbers refer to the number of the document as listed in Table 1. The detection limit is indicated by the "<" symbol for each parameter and each sample results.

The data is organized according to analytical type. Table C-1 is a summary of the most significant metal testing results. Table C-2 is a summary of the most significant volatile organic compound test results. Table C-3 is a summary of the most significant explosive testing results. Table C-4 is a summary of the most significant semi-volatile organic compound test results.

From 1987 though 1989, 174 soil samples were analyzed for volatile organic compounds. Information pertaining to the most significant VOCs is provided below.

TRICHLOROETHYLENE

- TCE detected in 103 of the 174 soil samples
  - 1 sample at 1,000,000 ug/kg
  - 4 samples 100,000 to 1,000,000 ug/kg (150,000 - 600,000 ug/kg)
  - 6 samples 10,000 to 100,000 ug/kg (21,880 - 78,870 ug/kg)
  - 15 samples 1,000 to 10,000 ug/kg (1,200 - 4,860 ug/kg)
  - 21 samples 100 to 1,000 ug/kg (103 - 920 ug/kg)
  - 36 samples 10 to 100 ug/kg (maximum 95 ug/kg)
  - detection limit of 5 ug/kg most prominent

METHYLENE CHLORIDE

- MEC detected in 64 of the 174 soil samples
  - 4 samples 100,000 to 1,000,000 ug/kg (maximum - 742,050 ug/kg)
  - 5 samples 10,000 to 100,000 ug/kg (11,000 - 30,335 ug/kg)
  - 9 samples 1,000 to 10,000 ug/kg (1,050 - 7,200 ug/kg)
  - 11 samples 100 to 1,000 ug/kg (200 - 880 ug/kg)
  - 20 samples 10 to 100 ug/kg (maximum 61 ug/kg)
  - detection limit of 6 ug/kg most prominent

ACETONE

- Acetone most detected LNAPL in the 174 soil samples
- Acetone detected in 38 of the 174 soil samples
  - 3 samples 10,000 to 100,000 ug/kg (11,000 - 33,000 ug/kg)
  - 4 samples 1,000 to 10,000 ug/kg (1,050 - 9,900 ug/kg)
  - 4 samples 100 to 1,000 ug/kg (100 - 830 ug/kg)
  - 38 samples 10 to 100 ug/kg (maximum 99 ug/kg)

From 1987 though 1989, 113 soil samples were analyzed for metals. Information pertaining to the most significant metals is provided below.

BARIUM

- Ba detected in 99 of the 113 soil samples
  - 2 samples 1,000 to 10,000 mg/kg (maximum 1,500 mg/kg)
  - 32 samples 100 to 1,000 ug/kg
  - detection limit of 20 mg/kg most prominent

CHROMIUM

- Cr detected in 69 of the 113 soil samples
  - 2 samples 100 to 1,000 mg/kg (maximum 130 mg/kg)
  - 31 samples 10 to 100 ug/kg (maximum 23.5 mg/kg)
- detection limit of 5 mg/kg most prominent

LEAD

- Pb detected in 108 of the 113 soil samples
  - 2 samples 100 to 1,000 mg/kg (maximum 200 mg/kg)
  - 54 samples 10 to 100 ug/kg (maximum 41.6 mg/kg)
- detection limit of 1 mg/kg most prominent

ZINC

- 2 samples 100 to 1,000 mg/kg (maximum 160 mg/kg)

3.4. SEDIMENT/SURFACE WATER INVESTIGATIONS RESULTS. Sediment/surface water investigations data tables are located in Appendix D.

The data is organized according to analytical type. Table D-1 is a summary of the most significant surface water metal testing results. Table D-2 is a summary of the most significant surface water volatile organic compound test results. Table D-3 is a summary of the most significant surface water explosive testing results. Table D-4 is a summary of the most significant surface water semi-volatile organic compound test results. Table D-5 is a summary of the most significant sediment metal testing results. Table D-6 is a summary of the most significant sediment volatile organic compound test results. Table D-7 is a summary of the most significant sediment explosive testing results. Table D-8 is a summary of the most significant sediment semi-volatile organic compound test results.

3.5. AERIAL PHOTOGRAPHS. Aerial photographs of the site from 1954 to 1985 are located in Appendix E.

3.6. ENGINEERING PROPERTIES TABLE. Engineering properties table is located in Appendix F. Physical testing was performed on 165 soil samples.

3.7. SOIL GAS SURVEY. The 1987 soil gas survey report is provided in Appendix G.

3.8. BORE HOLE LOGS AND WELL SCHEMATICS. Bore hole logs are located in Appendix H for all of the wells and bore holes. Well schematics are also located in Appendix H for all wells except for the BH wells.

3.9. CROSS-SECTIONS. Cross-sections from referenced reports are provided in Appendix I.

3.10. GROUNDWATER ELEVATION AND SURVEY COORDINATES/SURFACE ELEVATIONS DATA. Groundwater and surface elevations and survey

coordinates from referenced reports are provided in Appendix J.

4. NOVEMBER 1992 GROUNDWATER SAMPLING.

In November 1992, the COE sampled 41 of the 49 wells at the site to obtain data necessary for evaluating interim remedial action alternatives and monitor plume concentrations and migration. The depths and water levels of the seven wells planned for plugging during the RI were measured, but the wells were not sampled. Well 125 was not addressed for sampling in the RI/FS Work Plan and was therefore not sampled by the COE. Copies of field data forms documenting all well sampling information are provided as Appendix 4-A.

4.1. Groundwater Analytical Results. Groundwater samples were analyzed for the following parameters:

- Total Metals - Antimony (Sb), arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), nickel (Ni), selenium (Se), silver (Ag), and thallium (Tl);
- Anions - Chloride, nitrate, and sulfate;
- Explosives - HMX, RDX, 1,3,5-TNB, 1,3-DNB, Tetryl, 2,4,6-TNT, 4-Am-2,6-DNT, 2-Am-4,6-DNT, 2,6-DNT, 2,4-DNT, nitrobenzene (NB), 2-NT, 3-NT, and 4-NT;
- Volatile Organic Compounds (VOCs); and
- Semi-volatile Organic Compounds (SVOCs) - Hazardous Substances, Priority Pollutant Base/Neutral Compounds, and Priority Pollutant Acid Compounds.

4.1.1. Free-Phase Sampling. Free-phase sampling of dense nonaqueous phase liquids (DNAPL)s was attempted in five wells where it was expected that concentrations of DNAPLs would be very high, results are shown on Table 4.1. Three of these wells, MW-1, MW-2, and 120, have historically shown concentrations of TCE and methylene chloride (MEC) approaching or exceeding their solubilities. The other two wells, MW-22 and MW-23 had never been sampled, but it was anticipated that similarly high concentrations of DNAPLs would be found in these wells. Free-phase sampling was done by obtaining a sample from the bottom of

each well prior to purging (pre-purge free-phase sample) and after purging prior to sampling (pre-sample free-phase sample). Wells MW-1 and MW-2 have dedicated pumping systems; therefore, these samples were taken of the first water emerging from the sampling line during pumping of these wells. For wells MW-22, MW-23, and 120, these samples were obtained using a double check valve bailer. Free-phase samples were analyzed for VOCs only. In all cases either the pre-purge sample or the pre-sample had the highest concentrations. This is possibly due to the dilution of the DNAPL plume when the water undergoes mechanical mixing over the length of the screen due to the pumping action.

Table 4.1
Concentrations From Free-Phase Sampling

Well No.	Contaminant	Pre-Purge	Pre-Sample	Well Sample
120	MEC	460,000	1,100,000	884,000
MW-1		531,000	768,000	675,000
MW-2		17,800,000	13,100,000	9,080,000
MW-22		146,000	<2,500	10
MW-23		61,500	<2,500	<10
120	TCE	43,100	88,500	67,500
MW-1		30,000	49,000	36,400
MW-2		235,000	258,000	199,000
MW-22		14,450	<2,500	227
MW-23		8,150	<2,500	467

Free phase samples from MW-2 showed concentrations of MEC as high as 17,800,000 ug/l, as shown on Table 4.1. While this concentration is nearly twice what the sample taken in the normally method was, it is still close to the same magnitude and therefor is not that significant since anything over 1,000,000 ug/l is in the .1% range and is definitely indicates a DNAPL

plume. This was the highest concentration of MEC detected in all of the wells sampled.

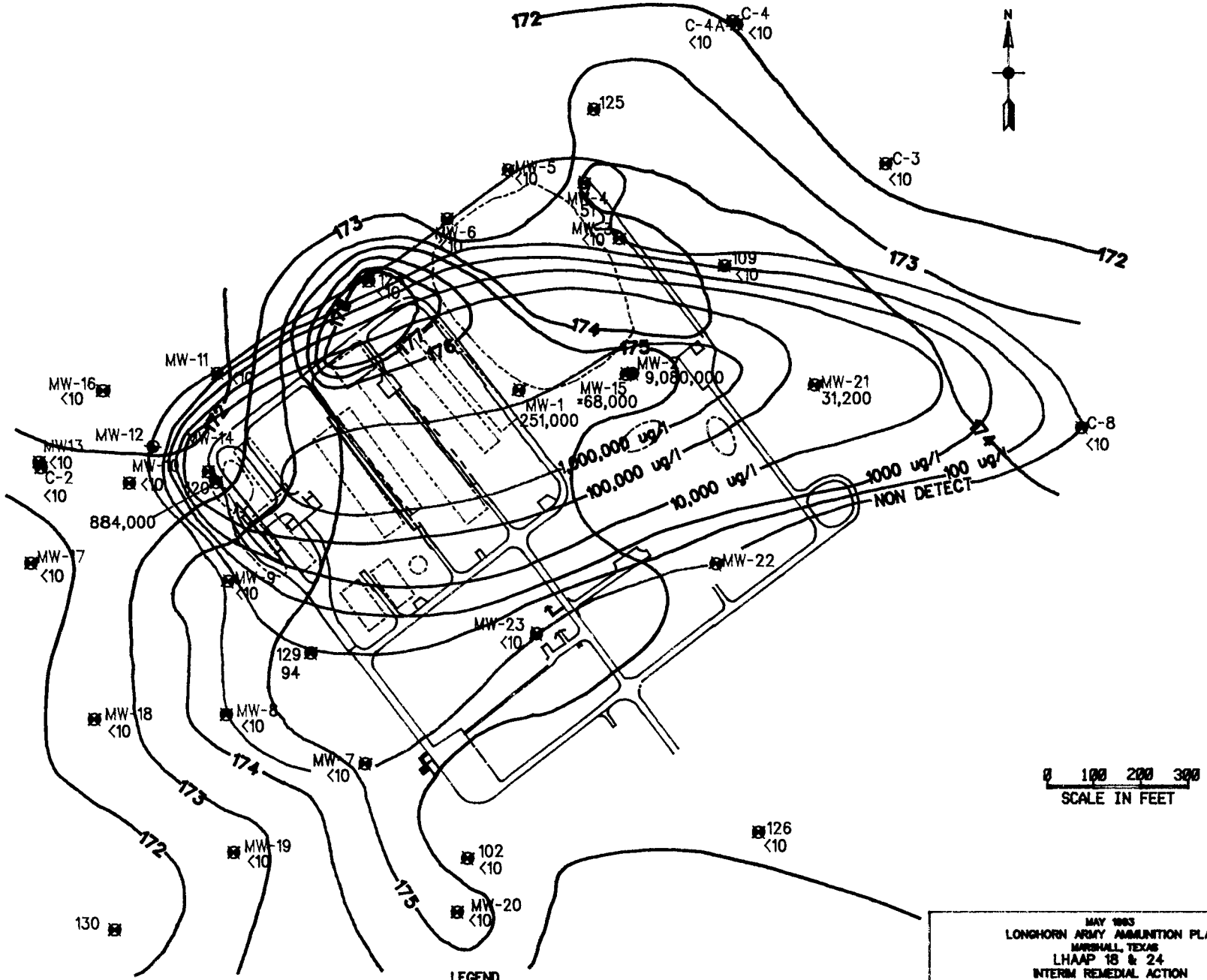
Free phase samples from MW-2 showed concentrations of TCE as high as 258,000 ug/l (258 mg/l), as shown on Table 4.1. This was the highest concentration of TCE detected in all of the wells sampled.

4.1.2. Contaminant Plumes. Two contaminants, TCE and MEC, are prolific enough to define two groundwater contaminant plumes beneath the burning ground area. The TCE plume is shown on Figure 4-1 and the methylene chloride plume is shown on Figure 4-2.

Contaminant concentrations are provided in the table in Appendix B and are shown on the figures for each of the wells sampled. For those wells in which free-phase sampling was performed, the constituent concentration detected in the well sample, and not the free-phase samples, was used in defining each plume. Concentrations detected in wells MW-10, MW-13, MW-14 and MW-15 were not used in defining the plumes because these wells appear to monitor deeper saturated zones than the other wells at the site.

The MEC plume is spread across the site in a mainly east to west configuration from MW-21 to well 120. All wells are mainly in the wells with the highest groundwater elevation, reflecting a plume shape that correlates with the mounding in the groundwater elevations. The highest concentrations of MEC are south of the UEP, at MW-2 (9,080,000 ug/l), MW-1 (251,000 ug/l) near the ACD at well 120 (884,000 ug/l), and at MW-15 (68,000 ug/l), in the deeper zone. From this area of high concentration, the MEC concentrations drop off sharply to <10 ug/l at almost all of the other wells tested. Since 1988, MW-2 has shown concentrations over 1,000,000 ug/l, MW-1 had concentrations over that in 1990 and BH-6 (now plugged but was near the location of MW-1) and BH-11 (south of MW-2) had concentration over that in 1984.

The high concentrations of TCE are mainly in the wells with the highest groundwater elevation, reflecting a plume shape that correlates with the mounding in the groundwater elevations. The highest concentrations of TCE are south of the UEP, at MW-2 (199,000 ug/l), near the ACD at well 120 (67,500 ug/l), and at MW-7 (11,300 ug/l) near the south corner of the burning ground (near the sump). From this area of high concentration, the TCE



NOTES:

1) = PRECEDING DETECTED CONCENTRATION DENOTES THAT THESE WELLS ARE ASSUMED TO BE MONITORING A DEEPER ZONE AND ARE NOT INCLUDED IN THESE CONTOURS.

2) DETECTION LIMIT IS <10.

LEGEND

- EXISTING MONITORING WELLS
- <10 CONCENTRATION OF METHYLENE CHLORIDE DETECTED IN GROUNDWATER IN NOV. 1992 (ug/l)
- SOURCE UNITS
- GROUNDWATER CONTOURS (NOV. 1992)

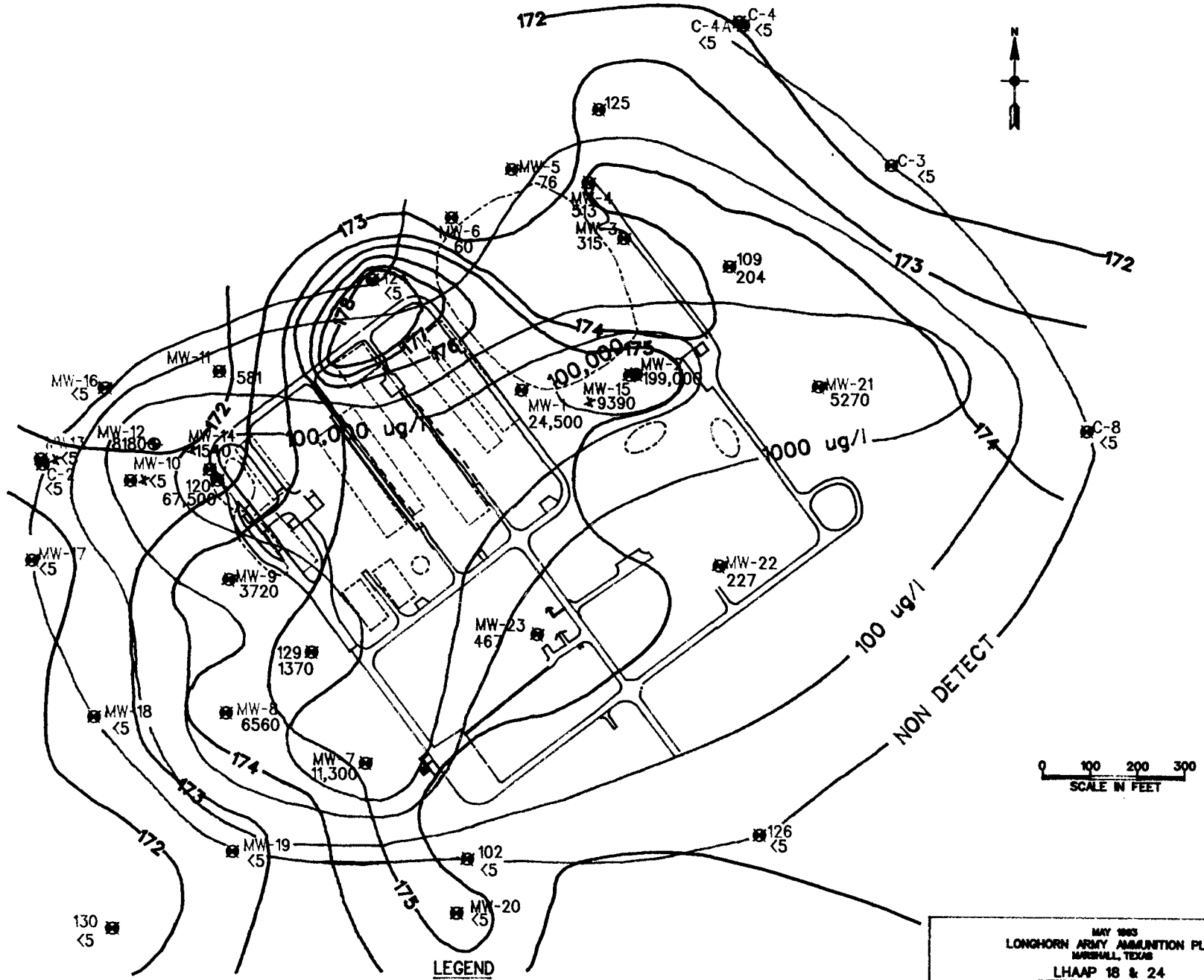
MAY 1993
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
LHAAP 18 & 24
INTERIM REMEDIAL ACTION
METHYLENE CHLORIDE CONCENTRATIONS
WITH CONTOURS
NOVEMBER 1992

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

DESIGNED BY: V.D. LANIER
DRAWN BY: C. STAUDENMAIER

FIGURE 4-1

0057789



NOTES:

1) * PRECEDING DETECTED CONCENTRATION DENOTES THAT THESE WELLS ARE ASSUMED TO BE MONITORING A DEEPER ZONE AND ARE NOT INCLUDED IN THESE CONTOURS.
2) DETECTION LIMIT IS <5.

LEGEND

- EXISTING MONITORING WELLS
- <5 CONCENTRATION OF TCE DETECTED IN GROUNDWATER, NOV. 1992 (ug/l)
- GROUNDWATER CONTOURS (NOV. 1992)
- TCE ISOCONCENTRATION CONTOURS
- SOURCE UNITS

MAY 1993
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
LHAAP 18 & 24
INTERIM REMEDIAL ACTION
TCE CONCENTRATIONS W/CONTOURS
NOVEMBER 1992

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

DESIGNED BY: V.D. LANIER
DRAWN BY: C. STAUDENMAIER

FIGURE 4-2

0 0 5 7 6 0

plume extends over most of the entire fenced area with overall concentrations of tens of thousands ug/l. Free phase samples from other wells within this area, showed TCE concentrations ranging from 8,150 ug/l in MW-23 up to 88,500 ug/l in well 120. Within 1,000 feet outside the fenced area, TCE concentrations drop off to below detection limits.

The biggest change seen in the sample event has been that MW-15 went from 37 ug/l MEC in 6/90 to 68,000 ug/l MEC in 11/92 and from 54 ug/l TCE in 6/90 to 9,390 ug/l TCE in 11/92. This indicates a downward migration pattern in the contaminant plume and it may also indicate faulty annulus seal in the monitoring well.

4.1.3. Quality Control/Quality Assurance Sampling. The round of groundwater sampling included 41 groundwater field samples, 5 quality control (QC) duplicates, 5 quality assurance (QA) duplicates, 14 travel blanks (TB), 10 free-phase (FP) samples, one QC duplicate FP sample, and one QA duplicate FP sample. All samples were delivered to the COE Southwestern Division Laboratory (SWD Lab) in Dallas, TX. These samples were distributed for analysis as shown on Table 1 in the QA/QC Report, which was prepared by the COE SWD Lab and is provided as Appendix 5-B. The SWD Lab and all contract laboratories who performed the analyses are validated by the Missouri River Division COE.

Data validation for this sampling event was performed by SWD Lab. Data validation concluded that analyses were 100 percent complete for the 296 samples delivered to SWD Lab, that the detection limits used were acceptable, and that the data generated was generally acceptable except for some high levels of contamination present in equipment blanks and one travel blank.

4.2. Piezometric Surface. Water level elevations recorded for November 1992 yield a similar piezometric surface configuration as has been plotted during previous sampling events, see Figure 4-3. Elevation recorded in wells MW-10, MW-13, MW-14 and MW-15 were not used in defining the lines of equal potential because these wells appear to monitor deeper saturated zones than the other wells at the site. Groundwater is flowing off the site in all directions along a horizontal gradient of approximately .0050. Regional direction of groundwater flow continues to be north-northeast towards Harrison Bayou and Caddo Lake along a

lower horizontal gradient of approximately .0025.

Wells 123 and 124 yielded water levels approximately 5 feet higher than the water levels recorded in November 1989, which is more than double the maximum 2 feet fluctuation observed in all of the other wells. Together the water levels recorded in both wells present a mounding effect in this area of the burning ground which has never been noted in the past. Both of these wells screen the top 15 feet of the water table. On the other hand, well MW-10 yielded a deeper water level than expected in relation to the other wells in the area. This water level is slightly more than 2 feet deeper than the level recorded in November 1989 and, when contoured with nearby well data, creates a depression in this area of the site which has never been noted in the past. Review of field notes and survey data does not indicate any identifiable errors in elevation or field measurements for any of these three wells.

Subsurface profiles indicate that many wells originally constructed with the intent to monitor the uppermost water-bearing zone beneath the burning ground may actually be constructed in a second deeper zone, or may be constructed through a confining material and are monitoring more than one zone.

4.3. Well Reference Data. The monitoring well data used for plotting well locations and computing elevations are shown on Table 4.3. Elevations were computed using the ground elevations and stick-up heights reported by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) as shown on Table 2-1 in the RI/FS Work Plan. Survey coordinates were also those from the USATHAMA data.

Review of the well reference data on Table 4.3 and the field data recorded in Appendix 4-B indicates various discrepancies and conditions which should be considered when evaluating the groundwater data obtained from this sampling event. These conditions are presented in the following paragraphs.

4.3.1 Blocked/Plugged Wells. Water levels were not obtained in two of the 49 wells at the site, wells BH-11 and 101. Well BH-11 was plugged at the ground surface, indicating the well boring may be permanently sealed. Well 101 had its dedicated

bailer stuck in the well casing. Both wells are scheduled for plugging during the RI.

4.3.2 Well Reference Elevations. Well reference elevations are surveyed ground elevations at the wellhead and surveyed top of well casing or protective casing. The point surveyed on the casing is notched to consistently be used for measuring well and water level depths.

Well C-4A has never been surveyed to establish either its location or elevation. An approximate ground elevation of 192.50 and an approximate well casing elevation of 194.80 were used in this report when computing any elevations associated with this well. Also, the well caps containing the dedicated pump connections on wells MW-1 through MW-16 now cover the surveyed notches on the well casings. Previously surveyed top of casing elevations were used in computing well elevations for this report, but new reference elevations are needed.

4.3.3. Bottom of Well Elevations. Measured well depths, water level depths, and their respective computed elevations are shown on Table 4.2. Also shown on Table 4.2 is the difference between constructed bottom of well (BOW) elevation and measured BOW elevation for each well. A plus (+) sign indicates the measured elevation was higher than the constructed elevation. The minus (-) sign indicates the measured elevation was lower than the constructed elevation.

Most differences in BOW elevations were noted in wells MW-1 through MW-14, varying from -0.08 to +6.43 feet. These differences are likely attributable to the post-well construction installation of dedicated pumping systems in these wells. The depth at which each pump is set is not known, and the reference elevation for computing these depths has changed due to the top of the well casing being capped with the well pumping connections. Those wells showing a difference of less than 2 feet in BOW elevation (MW-3, MW-4, MW-5, MW-7, MW-8, MW-10, MW-11, MW-12, and MW-13) indicate the pumps may be set within the sumps of the wells and not within the 5-foot screened intervals. Wells showing a difference of greater than 6 feet in BOW elevation (MW-9 and MW-14) indicate the pumps may be set at the top of the 5-foot screened intervals in the wells. Although neither of these two conditions invalidates any analytical data

obtained from these wells, these data should be considered when evaluating DNAPLs data.

APPENDIX 4-A
WATER SAMPLE FIELD DATA FORMS

005796

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 3 Nov 92

SITE: burning grounds TYPE OF SAMPLE: water

WELL NO: C-1 LOCATION: off paved road

CSG DIAM 4" CSG TYPE: PVC

RISER ELEV. 18" 15.92 depth

DEPTH TO WATER FROM TOP OF CASING: 48.88 ft TIME: 1450

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 20.75 TIME: 1400

WATER TABLE: MEASURING DEVICE: Disp. bailer

PH: ~~6.57~~ 6.54 ~~6.54~~ TIME: 1405 TYPE: Hydac

PH: ~~6.54~~ 6.53 ~~6.53~~

CONDUCTIVITY, umhos/cm TIME: 1405 TYPE: Hydac

2110 2110 TEMPERATURE: 60°

2100 2100 TURBIDITY: slight

CHEST# C-85 C/SEAL# 110492c85 BUS BILL# 1065866593

CHEST# C-64 C/SEAL# 110492c64 BUS BILL# 1065866604

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well not capped - needs screw-on type

hand bailed, well has 1½" PVC Bailer

fast recharge

no odor

weather was cool, 70°, partly cloudy, slight breeze

water sample slightly turbid

Picture #7

SAMPLE COLLECTOR: BF, JHard

005797

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 3 Nov 92

SITE: Burning grounds - BG TYPE OF SAMPLE: water

WELL NO: C-7 LOCATION: by paved road

CSG DIAM 4" CSG TYPE: PVC.

RISER ELEV. 26"

DEPTH TO WATER FROM TOP OF CASING: 24.0 ft. TIME: 1410

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 24.30 TIME: 1445

WATER TABLE: MEASURING DEVICE: disp. bailer

PH: 7.15 7.13 TIME: 1445 TYPE: ~~disp bailer~~ Hydac

PH: 7.12 7.11

CONDUCTIVITY, umhos/cm TIME: 1445 TYPE: Hydac

5.39. 5.39. TEMPERATURE: 61.6

5.38. 5.38. TURBIDITY: CLEAR

CHEST# C-94 C/SEAL# 110492c94 BUS BILL# 106586659 3

CHEST# C-64 C/SEAL# 110492c64 BUS BILL# 106586660 4

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and capped

weather was cool, 70°, cloudy with rain

no odor

bailed dry

water sample was clear

Picture #4,5,6

SAMPLE COLLECTOR: B. Post, J. Hord,

005798

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 3 Nov '92

SITE: Burning ground - BG. TYPE OF SAMPLE: water

WELL NO: C-10 LOCATION: beside dirt road, S. of burning ground

CSG DIAM 4" CSG TYPE: PVC

RISER ELEV. 2.0 ft

DEPTH TO WATER FROM TOP OF CASING: 26.46 ft TIME: 1110

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 26.75 TIME: 1540

WATER TABLE: MEASURING DEVICE: disp. bailer

PH: 7.23 7.23 TIME: 1540 TYPE: Hydac

PH: 7.23 7.23

CONDUCTIVITY, umhos/cm TIME: 1540 TYPE: Hydac

1500 1500 TEMPERATURE: 59.9°

1500 1500 TURBIDITY: slight

CHEST# C-64 C/SEAL# 10492C56 BUS BILL# 1-K586666O4

CHEST# C/SEAL# BUS BILL#

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well not capped - slide on cap needed

casing about 2 ft. lower than metal housing

fast recharge

weather cool, 70°, partly cloudy, breeze → purge

weather cold 45° cloudy - sampled

Sample water slightly turbid - no odor

Picture #2, 3

SAMPLE COLLECTOR: J. Hard, B Post

005799

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 3 Nov 92

SITE: Burning grounds - BG TYPE OF SAMPLE: water

WELL NO: C-9 LOCATION: beside dirt road, S. of burning grounds

CSG DIAM 4" CSG TYPE: PVC

RISER ELEV. 3.6 ft

DEPTH TO WATER FROM TOP OF CASING: 29.23 ft TIME: 1030

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 29.32 TIME: 1650

WATER TABLE: _____ MEASURING DEVICE: disp bailer

PH: 6.35 6.35 TIME: 1650 TYPE: Hydac

PH: 6.35 6.35

CONDUCTIVITY, umhos/cm TIME: 1650 TYPE: Hydac

9150 9150 TEMPERATURE: 58.3

9150 9150 TURBIDITY: clear

CHEST# C-89 C/SEAL# 110492C89 BUS BILL# 1065866604

CHEST# C-64 C/SEAL# 110492C64 BUS BILL# 1065866604

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well not capped - needs screw-on type

tape on metal housing indicated it had been sprayed to kill wasps

well water - no odor, cloudy

Purged until dry

weather was cool - 70°, partly cloudy, lt. breeze - purge

weather was cold - 45° cloudy, sample clear

Picture #1

SAMPLE COLLECTOR: J. Hand, B. Post

905000

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 4 Nov 92

SITE: burning grounds TYPE OF SAMPLE: water

WELL NO: C-5 LOCATION:

CSG DIAM 4" CSG TYPE: PVC

RISER ELEV. 15"

DEPTH TO WATER FROM TOP OF CASING: 10.37 ft TIME: 10:20

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 10.41 TIME: 10:35

WATER TABLE: MEASURING DEVICE:

PH: 7.33 7.33 TIME: 10:35 TYPE: Hydac

PH: 7.33 7.33

CONDUCTIVITY, umhos/cm TIME: 10:35 TYPE: Hydac

284 284 TEMPERATURE: 56.8°

284 284 TURBIDITY:

CHEST# C-77 C/SEAL# 110592C77 BUS BILL# 1065866648

CHEST# C-77 C/SEAL# 110592C77 BUS BILL# 1065866648

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well had no cap - needs screw on type

Well has 1¼" dedicated bailer

weather cloudy and cold, 45° - purge - sample day sunny - cold 45°

fast recharge

water sample slightly turbid - tan in color, no odor

Picture #9

SAMPLE COLLECTOR: BoP, J Hard

005801

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 4 Nov 92

SITE: burning grounds TYPE OF SAMPLE: water

WELL NO: C-4 LOCATION:

CSG DIAM 4" CSG TYPE: PVC - gray heavy gauge

RISER ELEV. 2 ft

DEPTH TO WATER FROM TOP OF CASING: 22.35 TIME: 11:50

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 22.35 TIME: 11:25

WATER TABLE: MEASURING DEVICE: Hydac

PH: 7.05 7.05 TIME: 1125 TYPE: Hydac

PH: 7.05 7.05

CONDUCTIVITY, umhos/cm TIME: 1125 TYPE: Hydac

152 152 TEMPERATURE: 58.2°

152 152 TURBIDITY:

CHEST# C-92 C/SEAL# 110592C-92 BUS BILL# 1065866648

CHEST# C-77 C/SEAL# 110592C77 BUS BILL# 1065866643

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well has no cap, casing is off center from housing - takes slide on cap

no measure mark, uneven cut on casing

1½" PVC dedicated bailer

purge water very muddy - first few gallons - rest clear

weather cloudy and cold, 46°, slight rain - purge day

weather during sampling cold, sunny, 45°, very slight turbidity - no odor

Picture # 10

SAMPLE COLLECTOR: B. Post, J. Hard

005802

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 5 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: C-6 LOCATION:

CSG DIAM 4" CSG TYPE: PVC gray

RISER ELEV. 2 ft

DEPTH TO WATER FROM TOP OF CASING: 22.98 TIME: 1500

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 23.00 TIME: 1000

WATER TABLE: MEASURING DEVICE:

PH: 6.33 6.33 TIME: 1030 TYPE: Hydac

PH: 6.33 6.33

CONDUCTIVITY, umhos/cm TIME: 1030 TYPE: Hydac

1698 1698 TEMPERATURE: 61°

1698 1698 TURBIDITY: slight

CHEST# C-81 C/SEAL# 110692C81 BUS BILL# 1065866703

CHEST# C-74 C/SEAL# 110692C74 BUS BILL# 1065866703

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well had no cap - covered with plastic bag - needs slide on type
first 20 gal purge water extremely muddy - rust colored
cleared up after 50 gal. purged
well casing off center in housing - uneven cut
sample water slightly turbid, lt. amber in color, no odor

weather - purge day - sunny, cold, 48°, sample day sunny cold 46°
Picture #8

SAMPLE COLLECTOR: J. Hand, B. Post

005803

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 5 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: Water

WELL NO: C-8 LOCATION:

CSG DIAM 4" CSG TYPE: PVC

RISER ELEV. 2 ft.

DEPTH TO WATER FROM TOP OF CASING: 19.26 TIME: 1330

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 19.27 TIME: 1415

WATER TABLE: MEASURING DEVICE:

PH: 6.60 6.60 TIME: 1425 TYPE: Hydac

PH: 6.60 6.60

CONDUCTIVITY, umhos/cm TIME: 1425 TYPE: Hydac

6300 6300 TEMPERATURE: 62°

6300 6300 TURBIDITY: clear, colorless

CHEST# C-74 C/SEAL# 110692C74 BUS BILL# 1065866703

CHEST# C-74 C/SEAL# 110692C74 BUS BILL# 1065866703

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Well had no cap - covered with plastic bag, needs slide-on type, lock had rusted - had to be cut off

Purge water very muddy - no odor

sample was clear & colorless - no odor

Weather - day of purge - sunny, cold 45°, sample day - partly cloudy 50°

Picture #12

SAMPLE COLLECTOR: J Hurd, B. Post

005804

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 6 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: 126 LOCATION:

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 30"

DEPTH TO WATER FROM TOP OF CASING: 25.83 TIME: 1345

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 25.78 TIME: 0900

WATER TABLE: MEASURING DEVICE:

PH: 6.18 6.18 TIME: 0900 TYPE: Hydac

PH: 6.18 6.18

CONDUCTIVITY, umhos/cm TIME: 0900 TYPE: Hydac

~~5785~~ 5530 ~~5780~~ 5530 TEMPERATURE: ~~60.8~~° 59.5

~~5780~~ 5530 ~~5780~~ 5530 TURBIDITY: Yes

CHEST# C-95 C/SEAL# B10792C95 BUS BILL# 1065866736
11

CHEST# C-95 C/SEAL# 110792C95 BUS BILL#

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was capped and locked, had 1½" dedicated PVC bailer sample turbid, slightly egg-color -tan- no odor

weather day of purge, cloudy, cool - 50°, sample day Sunny - cold 48°

Picture # 14

SAMPLE COLLECTOR: BPost, J Hord, D. Garnett

005895

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 6 Nov 92

SITE: Burning Grounds TYPE OF SAMPLE: water

WELL NO: MW 11 LOCATION:

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 15"

DEPTH TO WATER FROM TOP OF CASING: 5.50 TIME: 1540

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 5.38 TIME: 0925

WATER TABLE: MEASURING DEVICE:

PH: 4.98 4.98 TIME: 0930 TYPE: Hydac

PH: 4.98 4.98

CONDUCTIVITY, umhos/cm TIME: 0930 TYPE: Hydac

351 351

351 351

TEMPERATURE: 62.9

TURBIDITY: slight

CHEST# C-88 C/SEAL# 110792C88 BUS BILL# 1065866736 11

CHEST# C-95 C/SEAL# 110792C95 BUS BILL#

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Well was capped and locked - good condition

well had 1½" dedicated bailer, well was bailed dry

sample water slightly turbid, no odor

weather day of purge - cloudy, cool, 50°, sample day sunny, cool 48°

Picture # 16

SAMPLE COLLECTOR: B. Post, J. Hand, D. Garrett

005806

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 6 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: 130 LOCATION:

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 30"

DEPTH TO WATER FROM TOP OF CASING: 25.20 BSW TIME: 1500

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 7.33 TIME: 0955

WATER TABLE: MEASURING DEVICE:

PH: 6.38 6.38 TIME: 0955 TYPE: Hydac

PH: 6.38 6.38

CONDUCTIVITY, umhos/cm TIME: 0955 TYPE: Hydac

4760 4760 TEMPERATURE: 63.0°

4760 4760 TURBIDITY: No

CHEST# C-5 C/SEAL# 110792C5 BUS BILL# 1065866736

CHEST# C-95 C/SEAL# 110792C95 BUS BILL# 4

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was capped and locked, had 1½" PVC dedicated bailer

sample water was clear, no odor

weather day of purge cloudy & cool 50°, sample day sunny cold 48°

Picture #15

SAMPLE COLLECTOR: B. Post, J. Hurd, D. Garnett

005807

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 6 Nov 92

SITE: burning grounds TYPE OF SAMPLE: water

WELL NO: C-3 LOCATION:

CSG DIAM 4" CSG TYPE: PVC - gray

RISER ELEV. 2ft

DEPTH TO WATER FROM TOP OF CASING: 23.84 TIME: 0925

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 23.84 TIME: 1330

WATER TABLE: MEASURING DEVICE:

PH: 6.08 6.08 TIME: 1330 TYPE: Hydac

PH: 6.08 6.08

CONDUCTIVITY, umhos/cm TIME: 1330 TYPE: Hydac

1498 1498 TEMPERATURE: 62°

1498 1498 TURBIDITY:

CHEST# C-66 C/SEAL# 110692C66 BUS BILL# 1065866714

CHEST# C-74 C/SEAL# 110692C74 BUS BILL# 1065866703

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well had no cap, casing off center from housing

well was locked, had dedicated 1½" PVC

fast charging well - water ran clear

samplewater slightly turbid & off color - tan - no odor

weather - purgday clear, sunny - cold - 45°, sampleday sunny, cold 50°

Picture # 13

SAMPLE COLLECTOR: B Post, J. Hard

005808

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 9 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: C-2 LOCATION:

CSG DIAM 4" CSG TYPE: PVC gray

RISER ELEV. 1.4 ft

DEPTH TO WATER FROM TOP OF CASING: 4.21 TIME: 1320 / 10 Nov 92

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 4.20 TIME: 0940

WATER TABLE: MEASURING DEVICE:

PH: 6.62 6.62 TIME: 0950 TYPE: Hydac

PH: 6.62 6.62

CONDUCTIVITY, umhos/cm TIME: 0950 TYPE: Hydac

755 755 TEMPERATURE: 63.6

755 755 TURBIDITY: slight

CHEST# C-72 C/SEAL# 111092C-72 BUS BILL# 1065866835

CHEST# C-72 C/SEAL# 111092C72 BUS BILL# 1065866835

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Well casing is broken - diagonal break, casing off-center in housing, film on top of water, no cap sample water slightly turbid, tan in color, no odor

weather - purge day - sunny - cool 70°, sample day - overcast, cool 70°, lt. rain

SAMPLE COLLECTOR: BPost, J. Hand

005809

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 9 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-17 LOCATION:

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 18"

DEPTH TO WATER FROM TOP OF CASING: 7.72 TIME: 1330

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 8.52 TIME: 1045

WATER TABLE: MEASURING DEVICE:

PH: 6.55 6.55 TIME: 1045 TYPE: Hydac

PH: 6.55 6.55

CONDUCTIVITY, umhos/cm TIME: 1045 TYPE: Hydac

1007 1007 TEMPERATURE: 65.0

1007 1007 TURBIDITY: clear

CHEST# C-13 C/SEAL# 111092C13 BUS BILL# 1065866835

CHEST# C-12 C/SEAL# 111092C12 BUS BILL# 1065866835

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well housing was locked, dedicated bailer not attached

slow charging well pumped dry

water sample clear, colorless, no odor

Weather day of purge 70°, partly cloudy, sample day overcast, cool 70°, lt. rain

SAMPLE COLLECTOR:

005810

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 9 Nov 92

SITE: Burning Grounds TYPE OF SAMPLE:

WELL NO: MW-13 LOCATION:

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 14"

DEPTH TO WATER FROM TOP OF CASING: 6.30 TIME: 1340

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 6.31 TIME: 1300

WATER TABLE: MEASURING DEVICE:

PH: 6.94 6.94 TIME: 1300 TYPE: Hydac

PH: 6.94 6.94

CONDUCTIVITY, umhos/cm TIME: 1300 TYPE: Hydac

534 534 TEMPERATURE: 65.5

534 534 TURBIDITY: clear

CHEST# C-80 C/SEAL# 111092C-80 BUS BILL# 1065866846

CHEST# C-72 C/SEAL# 111092C72 BUS BILL# 1065866835

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Well had dedicated bailer attached, well was locked
housing was filled with water
Samplewas clear and colorless, no odor
Sample bailer had rust colored scum on it

weather day of purge 70° partly cloudy, sample day overcast, cool 70°, lt rain

SAMPLE COLLECTOR: B. Post, J. Ford

005811

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 10 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-16 LOCATION:

CSG DIAM 4" CSG TYPE: Stainless steel

RISER ELEV. 1.8 ft

DEPTH TO WATER FROM TOP OF CASING: 3.50 TIME: 1145

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 3.41 TIME: 0915

WATER TABLE: MEASURING DEVICE:

PH: 6.71 6.71 TIME: 0915 TYPE: Hydac

PH: 6.71 6.71

CONDUCTIVITY, umhos/cm TIME: 0915 TYPE: Hydac

660 660 TEMPERATURE: 65.9

660 660 TURBIDITY: slight

CHEST# C-83 C/SEAL# 111192C83 BUS BILL# 1065866880

CHEST# C-99 C/SEAL# 111192C-99 BUS BILL# 1065866890

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Well was locked and had dedicated well wizard,
top of housing and cap of casing very rusty
Purge line was broken, purge water taken from sample line
Well is reported to often be underwater, with heavy rain showers, fire ants reside in well
Sample slightly turbid - off color - tan, no odor - sample taken
with well wizard

weather day of purge - cool 60, overcast - rain, Sample day - cloudy - drizzle, 65°

SAMPLE COLLECTOR: B. Post, J. Heard, D. Garnett

005812

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 10 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-10 LOCATION:

CSG DIAM 4" CSG TYPE: S.S.

RISER ELEV. 2 ft

DEPTH TO WATER FROM TOP OF CASING: 9.32 TIME: 1130

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 6.24 TIME: 0940

WATER TABLE: MEASURING DEVICE:

PH: 6.80 6.80 TIME: 0940 TYPE: Hydac

PH: 6.80 6.80

CONDUCTIVITY, umhos/cm TIME: 0940 TYPE: Hydac

893 893 TEMPERATURE: 65.6

893 893 TURBIDITY: slight

CHEST# C-99 C/SEAL# 111192c93 BUS BILL# 1065866890

CHEST# C-99 C/SEAL# 111192c99 BUS BILL# 1065866890

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well had 4" Stainless Steel well wizard, total depth measured to top of well wizard

well pumped dry - slow charge

Sample slightly turbid, lt amber in color, no odor, sample taken with well wizard - Sample water cleared in color and turbidity midway through sampling - volatiles and metals taken first

weather day of purge - cool 55° overcast - rain, Sample day - cool 65° cloudy - drizzle

SAMPLE COLLECTOR: B. Post, J Hand, D. Garnett

005813

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 10 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-13 LOCATION:

CSG DIAM 4" CSG TYPE: PVC

RISER ELEV. 1.8 ft

DEPTH TO WATER FROM TOP OF CASING: 4.78 TIME: 1300

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 4.73 TIME: 10??

WATER TABLE: MEASURING DEVICE:

PH: 7.01 7.01 TIME: 1000 TYPE: Hydac

PH: 7.01 7.01

CONDUCTIVITY, umhos/cm TIME: 1000 TYPE: Hydac

924 924 TEMPERATURE: 65.4

924 924 TURBIDITY: Yes

CHEST# C-46 C/SEAL# 111192C-46 BUS BILL# 106586689O

CHEST# C-99 C/SEAL# 111192C-99 BUS BILL# 106586689O

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well had 4" Stainless Steel well wizard, total depth measured to top of well wizard, well was locked caps were missing off well wizard

water sample turbid, amber in color, no odor - Sample cleared somewhat during sampling - volatiles and nitrates - first samples taken - samples taken with well wizard

weather day of purge - overcast, cool 65°, rain, sample day cool 65° - drizzle

SAMPLE COLLECTOR: D. Garnett, J. Hurd, B Post

005814

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 10 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-8 LOCATION:

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 15"

DEPTH TO WATER FROM TOP OF CASING: 12.11 TIME: 1450

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 12.18 TIME: 1035

WATER TABLE: MEASURING DEVICE:

PH: 6.10 6.10 TIME: 1040 TYPE: Hydac

PH: 6.10 6.10

CONDUCTIVITY, umhos/cm TIME: 1040 TYPE: Hydac

768 768 TEMPERATURE: 66.6

768 768 TURBIDITY: clear

CHEST# C-55 C/SEAL# 111192c55 BUS BILL# 106586 6901

CHEST# C-79 C/SEAL# 111192c79 BUS BILL# 106586 6880

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well had dedicated well wizard - looked new, clean with all parts attached, well was locked

well pumped dry

sample clear, colorless, no odor, sample taken by well wizard

weather day of purge - cool 60° - rain, sample day cool, cloudy, Hdrizzle 65°

SAMPLE COLLECTOR: B. Post, J. Hord, D. Garnett

005815

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 10 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-19 LOCATION: _____

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 18"

DEPTH TO WATER FROM TOP OF CASING: 5.92 TIME: 1330

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 6.24 TIME: 1115

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 7.42 7.42 TIME: 1115 TYPE: Hydac

PH: 7.42 7.42

CONDUCTIVITY, umhos/cm TIME: 1115 TYPE: Hydac

9110 9110 TEMPERATURE: 66.6

9110 9110 TURBIDITY: very slight

CHEST# C-63 C/SEAL# 111192C62 BUS BILL# 1065866901

CHEST# C-79 C/SEAL# 111192C79 BUS BILL# 1065866880

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well had no lock, hinge on housing broken

well has stainless steel dedicated bailer

well purged dry

sample slightly turbid and off color - tan

weather day of purge, cloudy, cool 65°, lt. rain, sample day - cool 65° - lt rain

SAMPLE COLLECTOR: B. Post, J. Hood, D. Gravett

005818

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-7 LOCATION:

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 2 ft

DEPTH TO WATER FROM TOP OF CASING: 13.74 TIME: 1320

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 13.76 TIME: 0845

WATER TABLE: MEASURING DEVICE:

PH: 10.02 10.02 TIME: 0850 TYPE: Hydac

PH: 10.02 10.02

CONDUCTIVITY, umhos/cm TIME: 0850 TYPE: Hydac

1670 1670 TEMPERATURE: 63.0°

1670 1670 TURBIDITY: clear

CHEST# C-14 C/SEAL# 111292C14 BUS BILL# 1016586698 9
"

CHEST# C-96 C/SEAL# 111292C96 BUS BILL#

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and had a dedicated well wizard

well was purged dry

Sample was taken with dedicated well wizard,

Sample was clear, colorless, no odor during entire sampling time

weather: day of purge - cloudy, cool 70°, rain, sample day clear, sunny, cool - 60°

SAMPLE COLLECTOR: B. Post, D. Garnett, J. Hurd

005817

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-11-92

SITE: Burning Grounds TYPE OF SAMPLE:

WELL NO: MW-9 LOCATION:

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 2 ft 2.26

DEPTH TO WATER FROM TOP OF CASING: 7.78 TIME: 1400

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 9.85 TIME: 0905

WATER TABLE: MEASURING DEVICE:

PH: ~~11.0~~ 5.35 ~~11.0~~ 5.35 TIME: 0930 TYPE: Hydac

PH: ~~11.0~~ 5.35 ~~11.0~~ 5.35

CONDUCTIVITY, umhos/cm TIME: TYPE: Hydac

120 120 TEMPERATURE: 63.3

120 120 TURBIDITY: slight

CHEST# C-18 C/SEAL# 111292C18 BUS BILL# 1065866989

CHEST# C-96 C/SEAL# 111292-C92 BUS BILL#

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well had dedicated well wizard

well was purged dry

sample was taken with dedicated well wizard,

sample was colorless, slightly turbid, no odor

weather: dry, purge, ca. 70 rain, sample day clear, sunny 60°

SAMPLE COLLECTOR: B Post, J Hord, D Garrett

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11 Nov 2

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-20 LOCATION:

CSG DIAM 4" CSG TYPE: Stainless

RISER ELEV. 2 ft

DEPTH TO WATER FROM TOP OF CASING: 11.48 TIME: 1435

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 11.3 TIME: 0940

WATER TABLE: MEASURING DEVICE:

PH: 7.12 7.12 TIME: 0940 TYPE: Hydac

PH: 7.12 7.12

CONDUCTIVITY, umhos/cm TIME: 0940 TYPE: Hydac

204 204 TEMPERATURE: 61.5

204 204 TURBIDITY: yes

CHEST# C-96 C/SEAL# 111292C96 BUS BILL# 1Dc5866989

CHEST# C-96 C/SEAL# 111292C96 BUS BILL# "

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was capped and locked, housing was filled with water

well had stainless steel dedicated bailer

Well was purged dry

sample was turbid, whitish in color, no odor

sample taken with disposable bailer

~~weather day of purge, cool 70°, lt rain, sample day - partly cloudy, cool - 60°~~

SAMPLE COLLECTOR: B Post, J Hand, D Garnett

005819

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 12 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: 102 LOCATION: Inside burning ground.

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 2.5 ft

DEPTH TO WATER FROM TOP OF CASING: 19.80 TIME: 1100

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 18.39 TIME: 0830

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 7.28 7.22 TIME: 0835 TYPE: Hydac

PH: 7.20 7.18

CONDUCTIVITY, umhos/cm TIME: 0835 TYPE: Hydac

62.7 62.7 TEMPERATURE: 61.2

62.7 62.7 TURBIDITY: slight

CHEST# C-73 C/SEAL# 111392C73 BUS BILL# 1065867033 4

CHEST# C-86 C/SEAL# 111392C86 BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked, housing rusted, well has 2" dedicated bailer

well was purged until dry, soft clay at well bottom

rain event night before.

Sample slightly turbid, whitish-tan in color, no odor

weather - purge day - partly cloudy, windy & cold 55°, sample day sunny & cold 40°

SAMPLE COLLECTOR: D. Garrett, J Hard, B. Post

005820

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 12 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-21 LOCATION: inside buring grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 3 ft

DEPTH TO WATER FROM TOP OF CASING: 24.54 TIME: 1035

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 24.50 TIME: 0905

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 5.52 5.52 TIME: 0905 TYPE: Hydac

PH: 5.46 5.46

CONDUCTIVITY, umhos/cm TIME: 0905 TYPE: Hydac

4560 4560 TEMPERATURE: 60.8

4560 4560 TURBIDITY: _____

CHEST# C-12 C/SEAL# 111392C-12 BUS BILL# 1065867027

CHEST# C-12 C/SEAL# 111392C12 BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and capped, had 4" stainless steel casing

well had 2" dedicated stainless steel bailer

slow charging well

rain event night before

sample clear, colorless, no odor, sample became turbid

midway through sampling

weather - purge day - partly cloudy, windy, cold - 55°, sample day sunny, cold 45°

SAMPLE COLLECTOR: B. Post, J. Hand, P. Garnett

005821

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 12 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-21 LOCATION: inside buring grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 3 ft

DEPTH TO WATER FROM TOP OF CASING: 24.54 TIME: 1035

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 24.50 TIME: 0905

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 5.52 5.52 TIME: 0905 TYPE: Hydac

PH: 5.46 5.46

CONDUCTIVITY, umhos/cm TIME: 0905 TYPE: Hydac

4560 4560 TEMPERATURE: 60.8

4560 4560 TURBIDITY: _____

CHEST# C-12 C/SEAL# 111392C-12 BUS BILL# 1065867027

CHEST# C-12 C/SEAL# 111392C12 BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and capped, had 4" stainless steel casing

well had 2" dedicated stainless steel bailer

slow charging well

rain event night before

sample clear, colorless, no odor, sample became turbid

midway through sampling

weather - purge day - partly cloudy, windy, cold - 55°, sample day, sunny, cold 45°

SAMPLE COLLECTOR: B Post, J Hand, D Garnett

005822

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 12 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: 109 LOCATION:

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 32"

DEPTH TO WATER FROM TOP OF CASING: 22.47 TIME: 1135

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 22.50 TIME: 0930

WATER TABLE: MEASURING DEVICE:

PH: 6.44 6.44 TIME: 0930 TYPE: Hydac

PH: 6.44 6.45

CONDUCTIVITY, umhos/cm TIME: 0930 TYPE: Hydac

3700 3700 TEMPERATURE: 61.8

3700 3700 TURBIDITY: slight

CHEST# C-11 C/SEAL# 111392C11 BUS BILL# 1065867027 U

CHEST# C-12 C/SEAL# 111392C12 BUS BILL#

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Rusty housing was locked, dedicated 2" PVC bailer was fished out by Donnie

Rained the night before, area around well very wet - soggy

slow charging well

Sample colorless, very slightly turbid, became more turbid midway through sampling

weather day of purge partly cloudy, windy - cold 55°, sample day sunny, cold 50°

SAMPLE COLLECTOR: B. Post, D. Garnett, J. Hard

005823

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 12 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-3 LOCATION: inside burning grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 29"

DEPTH TO WATER FROM TOP OF CASING: 23.26 TIME: 1405

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 23.34 TIME: 1515

WATER TABLE: MEASURING DEVICE:

PH: 6.28 6.28 TIME: 1515 TYPE: Hydac

PH: 6.30 6.30

CONDUCTIVITY, umhos/cm TIME: 1515 TYPE: Hydac

1870 1870 TEMPERATURE: 66.2

1870 1870 TURBIDITY: clear

CHEST# C-8 C/SEAL# 111392 C 8 BUS BILL# 1065867022

CHEST# C-86 C/SEAL# 111392 C 86 BUS BILL# 1065867033

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and had a dedicated well wizard

sample was clear, colorless, no odor - water remained clear through out sampling

weather day of purge - partly cloudy, windy, cold - 55°, sample day sunny, cool 55°

SAMPLE COLLECTOR: B. Post, J Hord, D Garnett

005824

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 12 Nov 92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-4 LOCATION: inside burning grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 18"

DEPTH TO WATER FROM TOP OF CASING: 23.29 TIME: 1510

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 23.39 TIME: 1450

WATER TABLE: MEASURING DEVICE:

PH: 7.01 7.02 TIME: 1450 TYPE: Hydac

PH: 7.03 7.03

CONDUCTIVITY, umhos/cm TIME: 1450 TYPE: Hydac

3170 3170 TEMPERATURE: 67.7

3170 3170 TURBIDITY: clear

CHEST# C-86 C/SEAL# 111392C-86 BUS BILL# 116586703

CHEST# C-86 C/SEAL# 111392C86 BUS BILL# "

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and had a dedicated well wizard

well was purged dry

Sample was clear, colorless, no odor - water remained clear throughout sampling

weather - day of purge - partly cloudy, windy, cold -55°, sample day sunny, cool -50°

SAMPLE COLLECTOR: B. Post, J. Hand, D. Garnett

005825

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 13 Nov 92

SITE: Burning Grounds TYPE OF SAMPLE: water

WELL NO: 124 LOCATION: inside burning grounds

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 32" (housing)

DEPTH TO WATER FROM TOP OF CASING: 7.40 TIME: 1005

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 5.12 TIME: 0900

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 6.60 6.59 TIME: 0900 TYPE: Hydac

PH: 6.59 6.58

CONDUCTIVITY, umhos/cm TIME: 0900 TYPE: Hydac

69.7 69.7 TEMPERATURE: 60.4

69.7 69.7 TURBIDITY: turbid

CHEST# C-76 C/SEAL# 111492C76 BUS BILL# 1065867055

CHEST# C-65 C/SEAL# 111492C65 BUS BILL# 1065867055

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Rusted housing was locked, well had 2" dedicated PVC bailer

Wasps have made home in housing - were killed with wasp spray

sample was very turbid and off-color - tan, no odor

weather purge day - sunny, cold - 56°, sample day - sunny, cold 45°

SAMPLE COLLECTOR: B. Post, J. Hurd, D. Garrett

005826

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-13-92

SITE: Burning grounds TYPE OF SAMPLE: Water

WELL NO: MW-6 LOCATION: inside burning grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 22

DEPTH TO WATER FROM TOP OF CASING: 19.78 TIME: 1010

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 19.78 TIME: 0920

WATER TABLE: MEASURING DEVICE:

PH: 6.38 6.38 TIME: 0920 TYPE: Hydac

PH: 6.40 6.40

CONDUCTIVITY, umhos/cm TIME: 0920 TYPE: Hydac

1600 1600 TEMPERATURE: 61.9

1600 1600 TURBIDITY: clear

CHEST# C-65 C/SEAL# 111492C65 BUS BILL# 1065867055

CHEST# C-65 C/SEAL# 111492C65 BUS BILL# 1065867055

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and had a dedicated well wizard

well was purged dry

sample was clear and colorless, no odor - sample remained clear through out sampling

weather purge day, sunny, cold - 55°, sample day - sunny, cold - 45°

SAMPLE COLLECTOR: B. Post, D. Garrett, J Hood

005827

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-13-92

SITE: Burning grounds TYPE OF SAMPLE: water

WELL NO: MW-5 LOCATION: inside burning grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 21"

DEPTH TO WATER FROM TOP OF CASING: 22.40 TIME: 1120

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 2240 TIME: 0940

WATER TABLE: MEASURING DEVICE:

PH: 6.00 6.00 TIME: 0940 TYPE: Hydac

PH: 5.98 5.97

CONDUCTIVITY, umhos/cm TIME: 0940 TYPE: Hydac

1358 1358 TEMPERATURE: 64.0°

1358 1358 TURBIDITY: clear

CHEST# C-68 C/SEAL# 111492C68 BUS BILL# 1065867055

CHEST# C-65 C/SEAL# 111492C65 BUS BILL# 1065867055

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and had a dedicated well wizard

fast charging well

sample clear, colorless - no odor - sample remained clear

through out sampling

weather - purge day - clear, sunny, cold 55°, sample day clear, sunny, cold - 45°

SAMPLE COLLECTOR: B. Post, J. Hord, D. Garnett

005828

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-16-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: MW-12 LOCATION: Inside Burning ground

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 19"

DEPTH TO WATER FROM TOP OF CASING: 6.35 TIME: 1340

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 6.34 TIME: 0820

WATER TABLE: MEASURING DEVICE:

PH: 3.92 3.92 TIME: 0820 TYPE: Hydac

PH: 3.92 3.92

CONDUCTIVITY, umhos/cm TIME: 0820 TYPE: Hydac

1527 1527 TEMPERATURE: 62.9°

1527 1527 TURBIDITY: No

CHEST# C-63 C/SEAL# 111792C63 BUS BILL# 1065867143

CHEST# C14 C/SEAL# 111792C74 BUS BILL# 1065867132

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and had a dedicated well wizard, water turbid, fast charging well sample day - clear through out sampling - No odor

PICTURE WAS TAKEN

weather purge day - sunny 72° sample day - Sunny 50° - cold

SAMPLE COLLECTOR: J. H. D. G.

005829

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-16-92

SITE: Burning Grounds TYPE OF SAMPLE: WATER

WELL NO: MW-14 LOCATION: inside burning grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 24"

DEPTH TO WATER FROM TOP OF CASING: 10.55' TIME: 1220

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 10.52 TIME: 0845

WATER TABLE: MEASURING DEVICE:

PH: 3.17 3.17 TIME: 0845 TYPE: Hydac

PH: 3.17 3.17

CONDUCTIVITY, umhos/cm TIME: 0845 TYPE: Hydac

1223 1223 TEMPERATURE: 67.2°

1223 1223 TURBIDITY: yes

CHEST# C-74 C/SEAL# 111792C74 BUS BILL# 1065867132

CHEST# C-74 C/SEAL# 111792C74 BUS BILL# 1065867132

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and had a dedicated well wizard
water was turbid & red brown - well was very fast charger
Sample day - water turbid - slighty brown - no odor

picture was taken

weather purge day sunny 72° - Sample day - sunny 50°

SAMPLE COLLECTOR: JH, DG.

005830

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-16-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: 129 LOCATION: Inside Burning Grounds

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 2' 11" (35" housing)

DEPTH TO WATER FROM TOP OF CASING: 21.50 TIME: 1255

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 21.47 TIME: 1135

WATER TABLE: MEASURING DEVICE:

PH: 5.88 5.88 TIME: 11:35 TYPE: HydAC

PH: 5.88 5.88

CONDUCTIVITY, umhos/cm TIME: 11:35 TYPE: HydAC

340.0 341.0 TEMPERATURE: 69.9

340.0 340.0 TURBIDITY: YES

CHEST# C-79 C/SEAL# 111792C79 BUS BILL# 1065867143

CHEST# C-74 C/SEAL# 111792C74 BUS BILL# 1065867132

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Rusted housing was locked, well had 2" dedicated PVC bailer, WASPS have made home in housing - were killed with wasp spray - Good charging well Sample day - clear w/particles in vials - no odor During sampling water was bubbly

Weather - purge day 72° sunny, sample day - 72° sunny

SAMPLE COLLECTOR: J. H., DG.

Prepurge Free Phase

005831

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-11-92

SITE: Burning Grounds TYPE OF SAMPLE:

WELL NO: 120 LOCATION: Inside Burning Ground

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 32" (Housing) 300

Free Phase DEPTH TO WATER FROM TOP OF CASING: 26.63 / TIME: 0920

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: TIME:

WATER TABLE: MEASURING DEVICE:

PH: 4.87 4.87 TIME: 0920 TYPE: Hydac

PH: 4.87 4.86

CONDUCTIVITY, umhos/cm TIME: 0920 TYPE: Hydac

7780 7780 TEMPERATURE: 68°

7780 7780 TURBIDITY: Yes

CHEST# C-74 C/SEAL# 111792C74 BUS BILL# ~~1065867198~~ 1065867132

CHEST# C/SEAL# BUS BILL#

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Pre Purge - water turbid w/ sand

Weather pre free phase - 60° sunny

SAMPLE COLLECTOR: J. David D. Barnett

RE Sampling
FREE PHASE

005832

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: 120 LOCATION: INSIDE Burning Grounds

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 32" (Housing)

DEPTH TO WATER FROM TOP OF CASING: _____ TIME: _____

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 10.74 TIME: 0800

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 5.32 5.31 TIME: 0800 TYPE: Hydac

PH: 5.32 5.33

CONDUCTIVITY, umhos/cm TIME: 0800 TYPE: Hydac

8370 8380 TEMPERATURE: 66.4

8370 8390 TURBIDITY: yes

CHEST# C-29 C/SEAL# 111892C89 BUS BILL# 065867198

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Turbid with brown sand

Cloudy & Foggy - 55°

No odor

SAMPLE COLLECTOR: J. Hall, D. Barnett

005833

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: water

WELL NO: 120 LOCATION: Inside Burning Grounds

CSG DIAM 2" CSG TYPE: PVC

RISER ELEV. 32" (housing)

DEPTH TO WATER FROM TOP OF CASING: 10.50 TIME: 0920

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 10.74 TIME: 0800

WATER TABLE: MEASURING DEVICE:

PH: 5.32 5.31 TIME: 0800 TYPE: Hydac

PH: 5.32 5.33

CONDUCTIVITY, umhos/cm TIME: 0800 TYPE: Hydac

8370 8380 TEMPERATURE: 66.4

8370 8390 TURBIDITY: yes

CHEST# C-89 C/SEAL# 111892C89 BUS BILL# 1065867198

CHEST# C-89 C/SEAL# 111892C89 BUS BILL# 1065867198

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Rusted Housing was locked, well had 2" dedicated PVC Bailer - Turbid Water - Slow charging well - Dry sample day - Turbid Water - Lt Brown - No odor

picture was taken

Weather Purge Day - Sunny 60° Sample day - 55° cloudy & Foggy

SAMPLE COLLECTOR: J. Hall, D. Garnett

005834

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: MW-15 LOCATION: Inside Burning Grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 19"

DEPTH TO WATER FROM TOP OF CASING: 24.75 TIME: 1030

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 24.71 TIME: 0905

WATER TABLE: MEASURING DEVICE:

PH: 6.08 6.07 TIME: 0905 TYPE: Hydac

PH: 6.07 6.07

CONDUCTIVITY, umhos/cm TIME: 0905 TYPE: Hydac

537 537 TEMPERATURE: 64.2

537 537 TURBIDITY: Yes

CHEST# C-81 C/SEAL# 111892C81 BUS BILL# 1065867198

CHEST# C-89 C/SEAL# 111892C89 BUS BILL# 1065867198

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Well Wizard locked - well was dark brown
moderate charging - (consistant)
Sample was LT Brown - Turbid throughout
sampling - No Odor

Picture taken

Weather Purge Day - Sunny 65° Weather Sample Day - 55° Foggy + Overcas

SAMPLE COLLECTOR: J. Hawk D. Dawett

tre Purge - Free Phase --

005835

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: MW-1 LOCATION: Inside Burning Ground

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 17 1/2 (Housing)

DEPTH TO WATER FROM TOP OF CASING: 23.51 TIME: 1220

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: _____ TIME: _____

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 5.61 5.61 TIME: 1220 TYPE: Hydac

PH: 5.61 5.61

CONDUCTIVITY, umhos/cm TIME: 1220 TYPE: Hydac

4850 4850 TEMPERATURE: 69.1

4850 4850 TURBIDITY: No

CHEST# C-89 C/SEAL# 111892C89 BUS BILL# 1065867198

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

No Odor. Well Wizard - Locked Well
Used Well wizard to take sample off
the bottom.

WEATHER PURGE DAY - 62° Overcast

SAMPLE COLLECTOR: J. Haul, D. Darnett

Pre Sample FREE Phase

005836

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: WATER

WELL NO: MW-1 LOCATION: Inside burning grounds

CSG DIAM 4" CSG TYPE: STAINLESS STEEL

RISER ELEV. 17½

DEPTH TO WATER FROM TOP OF CASING: _____ TIME: _____

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 23.60 TIME: 0900

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 6.26 6.25 TIME: 0900 TYPE: Hydac

PH: 6.25 6.24

CONDUCTIVITY, umhos/cm TIME: 0900 TYPE: Hydac

4360 4360 TEMPERATURE: 6.73

4360 4360 TURBIDITY: NO with slight odor

CHEST# C-61 C/SEAL# 111892C61 BUS BILL# 1065867275

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

clear water with slight odor

used well wizard

Weather sample day - 60° - Cloudy

SAMPLE COLLECTOR: J. Hand, D. Daniett

005837

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: MW-1 LOCATION: Inside Burning Grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 17 1/2

DEPTH TO WATER FROM TOP OF CASING: 23.51 TIME: 1220

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 23.60 TIME: 0900

WATER TABLE: MEASURING DEVICE:

PH: 6.26 6.25 TIME: 0900 TYPE: Hydac

PH: 6.25 6.24

CONDUCTIVITY, umhos/cm TIME: 0900 TYPE: Hydac

4360 4360 TEMPERATURE: 67.3

4360 4360 TURBIDITY: NO - SLIGHT ODOR

CHEST# C-99 C/SEAL# 111892C99 BUS BILL# 106586 7264

CHEST# C-61 C/SEAL# 111892C61 BUS BILL# 106586 7275

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

well was locked and had a dedicated well head cover hinge is broke - NO odor pretty clear

Sample day - Clear in color with slight odor

Picture was Taken

Weather Purge Day - 62° cloudy - Overcast - Purge Day - 60° Cloudy

SAMPLE COLLECTOR: J. Hand D. Barnett

Pre Purge - Free Phase

005838

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: MW2 LOCATION: Inside Burning Grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 20'12 (Housing)

DEPTH TO WATER FROM TOP OF CASING: 21.75 TIME: 0930

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: _____ TIME: _____

WATER TABLE: _____ MEASURING DEVICE: well wiz

PH: 6.24 6.24 TIME: 0930 TYPE: Hydac

PH: 6.24 6.24

CONDUCTIVITY, umhos/cm TIME: 0930 TYPE: Hydac

2760 2750 TEMPERATURE: 65.2

2760 2750 TURBIDITY: No

CHEST# C-89 C/SEAL# 111892 C89 BUS BILL# 106586 7198

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

No odor - Clear water

used well wizard to take water

sample off bottom.

Weather - 55° cloudy & Foggy - cool

SAMPLE COLLECTOR: J. Hard, D. Garnett

Pre Sample Free Phase

005839

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: WATER

WELL NO: MW2 LOCATION: Inside Burning Ground

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 20½

DEPTH TO WATER FROM TOP OF CASING: _____ TIME: _____

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 21.74 TIME: 0815

WATER TABLE: _____ MEASURING DEVICE: well wiz

PH: 6.50 6.50 TIME: 0815 TYPE: Hydac

PH: 6.50 6.50

CONDUCTIVITY, umhos/cm TIME: 0815 TYPE: Hydac

2840 2830 TEMPERATURE: 65.7

2840 2840 TURBIDITY: ND

CHEST# C-61 C/SEAL# 111992C61 BUS BILL# 106586727 5

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Strong solvent odor with sudsy bubbles

Weather Sample Day - 60° overcast

SAMPLE COLLECTOR: J Hall D. Garnett

005840

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: MW-2 LOCATION: Inside Burning Grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 20'½" (Housing)

DEPTH TO WATER FROM TOP OF CASING: 21.75 TIME: 0940

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 21.74 TIME: 0815

WATER TABLE: MEASURING DEVICE: Well Wiz

PH: 6.50 6.50 TIME: 0815 TYPE: Hydac

PH: 6.50 6.50

CONDUCTIVITY, umhos/cm TIME: 0815 TYPE: Hydac

2840 2830 TEMPERATURE: 65.7

2840 2840 TURBIDITY: No Odor: Yes (Strong

CHEST# C-99 C/SEAL# 111992C99 BUS BILL# 1C6586726 4

CHEST# C-61 C/SEAL# 111992C61 BUS BILL# 1065867295

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Well was locked and had a dedicated well wizard
Slow Charging well - clear · NO ODOR - with bubble
Sample was clear with strong solvent odor
with sudsy bubbles

Picture was taken overcast

Weather Purge Day - 55° Cloudy & Foggy - cool - Sample Day - 60°

SAMPLE COLLECTOR: J Hand, D. Barnett

QA - C70
QC - C99

Pre Purge - Free Phase

005841

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-18-92

SITE: ~~Burning Grounds~~ #3 TYPE OF SAMPLE: Water

WELL NO: MW22 LOCATION: INSIDE BURNING GROUNDS

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 26"

DEPTH TO WATER FROM TOP OF CASING: 22.55 TIME: 1330

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: _____ TIME: _____

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 940 940 TIME: _____ TYPE: Hydac

PH: 940 940

CONDUCTIVITY, umhos/cm TIME: _____ TYPE: _____

3020 3020 TEMPERATURE: 69.7

3020 3020 TURBIDITY: yes

CHEST# C-61 C/SEAL# 11189261 BUS BILL# 1016586727 5

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Reg well - used discrete sampler to take samples. Slow well purging - Nodor

Weather purge day - 68° OVERCAST - no wind

SAMPLE COLLECTOR: J. Hand, D. Garnett

FREE PHASE

005812

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-19-92

SITE: Burning ground TYPE OF SAMPLE: WATER

WELL NO: MW-22 LOCATION: Inside Burning Ground

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 26"

DEPTH TO WATER FROM TOP OF CASING: _____ TIME: _____

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 29.16 TIME: Hydac

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 7.59 7.59 TIME: _____ TYPE: _____

PH: 7.59 7.59

CONDUCTIVITY, umhos/cm TIME: 0830 TYPE: Hydac

3040 3040 TEMPERATURE: 65.5

3040 3040 TURBIDITY: No

CHEST# C-64 C/SEAL# 111992C64 BUS BILL# ~~106586TZ97~~

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Clear water, no odor

Weather sample day: raining 65°

SAMPLE COLLECTOR: J. Ward, D. Darnett

005843

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-19-92

SITE: Burning Grounds TYPE OF SAMPLE: WATER

WELL NO: MW-22 LOCATION: Inside Burning Grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 20"

DEPTH TO WATER FROM TOP OF CASING: 22.55 TIME: 1330

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 29.16 TIME: 11-19-92 0905

WATER TABLE: MEASURING DEVICE:

PH: 7.59 7.59 TIME: 0830 TYPE: Hydac

PH: 7.59 7.59

CONDUCTIVITY, umhos/cm TIME: 0830 TYPE: Hydac

3040 3040 TEMPERATURE: 65.5

3040 3040 TURBIDITY: NO

CHEST# C-64 C/SEAL# 111992C64 BUS BILL#

CHEST# C-64 C/SEAL# 111992C64 BUS BILL#

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Used our well Wizard - well locked

No smell or odor

Clear water no odor

PICTURE TAKEN

Weather Purge Day - 68° overcast - No Wind Sample Day - raining 65°

SAMPLE COLLECTOR: J. Hand D. Garnett

005844

Pre Purge Free Phase

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-19-92

SITE: ~~Burning Ground~~ #3 TYPE OF SAMPLE: Water

WELL NO: MW23 LOCATION: Inside Burning Ground

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 29"

DEPTH TO WATER FROM TOP OF CASING: 23.32 TIME: 1010

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: _____ TIME: _____

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 8.89 8.90 TIME: 1010 TYPE: Hydac

PH: 8.90 8.90

CONDUCTIVITY, umhos/cm TIME: _____ TYPE: _____

1646 1646 TEMPERATURE: 67.6

1646 1646 TURBIDITY: yes slightly

CHEST# C-61 C/SEAL# 111892C61 BUS BILL# 176 5867275

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Stainless Steel case - well locked

water was slightly brown - turbid

Weather 62° cloudy overcast

SAMPLE COLLECTOR: J Hard D. Barnett

FREE Phase

005845

WATER SAMPLES FIELD DATA FORM

PROJECT: LH AAP DATE: 11-20-92

SITE: Burning Ground TYPE OF SAMPLE: WATER

WELL NO: MW-23 LOCATION: Inside Burning Ground

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 29"

DEPTH TO WATER FROM TOP OF CASING: _____ TIME: _____

RATE OF RECHARGE: _____

DEPTH TO WATER AT TIME OF SAMPLING: 23.94 TIME: _____

WATER TABLE: _____ MEASURING DEVICE: _____

PH: 7.29 7.28 TIME: 0830 TYPE: Hydac

PH: 7.28 7.28

CONDUCTIVITY, umhos/cm TIME: 0830 TYPE: Hydac

1650 1650 TEMPERATURE: 64.5

1650 1650 TURBIDITY: yes

CHEST# C-64 C/SEAL# 11992C64 BUS BILL# 1065867297

CHEST# _____ C/SEAL# _____ BUS BILL# _____

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

First discrete sample was clear

2nd & 3rd was Turbid.

No odor

Weather sample day - 65° - Raining

SAMPLE COLLECTOR: J. Hall, D. Barnett

005845

WATER SAMPLES FIELD DATA FORM

PROJECT: LHAAP DATE: 11-19-92

SITE: Burning Grounds TYPE OF SAMPLE: Water

WELL NO: MW-23 LOCATION: Inside Burning Grounds

CSG DIAM 4" CSG TYPE: Stainless Steel

RISER ELEV. 29"

DEPTH TO WATER FROM TOP OF CASING: 23.32 TIME: 1010

RATE OF RECHARGE:

DEPTH TO WATER AT TIME OF SAMPLING: 23.94 TIME: 11-19-92 0830

WATER TABLE: MEASURING DEVICE:

PH: 729 728 TIME: 0830 TYPE: Hydac

PH: 728 728

CONDUCTIVITY, umhos/cm TIME: 0830 TYPE: Hydac

1650 1650 TEMPERATURE: 64.5

1650 1650 TURBIDITY: yes

CHEST# C-55 C/SEAL# 111992C55 BUS BILL# 1065867297

CHEST# C-64 C/SEAL# 111992C64 BUS BILL# 1065867297

NOTES CONCERNING CONDITION OF WELL, ODOR, COLOR, AND PROBLEMS

Reg. well - used our well wizard to purge

No smell or odor - slow charging well

No oda or smell - turbid

PICTURE TAKEN

Weather Purge day - 62° - cloudy - overcast - Weather sample - 65° raining

SAMPLE COLLECTOR: J Hall D. Barnett

APPENDIX 4-B
GROUNDWATER SAMPLING QA/QC REPORT

005848

SOUTHWESTERN DIVISION LABORATORY, CORPS OF ENGINEERS
4815 Cass Street
Dallas, Texas 75235

SUBMITTAL OF SWDED-GL REPORT 15704-1

PROJECT: LONGHORN AAP Feature: LHAAP 18 AND 24	Contract No.
TEST REQUEST NO.: MIL 93-10 Dated: 16 NOVEMBER 1992 Received: 23 NOVEMBER 1992	From: CHIEF, GEOTECHNICAL BRANCH

MATERIAL: 41 Ground Water Field Samples, 5 Quality Control Duplicates, 5 Quality Assurance Duplicates, 14 Travel Blanks, 3 Equipment Blanks, 10 Free Phase Samples for VOAs, One Quality Control Duplicate Free Phase Sample and One Quality Assurance Free Phase Sample

Remarks:

Report sent to: FORT WORTH DISTRICT	Copy furnished:

Date: JAN 28 1993	Name and title: WILLIAM R. TANNER Director SWD Laboratory	Signature William R. Tanner

005849

SOUTHWESTERN DIVISION LABORATORY, CORPS OF ENGINEERS
4815 Cass Street
Dallas, Texas 75235

SUBMITTAL OF SWDED-GL REPORT 15704-1

PROJECT: LONGHORN AAP FEATURE: LHAAP 18 AND 24	Report submitted for payment FEB 1993
TEST REQUEST NO: MIL 93-10 Dated: 16 NOVEMBER 1992 Received: 23 NOVEMBER 1992	COST CODE

	COST
QUALITY ASSURANCE REPORT	$ 3,750.00
BALANCE DUE THIS REPORT	$ 3,750.00
TOTAL AMOUNT BILLED TO DATE	$82,735.97
AMOUNT REMAINING ON DA 2544	$ 764.03

U.S. ARMY CORPS OF ENGINEERS
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235
214/905-9130

QA/QC REPORT

Project: Longhorn Army Ammunition Plant
Site: Burning Ground
Date of Report: 4 January 1992

1.0 Discussion: During the Longhorn AAP - Burning Grounds-investigation, 41 ground water field samples, 5 quality control duplicates, 5 quality assurance duplicates, 14 travel blanks, 3 equipment blanks, 10 free phase samples for VOAs, one quality control duplicate free phase sample and one quality assurance free phase sample were received by Southwestern Division Laboratory(SWD). These samples were distributed for analysis as shown in Table 1. SWD and all contract laboratories are validated by the Missouri River Division COE.

2.0 Volatile Organic Analysis: The requested analyses were for 80 volatile water samples all using Method 8240. It was indicated by the contract laboratories that all samples were analyzed within the correct holding time.

2.1 Accuracy:

2.1.1. Standard Matrix Spikes: All were within acceptable ranges with the exception of one blank spike duplicate which had a recovery of 83% (range 84-122%) for chlorobenzene, this is not a significant difference.

2.1.2. Matrix Spikes: All were within acceptable ranges.

2.1.3. Surrogate Spikes: All were within acceptable ranges.

2.2 Precision:

2.2.1. Matrix Spike Duplicates: All were within acceptable ranges and had acceptable relative percent differences(RPD).

2.2.2. Field Sample and QC Duplicates:(refer to Table 2) All were within acceptable RPD range with the exception of one descrepancy. A minor descrepancy between the Methylene Chloride results for MW-1 was found, this could possibly be due to the high dilution factor used in the analysis of MW-1QC(See paragraph 8.2 Corrective Action).

2.3 Representativeness:

2.3.1. Travel Blanks for VOA: No signs of contamination were present except for TB/MW-22(2-4171) which contains 31µg/L of Chloroform-- the detection limit for Chloroform is 5-- the contaminant is greater than five times the detection limit thus the travel blank is significantly contaminated. Since no contamination was present in the method blanks, field contamination probably occurred.

2.3.2. Equipment Blanks:(Refer to Table 4) Two of the three Equipment Blanks show contamination. EB 102(2-4065) has 24µg/L of Chloroform, 13µg/L of Bromodichloromethane and 7µg/L of Dibromochloromethane. EB 120(2-4118) has 56µg/L of Chloroform and 18µg/L of Methylene Chloride. Since no contamination was present in method blanks, field contamination probably occurred.

---Detection Limits---

Chloroform = 5
Bromodichloromethane = 5
Dibromochloromethane = 5
Methylene Chloride = 10

The contaminants in EB120 are not greater than five times their respective detection limits; thus, the contamination is not of a significant amount. One of the contaminants in EB120-- Chloroform-- is greater than five times its respective detection limit, this is an unacceptable amount of contamination.

2.3.3. Method Blanks: All method blanks were free of contamination.

2.4 Comparability:

2.4.1. Refer to Table 3 for the QA/Field comparison

2.4.2. Discrepancies: Two minor discrepancies were found, MW-1 and MW-2FP for Methylene Chloride -- these are not significant differences. No major discrepancies were found.

3.0 Semi-Volatile Organics: The requested analysis were for 54 water samples all using method 8270. It was indicated by the contract laboratories that all samples were analyzed within the correct holding time.

3.1 Accuracy:

3.1.1. Standard Matrix Spikes: All were within acceptable ranges.

3.1.2. Matrix Spikes: All were within acceptable ranges except for sample C-10QA for Pentachlorophenol-- 4%(Range 9-103%) and sample MW-19QA for 4-Nitrophenol-- 91%(Range 10-80%). These discrepancies were due to high matrix interference in samples.

3.1.3. Surrogate Spikes: All were within acceptable ranges except for the surrogate run on 11/16/92 by Eureka-- 32% Recovery (Range 33-133%) for 2-Fluorophenol-- this is not a significant difference.

3.2 Precision:

3.2.1. Matrix Spike Duplicates: All were within acceptable ranges and had acceptable RPDs except for sample C-10QA for 4-Nitrophenol-- RPD=140%(Range 10-80%) and for Pentachlorophenol-- RPD=170%(Range 9-103%). These discrepancies are due to matrix interference in samples.

3.2.2. Field Sample and QC Duplicates:(refer to Table 2) All were within acceptable RPD range.

3.3 Representativeness:

3.3.1. Equipment Blanks:(Refer to Table 4) No signs of contamination were present.

3.3.2. Method Blanks: No signs of contamination were present.

3.4 Comparability:

3.4.1. Refer to Table 3 for the QA/Field comparison

3.4.2. Discrepancies: Two minor discrepancies were found, C-10 for Bis(2-Ethylhexyl)phthalate and MW-1 for Bis(2-Ethylhexyl)phthalate-- neither is significantly different. No major discrepancies were found.

4.0 Metals: The requested analyses were for 54 water samples. Methods used-- Antimony(7041); Arsenic(7060); Barium, Cadmium, Chromium, Nickel, and Silver(6010); Lead(7421); Mercury(7471); Selenium(7740) and Thallium(7841). It was indicated by SWD and the contract laboratories that all samples were analyzed within the correct holding time.

4.1 Accuracy:

4.1.1. Standard Matrix Spikes: All were within acceptable ranges.

4.1.2. Matrix Spikes: Several were outside acceptable ranges-- one of which was unacceptable due to matrix interference (sample 102 for Thallium), the other samples were not significantly beyond the acceptable percent recovery ranges.

sample#	element	spike%	repeat%	range%
C-7	Thallium	79	-	80-120
130	Thallium	122	-	80-120
102	Thallium	68	76	80-120
MW-14	Arsenic	79	79	80-120
MW-3	Nickel	76	-	80-120
C-10QA	Mercury	124	-	80-120
C-2QA	Cadmium	76	-	80-120
C-2QA	Chromium	75	-	80-120
MW-19QA	Antimony	78	-	80-120
MW-19QA	Barium	77	-	80-120
MW-19QA	Antimony	78	-	80-120
MW-3QA	Nickel	79	-	80-120
MW-1QA	Barium	77	-	80-120

sample#	element	spike%	repeat%	range%
MW-1QA	Cadmium	77	-	80-120
MW-1QA	Chromium	79	-	80-120
MW-1QA	Nickel	77	-	80-120
MW-1QA	Lead	71	-	80-120

4.2 Precision:

4.2.1. Matrix Spike Duplicates: All were within acceptable RPD ranges.

4.2.2. Field Sample and QC Duplicates:(refer to Table 2) All were within acceptable RPD ranges except for a minor discrepancy with sample C-2 for Chromium-- this is not a significant difference. No major discrepancies were found.

4.2.3. Laboratory Duplicates: All were within acceptable RPD ranges.

4.3 Representativeness:

4.3.1. Equipment Blanks:(Refer to Table 4) All three show small amounts of contamination-- for EB19, Lead has 6µg/L; for EB102, Antimony has 2 µg/L and for EB120, Antimony has 2µg/L, Arsenic has 2µg/L, Thallium has 5µg/L and Silver has 11µg/L. Since no contamination was present in Method Blanks, the contamination probably occurred in the field.

---Detection Limits---

Lead = 5µg/L
Antimony = 2µg/L
Arsenic = 2µg/L
Thallium = 5µg/L
Silver = 10µg/L

EB19, EB102, and EB120 all had less than five times the detection limit of contamination-- these are not significant amounts

4.3.2. Method Blanks: All method blanks were free of contamination.

4.4. Comparability:

4.4.1. Refer to Table 3 for the QA/Field comparison

4.4.2. Discrepancies: Three minor discrepancies were found-- C-10 for Lead, MW-19 for lead and MW-1 for Antimony--none are significant differences. No major discrepancies were found.

5.0 Explosives: The requested analyses were for 54 water samples all using Method 8330. It was indicated by MRD laboratory that the holding times were missed for the samples collected 11/4/92 due to shipping errors(See paragraph 8.5.3 Corrective Action), all other samples met their holding times.

5.1 Accuracy:

5.1.1. Standard Matrix Spikes: (See paragraph 8.5.6)Several were out of acceptable range-- Blank spike analyzed on 11/23/92 from MRD is 54% for Tertyl(Range 60-110%), Blank

spike analyzed on 11/27/92 from MRD is 43% for Tertyl(Range 60-110%) and is 69% for 2,4,6-TNT(Range 75-125%), Blank spike analyzed on 11/19/92 from NDRC is 150% for RDX(Range 75-125%) and is 136% for m-Nitrotoluene(Range 75-125%). All other standard matrix spikes were acceptable.

5.1.2. Matrix Spikes: Several were out of acceptable range-- sample C-4 for tertyl is 45%(Range 60-110); sample 124 for HDX is 69%(Range 75-125%), for TNB is 74%(Range 75-125%), for DNB is 68%(Range 75-125%), for Tertyl is 40%(Range 60-110%) and for 2,4-DNT is 73%(Range 75-125%). All were affected by high matrix interference.

5.2 Precision:

5.2.1. Matrix Spike Duplicates: All were within acceptable RPD ranges.

5.2.2. Field Sample and QC Duplicates:(refer to Table 2) Five minor discrepancies were found-- sample C-10 for 2,4-DNT; sample MW-3 for 2,4,6-TNT and for 2-AM-4,6-DNT and sample MW-1 for 1,3-DNB-- none were significant differences. One major discrepancy was found in sample MW-3 for 2,4-DNT due to matrix interference(See paragraph 8.5.1 Corrective Action).

5.3 Representativeness:

5.3.1. Equipment Blanks:(Refer to Table 4) Two of the three Equipment Blanks show contamination. EB102 has 0.53µg/L of 1,3,5-TNB, 1.24µg/L of 2,4,6-TNT and 0.29µg/L of 2-AM-4,6-DNT. EB120 has 1.61µg/L of 2,4,6-TNT. Since no contamination was found in the method blanks the contamination probably occurred in the field.

---Detection Limits---

1,3,5-TNB = 0.1µg/L
2,4,6-TNT = 0.1µg/L
2-AM-4,6-DNT = 0.1µg/L

EB102 and EB120 both have contamination greater than five times the detection limit for 2,4,6-TNT-- this is unacceptable. Also, EB102 for 1,3,5-TNB is greater than five times the detection limit-- this is an unacceptable amount of contamination.

5.3.2. Method Blanks: All were free of contamination.

5.4 Comparability:

5.4.1. Refer to Table 3 for the QA/Field comparison.

5.4.2. Discrepancies: Several minor discrepancies were found-- MW-3 for 1,3-DNB and for 2,4,6-TNT and MW-1 for 1,3-DNB-- these are not significant differences. One major discrepancy was found --C-10 for RDX due to matrix interference(See paragraph 8.5.2 Corrective Action).

6.0 Anions: The requested analyses were for 54 water samples all using Method 300.0, except for the QA samples analyzed by NDRC in which Method 9252 for Chloride, Method 353.3 for Nitrate, and Method 9038 for Sulfate were substituted(See paragraph 8.6.1 Corrective Action). It was indicated by SWD and the contract

laboratory that all samples were analyzed within the correct holding time.

6.1 Accuracy:

6.1.1. Standard Matrix Spikes: All were within acceptable ranges.

6.1.2. Matrix Spikes: All were within acceptable ranges.

6.2 Precision:

6.2.1. Matrix Spike Duplicates: All were within acceptable ranges and had acceptable RPDs.

6.2.2. Field Sample and QC Duplicates: (refer to Table 2) Several minor discrepancies were found-- MW-19 for Nitrate, MW-1 for Nitrate and Sulfate-- these are not significant differences. Also, one major discrepancy was found for sample C-10 for nitrate(See paragraph 8.6.3 Corrective Action).

6.2.3. Laboratory Duplicates: All were within acceptable RPD range.

6.3 Representativeness:

6.3.1. Equipment Blanks:(Refer to Table 4)All three equipment blanks have contamination-- blank EB19 for Chloride(19mg/L), Nitrate(0.06mg/L), and Sulfate(3.2mg/L); blank EB102 for Chloride(1.5mg/L) and blank EB120 for Chloride(0.6mg/L). Since the method blanks are not contaminated, the contamination probably occurred in the field.

--- Detection Limits--
Chloride = 0.2mg/L
Nitrate = 0.002mg/L
Chloride = 0.2mg/L

EB19 for Chloride, Nitrate, and Sulfate are all higher than five times the detection limit-- this is not acceptable. EB102 for Chloride is also higher than five times its detection limit.

6.3.2. Method Blanks: All were free of contamination.

6.4 Comparability:

6.4.1. Refer to Table 3 for the QA/Field comparison.

6.4.2. Discrepancies: Several minor discrepancies were found-- sample C-10 for Sulfate, sample MW-19 for Sulfate and sample MW-1 for Nitrate and Sulfate--none of these are significant differences. Also, one major discrepancy was found for sample C-2 for Nitrate-- this is possibly due to the different detection limits used by the two laboratories for Nitrate(SWD=0.002 - NDRC-0.01) because of different method used by NDRC.

7.0 Problems: (also see paragraph 8.0 Corrective Action)

7.1 Forms: Chain of Custodies(COC) were reasonably free of error except for samples 130(2-3988) and 129(2-3989) which were transposed on the COC received by SWD. Also, Travel Blank (MW-22) was mislabeled as sample MW-22 on original COC.

7.2 **Volatiles:** First, Trichlorofluoromethane was not analyzed by NDRC for the QA samples. Second, NDRC analyzed the QA samples for total 1,2- Dichloroethene; while, Eureka analyzed the QC samples for cis-1,2-Dichloroethene and trans-1,2-Dichloroethene. Third, an incorrect dilution factor was shown for sample MW-1 analyzed by Eureka.

7.3 **Semi-Volatiles:** none

7.4 **Metals:** none

7.5 **Explosives:** NB, 2-NT, 3-NT, and 4-NT were not reported by MRD for any of the samples. Also, 2-AM-4,6-DNT and 4-AM-2,6-DNT were not reported by NDRC for any of the QA samples. The holding times for samples collected 11/4/92(C-1,C-7,C-9,C-10 and C-10QC) were exceeded due to shipping problems associated with a three day weekend. The incorrect extraction date was placed on the report for explosives extracted on November 11. Also, one major problem with QA/Field comparison was found.

7.6 **Anions:** One major problem with QA/Field comparison was found.

7.7 **Equipment Blanks:**(Refer to Table 4) All had low levels of volatiles, metals,anions and explosives. EB19 had high levels of Chloride, Nitrate and Sulfate, and EB102 had high levels of Chloride. Also, EB102 and EB120 had high levels of 2,4,6-TNT and EB102 had high levels of 1,3,5-TNB and 2-AM-4,6DNT. EB120, also, had a high level of Chloroform.

7.8 **Sensitivity:** Different detection limits were used by each laboratory for many of the compounds.

8.0 Corrective Action:

8.1 **Forms:** COC errors corrected upon receipt at SWD Laboratory. Also, errors on report for samples 129 and 130(2-3988 and 3989) were corrected(refer to Appendix).

8.2 **Volatiles:** First, Eureka was informed of dilution error associated with sample MW-1-- due to high methylene chloride concentrations they treated the samples as if they were free phase(aqueous waste) and diluted all 500 times(refer to Appendix). Second, NDRC was informed of their failure to analyze QA samples for cis and trans-1,2-dichloroethene instead of total 1,2-dichloroethene. Third, NDRC was informed of their failure to run Trichlorofluoromethane-- they stated that in the future they would analyze all samples listed in Method 8240.

8.3 **Semi-Volatiles:** none

8.4 **Metals:** none

8.5 **Explosives:**

8.5.1. MRD laboratory was informed about problems with matrix interference, extraction dates and confirmation of results. True extraction date for samples received 11/10/92 is 11/12/92 not 11/11/92.

8.5.2. NDRC laboratory sent a copy of the chromatogram for sample C-10QA(major data disagreement between QA and Field-see Table 3) which confirms NDRC's result(refer to Appendix).

8.5.3. Fort Worth District's samplers were informed not

to sampling the day before a three day weekend associated with a holiday.

8.5.4. S. Schnitker(Chemist at MRD) stated that the four explosives-- NB, 2-NT, 3-NT, and 4-NT-- were analyzed and were below detectable limits due to the high volatility of the four compounds(See Method 8330's practical quantitation limit for the four compounds-- method shows that these compounds were not detectable due to their high volatility). Also, refer to Appendix for further details.

8.5.5. NDRC was informed of their failure to analyze 2 of the 14 compounds. They reported that in the future they would analyze all 14 compounds.

8.5.6. The standard matrix spike recoveries analyzed by MRD ;which were out of range, were rerun for the batch of samples and were within acceptable limits.

8.6 Anions:

8.6.1. QA laboratory has been advised to use Method 300.0 for Anions. NDRC is now able to run Method 300.0, since they have acquired the correct instrument.

8.6.2. After rechecking chromatogram for Field result, the major discrepancy between QA and Field results are probably due to the different detection limits and different methods used by each laboratory.

8.6.3. Discrepancy between Field and QC (sample C-10 for nitrate) was probably due to the break down of the QC sample from nitrate to nitrite. This conclusion is supported by the comparison between Field and QA samples for C-10, which have the same result.

8.7 Equipment Blanks: Forth Worth District was notified about the highly contaminated blanks.

8.8 Sensitivity: Each laboratory should be informed of the correct detection limits listed in the workplan.

9.0 Conclusion:

9.1 Analytical Completeness:

analysis	#samples received	#samples analyzed	%Complete
Volatiles	80	80	100
Semi-Volatiles	54	54	100
Metals	54	54	100
Explosives	54	54	100
Anions	54	54	100
Total	296	296	100

9.2 The data is generally acceptable. The exceptions being the high levels of contamination in the equipment blanks and one travel blank.

TABLE 1

TABLE 1
SAMPLE DISTRIBUTION FOR ANALYSIS

Field#	SWD#	Report#	Methods [VOA	SemiVOA	TotM	Anions	EXP]	
11/4/92 Sampling								
VOTB	2-3952	15704	3	NA	NA	NA	NA	Water
C-1	2-3953	15704	3	3	1	1	4	Water
C-7	2-3954	15704	3	3	1	1	4	Water
C-9	2-3955	15704	3	3	1	1	4	Water
C-10	2-3956	15704	3	3	1	1	4	Water
C-10QC	2-3957	15704	3	3	1	1	4	Water
C-10QA	2-3958	15704	2	2	2	2	2	Water
11/5/92 Sampling								
TB	2-3968	15704	3	NA	NA	NA	NA	Water
C-4	2-3969	15704	3	3	1	1	4	Water
C-5	2-3970	15704	3	3	1	1	4	Water
11/6/92 Sampling								
TB	2-3982	15704	3	NA	NA	NA	NA	Water
C-8	2-3983	15704	3	3	1	1	4	Water
C-6	2-3984	15704	3	3	1	1	4	Water
C-4A	2-3985	15704	3	3	1	1	4	Water
C-3	2-3986	15704	3	3	1	1	4	Water
11/7/92 Sampling								
MW-11	2-3987	15704	3	3	1	1	4	Water
130	2-3988	15704	3	3	1	1	4	Water
126	2-3989	15704	3	3	1	1	4	Water
TB	2-3990	15704	3	NA	NA	NA	NA	Water
11/10/92 Sampling								
TB	2-3998	15704	3	NA	NA	NA	NA	Water
MW-17	2-3999	15704	3	3	1	1	4	Water
MW-18	2-4000	15704	3	3	1	1	4	Water
C-2	2-4001	15704	3	3	1	1	4	Water
C-2QC	2-4002	15704	3	3	1	1	4	Water
C-2QA	2-4003	15704	2	2	2	2	2	Water

Notes:
NA-Not Available,FP-Free Phase,TB-Travel Blank,EB-Equipment Blank
1- Southwestern Division Laboratory 3- Eureka Laboratory
2- NDRC Laboratory of Dallas, TX 4- Missouri River Division Lab

TABLE 1
SAMPLE DISTRIBUTION FOR ANALYSIS

Field#	SWD#	Report#	Methods [VOA	SemiVOA	TotM	Anions	EXP]	Matrix
11/11/92 Sampling								
TB	2-4012	15704	3	NA	NA	NA	NA	Water
MW-8	2-4013	15704	3	3	1	1	4	Water
MW-10	2-4014	15704	3	3	1	1	4	Water
MW-13	2-4015	15704	3	3	1	1	4	Water
MW-16	2-4016	15704	3	3	1	1	4	Water
MW-19	2-4017	15704	3	3	1	1	4	Water
EB-19	2-4018	15704	3	3	1	1	4	Water
MW-19QC	2-4019	15704	3	3	1	1	4	Water
MW-19QA	2-4020	15704	2	2	2	2	2	Water
TB	2-4021	15704	3	NA	NA	NA	NA	Water
11/12/92 Sampling								
TB	2-4037	15704	3	NA	NA	NA	NA	Water
MW-20	2-4038	15704	3	3	1	1	4	Water
MW-9	2-4039	15704	3	3	1	1	4	Water
MW-7	2-4040	15704	3	3	1	1	4	Water
11/13/92								
TB MW-21	2-4061	15704	3	NA	NA	NA	NA	Water
TB MW-4	2-4062	15704	3	NA	NA	NA	NA	Water
109	2-4063	15704	3	3	1	1	4	Water
102	2-4064	15704	3	3	1	1	4	Water
EB 102	2-4065	15704	3	3	1	1	4	Water
MW-21	2-4066	15704	3	3	1	1	4	Water
MW-4	2-4067	15704	3	3	1	1	4	Water
MW-3	2-4068	15704	3	3	1	1	4	Water
MW-3QC	2-4069	15704	3	3	1	1	4	Water
MW-3QA	2-4070	15704	2	2	2	2	2	Water
11/14/92 Sampling								
TB	2-4076	15704	3	NA	NA	NA	NA	Water
MW-6	2-4077	15704	3	3	1	1	4	Water
MW-5	2-4078	15704	3	3	1	1	4	Water
124	2-4079	15704	3	3	1	1	4	Water

Notes:
NA-Not Available,FP-Free Phase,TB-Travel Blank,EB-Equipment Blank
1- Southwestern Division Laboratory 3- Eureka Laboratory
2- NDRC Laboratory of Dallas, TX 4- Missouri River Division Lab

TABLE 1
SAMPLE DISTRIBUTION FOR ANALYSIS

Field#	SWD#	Report#	Methods [VOA	SemiVOA	TotM Anions	EXP]	Matrix
11/17/92 Sampling							
TB MW-14	2-4115	15704	3	NA	NA	NA	Water
MW-12	2-4116	15704	3	3	1	1	4	Water
MW-14	2-4117	15704	3	3	1	1	4	Water
EB 120	2-4118	15704	3	3	1	1	4	Water
120FP	2-4119	15704	3	NA	NA	NA	NA	Water
129	2-4120	15704	3	3	1	1	4	Water
11/18/92 Sampling							
TB 120	2-4122	15704	3	NA	NA	NA	NA	Water
MW-1FP	2-4123	15704	3	NA	NA	NA	NA	Water
MW-2FP	2-4124	15704	3	NA	NA	NA	NA	Water
120FP	2-4125	15704	3	NA	NA	NA	NA	Water
MW-15	2-4126	15704	3	3	1	1	4	Water
120	2-4127	15704	3	3	1	1	4	Water
TB	2-4138	15704	3	NA	NA	NA	NA	Water
MW-1	2-4139	15704	3	3	1	1	4	Water
MW-1FP	2-4140	15704	3	NA	NA	NA	NA	Water
MW-2	2-4141	15704	3	3	1	1	4	Water
MW-2FP	2-4142	15704	3	NA	NA	NA	NA	Water
MW-22FP	2-4143	15704	3	NA	NA	NA	NA	Water
MW-23FP	2-4144	15704	3	NA	NA	NA	NA	Water
MW-1QC	2-4145	15704	3	3	1	1	4	Water
MW-2FP/QC	2-4146	15704	3	NA	NA	NA	NA	Water
MW-1QA	2-4147	15704	2	2	2	2	2	Water
MW-2FP/QA	2-4148	15704	2	NA	NA	NA	NA	Water
11/20/92 Sampling							
TB MW-22	2-4171	15704	3	NA	NA	NA	NA	Water
MW-22FP	2-4172	15704	3	NA	NA	NA	NA	Water
MW-23FP	2-4173	15704	3	NA	NA	NA	NA	Water
MW-22	2-4174	15704	3	3	1	1	4	Water
MW-23	2-4175	15704	3	3	1	1	4	Water

Notes:
NA-Not Available,FP-Free Phase,TB-Travel Blank,EB-Equipment Blank
1- Southwestern Division Laboratory 3- Eureka Laboratory
2- NDRC Laboratory of Dallas, TX 4- Missouri River Division Lab

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TABLE 2

TABLE 2
? FIELD AND QC DATA

Result	QC Result	Units
2	< 2	µg/L
2	< 2	µg/L
546	516	µg/L
10	< 10	µg/l
10	< 10	µg/L
22	23	µg/L
0.2	< 0.2	µg/L
15	< 15	µg/L
2	< 2	µg/L
10	< 10	µg/L
5	< 5	µg/L
607	520	mg/L
♦♦0.070	0.002	mg/L
6.90	5.70	mg/L
0.11	0.16	µg/L
.2	1.2	µg/L
26	< 0.26	µg/L
.11	< 0.11	µg/L
0.55	< 0.55	µg/L
0.11	< 0.11	µg/L
♦0.13	< 0.02	µg/L
0.31	< 0.31	µg/L
0.03	< 0.03	µg/L
0.06	< 0.06	µg/L
10	< 10	µg/L
10	< 10	µg/L
10	< 10	µg/L
10	< 10	µg/L
10	< 10	µg/L
5	< 5	µg/L
5	< 5	µg/L
5	< 5	µg/L
5	< 5	µg/L
5	< 5	µg/L
5	< 5	µg/L
5	< 5	µg/L
5	< 5	µg/L
5	< 5	µg/L

ed ♦ : Minor data disagreement

lt	QC Result	Units
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 10	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	43	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 5	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 50	µg/L
	< 50	µg/L
	< 50	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L
	< 10	µg/L

♦ : Minor data disagreement

Field# C-10

Analysis	Field Result	QC Result	Units
N-Nitrosodi-n-propylamine	< 10	< 10	µg/L
Nitrobenzene	< 10	< 10	µg/L
Di-n-octyl phthalate	18	14	µg/L
1,2,4-Trichlorobenzene	< 10	< 10	µg/L
Napthalene	< 10	< 10	µg/L
Hexachlorobutadiene	< 10	< 10	µg/L
2-Methylnaphthlene	< 10	< 10	µg/L
Hexachlorocyclopentadiene	< 10	< 10	µg/L
2-Chloronaphthalene	< 10	< 10	µg/L
Dimethyl phthalate	< 10	< 10	µg/L
Acenaphthylene	< 10	< 10	µg/L
Acenaphthene	< 10	< 10	µg/L
2,4-Dinitrotoluene	< 20	< 20	µg/L
2,6-Dinitrotoluene	< 20	< 20	µg/L
Fluorene	< 10	< 10	µg/L
Diethyl phthalate	< 10	< 10	µg/L
4-Chlorophenyl phenyl ether	< 10	< 10	µg/L
N-Nitrosodiphenylamine	< 20	< 20	µg/L
4-Bromophenyl phenyl ether	< 10	< 20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 10	µg/L
Phenanthrene	< 10	< 10	µg/L
Anthracene	< 10	< 10	µg/L
Di-n-butyl phthalate	< 10	< 10	µg/L
Fluoranthene	< 10	< 10	µg/L
Benzidine	< 80	< 80	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 20	µg/L
Pyrene	< 10	< 10	µg/L
Butyl benzyl phthalate	< 10	< 10	µg/L
3,3-Dichlorobenzidine	< 20	< 20	µg/L
Chrysene	< 10	< 10	µg/L
Benzo(a)anthracene	< 10	< 10	µg/L
Bis(2-Ethylhexyl)phthalate	59	123	µg/L
Benzo(k)fluoranthene	< 10	< 10	µg/L
Benzo(b)fluoranthene	< 10	< 10	µg/L
Benzo(a)pyrene	< 10	< 10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 10	µg/L
Dibenzo(a,h)anthracene	< 10	< 10	µg/L
Benzo(g,h,i)perylene	< 10	< 10	µg/L
Isophorone	< 10	< 10	µg/L
Aniline	< 10	< 10	µg/L
Benzyl alcohol	< 10	< 10	µg/L
o-Cresol	< 10	< 10	µg/L
p-Cresol	< 10	< 10	µg/L
Benzoic acid	< 50	< 50	µg/L
4-Chloroaniline	< 10	< 10	µg/L
2,4,5-Trichlorophenol	< 50	< 50	µg/L

Notes: ♦♦ : Major data disagreement
- : Not analyzed or not reported ♦ : Minor data disagreement

Field# C-10

Analysis	Field Result	QC Result	Units
2-Nitroaniline	< 50	< 50	µg/L
Nitroaniline	< 50	< 50	µg/L
Dibenzofuran	< 10	< 10	µg/L
4-Nitroaniline	< 50	< 50	µg/L

Notes: ♦♦ : Major data disagreement
- : Not analyzed or not reported ♦ : Minor data disagreement

Field# C-2

TABLE 2
COMPARISON OF FIELD AND QC DATA

Analysis	Field Result	QC Result	Units
--Metals--			
Antimony	< 2	< 2	µg/L
Arsenic	< 2	< 2	µg/L
Barium	363	347	µg/L
Cadmium	< 10	< 10	µg/l
Chromium	♦22	< 10	µg/L
Lead	9	< 5	µg/L
Mercury	< 0.2	< 0.2	µg/L
Nickel	< 15	< 15	µg/L
Selenium	< 2	< 2	µg/L
Silver	< 10	< 10	µg/L
Thallium	< 5	< 5	µg/L
--Anions--			
Chloride	180	180	mg/L
Nitrate	0.002	0.002	mg/L
Sulfate	0.30	0.40	mg/L
--Explosives--			
HMX	< 1	< 1	µg/L
RDX	< 0.84	< 0.84	µg/L
1,3,5-TNB	< 0.26	< 0.26	µg/L
1,3-DNB	< 0.11	< 0.11	µg/L
Tetryl	< 0.55	< 0.55	µg/L
2,4,6-TNT	< 0.11	< 0.11	µg/L
2,4-DNT	< 0.02	< 0.02	µg/L
2,6-DNT	< 0.31	< 0.02	µg/L
4-Am-2,6-DNT	< 0.06	< 0.06	µg/L
2-Am-4,6-DNT	< 0.03	< 0.03	µg/L
--Volatile Organics--			
Chloromethane	< 10	< 10	µg/L
Bromomethane	< 10	< 10	µg/L
Vinyl Chloride	< 10	< 10	µg/L
Chloroethane	< 10	< 10	µg/L
Methylene chloride	< 10	< 5	µg/L
Trichlorofluoromethane	< 5	< 5	µg/L
1,1-Dichloroethene	< 5	< 5	µg/L
1,1-Dichloroethane	< 5	< 5	µg/L
trans-1,2-Dichloroethene	< 5	< 5	µg/L
Cis-1,2-Dichloroethene	< 5	< 5	µg/L
Chloroform	< 5	< 5	µg/L
1,2-Dichloroethane	< 5	< 5	µg/L
1,1,1-Trichloroethane	< 5	< 5	µg/L
Carbon tetrachloride	< 5	< 5	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# C-2

Analysis	Field Result	QC Result	Units
--Volatile Organics--(con't)			
Bromodichloromethane	< 5	< 5	µg/L
1,2-Dichloropropane	< 5	< 5	µg/L
trans-1,3-Dichloropropene	< 5	< 5	µg/L
Trichloroethene	< 5	< 5	µg/L
Benzene	< 5	< 5	µg/L
Dibromochloromethane	< 5	< 5	µg/L
1,1,2-Trichloroethane	< 5	< 5	µg/L
Cis-1,3-Dichloropropene	< 5	< 5	µg/L
2-Chloroethyl vinyl ether	< 10	< 10	µg/L
Bromoform	< 5	< 5	µg/L
1,1,2,2-Tetrachloroethane	< 5	< 5	µg/L
Tetrachlorethene	< 5	< 5	µg/L
Toluene	< 5	< 5	µg/L
Chlorobenzene	< 5	< 5	µg/L
Ethylbenzene	< 5	< 5	µg/L
Total Xylenes	< 5	< 5	µg/L
Carbon Disulfide	< 5	< 5	µg/L
Acetone	< 10	< 10	µg/L
2-Butanone	< 5	< 5	µg/L
Vinyl Acetate	< 5	< 5	µg/L
2-Hexanone	< 5	< 5	µg/L
4-Methyl-2-pentanone	< 5	< 5	µg/L
Styrene	< 5	< 5	µg/L
Total Dichlorobenzene	< 5	< 5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	< 10	µg/L
2-Chlorophenol	< 10	< 10	µg/L
2-Nitrophenol	< 10	< 10	µg/L
2,4-Dimethylphenol	< 10	< 10	µg/L
2,4-Dichlorophenol	< 10	< 10	µg/L
4-Chlor-3-methylphenol	< 10	< 10	µg/L
2,4,6-Trichlorophenol	< 10	< 10	µg/L
2,4-Dinitrophenol	< 50	< 50	µg/L
4-Nitrophenol	< 50	< 50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 50	µg/L
Pentachlorophenol	< 10	< 10	µg/L
N-Nitrosodimethylamine	< 10	< 10	µg/L
Bis(2-Chloroethyl)ether	< 10	< 10	µg/L
1,3-Dichlorobenzene	< 10	< 10	µg/L
1,2-Dichlorobenzene	< 10	< 10	µg/L
1,4-Dichlorobenzene	< 10	< 10	µg/L
Hexachlorobenzene	< 10	< 10	µg/L
Hexachloroethane	< 10	< 10	µg/L

Notes:

- : Not analyzed or not reported ♦ : Minor data disagreement

♦♦ : Major data disagreement

Field# C-2

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics--			
N-Nitrosodi-n-propylamine	< 10	< 10	µg/L
Nitrobenzene	< 10	< 10	µg/L
Di-n-octyl phthalate	< 10	< 10	µg/L
1,2,4-Trichlorobenzene	< 10	< 10	µg/L
Napthalene	< 10	< 10	µg/L
Hexachlorobutadiene	< 10	< 10	µg/L
2-Methylnaphthlene	< 10	< 10	µg/L
Hexachlorocyclopentadiene	< 10	< 10	µg/L
2-Chloronaphthalene	< 10	< 10	µg/L
Dimethyl phthalate	< 10	< 10	µg/L
Acenaphthylene	< 10	< 10	µg/L
Acenaphthene	< 10	< 10	µg/L
2,4-Dinitrotoluene	< 20	< 20	µg/L
2,6-Dinitrotoluene	< 20	< 20	µg/L
Fluorene	< 10	< 10	µg/L
Diethyl phthalate	< 10	< 10	µg/L
4-Chlorophenyl phenyl ether	< 10	< 10	µg/L
N-Nitrosodiphenylamine	< 20	< 20	µg/L
4-Bromophenyl phenyl ether	< 10	< 20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 10	µg/L
Phenanthrene	< 10	< 10	µg/L
Anthracene	< 10	< 10	µg/L
Di-n-butyl phthalate	< 10	< 10	µg/L
Fluoranthene	< 10	< 10	µg/L
Benzidine	< 80	< 80	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 20	µg/L
Pyrene	< 10	< 10	µg/L
Butyl benzyl phthalate	< 10	< 10	µg/L
3,3-Dichlorobenzidine	< 20	< 20	µg/L
Chrysene	< 10	< 10	µg/L
Benzo(a)anthracene	< 10	< 10	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	< 40	µg/L
Benzo(k)fluoranthene	< 10	< 10	µg/L
Benzo(b)fluoranthene	< 10	< 10	µg/L
Benzo(a)pyrene	< 10	< 10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 10	µg/L
Dibenzo(a,h)anthracene	< 10	< 10	µg/L
Benzo(g,h,i)perylene	< 10	< 10	µg/L
Isophorone	< 10	< 10	µg/L
Aniline	< 10	< 10	µg/L
Benzyl alcohol	< 10	< 10	µg/L
o-Cresol	< 10	< 10	µg/L
p-Cresol	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# C-2

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics(con't)--			
Benzoic acid	< 50	< 50	µg/L
4-Chloroaniline	< 10	< 10	µg/L
2,4,5-Trichlorophenol	< 50	< 50	µg/L
2-Nitroaniline	< 50	< 50	µg/L
Nitroaniline	< 50	< 50	µg/L
Dibenzofuran	< 10	< 10	µg/L
4-Nitroaniline	< 50	< 50	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-19

TABLE 2
COMPARISON OF FIELD AND QC DATA

Analysis	Field Result	QC Result	Units
--Metals--			
Antimony	3	3	µg/L
Arsenic	2	2	µg/L
Barium	65	63	µg/L
Cadmium	< 10	< 10	µg/l
Chromium	< 10	< 10	µg/L
Lead	11	9	µg/L
Mercury	< 0.2	< 0.2	µg/L
Nickel	< 15	< 15	µg/L
Selenium	< 2	< 2	µg/L
Silver	< 10	< 10	µg/L
Thallium	< 5	< 5	µg/L
--Anions--			
Chloride	2200	2250	mg/L
Nitrate	♦♦0.02	0.20	mg/L
Sulfate	340	340	mg/L
--Explosives--			
HMX	< 1	< 1	µg/L
RDX	< 0.84	< 0.84	µg/L
1,3,5-TNB	< 0.26	< 0.26	µg/L
1,3-DNB	< 0.11	< 0.11	µg/L
Tetryl	< 0.55	< 0.55	µg/L
2,4,6-TNT	< 0.11	< 0.11	µg/L
2,4-DNT	< 0.02	< 0.02	µg/L
2,6-DNT	< 0.31	< 0.31	µg/L
4-Am-2,6-DNT	0.10	< 0.06	µg/L
2-Am-4,6-DNT	< 0.03	< 0.03	µg/L
--Volatile Organics--			
Chloromethane	< 10	< 10	µg/L
Bromomethane	< 10	< 10	µg/L
Vinyl Chloride	< 10	< 10	µg/L
Chloroethane	< 10	< 10	µg/L
Methylene chloride	< 10	< 5	µg/L
Trichlorofluoromethane	< 5	< 5	µg/L
1,1-Dichloroethene	< 5	< 5	µg/L
1,1-Dichloroethane	< 5	< 5	µg/L
trans-1,2-Dichloroethene	< 5	< 5	µg/L
Cis-1,2-Dichloroethene	< 5	< 5	µg/L
Chloroform	< 5	< 5	µg/L
1,2-Dichloroethane	< 5	< 5	µg/L
1,1,1-Trichloroethane	< 5	< 5	µg/L
Carbon tetrachloride	< 5	< 5	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-19

Analysis	Field Result	QC Result	Units
--Volatile Organics--(con't)			
Bromodichloromethane	< 5	< 5	µg/L
1,2-Dichloropropane	< 5	< 5	µg/L
trans-1,3-Dichloropropene	< 5	< 5	µg/L
Trichloroethene	< 5	< 5	µg/L
Benzene	< 5	< 5	µg/L
Dibromochloromethane	< 5	< 5	µg/L
1,1,2-Trichloroethane	< 5	< 5	µg/L
Cis-1,3-Dichloropropene	< 5	< 5	µg/L
2-Chloroethyl vinyl ether	< 10	< 10	µg/L
Bromoform	< 5	< 5	µg/L
1,1,2,2-Tetrachloroethane	< 5	< 5	µg/L
Tetrachlorethene	< 5	< 5	µg/L
Toluene	< 5	< 5	µg/L
Chlorobenzene	< 5	< 5	µg/L
Ethylbenzene	< 5	< 5	µg/L
Total Xylenes	< 5	< 5	µg/L
Carbon Disulfide	< 5	< 5	µg/L
Acetone	< 10	< 10	µg/L
2-Butanone	< 5	< 5	µg/L
Vinyl Acetate	< 5	< 5	µg/L
2-Hexanone	< 5	< 5	µg/L
4-Methyl-2-pentanone	< 5	< 5	µg/L
Styrene	< 5	< 5	µg/L
Total Dichlorobenzene	< 5	< 5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	< 10	µg/L
2-Chlorophenol	< 10	< 10	µg/L
2-Nitrophenol	< 10	< 10	µg/L
2,4-Dimethylphenol	< 10	< 10	µg/L
2,4-Dichlorophenol	< 10	< 10	µg/L
4-Chlor-3-methylphenol	< 10	< 10	µg/L
2,4,6-Trichlorophenol	< 10	< 10	µg/L
2,4-Dinitrophenol	< 50	< 50	µg/L
4-Nitrophenol	< 50	< 50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 50	µg/L
Pentachlorophenol	< 10	< 10	µg/L
N-Nitrosodimethylamine	< 10	< 10	µg/L
Bis(2-Chloroethyl)ether	< 10	< 10	µg/L
1,3-Dichlorobenzene	< 10	< 10	µg/L
1,2-Dichlorobenzene	< 10	< 10	µg/L
1,4-Dichlorobenzene	< 10	< 10	µg/L
Hexachlorobenzene	< 10	< 10	µg/L
Hexachloroethane	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-19

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics--			
N-Nitrosodi-n-propylamine	< 10	< 10	µg/L
Nitrobenzene	< 10	< 10	µg/L
Di-n-octyl phthalate	< 10	< 10	µg/L
1,2,4-Trichlorobenzene	< 10	< 10	µg/L
Napthalene	< 10	< 10	µg/L
Hexachlorobutadiene	< 10	< 10	µg/L
2-Methylnaphthlene	< 10	< 10	µg/L
Hexachlorocyclopentadiene	< 10	< 10	µg/L
2-Chloronaphthalene	< 10	< 10	µg/L
Dimethyl phthalate	< 10	< 10	µg/L
Acenaphthylene	< 10	< 10	µg/L
Acenaphthene	< 10	< 10	µg/L
2,4-Dinitrotoluene	< 20	< 20	µg/L
2,6-Dinitrotoluene	< 20	< 20	µg/L
Fluorene	< 10	< 10	µg/L
Diethyl phthalate	< 10	< 10	µg/L
4-Chlorophenyl phenyl ether	< 10	< 10	µg/L
N-Nitrosodiphenylamine	< 20	< 20	µg/L
4-Bromophenyl phenyl ether	< 10	< 20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 10	µg/L
Phenanthrene	< 10	< 10	µg/L
Anthracene	< 10	< 10	µg/L
Di-n-butyl phthalate	< 10	< 10	µg/L
Fluoranthene	< 10	< 10	µg/L
Benzidine	< 80	< 80	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 20	µg/L
Pyrene	< 10	< 10	µg/L
Butyl benzyl phthalate	< 10	< 10	µg/L
3,3-Dichlorobenzidine	< 20	< 20	µg/L
Chrysene	< 10	< 10	µg/L
Benzo(a)anthracene	< 10	< 10	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	< 40	µg/L
Benzo(k)fluoranthene	< 10	< 10	µg/L
Benzo(b)fluoranthene	< 10	< 10	µg/L
Benzo(a)pyrene	< 10	< 10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 10	µg/L
Dibenzo(a,h)anthracene	< 10	< 10	µg/L
Benzo(g,h,i)perylene	< 10	< 10	µg/L
Isophorone	< 10	< 10	µg/L
Aniline	< 10	< 10	µg/L
Benzyl alcohol	< 10	< 10	µg/L
o-Cresol	< 10	< 10	µg/L
p-Cresol	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-19

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics(con't)--			
Benzoic acid	< 50	< 50	µg/L
4-Chloroaniline	< 10	< 10	µg/L
2,4,5-Trichlorophenol	< 50	< 50	µg/L
2-Nitroaniline	< 50	< 50	µg/L
Nitroaniline	< 50	< 50	µg/L
Dibenzofuran	< 10	< 10	µg/L
4-Nitroaniline	< 50	< 50	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-3

TABLE 2
COMPARISON OF FIELD AND QC DATA

Analysis	Field Result	QC Result	Units
--Metals--			
Antimony	2	3	µg/L
Arsenic	< 2	2	µg/L
Barium	1130	1276	µg/L
Cadmium	< 10	< 10	µg/l
Chromium	< 10	< 10	µg/L
Lead	5	< 5	µg/L
Mercury	< 0.2	< 0.2	µg/L
Nickel	22	< 15	µg/L
Selenium	< 2	< 2	µg/L
Silver	< 10	< 10	µg/L
Thallium	< 5	< 5	µg/L
--Anions--			
Chloride	440	430	mg/L
Nitrate	0.16	0.17	mg/L
Sulfate	20	22	mg/L
--Explosives--			
HMX	< 1	< 1	µg/L
RDX	< 0.84	< 0.84	µg/L
1,3,5-TNB	< 0.26	< 0.26	µg/L
1,3-DNB	♦0.60	< 0.11	µg/L
Tetryl	< 0.55	< 0.55	µg/L
2,4,6-TNT	♦0.35	< 0.11	µg/L
2,4-DNT	♦♦0.36	< 0.02	µg/L
2,6-DNT	< 0.31	< 0.31	µg/L
4-Am-2,6-DNT	< 0.03	< 0.03	µg/L
2-Am-4,6-DNT	♦0.25	< 0.06	µg/L
--Volatile Organics--			
Chloromethane	< 10	< 10	µg/L
Bromomethane	< 10	< 10	µg/L
Vinyl Chloride	< 10	< 10	µg/L
Chloroethane	< 10	< 10	µg/L
Methylene chloride	< 10	< 5	µg/L
Trichlorofluoromethane	< 5	< 5	µg/L
1,1-Dichloroethene	< 5	< 5	µg/L
1,1-Dichloroethane	7	7	µg/L
trans-1,2-Dichloroethene	< 5	< 5	µg/L
Cis-1,2-Dichloroethene	18	20	µg/L
Chloroform	< 5	< 5	µg/L
1,2-Dichloroethane	< 5	< 5	µg/L
1,1,1-Trichloroethane	< 5	< 5	µg/L
Carbon tetrachloride	< 5	< 5	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-3

Analysis	Field Result	QC Result	Units
--Volatile Organics--(con't)			
Bromodichloromethane	< 5	< 5	µg/L
1,2-Dichloropropane	< 5	< 5	µg/L
trans-1,3-Dichloropropene	< 5	< 5	µg/L
Trichloroethene	315	354	µg/L
Benzene	< 5	< 5	µg/L
Dibromochloromethane	< 5	< 5	µg/L
1,1,2-Trichloroethane	< 5	< 5	µg/L
Cis-1,3-Dichloropropene	< 5	< 5	µg/L
2-Chloroethyl vinyl ether	< 10	< 10	µg/L
Bromoform	< 5	< 5	µg/L
1,1,2,2-Tetrachloroethane	< 5	< 5	µg/L
Tetrachlorethene	< 5	< 5	µg/L
Toluene	< 5	< 5	µg/L
Chlorobenzene	< 5	< 5	µg/L
Ethylbenzene	< 5	< 5	µg/L
Total Xylenes	< 5	< 5	µg/L
Carbon Disulfide	< 5	< 5	µg/L
Acetone	< 10	< 10	µg/L
2-Butanone	< 5	< 5	µg/L
Vinyl Acetate	< 5	< 5	µg/L
2-Hexanone	< 5	< 5	µg/L
4-Methyl-2-pentanone	< 5	< 5	µg/L
Styrene	< 5	< 5	µg/L
Total Dichlorobenzene	< 5	< 5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	< 10	µg/L
2-Chlorophenol	< 10	< 10	µg/L
2-Nitrophenol	< 10	< 10	µg/L
2,4-Dimethylphenol	< 10	< 10	µg/L
2,4-Dichlorophenol	< 10	< 10	µg/L
4-Chlor-3-methylphenol	< 10	< 10	µg/L
2,4,6-Trichlorophenol	< 10	< 10	µg/L
2,4-Dinitrophenol	< 50	< 50	µg/L
4-Nitrophenol	< 50	< 50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 50	µg/L
Pentachlorophenol	< 10	< 10	µg/L
N-Nitrosodimethylamine	< 10	< 10	µg/L
Bis(2-Chloroethyl)ether	< 10	< 10	µg/L
1,3-Dichlorobenzene	< 10	< 10	µg/L
1,2-Dichlorobenzene	< 10	< 10	µg/L
1,4-Dichlorobenzene	< 10	< 10	µg/L
Hexachlorobenzene	< 10	< 10	µg/L
Hexachloroethane	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
** : Major data disagreement

Field# MW-3 Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics--			
N-Nitrosodi-n-propylamine	< 10	< 10	µg/L
Nitrobenzene	< 10	< 10	µg/L
Di-n-octyl phthalate	< 10	< 10	µg/L
1,2,4-Trichlorobenzene	< 10	< 10	µg/L
Napthalene	< 10	< 10	µg/L
Hexachlorobutadiene	< 10	< 10	µg/L
2-Methylnaphthlene	< 10	< 10	µg/L
Hexachlorocyclopentadiene	< 10	< 10	µg/L
2-Chloronaphthalene	< 10	< 10	µg/L
Dimethyl phthalate	< 10	< 10	µg/L
Acenaphthylene	< 10	< 10	µg/L
Acenaphthene	< 10	< 10	µg/L
2,4-Dinitrotoluene	< 20	< 20	µg/L
2,6-Dinitrotoluene	< 20	< 20	µg/L
Fluorene	< 10	< 10	µg/L
Diethyl phthalate	< 10	< 10	µg/L
4-Chlorophenyl phenyl ether	< 10	< 10	µg/L
N-Nitrosodiphenylamine	< 20	< 20	µg/L
4-Bromophenyl phenyl ether	< 10	< 20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 10	µg/L
Phenanthrene	< 10	< 10	µg/L
Anthracene	< 10	< 10	µg/L
Di-n-butyl phthalate	< 10	< 10	µg/L
Fluoranthene	< 10	< 10	µg/L
Benzidine	< 80	< 80	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 20	µg/L
Pyrene	< 10	< 10	µg/L
Butyl benzyl phthalate	< 10	< 10	µg/L
3,3-Dichlorobenzidine	< 20	< 20	µg/L
Chrysene	< 10	< 10	µg/L
Benzo(a)anthracene	< 10	< 10	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	< 40	µg/L
Benzo(k)fluoranthene	< 10	< 10	µg/L
Benzo(b)fluoranthene	< 10	< 10	µg/L
Benzo(a)pyrene	< 10	< 10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 10	µg/L
Dibenzo(a,h)anthracene	< 10	< 10	µg/L
Benzo(g,h,i)perylene	< 10	< 10	µg/L
Isophorone	< 10	< 10	µg/L
Aniline	< 10	< 10	µg/L
Benzyl alcohol	< 10	< 10	µg/L
o-Cresol	< 10	< 10	µg/L
p-Cresol	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-3

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics(con't)--			
Benzoic acid	< 50	< 50	µg/L
4-Chloroaniline	< 10	< 10	µg/L
2,4,5-Trichlorophenol	< 50	< 50	µg/L
2-Nitroaniline	< 50	< 50	µg/L
Nitroaniline	< 50	< 50	µg/L
Dibenzofuran	< 10	< 10	µg/L
4-Nitroaniline	< 50	< 50	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-1

TABLE 2
COMPARISON OF FIELD AND QC DATA

Analysis	Field Result	QC Result	Units
--Metals--			
Antimony	3	5	µg/L
Arsenic	2	2	µg/L
Barium	5160	5230	µg/L
Cadmium	< 10	< 10	µg/l
Chromium	< 10	< 10	µg/L
Lead	5	5	µg/L
Mercury	< 0.2	< 0.2	µg/L
Nickel	20	< 15	µg/L
Selenium	< 2	< 2	µg/L
Silver	< 10	< 10	µg/L
Thallium	6	7	µg/L
--Anions--			
Chloride	1260	1260	mg/L
Nitrate	♦0.50	0.20	mg/L
Sulfate	♦3	8	mg/L
--Explosives--			
HMX	< 1	< 1	µg/L
RDX	< 0.84	< 0.84	µg/L
1,3,5-TNB	< 0.26	< 0.26	µg/L
1,3-DNB	♦0.39	< 0.11	µg/L
Tetryl	< 0.55	< 0.55	µg/L
2,4,6-TNT	< 0.11	< 0.11	µg/L
2,4-DNT	< 0.02	< 0.02	µg/L
2,6-DNT	< 0.31	< 0.31	µg/L
4-Am-2,6-DNT	< 0.03	< 0.03	µg/L
2-Am-4,6-DNT	< 0.06	< 0.06	µg/L
--Volatile Organics--			
Chloromethane	< 10	*< 5000	µg/L
Bromomethane	< 10	*< 5000	µg/L
Vinyl Chloride	< 10	*< 5000	µg/L
Chloroethane	< 10	*< 5000	µg/L
Methylene chloride	♦251000	*675000	µg/L
Trichlorofluoromethane	1600	*< 2500	µg/L
1,1-Dichloroethene	< 5	*< 2500	µg/L
1,1-Dichloroethane	< 5	*< 2500	µg/L
trans-1,2-Dichloroethene	< 5	*< 2500	µg/L
Cis-1,2-Dichloroethene	< 5	*< 2500	µg/L
Chloroform	287	*< 2500	µg/L
1,2-Dichloroethane	< 5	*< 2500	µg/L
1,1,1-Trichloroethane	< 5	*< 2500	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement
* : High dilution factor used

Field# MW-1

Analysis	Field Result	QC Result	Units
--Volatile Organics--(con't)			
Carbon tetrachloride	< 5	*< 2500	µg/L
Bromodichloromethane	< 5	*< 2500	µg/L
1,2-Dichloropropane	< 5	*< 2500	µg/L
trans-1,3-Dichloropropene	< 5	*< 2500	µg/L
Trichloroethene	24300	* 36400	µg/L
Benzene	< 5	*< 2500	µg/L
Dibromochloromethane	< 5	*< 2500	µg/L
1,1,2-Trichloroethane	25	*< 2500	µg/L
Cis-1,3-Dichloropropene	< 5	*< 2500	µg/L
2-Chloroethyl vinyl ether	< 10	*< 5000	µg/L
Bromoform	< 5	*< 2500	µg/L
1,1,2,2-Tetrachloroethane	< 5	*< 2500	µg/L
Tetrachlorethene	14	*< 2500	µg/L
Toluene	9	*< 2500	µg/L
Chlorobenzene	< 5	*< 2500	µg/L
Ethylbenzene	< 5	*< 2500	µg/L
Total Xylenes	5	*< 2500	µg/L
Carbon Disulfide	< 5	*< 2500	µg/L
Acetone	< 10	*< 5000	µg/L
2-Butanone	< 5	*< 2500	µg/L
Vinyl Acetate	< 5	*< 2500	µg/L
2-Hexanone	< 5	*< 2500	µg/L
4-Methyl-2-pentanone	< 5	*< 2500	µg/L
Styrene	< 5	*< 2500	µg/L
Total Dichlorobenzene	< 5	*< 2500	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	< 10	µg/L
2-Chlorophenol	< 10	< 10	µg/L
2-Nitrophenol	< 10	< 10	µg/L
2,4-Dimethylphenol	< 10	< 10	µg/L
2,4-Dichlorophenol	< 10	< 10	µg/L
4-Chlor-3-methylphenol	< 10	< 10	µg/L
2,4,6-Trichlorophenol	< 10	< 10	µg/L
2,4-Dinitrophenol	< 50	< 50	µg/L
4-Nitrophenol	< 50	< 50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 50	µg/L
Pentachlorophenol	< 10	< 10	µg/L
N-Nitrosodimethylamine	< 10	< 10	µg/L
Bis(2-Chloroethyl)ether	< 10	< 10	µg/L
1,3-Dichlorobenzene	< 10	< 10	µg/L
1,2-Dichlorobenzene	< 10	< 10	µg/L
1,4-Dichlorobenzene	< 10	< 10	µg/L
Hexachlorobenzene	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement
* : High dilution factor used

Field# MW-1

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics--			
Hexachloroethane	< 10	< 10	µg/L
N-Nitrosodi-n-propylamine	< 10	< 10	µg/L
Nitrobenzene	< 10	< 10	µg/L
Di-n-octyl phthalate	< 10	< 10	µg/L
1,2,4-Trichlorobenzene	< 10	< 10	µg/L
Napthalene	< 10	< 10	µg/L
Hexachlorobutadiene	< 10	< 10	µg/L
2-Methylnaphthlene	< 10	< 10	µg/L
Hexachlorocyclopentadiene	< 10	< 10	µg/L
2-Chloronaphthalene	< 10	< 10	µg/L
Dimethyl phthalate	< 10	< 10	µg/L
Acenaphthylene	< 10	< 10	µg/L
Acenaphthene	< 10	< 10	µg/L
2,4-Dinitrotoluene	< 20	< 20	µg/L
2,6-Dinitrotoluene	< 20	< 20	µg/L
Fluorene	< 10	< 10	µg/L
Diethyl phthalate	< 10	< 10	µg/L
4-Chlorophenyl phenyl ether	< 10	< 10	µg/L
N-Nitrosodiphenylamine	< 20	< 20	µg/L
4-Bromophenyl phenyl ether	< 10	< 20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 10	µg/L
Phenanthrene	< 10	< 10	µg/L
Anthracene	< 10	< 10	µg/L
Di-n-butyl phthalate	< 10	< 10	µg/L
Fluoranthene	< 10	< 10	µg/L
Benzidine	< 80	< 80	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 20	µg/L
Pyrene	< 10	< 10	µg/L
Butyl benzyl phthalate	< 10	< 10	µg/L
3,3-Dichlorobenzidine	< 20	< 20	µg/L
Chrysene	< 10	< 10	µg/L
Benzo(a)anthracene	< 10	< 10	µg/L
Bis(2-Ethylhexyl)phthalate	62	< 40	µg/L
Benzo(k)fluoranthene	< 10	< 10	µg/L
Benzo(b)fluoranthene	< 10	< 10	µg/L
Benzo(a)pyrene	< 10	< 10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 10	µg/L
Dibenzo(a,h)anthracene	< 10	< 10	µg/L
Benzo(g,h,i)perylene	< 10	< 10	µg/L
Isophorone	< 10	< 10	µg/L
Aniline	< 10	< 10	µg/L
Benzyl alcohol	< 10	< 10	µg/L
o-Cresol	< 10	< 10	µg/L
p-Cresol	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-1

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics(con't)--			
Benzoic acid	< 50	< 50	µg/L
4-Chloroaniline	< 10	< 10	µg/L
2,4,5-Trichlorophenol	< 50	< 50	µg/L
2-Nitroaniline	< 50	< 50	µg/L
Nitroaniline	< 50	< 50	µg/L
Dibenzofuran	< 10	< 10	µg/L
4-Nitroaniline	< 50	< 50	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-2 Free Phase

TABLE 2
COMPARISON OF FIELD AND QC DATA

Analysis	Field Result	QC Result	Units
--Volatile Organics--			
Chloromethane	<5000	*< 5000	µg/L
Bromomethane	<5000	*< 5000	µg/L
Vinyl Chloride	<5000	*< 5000	µg/L
Chloroethane	<5000	*< 5000	µg/L
Methylene chloride	12100000	*13100000	µg/L
Trichlorofluoromethane	<2500	*4000	µg/L
1,1-Dichloroethene	<2500	*< 2500	µg/L
1,1-Dichloroethane	<2500	*< 2500	µg/L
trans-1,2-Dichloroethene	<2500	*< 2500	µg/L
Cis-1,2-Dichloroethene	<2500	*< 2500	µg/L
Chloroform	2900	*< 2500	µg/L
1,2-Dichloroethane	<2500	*< 2500	µg/L
1,1,1-Trichloroethane	<2500	*< 2500	µg/L
Carbon tetrachloride	<2500	*< 2500	µg/L
Bromodichloromethane	<2500	*< 2500	µg/L
1,2-Dichloropropane	<2500	*< 2500	µg/L
trans-1,3-Dichloropropene	<2500	*< 2500	µg/L
Trichloroethene	251000	*258000	µg/L
Benzene	<2500	*< 2500	µg/L
Dibromochloromethane	<2500	*< 2500	µg/L
1,1,2-Trichloroethane	<2500	*< 2500	µg/L
Cis-1,3-Dichloropropene	<2500	*< 2500	µg/L
2-Chloroethyl vinyl ether	<2500	*< 5000	µg/L
Bromoform	<2500	*< 2500	µg/L
1,1,2,2-Tetrachloroethane	<2500	*< 2500	µg/L
Tetrachlorethene	<2500	*< 2500	µg/L
Toluene	<2500	*< 2500	µg/L
Chlorobenzene	<2500	*< 2500	µg/L
Ethylbenzene	<2500	*< 2500	µg/L
Total Xylenes	<2500	*< 2500	µg/L
Carbon Disulfide	<2500	*< 2500	µg/L
Acetone	<5000	*< 5000	µg/L
2-Butanone	<2500	*< 2500	µg/L
Vinyl Acetate	<2500	*< 2500	µg/L
2-Hexanone	<2500	*< 2500	µg/L
4-Methyl-2-pentanone	<2500	*< 2500	µg/L
Styrene	<2500	*< 2500	µg/L
Total Dichlorobenzene	<2500	*< 2500	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
** : Major data disagreement(see paragraph 1b2)
* : High dilution factor used

005883

TABLE 3

Field# C-10

005884

TABLE 3
COMPARISON OF FIELD AND QA DATA

Analysis	Field Result	QA Result	Units
--Metals--			
Antimony	< 2	< 5	µg/L
Arsenic	2	< 10	µg/L
Barium	546	530	µg/L
Cadmium	< 10	< 5	µg/l
Chromium	< 10	< 50	µg/L
Lead	♦22	8	µg/L
Mercury	< 0.2	< 1	µg/L
Nickel	< 15	< 50	µg/L
Selenium	< 2	< 10	µg/L
Silver	< 10	< 10	µg/L
Thallium	< 5	< 2	µg/L
--Anions--			
Chloride	607	493	mg/L
Nitrate	0.070	0.070	mg/L
Sulfate	♦6.90	< 1	mg/L
--Explosives--			
HMX	0.11	< 0.10	µg/L
RDX	♦♦1.2	< 0.10	µg/L
1,3,5-TNB	< 0.26	< 0.10	µg/L
1,3-DNB	< 0.11	< 0.10	µg/L
Tetryl	< 0.55	< 0.10	µg/L
2,4,6-TNT	< 0.11	< 0.10	µg/L
2,4-DNT	0.13	< 0.10	µg/L
2,6-DNT	< 0.31	< 0.10	µg/L
2-Am-4,6-DNT	< 0.03	-	µg/L
4-Am-2,6-DNT	< 0.06	-	µg/L
NB	-	< 0.10	µg/L
2-NT	-	< 0.10	µg/L
3-NT	-	< 0.10	µg/L
4-NT	-	< 0.10	µg/L
--Volatile Organics--			
Chloromethane	< 10	< 10	µg/L
Bromomethane	< 10	< 10	µg/L
Vinyl Chloride	< 10	< 10	µg/L
Chloroethane	< 10	< 10	µg/L
Methylene chloride	< 10	< 5	µg/L
Trichlorofluoromethane	< 5	-	µg/L
1,1-Dichloroethene	< 5	< 5	µg/L
1,1-Dichloroethane	< 5	< 5	µg/L
trans-1,2-Dichloroethene	< 5	+< 5	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2

Field# C-10

Analysis	Field Result	QA Result	Units
--Volatile Organics(con't)--			
Cis-1,2-Dichloroethene	< 5	+< 5	µg/L
Chloroform	< 5	< 5	µg/L
1,2-Dichloroethane	< 5	< 5	µg/L
1,1,1-Trichloroethane	< 5	< 5	µg/L
Carbon tetrachloride	< 5	< 5	µg/L
Bromodichloromethane	< 5	< 5	µg/L
1,2-Dichloropropane	< 5	< 5	µg/L
trans-1,3-Dichloropropene	< 5	< 5	µg/L
Trichloroethene	< 5	< 5	µg/L
Benzene	< 5	< 5	µg/L
Dibromochloromethane	< 5	< 5	µg/L
1,1,2-Trichloroethane	< 5	< 5	µg/L
Cis-1,3-Dichloropropene	< 5	< 5	µg/L
2-Chloroethyl vinyl ether	< 10	< 10	µg/L
Bromoform	< 5	< 5	µg/L
1,1,2,2-Tetrachloroethane	< 5	< 5	µg/L
Tetrachlorethene	< 5	< 5	µg/L
Toluene	< 5	< 5	µg/L
Chlorobenzene	< 5	< 5	µg/L
Ethylbenzene	< 5	< 5	µg/L
Total Xylenes	< 5	< 5	µg/L
Carbon Disulfide	< 5	< 5	µg/L
Acetone	40	< 100	µg/L
2-Butanone	< 5	< 50	µg/L
Vinyl Acetate	< 5	< 50	µg/L
2-Hexanone	< 5	< 50	µg/L
4-Methyl-2-pentanone	< 5	< 50	µg/L
Styrene	< 5	< 5	µg/L
Total Dichlorobenzene	< 5	< 5	µg/L
--Semi-Volatile Organics--			
Phenol	11	16	µg/L
2-Chlorophenol	< 10	< 10	µg/L
2-Nitrophenol	< 10	< 10	µg/L
2,4-Dimethylphenol	< 10	< 10	µg/L
2,4-Dichlorophenol	< 10	< 10	µg/L
4-Chlor-3-methylphenol	< 10	< 20	µg/L
2,4,6-Trichlorophenol	< 10	< 10	µg/L
2,4-Dinitrophenol	< 50	< 50	µg/L
4-Nitrophenol	< 50	< 50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 50	µg/L
Pentachlorophenol	< 10	< 50	µg/L
N-Nitrosodimethylamine	< 10	< 10	µg/L
Bis(2-Chloroethyl)ether	< 10	< 10	µg/L
1,3-Dichlorobenzene	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2

Field# C-10

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
1,2-Dichlorobenzene	< 10	< 10	µg/L
1,4-Dichlorobenzene	< 10	< 10	µg/L
Hexachlorobenzene	< 10	< 10	µg/L
Hexachloroethane	< 10	< 10	µg/L
N-Nitrosodi-n-propylamine	< 10	< 10	µg/L
Nitrobenzene	< 10	< 10	µg/L
Di-n-octyl phthalate	18	10.6	µg/L
1,2,4-Trichlorobenzene	< 10	< 10	µg/L
Napthalene	< 10	< 10	µg/L
Hexachlorobutadiene	< 10	< 10	µg/L
2-Methylnaphthlene	< 10	< 10	µg/L
Hexachlorocyclopentadiene	< 10	< 10	µg/L
2-Chloronaphthalene	< 10	< 10	µg/L
Dimethyl phthalate	< 10	< 10	µg/L
Acenaphthylene	< 10	< 10	µg/L
Acenaphthene	< 10	< 10	µg/L
2,4-Dinitrotoluene	< 20	< 10	µg/L
2,6-Dinitrotoluene	< 20	< 10	µg/L
Fluorene	< 10	< 10	µg/L
Diethyl phthalate	< 10	< 10	µg/L
4-Chlorophenyl phenyl ether	< 10	< 10	µg/L
N-Nitrosodiphenylamine	< 20	< 10	µg/L
4-Bromophenyl phenyl ether	< 10	< 10	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 10	µg/L
Phenanthrene	< 10	< 10	µg/L
Anthracene	< 10	< 10	µg/L
Di-n-butyl phthalate	< 10	< 10	µg/L
Fluoranthene	< 10	< 10	µg/L
Benzidine	< 80	-	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 10	µg/L
Pyrene	< 10	< 10	µg/L
Butyl benzyl phthalate	< 10	< 10	µg/L
3,3-Dichlorobenzidine	< 20	< 20	µg/L
Chrysene	< 10	< 10	µg/L
Benzo(a)anthracene	< 10	< 10	µg/L
Bis(2-Ethylhexyl)phthalate	♦59	23.1	µg/L
Benzo(k)fluoranthene	< 10	< 10	µg/L
Benzo(b)fluoranthene	< 10	< 10	µg/L
Benzo(a)pyrene	< 10	< 10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 10	µg/L
Dibenzo(a,h)anthracene	< 10	< 10	µg/L
Benzo(g,h,i)perylene	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Major data disagreement
♦♦ : Major data disagreement

Field# C-10

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
Isophorone	< 10	< 10	µg/L
Aniline	< 10	< -	µg/L
Benzyl alcohol	< 10	< 20	µg/L
o-Cresol(2-methylphenol)	< 10	< 10	µg/L
p-Cresol(4-methylphenol)	< 10	< 10	µg/L
Benzoic acid	< 50	< 50	µg/L
4-Chloroaniline	< 10	< 20	µg/L
2,4,5-Trichlorophenol	< 50	< 50	µg/L
2-Nitroaniline	< 50	< 50	µg/L
Nitroaniline	< 50	< 50	µg/L
Dibenzofuran	< 10	< 10	µg/L
4-Nitroaniline	< 50	< 50	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# C-2

TABLE 3
COMPARISON OF FIELD AND QA DATA

Analysis	Field Result	QA Result	Units
--Metals--			
Antimony	< 2	< 1	µg/L
Arsenic	< 2	< 10	µg/L
Barium	363	310	µg/L
Cadmium	< 10	< 5	µg/l
Chromium	22	< 50	µg/L
Lead	9	< 5	µg/L
Mercury	< 0.2	< 1	µg/L
Nickel	< 15	< 50	µg/L
Selenium	< 2	< 10	µg/L
Silver	< 10	< 10	µg/L
Thallium	< 5	< 2	µg/L
--Anions--			
Chloride	180	186	mg/L
Nitrate	♦♦0.002	0.06	mg/L
Sulfate	0.30	< 1	mg/L
--Explosives--			
HMX	< 1	< 0.10	µg/L
RDX	< 0.84	< 0.10	µg/L
1,3,5-TNB	< 0.26	< 0.10	µg/L
1,3-DNB	< 0.11	< 0.10	µg/L
Tetryl	< 0.55	< 0.10	µg/L
2,4,6-TNT	< 0.11	< 0.10	µg/L
2,4-DNT	< 0.02	< 0.10	µg/L
2,6-DNT	< 0.31	< 0.10	µg/L
2-Am-4,6-DNT	< 0.03	-	µg/L
4-Am-2,6-DNT	< 0.06	-	µg/L
NB	-	< 0.10	µg/L
2-NT	-	< 0.10	µg/L
3-NT	-	< 0.10	µg/L
4-NT	-	< 0.10	µg/L
--Volatile Organics--			
Chloromethane	< 10	< 10	µg/L
Bromomethane	< 10	< 10	µg/L
Vinyl Chloride	< 10	< 10	µg/L
Chloroethane	< 10	< 10	µg/L
Methylene chloride	< 10	< 5	µg/L
Trichlorofluoromethane	< 5	-	µg/L
1,1-Dichloroethene	< 5	< 5	µg/L
1,1-Dichloroethane	< 5	< 5	µg/L
trans-1,2-Dichloroethene	< 5	+< 5	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2

Field# C-2

Analysis	Field Result	QA Result	Units
--Volatile Organics--(con't)			
Cis-1,2-Dichloroethene	< 5	+< 5	µg/L
Chloroform	< 5	< 5	µg/L
1,2-Dichloroethane	< 5	< 5	µg/L
1,1,1-Trichloroethane	< 5	< 5	µg/L
Carbon tetrachloride	< 5	< 5	µg/L
Bromodichloromethane	< 5	< 5	µg/L
1,2-Dichloropropane	< 5	< 5	µg/L
trans-1,3-Dichloropropene	< 5	< 5	µg/L
Trichloroethene	< 5	< 5	µg/L
Benzene	< 5	< 5	µg/L
Dibromochloromethane	< 5	< 5	µg/L
1,1,2-Trichloroethane	< 5	< 5	µg/L
Cis-1,3-Dichloropropene	< 5	< 5	µg/L
2-Chloroethyl vinyl ether	< 10	< 10	µg/L
Bromoform	< 5	< 5	µg/L
1,1,2,2-Tetrachloroethane	< 5	< 5	µg/L
Tetrachlorethene	< 5	< 5	µg/L
Toluene	< 5	< 5	µg/L
Chlorobenzene	< 5	< 5	µg/L
Ethylbenzene	< 5	< 5	µg/L
Total Xylenes	< 5	< 5	µg/L
Carbon Disulfide	< 5	< 5	µg/L
Acetone	< 10	< 100	µg/L
2-Butanone	< 5	< 50	µg/L
Vinyl Acetate	< 5	< 50	µg/L
2-Hexanone	< 5	< 50	µg/L
4-Methyl-2-pentanone	< 5	< 50	µg/L
Styrene	< 5	< 5	µg/L
Total Dichlorobenzene	< 5	< 5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	< 20	µg/L
2-Chlorophenol	< 10	< 20	µg/L
2-Nitrophenol	< 10	< 20	µg/L
2,4-Dimethylphenol	< 10	< 20	µg/L
2,4-Dichlorophenol	< 10	< 20	µg/L
4-Chlor-3-methylphenol	< 10	< 40	µg/L
2,4,6-Trichlorophenol	< 10	< 20	µg/L
2,4-Dinitrophenol	< 50	< 100	µg/L
4-Nitrophenol	< 50	< 100	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 100	µg/L
Pentachlorophenol	< 10	< 100	µg/L
N-Nitrosodimethylamine	< 10	< 20	µg/L
Bis(2-Chloroethyl)ether	< 10	< 20	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2

Field# C-2

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
1,3-Dichlorobenzene	< 10	< 20	µg/L
1,2-Dichlorobenzene	< 10	< 20	µg/L
1,4-Dichlorobenzene	< 10	< 20	µg/L
Hexachlorobenzene	< 10	< 20	µg/L
Hexachloroethane	< 10	< 20	µg/L
N-Nitrosodi-n-propylamine	< 10	< 20	µg/L
Nitrobenzene	< 10	< 20	µg/L
Di-n-octyl phthalate	< 10	< 20	µg/L
1,2,4-Trichlorobenzene	< 10	< 20	µg/L
Napthalene	< 10	< 20	µg/L
Hexachlorobutadiene	< 10	< 20	µg/L
2-Methylnaphthlene	< 10	< 20	µg/L
Hexachlorocyclopentadiene	< 10	< 20	µg/L
2-Chloronaphthalene	< 10	< 20	µg/L
Dimethyl phthalate	< 10	< 20	µg/L
Acenaphthylene	< 10	< 20	µg/L
Acenaphthene	< 10	< 20	µg/L
2,4-Dinitrotoluene	< 20	< 20	µg/L
2,6-Dinitrotoluene	< 20	< 20	µg/L
Fluorene	< 10	< 20	µg/L
Diethyl phthalate	< 10	< 20	µg/L
4-Chlorophenyl phenyl ether	< 10	< 20	µg/L
N-Nitrosodiphenylamine	< 20	< 20	µg/L
4-Bromophenyl phenyl ether	< 10	< 20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 20	µg/L
Phenanthrene	< 10	< 20	µg/L
Anthracene	< 10	< 20	µg/L
Di-n-butyl phthalate	< 10	< 20	µg/L
Fluoranthene	< 10	< 20	µg/L
Benzidine	< 80	-	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 20	µg/L
Pyrene	< 10	< 20	µg/L
Butyl benzyl phthalate	< 10	< 20	µg/L
3,3-Dichlorobenzidine	< 20	< 40	µg/L
Chrysene	< 10	< 20	µg/L
Benzo(a)anthracene	< 10	< 20	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	< 20	µg/L
Benzo(k)fluoranthene	< 10	< 20	µg/L
Benzo(b)fluoranthene	< 10	< 20	µg/L
Benzo(a)pyrene	< 10	< 20	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 20	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-19

005891

TABLE 3
COMPARISON OF FIELD AND QA DATA

Analysis	Field Result	QA Result	Units
--Metals--			
Antimony	♦3	< 1	µg/L
Arsenic	2	< 10	µg/L
Barium	65	60	µg/L
Cadmium	< 10	< 5	µg/l
Chromium	< 10	< 50	µg/L
Lead	♦11	< 5	µg/L
Mercury	< 0.2	< 1	µg/L
Nickel	< 15	< 50	µg/L
Selenium	< 2	< 10	µg/L
Silver	< 10	< 10	µg/L
Thallium	< 5	< 2	µg/L
--Anions--			
Chloride	2200	2580	mg/L
Nitrate	0.02	< 0.01	mg/L
Sulfate	♦340	59	mg/L
--Explosives--			
HMX	< 1	< 0.10	µg/L
RDX	< 0.84	< 0.10	µg/L
1,3,5-TNB	< 0.26	< 0.10	µg/L
1,3-DNB	< 0.11	< 0.10	µg/L
Tetryl	< 0.55	< 0.10	µg/L
2,4,6-TNT	< 0.11	< 0.10	µg/L
2,4-DNT	< 0.02	< 0.10	µg/L
2,6-DNT	< 0.31	< 0.10	µg/L
4-Am-2,6-DNT	0.10	-	µg/L
2-Am-4,6-DNT	< 0.03	-	µg/L
NB	-	< 0.10	µg/L
2-NT	-	< 0.10	µg/L
3-NT	-	< 0.10	µg/L
4-NT	-	< 0.10	µg/L
--Volatile Organics--			
Chloromethane	< 10	< 10	µg/L
Bromomethane	< 10	< 10	µg/L
Vinyl Chloride	< 10	< 10	µg/L
Chloroethane	< 10	< 10	µg/L
Methylene chloride	< 10	< 5	µg/L
Trichlorofluoromethane	< 5	< -	µg/L
1,1-Dichloroethene	< 5	< 5	µg/L
1,1-Dichloroethane	< 5	< 5	µg/L
trans-1,2-Dichloroethene	< 5	+< 5	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2

Field# MW-19

Analysis	Field Result	QA Result	Units
--Volatile Organics--(con't)			
Cis-1,2-Dichloroethene	< 5	+< 5	µg/L
Chloroform	< 5	< 5	µg/L
1,2-Dichloroethane	< 5	< 5	µg/L
1,1,1-Trichloroethane	< 5	< 5	µg/L
Carbon tetrachloride	< 5	< 5	µg/L
Bromodichloromethane	< 5	< 5	µg/L
1,2-Dichloropropane	< 5	< 5	µg/L
trans-1,3-Dichloropropene	< 5	< 5	µg/L
Trichloroethene	< 5	< 5	µg/L
Benzene	< 5	< 5	µg/L
Dibromochloromethane	< 5	< 5	µg/L
1,1,2-Trichloroethane	< 5	< 5	µg/L
Cis-1,3-Dichloropropene	< 5	< 5	µg/L
2-Chloroethyl vinyl ether	< 10	< 10	µg/L
Bromoform	< 5	< 5	µg/L
1,1,2,2-Tetrachloroethane	< 5	< 5	µg/L
Tetrachlorethene	< 5	< 5	µg/L
Toluene	< 5	< 5	µg/L
Chlorobenzene	< 5	< 5	µg/L
Ethylbenzene	< 5	< 5	µg/L
Total Xylenes	< 5	< 5	µg/L
Carbon Disulfide	< 5	< 5	µg/L
Acetone	< 10	< 100	µg/L
2-Butanone	< 5	< 50	µg/L
Vinyl Acetate	< 5	< 50	µg/L
2-Hexanone	< 5	< 50	µg/L
4-Methyl-2-pentanone	< 5	< 50	µg/L
Styrene	< 5	< 5	µg/L
Total Dichlorobenzene	< 5	< 5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	< 20	µg/L
2-Chlorophenol	< 10	< 20	µg/L
2-Nitrophenol	< 10	< 20	µg/L
2,4-Dimethylphenol	< 10	< 20	µg/L
2,4-Dichlorophenol	< 10	< 20	µg/L
4-Chlor-3-methylphenol	< 10	< 40	µg/L
2,4,6-Trichlorophenol	< 10	< 20	µg/L
2,4-Dinitrophenol	< 50	< 100	µg/L
4-Nitrophenol	< 50	< 100	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 100	µg/L
Pentachlorophenol	< 10	< 100	µg/L
N-Nitrosodimethylamine	< 10	< 20	µg/L
Bis(2-Chloroethyl)ether	< 10	< 20	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2

Field# MW-19

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
1,3-Dichlorobenzene	< 10	< 20	µg/L
1,2-Dichlorobenzene	< 10	< 20	µg/L
1,4-Dichlorobenzene	< 10	< 20	µg/L
Hexachlorobenzene	< 10	< 20	µg/L
Hexachloroethane	< 10	< 20	µg/L
N-Nitrosodi-n-propylamine	< 10	< 20	µg/L
Nitrobenzene	< 10	< 20	µg/L
Di-n-octyl phthalate	< 10	< 20	µg/L
1,2,4-Trichlorobenzene	< 10	< 20	µg/L
Napthalene	< 10	< 20	µg/L
Hexachlorobutadiene	< 10	< 20	µg/L
2-Methylnaphthlene	< 10	< 20	µg/L
Hexachlorocyclopentadiene	< 10	< 20	µg/L
2-Chloronaphthalene	< 10	< 20	µg/L
Dimethyl phthalate	< 10	< 20	µg/L
Acenaphthylene	< 10	< 20	µg/L
Acenaphthene	< 10	< 20	µg/L
2,4-Dinitrotoluene	< 20	< 20	µg/L
2,6-Dinitrotoluene	< 20	< 20	µg/L
Fluorene	< 10	< 20	µg/L
Diethyl phthalate	< 10	< 20	µg/L
4-Chlorophenyl phenyl ether	< 10	< 20	µg/L
N-Nitrosodiphenylamine	< 20	< 20	µg/L
4-Bromophenyl phenyl ether	< 10	< 20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 20	µg/L
Phenanthrene	< 10	< 20	µg/L
Anthracene	< 10	< 20	µg/L
Di-n-butyl phthalate	< 10	< 20	µg/L
Fluoranthene	< 10	< 20	µg/L
Benzidine	< 80	< -	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 20	µg/L
Pyrene	< 10	< 20	µg/L
Butyl benzyl phthalate	< 10	< 20	µg/L
3,3-Dichlorobenzidine	< 20	< 40	µg/L
Chrysene	< 10	< 20	µg/L
Benzo(a)anthracene	< 10	< 20	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	< 20	µg/L
Benzo(k)fluoranthene	< 10	< 20	µg/L
Benzo(b)fluoranthene	< 10	< 20	µg/L
Benzo(a)pyrene	< 10	< 20	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-19

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
Indeno(1,2,3-cd)pyrene	< 10	< 20	µg/L
Dibenzo(a,h)anthracene	< 10	< 20	µg/L
Benzo(g,h,i)perylene	< 10	< 20	µg/L
Isophorone	< 10	< 20	µg/L
Aniline	< 10	-	µg/L
Benzyl alcohol	< 10	< 40	µg/L
o-Cresol(2-Methylphenol)	< 10	< 20	µg/L
p-Cresol(4-Methylphenol)	< 10	< 20	µg/L
Benzoic acid	< 50	< 100	µg/L
4-Chloroaniline	< 10	< 40	µg/L
2,4,5-Trichlorophenol	< 50	< 100	µg/L
2-Nitroaniline	< 50	< 100	µg/L
Nitroaniline	< 50	< 100	µg/L
Dibenzofuran	< 10	< 20	µg/L
4-Nitroaniline	< 50	< 100	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-3

TABLE 3
COMPARISON OF FIELD AND QA DATA

Analysis	Field Result	QA Result	Units
--Metals--			
Antimony	2	< 1	µg/L
Arsenic	< 2	< 10	µg/L
Barium	1130	1170	µg/L
Cadmium	< 10	< 5	µg/l
Chromium	< 10	< 50	µg/L
Lead	5	< 5	µg/L
Mercury	< 0.2	< 1	µg/L
Nickel	22	< 50	µg/L
Selenium	< 2	< 10	µg/L
Silver	< 10	< 10	µg/L
Thallium	< 5	< 2	µg/L
--Anions--			
Chloride	440	418	mg/L
Nitrate	0.16	0.20	mg/L
Sulfate	20	16	mg/L
--Explosives--			
HMX	< 1	< 0.10	µg/L
RDX	< 0.84	< 0.10	µg/L
1,3,5-TNB	< 0.26	< 0.10	µg/L
1,3-DNB	♦0.60	< 0.10	µg/L
Tetryl	< 0.55	< 0.10	µg/L
2,4,6-TNT	♦0.35	< 0.10	µg/L
2,4-DNT	♦0.36	< 0.10	µg/L
2,6-DNT	< 0.31	< 0.10	µg/L
4-Am-2,6-DNT	< 0.06	-	µg/L
2-Am-4,6-DNT	0.25	-	µg/L
NB	-	< 0.10	µg/L
2-NT	-	< 0.10	µg/L
3-NT	-	< 0.10	µg/L
4-NT	-	< 0.10	µg/L
--Volatile Organics--			
Chloromethane	< 10	< 10	µg/L
Bromomethane	< 10	< 10	µg/L
Vinyl Chloride	< 10	14.9	µg/L
Chloroethane	< 10	< 10	µg/L
Methylene chloride	< 10	< 5	µg/L
Trichlorofluoromethane	< 5	< -	µg/L
1,1-Dichloroethene	< 5	< 5	µg/L
1,1-Dichloroethane	7	8.9	µg/L
trans-1,2-Dichloroethene	< 5	+ 26.7	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2

Field# MW-3

Analysis	Field Result	QA Result	Units
--Volatile Organics--(con't)			
Cis-1,2-Dichloroethene	18	+ 26.7	µg/L
Chloroform	< 5	< 5	µg/L
1,2-Dichloroethane	< 5	< 5	µg/L
1,1,1-Trichloroethane	< 5	< 5	µg/L
Carbon tetrachloride	< 5	< 5	µg/L
Bromodichloromethane	< 5	< 5	µg/L
1,2-Dichloropropane	< 5	< 5	µg/L
trans-1,3-Dichloropropene	< 5	< 5	µg/L
Trichloroethene	315	484	µg/L
Benzene	< 5	< 5	µg/L
Dibromochloromethane	< 5	< 5	µg/L
1,1,2-Trichloroethane	< 5	< 5	µg/L
Cis-1,3-Dichloropropene	< 5	< 5	µg/L
2-Chloroethyl vinyl ether	< 10	< 10	µg/L
Bromoform	< 5	< 5	µg/L
1,1,2,2-Tetrachloroethane	< 5	< 5	µg/L
Tetrachlorethene	< 5	< 5	µg/L
Toluene	< 5	< 5	µg/L
Chlorobenzene	< 5	< 5	µg/L
Ethylbenzene	< 5	< 5	µg/L
Total Xylenes	< 5	< 5	µg/L
Carbon Disulfide	< 5	< 5	µg/L
Acetone	< 10	< 100	µg/L
2-Butanone	< 5	< 50	µg/L
Vinyl Acetate	< 5	< 50	µg/L
2-Hexanone	< 5	< 50	µg/L
4-Methyl-2-pentanone	< 5	< 50	µg/L
Styrene	< 5	< 5	µg/L
Total Dichlorobenzene	< 5	< 5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	< 10	µg/L
2-Chlorophenol	< 10	< 10	µg/L
2-Nitrophenol	< 10	< 10	µg/L
2,4-Dimethylphenol	< 10	< 10	µg/L
2,4-Dichlorophenol	< 10	< 10	µg/L
4-Chlor-3-methylphenol	< 10	< 20	µg/L
2,4,6-Trichlorophenol	< 10	< 10	µg/L
2,4-Dinitrophenol	< 50	< 50	µg/L
4-Nitrophenol	< 50	< 50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 50	µg/L
Pentachlorophenol	< 10	< 50	µg/L
N-Nitrosodimethylamine	< 10	< 10	µg/L
Bis(2-Chloroethyl)ether	< 10	< 10	µg/L
1,3-Dichlorobenzene	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2

Field# MW-3

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
1,2-Dichlorobenzene	< 10	< 10	µg/L
1,4-Dichlorobenzene	< 10	< 10	µg/L
Hexachlorobenzene	< 10	< 10	µg/L
Hexachloroethane	< 10	< 10	µg/L
N-Nitrosodi-n-propylamine	< 10	< 10	µg/L
Nitrobenzene	< 10	< 10	µg/L
Di-n-octyl phthalate	< 10	< 10	µg/L
1,2,4-Trichlorobenzene	< 10	< 10	µg/L
Napthalene	< 10	< 10	µg/L
Hexachlorobutadiene	< 10	< 10	µg/L
2-Methylnaphthlene	< 10	< 10	µg/L
Hexachlorocyclopentadiene	< 10	< 10	µg/L
2-Chloronaphthalene	< 10	< 10	µg/L
Dimethyl phthalate	< 10	< 10	µg/L
Acenaphthylene	< 10	< 10	µg/L
Acenaphthene	< 10	< 10	µg/L
2,4-Dinitrotoluene	< 20	< 10	µg/L
2,6-Dinitrotoluene	< 20	< 10	µg/L
Fluorene	< 10	< 10	µg/L
Diethyl phthalate	< 10	< 10	µg/L
4-Chlorophenyl phenyl ether	< 10	< 10	µg/L
N-Nitrosodiphenylamine	< 20	< 10	µg/L
4-Bromophenyl phenyl ether	< 10	< 10	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 10	µg/L
Phenanthrene	< 10	< 10	µg/L
Anthracene	< 10	< 10	µg/L
Di-n-butyl phthalate	< 10	< 10	µg/L
Fluoranthene	< 10	< 10	µg/L
Benzidine	< 80	< -	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 10	µg/L
Pyrene	< 10	< 10	µg/L
Butyl benzyl phthalate	< 10	< 10	µg/L
3,3-Dichlorobenzidine	< 20	< 20	µg/L
Chrysene	< 10	< 10	µg/L
Benzo(a)anthracene	< 10	< 10	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	< 10	µg/L
Benzo(k)fluoranthene	< 10	< 10	µg/L
Benzo(b)fluoranthene	< 10	< 10	µg/L
Benzo(a)pyrene	< 10	< 10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 10	µg/L
Dibenzo(a,h)anthracene	< 10	< 10	µg/L
Benzo(g,h,i)perylene	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-3

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
Isophorone	< 10	< 10	µg/L
Aniline	< 10	< -	µg/L
Benzyl alcohol	< 10	< 20	µg/L
o-Cresol(2-Methylphenol)	< 10	< 10	µg/L
p-Cresol(4-Methylphenol)	< 10	< 10	µg/L
Benzoic acid	< 50	< 50	µg/L
4-Chloroaniline	< 10	< 20	µg/L
2,4,5-Trichlorophenol	< 50	< 50	µg/L
2-Nitroaniline	< 50	< 50	µg/L
Nitroaniline	< 50	< 50	µg/L
Dibenzofuran	< 10	< 10	µg/L
4-Nitroaniline	< 50	< 50	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-1

TABLE 3
COMPARISON OF FIELD AND QA DATA

Analysis	Field Result	QA Result	Units
--Metals--			
Antimony	♦3	< 1	µg/L
Arsenic	2	< 10	µg/L
Barium	5160	5300	µg/L
Cadmium	< 10	< 50	µg/l
Chromium	< 10	< 50	µg/L
Lead	5	< 5	µg/L
Mercury	< 0.2	< 1	µg/L
Nickel	20	< 50	µg/L
Selenium	< 2	< 10	µg/L
Silver	< 10	< 10	µg/L
Thallium	♦6	< 2	µg/L
--Anions--			
Chloride	1260	1390	mg/L
Nitrate	♦0.50	0.09	mg/L
Sulfate	♦3	< 1	mg/L
--Explosives--			
HMX	< 1	< 0.10	µg/L
RDX	< 0.84	< 0.10	µg/L
1,3,5-TNB	< 0.26	< 0.10	µg/L
1,3-DNB	♦0.39	< 0.10	µg/L
Tetryl	< 0.55	< 0.10	µg/L
2,4,6-TNT	< 0.11	< 0.10	µg/L
2,4-DNT	< 0.02	< 0.10	µg/L
2,6-DNT	< 0.31	< 0.10	µg/L
4-Am-2,6-DNT	< 0.03	-	µg/L
2-Am-4,6-DNT	< 0.06	-	µg/L
NB	-	< 0.10	µg/L
2-NT	-	< 0.10	µg/L
3-NT	-	< 0.10	µg/L
4-NT	-	< 0.10	µg/L
--Volatile Organics--			
Chloromethane	< 10	*< 500	µg/L
Bromomethane	< 10	*< 500	µg/L
Vinyl Chloride	< 10	*< 500	µg/L
Chloroethane	< 10	*< 500	µg/L
Methylene chloride	♦251000	*599000	µg/L
Trichlorofluoromethane	1600	-	µg/L
1,1-Dichloroethene	< 5	*< 250	µg/L
1,1-Dichloroethane	< 5	*< 250	µg/L
trans-1,2-Dichloroethene	< 5	+*< 250	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
** : Major data disagreement + : See paragraph 8.2
* : High dilution factor used

Field# MW-1

Analysis	Field Result	QA Result	Units
--Volatile Organics--(con't)			
Cis-1,2-Dichloroethene	18	+*< 250	µg/L
Chloroform	287	*< 250	µg/L
1,2-Dichloroethane	< 5	*< 250	µg/L
1,1,1-Trichloroethane	< 5	*< 250	µg/L
Carbon tetrachloride	< 5	*< 250	µg/L
Bromodichloromethane	< 5	*< 250	µg/L
1,2-Dichloropropane	< 5	*< 250	µg/L
trans-1,3-Dichloropropene	< 5	*< 250	µg/L
Trichloroethene	24300	*29400	µg/L
Benzene	< 5	*< 250	µg/L
Dibromochloromethane	< 5	*< 250	µg/L
1,1,2-Trichloroethane	25	*< 250	µg/L
Cis-1,3-Dichloropropene	< 5	*< 250	µg/L
2-Chloroethyl vinyl ether	< 10	*< 500	µg/L
Bromoform	< 5	*< 250	µg/L
1,1,2,2-Tetrachloroethane	< 5	*< 250	µg/L
Tetrachlorethene	14	*< 250	µg/L
Toluene	9	*< 250	µg/L
Chlorobenzene	< 5	*< 250	µg/L
Ethylbenzene	< 5	*< 250	µg/L
Total Xylenes	5	*< 250	µg/L
Carbon Disulfide	< 5	*< 250	µg/L
Acetone	< 10	*<5000	µg/L
2-Butanone	< 5	*<2500	µg/L
Vinyl Acetate	< 5	*<2500	µg/L
2-Hexanone	< 5	*<2500	µg/L
4-Methyl-2-pentanone	< 5	*<2500	µg/L
Styrene	< 5	*< 250	µg/L
Total Dichlorobenzene	< 5	*< 250	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	< 10	µg/L
2-Chlorophenol	< 10	< 10	µg/L
2-Nitrophenol	< 10	< 10	µg/L
2,4-Dimethylphenol	< 10	< 10	µg/L
2,4-Dichlorophenol	< 10	< 10	µg/L
4-Chlor-3-methylphenol	< 10	< 20	µg/L
2,4,6-Trichlorophenol	< 10	< 10	µg/L
2,4-Dinitrophenol	< 50	< 50	µg/L
4-Nitrophenol	< 50	< 50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	< 50	µg/L
Pentachlorophenol	< 10	< 50	µg/L
N-Nitrosodimethylamine	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2
* : High dilution factor used

Field# MW-1

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
Bis(2-Chloroethyl)ether	< 10	< 10	µg/L
1,3-Dichlorobenzene	< 10	< 10	µg/L
1,2-Dichlorobenzene	< 10	< 10	µg/L
1,4-Dichlorobenzene	< 10	< 10	µg/L
Hexachlorobenzene	< 10	< 10	µg/L
Hexachloroethane	< 10	< 10	µg/L
N-Nitrosodi-n-propylamine	< 10	< 10	µg/L
Nitrobenzene	< 10	< 10	µg/L
Di-n-octyl phthalate	< 10	< 10	µg/L
1,2,4-Trichlorobenzene	< 10	< 10	µg/L
Napthalene	< 10	< 10	µg/L
Hexachlorobutadiene	< 10	< 10	µg/L
2-Methylnaphthlene	< 10	< 10	µg/L
Hexachlorocyclopentadiene	< 10	< 10	µg/L
2-Chloronaphthalene	< 10	< 10	µg/L
Dimethyl phthalate	< 10	< 10	µg/L
Acenaphthylene	< 10	< 10	µg/L
Acenaphthene	< 10	< 10	µg/L
2,4-Dinitrotoluene	< 20	< 10	µg/L
2,6-Dinitrotoluene	< 20	< 10	µg/L
Fluorene	< 10	< 10	µg/L
Diethyl phthalate	< 10	< 10	µg/L
4-Chlorophenyl phenyl ether	< 10	< 10	µg/L
N-Nitrosodiphenylamine	< 20	< 10	µg/L
4-Bromophenyl phenyl ether	< 10	< 10	µg/L
Bis(2-Chloroisopropyl)ether	< 10	< 10	µg/L
Phenanthrene	< 10	< 10	µg/L
Anthracene	< 10	< 10	µg/L
Di-n-butyl phthalate	< 10	< 10	µg/L
Fluoranthene	< 10	< 10	µg/L
Benzidine	< 80	< -	µg/L
Bis(2-Chloroethoxy)methane	< 20	< 10	µg/L
Pyrene	< 10	< 10	µg/L
Butyl benzyl phthalate	< 10	< 10	µg/L
3,3-Dichlorobenzidine	< 20	< 20	µg/L
Chrysene	< 10	< 10	µg/L
Benzo(a)anthracene	< 10	< 10	µg/L
Bis(2-Ethylhexyl)phthalate	♦62	< 10	µg/L
Benzo(k)fluoranthene	< 10	< 10	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-1

Analysis	Field Result	QA Result	Units
--Semi-Volatile Organics(con't)--			
Benzo(b)fluoranthene	< 10	< 10	µg/L
Benzo(a)pyrene	< 10	< 10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	< 10	µg/L
Dibenzo(a,h)anthracene	< 10	< 10	µg/L
Benzo(g,h,i)perylene	< 10	< 10	µg/L
Isophorone	< 10	< 10	µg/L
Aniline	< 10	< -	µg/L
Benzyl alcohol	< 10	< 20	µg/L
o-Cresol	< 10	< 10	µg/L
p-Cresol	< 10	< 10	µg/L
Benzoic acid	< 50	< 50	µg/L
4-Chloroaniline	< 10	< 20	µg/L
2,4,5-Trichlorophenol	< 50	< 50	µg/L
2-Nitroaniline	< 50	< 50	µg/L
Nitroaniline	< 50	< 50	µg/L
Dibenzofuran	< 10	< 10	µg/L
4-Nitroaniline	< 50	< 50	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement

Field# MW-2 Free Phase

TABLE 3
COMPARISON OF FIELD AND QA DATA

Analysis	Field Result	QA Result	Units
--Volatile Organics--			
Chloromethane	<5000	*<250000	µg/L
Bromomethane	<5000	*<250000	µg/L
Vinyl Chloride	<5000	*<250000	µg/L
Chloroethane	<5000	*<250000	µg/L
Methylene chloride	♦12100000	*62100000	µg/L
Trichlorofluoromethane	<2500	-	µg/L
1,1-Dichloroethene	<2500	*<125000	µg/L
1,1-Dichloroethane	<2500	*<125000	µg/L
trans-1,2-Dichloroethene	<2500	+*<125000	µg/L
Cis-1,2-Dichloroethene	<2500	+*<125000	µg/L
Chloroform	2900	*<125000	µg/L
1,2-Dichloroethane	<2500	*<125000	µg/L
1,1,1-Trichloroethane	<2500	*<125000	µg/L
Carbon tetrachloride	<2500	*<125000	µg/L
Bromodichloromethane	<2500	*<125000	µg/L
1,2-Dichloropropane	<2500	*<125000	µg/L
trans-1,3-Dichloropropene	<2500	*<125000	µg/L
Trichloroethene	251000	* 188000	µg/L
Benzene	<2500	*<125000	µg/L
Dibromochloromethane	<2500	*<125000	µg/L
1,1,2-Trichloroethane	<2500	*<125000	µg/L
Cis-1,3-Dichloropropene	<2500	*<125000	µg/L
2-Chloroethyl vinyl ether	<2500	*<250000	µg/L
Bromoform	<2500	*<125000	µg/L
1,1,2,2-Tetrachloroethane	<2500	*<125000	µg/L
Tetrachlorethene	<2500	*<125000	µg/L
Toluene	<2500	*<125000	µg/L
Chlorobenzene	<2500	*<125000	µg/L
Ethylbenzene	<2500	*<125000	µg/L
Total Xylenes	<2500	*<125000	µg/L
Carbon Disulfide	<2500	*<125000	µg/L
Acetone	<5000	*<2500000	µg/L
2-Butanone	<2500	*<1250000	µg/L
Vinyl Acetate	<2500	*<1250000	µg/L
2-Hexanone	<2500	*<1250000	µg/L
4-Methyl-2-pentanone	<2500	*<1250000	µg/L
Styrene	<2500	*<125000	µg/L
Total Dichlorobenzene	<2500	*<125000	µg/L

Notes:
- : Not analyzed or not reported ♦ : Minor data disagreement
♦♦ : Major data disagreement + : See paragraph 8.2
* : High dilution factor used

TABLE 4

Field#EB-19

TABLE 4
EQUIPMENT BLANK ANALYSES

Analysis	EB Result	Detection Limit	Units
--Metals--			
Antimony	< 2	2	µg/L
Arsenic	< 2	2	µg/L
Barium	< 5	5	µg/L
Cadmium	< 10	10	µg/l
Chromium	< 10	10	µg/L
Lead	6	5	µg/L
Mercury	< 0.2	0.2	µg/L
Nickel	< 15	15	µg/L
Selenium	< 2	2	µg/L
Silver	< 10	10	µg/L
Thallium	< 5	5	µg/L
--Anions--			
Chloride	♦19	0.2	mg/L
Nitrate	♦0.06	0.002	mg/L
Sulfate	♦3.2	0.2	mg/L
--Explosives--			
HMX	< 1.00	1.00	µg/L
RDX	< 0.84	0.84	µg/L
1,3,5-TNB	< 0.26	0.26	µg/L
1,3-DNB	< 0.11	0.11	µg/L
Tetryl	< 0.55	0.55	µg/L
2,4,6-TNT	< 0.11	0.11	µg/L
2,4-DNT	0.05	0.02	µg/L
2,6-DNT	< 0.31	0.31	µg/L
2-Am-4,6-DNT	< 0.03	0.03	µg/L
4-Am-2,6-DNT	< 0.06	0.06	µg/L
--Volatile Organics--			
Chloromethane	< 10	10	µg/L
Bromomethane	< 10	10	µg/L
Vinyl Chloride	< 10	10	µg/L
Chloroethane	< 10	10	µg/L
Methylene chloride	< 10	10	µg/L
Trichlorofluoromethane	< 5	5	µg/L
1,1-Dichloroethene	< 5	5	µg/L
1,1-Dichloroethane	< 5	5	µg/L
trans-1,2-Dichloroethene	< 5	5	µg/L
Cis-1,2-Dichloroethene	< 5	5	µg/L
Chloroform	< 5	5	µg/L
1,2-Dichloroethane	< 5	5	µg/L
1,1,1-Trichloroethane	< 5	5	µg/L
Carbon tetrachloride	< 5	5	µg/L

Notes:
♦ : Major contaminant

Field# EB-19

Analysis	EB Result	Detection Limit	Units
--Volatile Organics--(con't)			
Bromodichloromethane	< 5	5	µg/L
1,2-Dichloropropane	< 5	5	µg/L
trans-1,3-Dichloropropene	< 5	5	µg/L
Trichloroethene	< 5	5	µg/L
Benzene	< 5	5	µg/L
Dibromochloromethane	< 5	5	µg/L
1,1,2-Trichloroethane	< 5	5	µg/L
Cis-1,3-Dichloropropene	< 5	5	µg/L
2-Chloroethyl vinyl ether	< 10	10	µg/L
Bromoform	< 5	5	µg/L
1,1,2,2-Tetrachloroethane	< 5	5	µg/L
Tetrachlorethene	< 5	5	µg/L
Toluene	< 5	5	µg/L
Chlorobenzene	< 5	5	µg/L
Ethylbenzene	< 5	5	µg/L
Total Xylenes	< 5	5	µg/L
Carbon Disulfide	< 5	5	µg/L
Acetone	< 10	10	µg/L
2-Butanone	< 5	5	µg/L
Vinyl Acetate	< 5	5	µg/L
2-Hexanone	< 5	5	µg/L
4-Methyl-2-pentanone	< 5	5	µg/L
Styrene	< 5	5	µg/L
Total Dichlorobenzene	< 5	5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	10	µg/L
2-Chlorophenol	< 10	10	µg/L
2-Nitrophenol	< 10	10	µg/L
2,4-Dimethylphenol	< 10	10	µg/L
2,4-Dichlorophenol	< 10	10	µg/L
4-Chlor-3-methylphenol	< 10	10	µg/L
2,4,6-Trichlorophenol	< 10	10	µg/L
2,4-Dinitrophenol	< 50	50	µg/L
4-Nitrophenol	< 50	50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	50	µg/L
Pentachlorophenol	< 10	10	µg/L
N-Nitrosodimethylamine	< 10	10	µg/L
Bis(2-Chloroethyl)ether	< 10	10	µg/L
1,3-Dichlorobenzene	< 10	10	µg/L
1,2-Dichlorobenzene	< 10	10	µg/L
1,4-Dichlorobenzene	< 10	10	µg/L
Hexachlorobenzene	< 10	10	µg/L
Hexachloroethane	< 10	10	µg/L

Notes:
♦ : Major contaminant

Field#EB-19

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics(con't)--			
N-Nitrosodi-n-propylamine	< 10	10	µg/L
Nitrobenzene	< 10	10	µg/L
Di-n-octyl phthalate	< 10	10	µg/L
1,2,4-Trichlorobenzene	< 10	10	µg/L
Napthalene	< 10	10	µg/L
Hexachlorobutadiene	< 10	10	µg/L
2-Methylnaphthlene	< 10	10	µg/L
Hexachlorocyclopentadiene	< 10	10	µg/L
2-Chloronaphthalene	< 10	10	µg/L
Dimethyl phthalate	< 10	10	µg/L
Acenaphthylene	< 10	10	µg/L
Acenaphthene	< 10	10	µg/L
2,4-Dinitrotoluene	< 20	20	µg/L
2,6-Dinitrotoluene	< 20	20	µg/L
Fluorene	< 10	10	µg/L
Diethyl phthalate	< 10	10	µg/L
4-Chlorophenyl phenyl ether	< 10	10	µg/L
N-Nitrosodiphenylamine	< 20	20	µg/L
4-Bromophenyl phenyl ether	< 10	20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	10	µg/L
Phenanthrene	< 10	10	µg/L
Anthracene	< 10	10	µg/L
Di-n-butyl phthalate	< 10	10	µg/L
Fluoranthene	< 10	10	µg/L
Benzidine	< 80	80	µg/L
Bis(2-Chloroethoxy)methane	< 20	20	µg/L
Pyrene	< 10	10	µg/L
Butyl benzyl phthalate	< 10	10	µg/L
3,3-Dichlorobenzidine	< 20	20	µg/L
Chrysene	< 10	10	µg/L
Benzo(a)anthracene	< 10	10	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	40	µg/L
Benzo(k)fluoranthene	< 10	10	µg/L
Benzo(b)fluoranthene	< 10	10	µg/L
Benzo(a)pyrene	< 10	10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	10	µg/L
Dibenzo(a,h)anthracene	< 10	10	µg/L
Benzo(g,h,i)perylene	< 10	10	µg/L
Isophorone	< 10	10	µg/L
Aniline	< 10	10	µg/L
Benzyl alcohol	< 10	10	µg/L
o-Cresol	< 10	10	µg/L
p-Cresol	< 10	10	µg/L
Benzoic acid	< 50	50	µg/L
4-Chloroaniline	< 10	10	µg/L
2,4,5-Trichlorophenol	< 50	50	µg/L

Notes: ♦ : Major contaminant

Field#EB-19

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics(con't)--			
2-Nitroaniline	< 50	50	µg/L
Nitroaniline	< 50	50	µg/L
Dibenzofuran	< 10	10	µg/L
4-Nitroaniline	< 50	50	µg/L

Notes:
♦ : Major contaminant

Field#EB102

TABLE 4
EQUIPMENT BLANK ANALYSES

Analysis	EB Result	Detection Limit	Units
--Metals--			
Antimony	2	2	µg/L
Arsenic	< 2	2	µg/L
Barium	< 5	5	µg/L
Cadmium	< 10	10	µg/l
Chromium	< 10	10	µg/L
Lead	< 5	5	µg/L
Mercury	< 0.2	0.2	µg/L
Nickel	< 15	15	µg/L
Selenium	< 2	2	µg/L
Silver	< 10	10	µg/L
Thallium	< 5	5	µg/L
--Anions--			
Chloride	♦1.5	0.2	mg/L
Nitrate	< 0.002	0.002	mg/L
Sulfate	< 0.2	0.2	mg/L
--Explosives--			
HMX	< 1.00	1.00	µg/L
RDX	< 0.84	0.84	µg/L
1,3,5-TNB	♦0.53	0.26	µg/L
1,3-DNB	< 0.11	0.11	µg/L
Tetryl	< 0.55	0.55	µg/L
2,4,6-TNT	♦1.24	0.11	µg/L
2,4-DNT	< 0.02	0.02	µg/L
2,6-DNT	< 0.31	0.31	µg/L
2-Am-4,6-DNT	♦0.29	0.03	µg/L
4-Am-2,6-DNT	< 0.06	0.06	µg/L
--Volatile Organics--			
Chloromethane	< 10	10	µg/L
Bromomethane	< 10	10	µg/L
Vinyl Chloride	< 10	10	µg/L
Chloroethane	< 10	10	µg/L
Methylene chloride	< 10	10	µg/L
Trichlorofluoromethane	< 5	5	µg/L
1,1-Dichloroethene	< 5	5	µg/L
1,1-Dichloroethane	< 5	5	µg/L
trans-1,2-Dichloroethene	< 5	5	µg/L
Cis-1,2-Dichloroethene	< 5	5	µg/L
Chloroform	24	5	µg/L
1,2-Dichloroethane	< 5	5	µg/L
1,1,1-Trichloroethane	< 5	5	µg/L
Carbon tetrachloride	< 5	5	µg/L

Notes:
♦ : Major contaminant

Field#EB102

Analysis	EB Result	Detection Limit	Units
--Volatile Organics--(con't)			
Bromodichloromethane	13	5	µg/L
1,2-Dichloropropane	< 5	5	µg/L
trans-1,3-Dichloropropene	< 5	5	µg/L
Trichloroethene	< 5	5	µg/L
Benzene	< 5	5	µg/L
Dibromochloromethane	7	5	µg/L
1,1,2-Trichloroethane	< 5	5	µg/L
Cis-1,3-Dichloropropene	< 5	5	µg/L
2-Chloroethyl vinyl ether	< 10	10	µg/L
Bromoform	< 5	5	µg/L
1,1,2,2-Tetrachloroethane	< 5	5	µg/L
Tetrachlorethene	< 5	5	µg/L
Toluene	< 5	5	µg/L
Chlorobenzene	< 5	5	µg/L
Ethylbenzene	< 5	5	µg/L
Total Xylenes	< 5	5	µg/L
Carbon Disulfide	< 5	5	µg/L
Acetone	< 10	10	µg/L
2-Butanone	< 5	5	µg/L
Vinyl Acetate	< 5	5	µg/L
2-Hexanone	< 5	5	µg/L
4-Methyl-2-pentanone	< 5	5	µg/L
Styrene	< 5	5	µg/L
Total Dichlorobenzene	< 5	5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	10	µg/L
2-Chlorophenol	< 10	10	µg/L
2-Nitrophenol	< 10	10	µg/L
2,4-Dimethylphenol	< 10	10	µg/L
2,4-Dichlorophenol	< 10	10	µg/L
4-Chlor-3-methylphenol	< 10	10	µg/L
2,4,6-Trichlorophenol	< 10	10	µg/L
2,4-Dinitrophenol	< 50	50	µg/L
4-Nitrophenol	< 50	50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	50	µg/L
Pentachlorophenol	< 10	10	µg/L
N-Nitrosodimethylamine	< 10	10	µg/L
Bis(2-Chloroethyl)ether	< 10	10	µg/L
1,3-Dichlorobenzene	< 10	10	µg/L
1,2-Dichlorobenzene	< 10	10	µg/L
1,4-Dichlorobenzene	< 10	10	µg/L
Hexachlorobenzene	< 10	10	µg/L
Hexachloroethane	< 10	10	µg/L

Notes:
♦ : Major contaminant

Field#EB102

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics(con't)--			
N-Nitrosodi-n-propylamine	< 10	10	µg/L
Nitrobenzene	< 10	10	µg/L
Di-n-octyl phthalate	< 10	10	µg/L
1,2,4-Trichlorobenzene	< 10	10	µg/L
Napthalene	< 10	10	µg/L
Hexachlorobutadiene	< 10	10	µg/L
2-Methylnaphthlene	< 10	10	µg/L
Hexachlorocyclopentadiene	< 10	10	µg/L
2-Chloronaphthalene	< 10	10	µg/L
Dimethyl phthalate	< 10	10	µg/L
Acenaphthylene	< 10	10	µg/L
Acenaphthene	< 10	10	µg/L
2,4-Dinitrotoluene	< 20	20	µg/L
2,6-Dinitrotoluene	< 20	20	µg/L
Fluorene	< 10	10	µg/L
Diethyl phthalate	< 10	10	µg/L
4-Chlorophenyl phenyl ether	< 10	10	µg/L
N-Nitrosodiphenylamine	< 20	20	µg/L
4-Bromophenyl phenyl ether	< 10	20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	10	µg/L
Phenanthrene	< 10	10	µg/L
Anthracene	< 10	10	µg/L
Di-n-butyl phthalate	< 10	10	µg/L
Fluoranthene	< 10	10	µg/L
Benzidine	< 80	80	µg/L
Bis(2-Chloroethoxy)methane	< 20	20	µg/L
Pyrene	< 10	10	µg/L
Butyl benzyl phthalate	< 10	10	µg/L
3,3-Dichlorobenzidine	< 20	20	µg/L
Chrysene	< 10	10	µg/L
Benzo(a)anthracene	< 10	10	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	40	µg/L
Benzo(k)fluoranthene	< 10	10	µg/L
Benzo(b)fluoranthene	< 10	10	µg/L
Benzo(a)pyrene	< 10	10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	10	µg/L
Dibenzo(a,h)anthracene	< 10	10	µg/L
Benzo(g,h,i)perylene	< 10	10	µg/L
Isophorone	< 10	10	µg/L
Aniline	< 10	10	µg/L
Benzyl alcohol	< 10	10	µg/L
o-Cresol	< 10	10	µg/L
p-Cresol	< 10	10	µg/L
Benzoic acid	< 50	50	µg/L
4-Chloroaniline	< 10	10	µg/L
2,4,5-Trichlorophenol	< 50	50	µg/L

Notes: ♦ : Major contaminant

Field#EB102

Analysis	Field Result	QC Result	Units
Semi-Volatile Organics(con't)--			
2-Nitroaniline	< 50	50	µg/L
Nitroaniline	< 50	50	µg/L
Dibenzofuran	< 10	10	µg/L
4-Nitroaniline	< 50	50	µg/L

Notes:
♦ : Major contaminant

Field#EB120

TABLE 4
EQUIPMENT BLANK ANALYSES

Analysis	EB Result	Detection Limit	Units
--Metals--			
Antimony	2	2	µg/L
Arsenic	2	2	µg/L
Barium	< 5	5	µg/L
Cadmium	< 10	10	µg/l
Chromium	< 10	10	µg/L
Lead	< 5	5	µg/L
Mercury	< 0.2	0.2	µg/L
Nickel	< 15	15	µg/L
Selenium	< 2	2	µg/L
Silver	11	10	µg/L
Thallium	5	5	µg/L
--Anions--			
Chloride	0.6	0.2	mg/L
Nitrate	< 0.002	0.002	mg/L
Sulfate	< 0.2	0.2	mg/L
--Explosives--			
HMX	< 1.00	1.00	µg/L
RDX	< 0.84	0.84	µg/L
1,3,5-TNB	< 0.26	0.26	µg/L
1,3-DNB	< 0.11	0.11	µg/L
Tetryl	< 0.55	0.55	µg/L
2,4,6-TNT	♦1.61	0.11	µg/L
2,4-DNT	< 0.02	0.02	µg/L
2,6-DNT	< 0.31	0.31	µg/L
2-Am-4,6-DNT	< 0.03	0.03	µg/L
4-Am-2,6-DNT	< 0.06	0.06	µg/L
--Volatile Organics--			
Chloromethane	< 10	10	µg/L
Bromomethane	< 10	10	µg/L
Vinyl Chloride	< 10	10	µg/L
Chloroethane	< 10	10	µg/L
Methylene chloride	18	10	µg/L
Trichlorofluoromethane	< 5	5	µg/L
1,1-Dichloroethene	< 5	5	µg/L
1,1-Dichloroethane	< 5	5	µg/L
trans-1,2-Dichloroethene	< 5	5	µg/L
Cis-1,2-Dichloroethene	< 5	5	µg/L
Chloroform	♦56	5	µg/L
1,2-Dichloroethane	< 5	5	µg/L
1,1,1-Trichloroethane	< 5	5	µg/L
Carbon tetrachloride	< 5	5	µg/L

Notes:
♦ : Major contaminant

Field#EB120

Analysis	EB Result	Detection Limit	Units
--Volatile Organics--(con't)			
Bromodichloromethane	< 5	5	µg/L
1,2-Dichloropropane	< 5	5	µg/L
trans-1,3-Dichloropropene	< 5	5	µg/L
Trichloroethene	< 5	5	µg/L
Benzene	< 5	5	µg/L
Dibromochloromethane	< 5	5	µg/L
1,1,2-Trichloroethane	< 5	5	µg/L
Cis-1,3-Dichloropropene	< 5	5	µg/L
2-Chloroethyl vinyl ether	< 10	10	µg/L
Bromoform	< 5	5	µg/L
1,1,2,2-Tetrachloroethane	< 5	5	µg/L
Tetrachlorethene	< 5	5	µg/L
Toluene	< 5	5	µg/L
Chlorobenzene	< 5	5	µg/L
Ethylbenzene	< 5	5	µg/L
Total Xylenes	< 5	5	µg/L
Carbon Disulfide	< 5	5	µg/L
Acetone	< 10	10	µg/L
2-Butanone	< 5	5	µg/L
Vinyl Acetate	< 5	5	µg/L
2-Hexanone	< 5	5	µg/L
4-Methyl-2-pentanone	< 5	5	µg/L
Styrene	< 5	5	µg/L
Total Dichlorobenzene	< 5	5	µg/L
--Semi-Volatile Organics--			
Phenol	< 10	10	µg/L
2-Chlorophenol	< 10	10	µg/L
2-Nitrophenol	< 10	10	µg/L
2,4-Dimethylphenol	< 10	10	µg/L
2,4-Dichlorophenol	< 10	10	µg/L
4-Chlor-3-methylphenol	< 10	10	µg/L
2,4,6-Trichlorophenol	< 10	10	µg/L
2,4-Dinitrophenol	< 50	50	µg/L
4-Nitrophenol	< 50	50	µg/L
2-Methyl-4,6-Dinitrophenol	< 50	50	µg/L
Pentachlorophenol	< 10	10	µg/L
N-Nitrosodimethylamine	< 10	10	µg/L
Bis(2-Chloroethyl)ether	< 10	10	µg/L
1,3-Dichlorobenzene	< 10	10	µg/L
1,2-Dichlorobenzene	< 10	10	µg/L
1,4-Dichlorobenzene	< 10	10	µg/L
Hexachlorobenzene	< 10	10	µg/L
Hexachloroethane	< 10	10	µg/L

Notes:
♦ : Major contaminant

Field#EB120

Analysis	Field Result	QC Result	Units
--Semi-Volatile Organics(con't)--			
N-Nitrosodi-n-propylamine	< 10	10	µg/L
Nitrobenzene	< 10	10	µg/L
Di-n-octyl phthalate	< 10	10	µg/L
1,2,4-Trichlorobenzene	< 10	10	µg/L
Napthalene	< 10	10	µg/L
Hexachlorobutadiene	< 10	10	µg/L
2-Methylnaphthlene	< 10	10	µg/L
Hexachlorocyclopentadiene	< 10	10	µg/L
2-Chloronaphthalene	< 10	10	µg/L
Dimethyl phthalate	< 10	10	µg/L
Acenaphthylene	< 10	10	µg/L
Acenaphthene	< 10	10	µg/L
2,4-Dinitrotoluene	< 20	20	µg/L
2,6-Dinitrotoluene	< 20	20	µg/L
Fluorene	< 10	10	µg/L
Diethyl phthalate	< 10	10	µg/L
4-Chlorophenyl phenyl ether	< 10	10	µg/L
N-Nitrosodiphenylamine	< 20	20	µg/L
4-Bromophenyl phenyl ether	< 10	20	µg/L
Bis(2-Chloroisopropyl)ether	< 10	10	µg/L
Phenanthrene	< 10	10	µg/L
Anthracene	< 10	10	µg/L
Di-n-butyl phthalate	< 10	10	µg/L
Fluoranthene	< 10	10	µg/L
Benzidine	< 80	80	µg/L
Bis(2-Chloroethoxy)methane	< 20	20	µg/L
Pyrene	< 10	10	µg/L
Butyl benzyl phthalate	< 10	10	µg/L
3,3-Dichlorobenzidine	< 20	20	µg/L
Chrysene	< 10	10	µg/L
Benzo(a)anthracene	< 10	10	µg/L
Bis(2-Ethylhexyl)phthalate	< 40	40	µg/L
Benzo(k)fluoranthene	< 10	10	µg/L
Benzo(b)fluoranthene	< 10	10	µg/L
Benzo(a)pyrene	< 10	10	µg/L
Indeno(1,2,3-cd)pyrene	< 10	10	µg/L
Dibenzo(a,h)anthracene	< 10	10	µg/L
Benzo(g,h,i)perylene	< 10	10	µg/L
Isophorone	< 10	10	µg/L
Aniline	< 10	10	µg/L
Benzyl alcohol	< 10	10	µg/L
o-Cresol	< 10	10	µg/L
p-Cresol	< 10	10	µg/L
Benzoic acid	< 50	50	µg/L
4-Chloroaniline	< 10	10	µg/L
2,4,5-Trichlorophenol	< 50	50	µg/L

Notes: ♦ : Major contaminant

Field#EB120

Analysis	Field Result	QC Result	Units
Semi-Volatile Organics(con't)--			
2-Nitroaniline	< 50	50	µg/L
Nitroaniline	< 50	50	µg/L
Dibenzofuran	< 10	10	µg/L
4-Nitroaniline	< 50	50	µg/L

Notes:
♦ : Major contaminant

005917

APPENDIX 1

005918

U.S. ARMY CORPS OF ENGINEERS
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235
214/905-9130

Report Date: 30 November 92

District: Fort Worth
Project: Longhorn AAP
Date Sampled: 7 November 1992
Location: Burning Ground
Field Number: 126
Date received: 8 November 1992
SWD Number: 2-3989
Sample Matrix: Water
Analyst: JRA, FR

Parameter	Detection Limit		Results	Units	Date Analyzed	Method
Barium	5		287	µg/L	11/23/92	6010
Cadmium	10	<	10	µg/L	11/23/92	6010
Chromium	10		11	µg/L	11/23/92	6010
Nickel	15		28	µg/L	11/23/92	6010
Silver	10	<	10	µg/L	11/23/92	6010

005919

U.S. ARMY CORPS OF ENGINEERS
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235
214/905-9130

Report Date: 30 November 92

District: Fort Worth
Project: Longhorn AAP
Date Sampled: 7 November 1992
Location: Burning Ground
Field Number: 130
Date received: 8 November 1992
SWD Number: 2-3988
Sample Matrix: Water
Analyst: JRA, FR

Parameter	Detection Limit		Results	Units	Date Analyzed	Method
Barium	5		6200	µg/L	11/23/92	6010
Cadmium	10	<	10	µg/L	11/23/92	6010
Chromium	10	<	10	µg/L	11/23/92	6010
Nickel	15	<	15	µg/L	11/23/92	6010
Silver	10	<	10	µg/L	11/23/92	6010

U.S. ARMY CORPS OF ENGINEERS
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235
214/905-9130

005920

Report Date: 25 November 92

District: Fort Worth
Project: Longhorn AAP
Date Sampled: 7 November 1992
Location: Burning Ground
Field Number: 126
Date received: 8 November 1992
SWD Number: 2-3989
Sample Matrix: Water
Analyst: CP

Parameter	Detection Limit	Results	Units	Date Analyzed	Dilution Factor	Method
Chloride	10	1450	mg/L	11/08/92	50	300.0
Nitrate	0.002	0.04	mg/L	11/08/92	1	300.0
Sulfate	0.2	160	mg/L	11/08/92	1	300.0

005921

U.S. ARMY CORPS OF ENGINEERS
Southwestern Division Laboratory
4815 Cass Street
Dallas, Texas 75235
214/905-9130

Report Date: 25 November 92

District: Fort Worth
Project: Longhorn AAP
Date Sampled: 7 November 1992
Location: Burning Ground
Field Number: 130
Date received: 8 November 1992
SWD Number: 2-3988
Sample Matrix: Water
Analyst: CP

Parameter	Detection Limit	Results	Units	Date Analyzed	Dilution Factor	Method
Chloride	4	1700	mg/L	11/08/92	20	300.0
Nitrate	0.002	0.02	mg/L	11/08/92	1	300.0
Sulfate	0.2	0.40	mg/L	11/08/92	1	300.0

005922

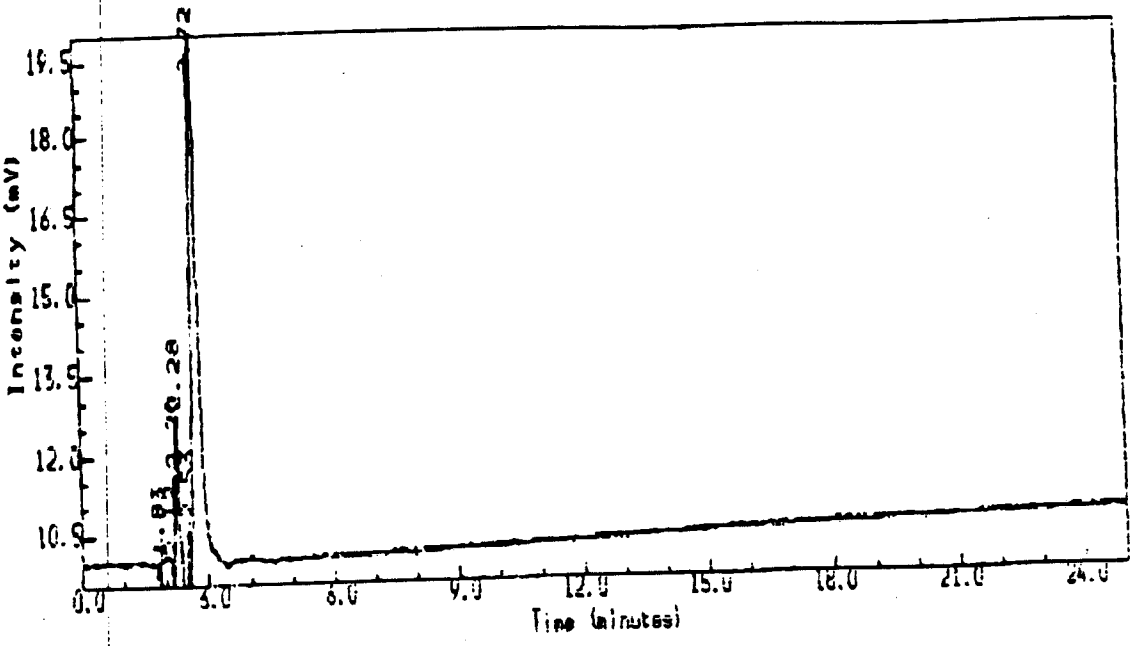
APPENDIX 2

...ted on 10-NOV-199- at 11:18

005923

Injection Report

...quired on 10-NOV-1992 at 11:52



...c Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
...ms Id :
...omment :
...ethod Title : EPA 8330
...ample Name : CH3CN:CACL2
...ample Id :
...ample Type : Sample Amount=1.00000
...ottle No : 1

PEAK INFORMATION

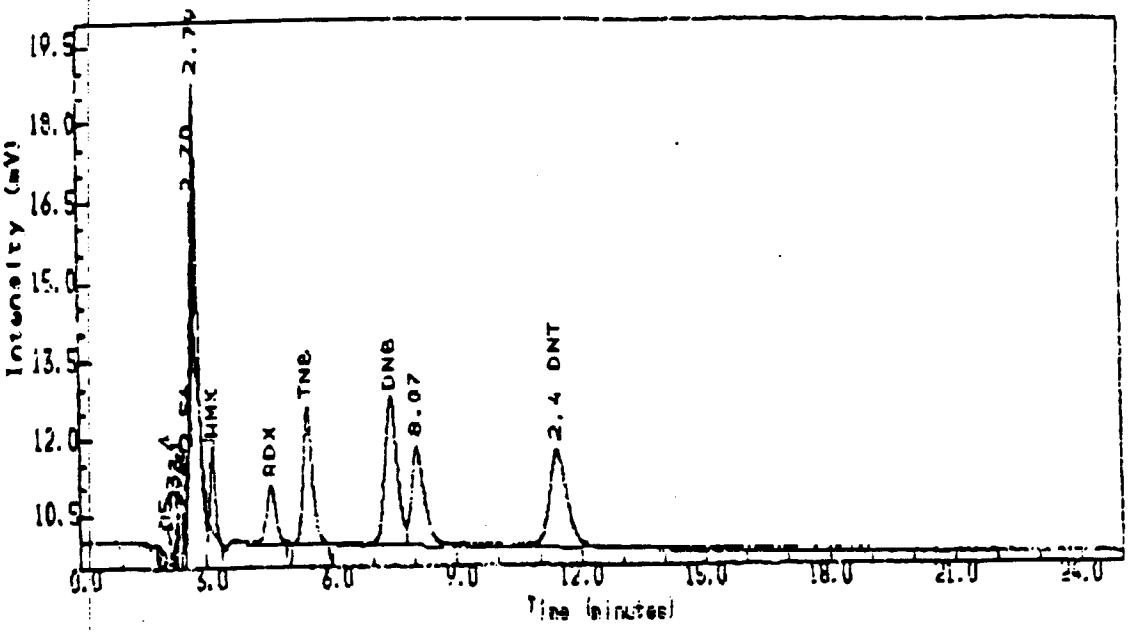
...ak RT	...ains RT	Exp	Hgnt uV	ng/L	Peak name	Width	RF slope	RF intercept

...otals		
...nknowns	16395	N/A
...uantified	0	0.000
Grand Total	16395	0.000

005924

Injection Report

Acquired on 16-NOV-1992 at 13:42



NORC Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Lims Id :
Comment :
Method Title : EPA 8330
Sample Name : STD/#1
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 4

PEAK INFORMATION

Peak	RT mins	RT Exp	Hght uV	ug/L	Peak name	Width	RF slope	RF intercept
8	3.169	3.160	1716	437.225	HMX	6.9	3.9402	-6.71792
9	4.564	4.650	1175	464.668	RDX	14.4	2.5629	-15.94274
10	5.440	5.610	2650	474.456	TNB	14.1	5.7440	-75.21344
11	7.440	7.500	2900	478.148	DNB	19.5	6.0877	-10.98079
13	11.427	11.500	1927	495.438	2,4 DNT	26.1	3.9210	-15.12659

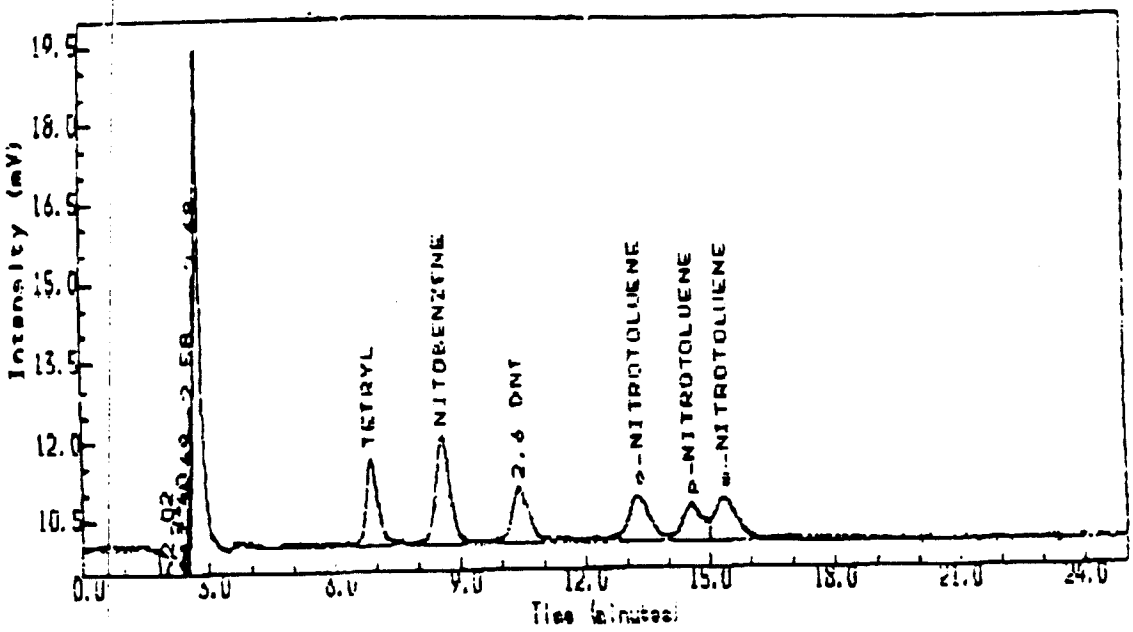
Totals		
Unknowns	25470	N/A
Quantified	10368	2349.935
Grand Total	35838	2349.935

eported on 16-NOV-1992 at 14:34

005925

Injection Report

quired on 16-NOV-1992 at 14:08



Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Lims Id :
Comment :
Method Title : EPA 8330
Sample Name : STD/#2
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 5

PEAK INFORMATION

Peak	RT mins	RT Exp	Hgnt uV	ug/L	Peak name	Width	RF slope	RF intercept
8	6.864	6.860	1670	474.025	TETRYL	17.1	3.4987	11.6608
9	8.596	8.590	2069	472.617	NITOBENZENE	21.9	4.3742	1.4263
10	10.422	10.390	1074	442.150	2,6 DNT	24.5	2.4255	1.9430
11	13.293	13.250	916	674.019	o-NITROTOLUENE	28.5	1.3576	0.9351
12	14.533	14.550	697	488.965	p-NITROTOLUENE	39.7	1.4306	-2.15648
13	15.387	15.350	861	505.426	m-NITROTOLUENE	34.9	1.7161	-6.34508

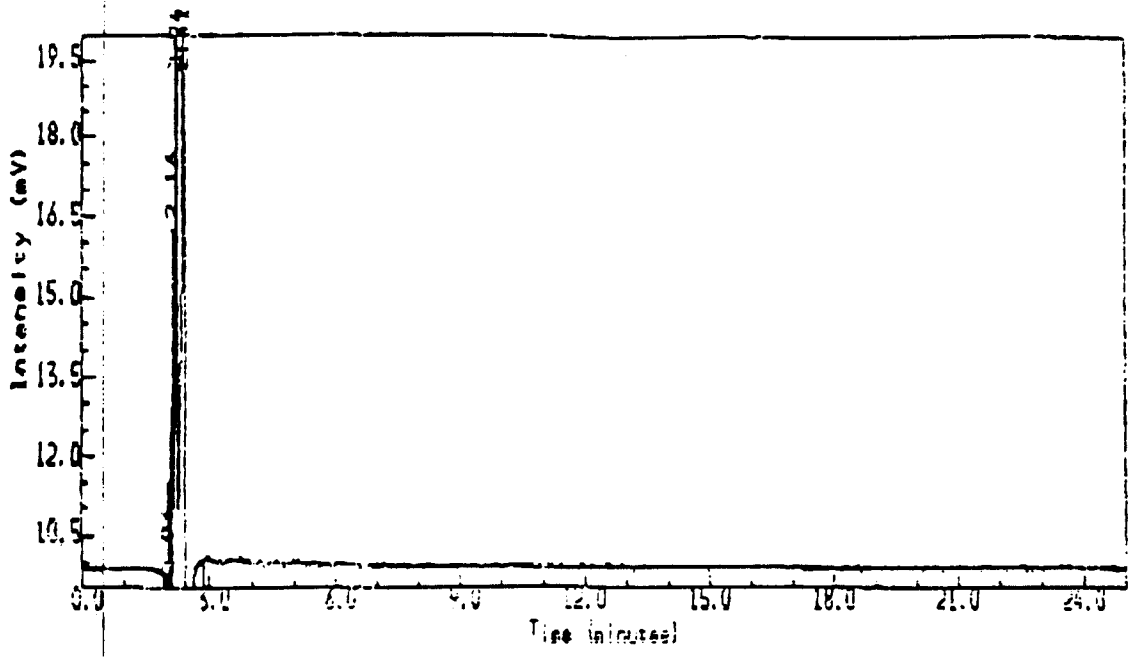
Totals		
Unknowns	15052	N/A
-ified	7288	3057.202
Total	22340	3057.202

Exported on 16-NOV-1992 at 15:37

005926

Injection Report

Acquired on 16-NOV-1992 at 15:12



Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Runs Id :
Comment :
Method Title : EPA 8330
Sample Name : BLK
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 6

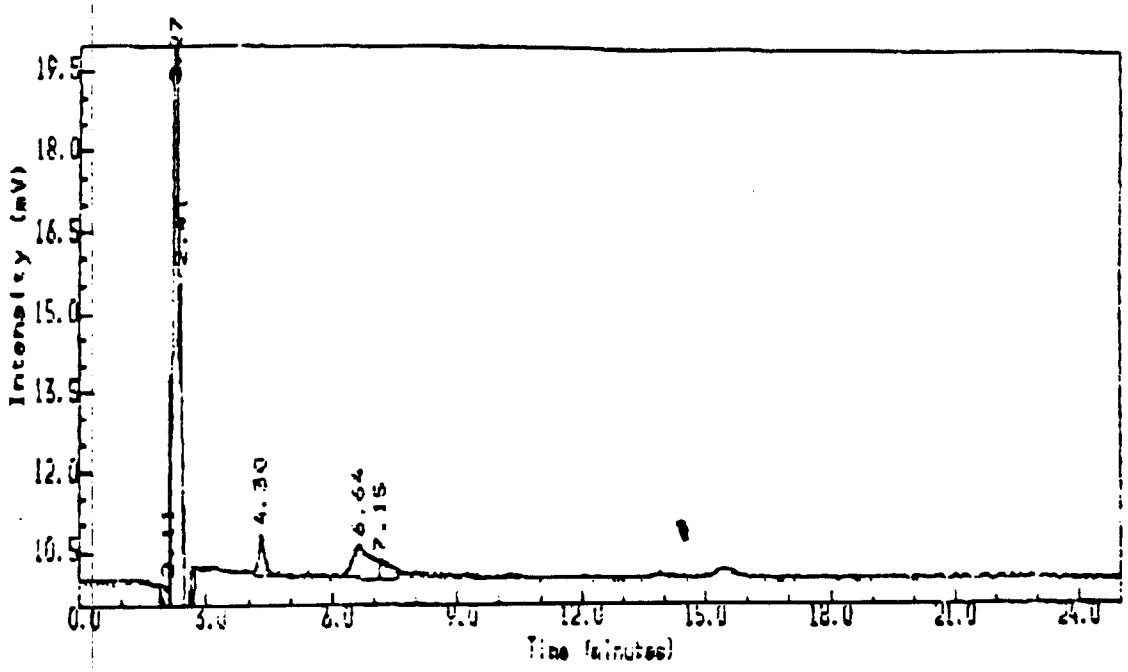
PEAK INFORMATION

Peak RT	Rams RT	Exp	Hght uV	ug/L	Peak name	Width	RF slope	RF intercept

Totals		
Unknowns	51359	N/A
Quantified	0	0.000
Grand Total	51359	0.000

Injection Report

quired on 16-NOV-1992 at 16:33



C Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Lims Id :
Comment :
Method Title : EPA 8330 D92-12008-1 C-10 QA 2-3958
Sample Name : 4845-1
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 9

PEAK INFORMATION

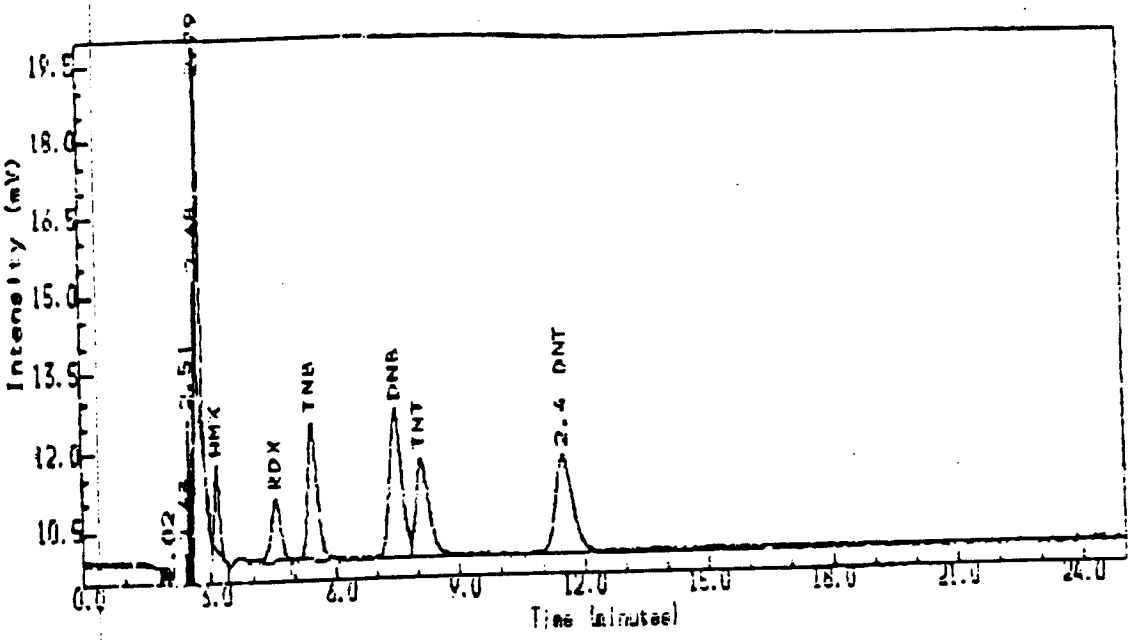
Peak RT mins	RT Exp	Hgnt uV	ug/l	Peak name	Width	RF slope	RF intercept

Totals		
Unknowns	45518	N/A
Quantified	0	0.000
Grand Total	45518	0.000

005928

Injection Report

Acquired on 16-NOV-1992 at 18:47



HRC Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Lims Id :
Comment :
Method Title : EPA 8330
Sample Name : STD#1
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 14

PEAK INFORMATION

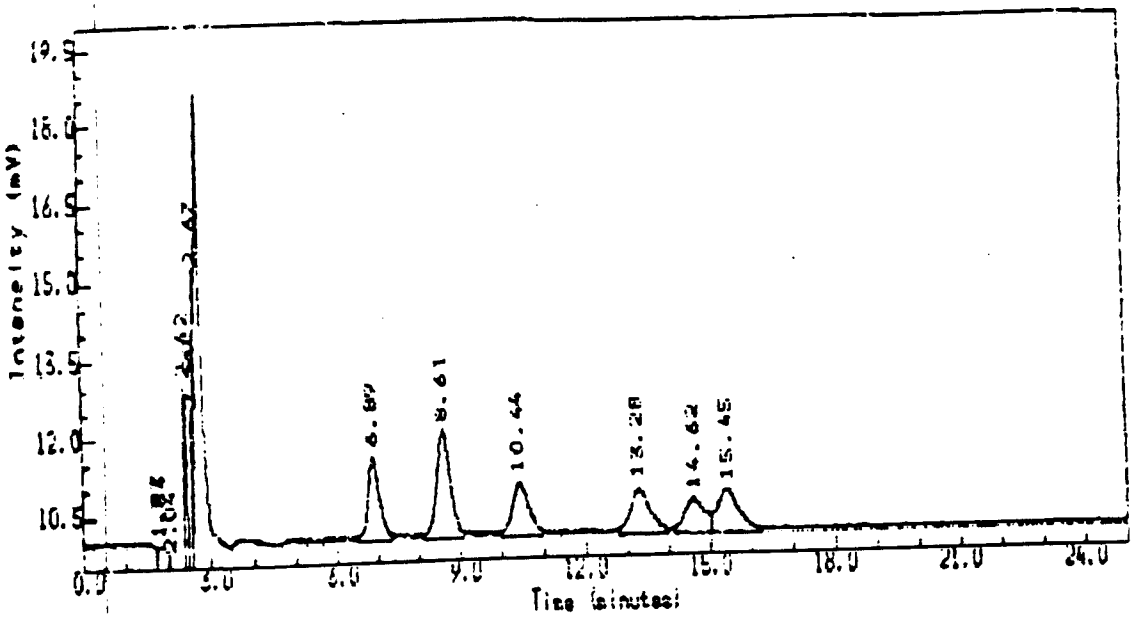
Peak	RT mins	RT Exp	Hgnt uV	ug/L	Peak name	Width	RF slope	RF intercept
8	3.173	3.160	1653	421.294	HMX	6.9	3.9402	-6.71792
9	4.587	4.650	1169	462.496	RDX	14.4	2.5629	-15.94274
10	5.462	5.610	2635	471.827	TNB	14.4	5.7440	-75.21344
11	7.498	7.500	2879	474.763	DNB	19.5	6.0877	-10.98079
12	8.098	8.270	1914	483.643	TNT	19.7	4.0063	-23.16000
13	11.529	11.500	1913	491.617	2,4 DNT	25.9	3.9210	-15.12659

Totals		
Unknowns	21483	N/A
Quantified	12164	2805.641
Total	33647	2805.641

005929

Injection Report

Acquired on 16-NOV-1992 at 19:14



NUS Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Lims Id :
Comment :
Method Title : EPA 8330
Sample Name : STD#2
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 15

PEAK INFORMATION

Peak RT	mins RT Exp	Hght uV	ug/L	Peak name	Width	RF slope	RF intercept

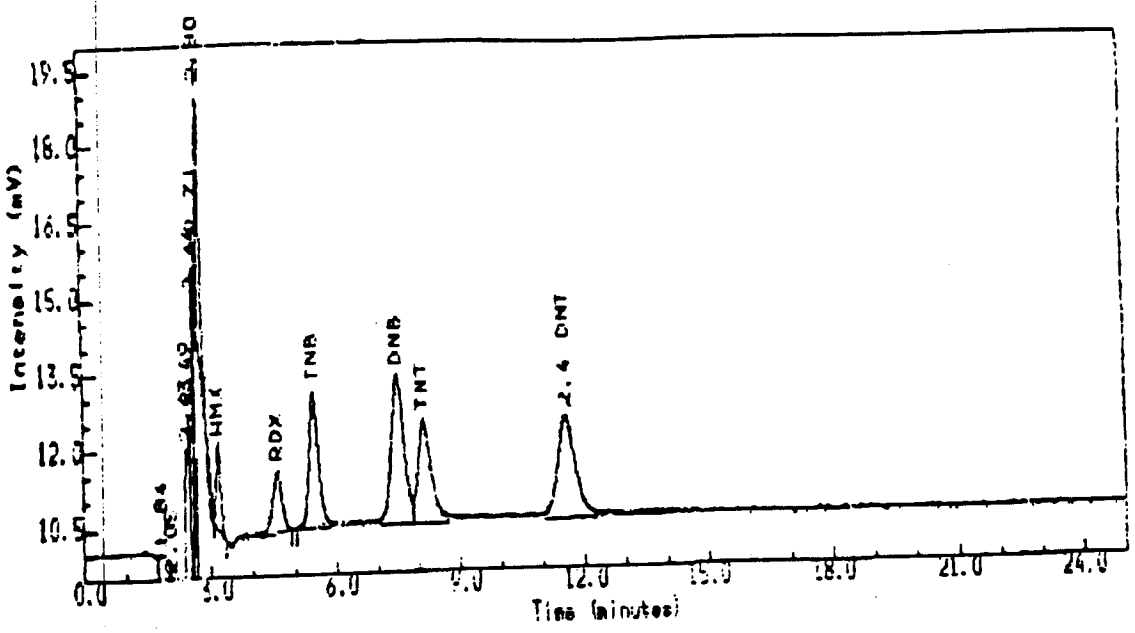
Totals		
Unknowns	27956	N/A
Quantified	0	0.000
Grand Total	27956	0.000

Printed on 17-NOV-1992 at 08:10

005930

Injection Report

Acquired on 17-NOV-1992 at 08:20



WRC Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Lims Id :
Comment :
Method Title : EPA 8330
Sample Name : lcs#1
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 16

PEAK INFORMATION

Peak	RT mins	RT Exp	Hght uV	ug/L	Peak name	Width	RF slope	RF intercept
10	3.182	3.180	16766.25	5.695	HMX 91%	6.9	3.9402	-6.71792
11	4.604	4.650	11936.25	6.290	RDX 101%	14.1	2.5629	-15.94274
12	5.484	5.610	2663	6.356	TNB	14.4	5.7440	-75.21344
13	7.516	7.500	2970	6.529	DNB	19.5	6.0877	-10.98079
14	8.133	8.270	2026.625	6.818	TNT 109%	20.0	4.0063	-23.16000
15	11.564	11.500	2008.625	6.879	2,4 DNT 110%	26.9	3.9210	-15.12659
						-		

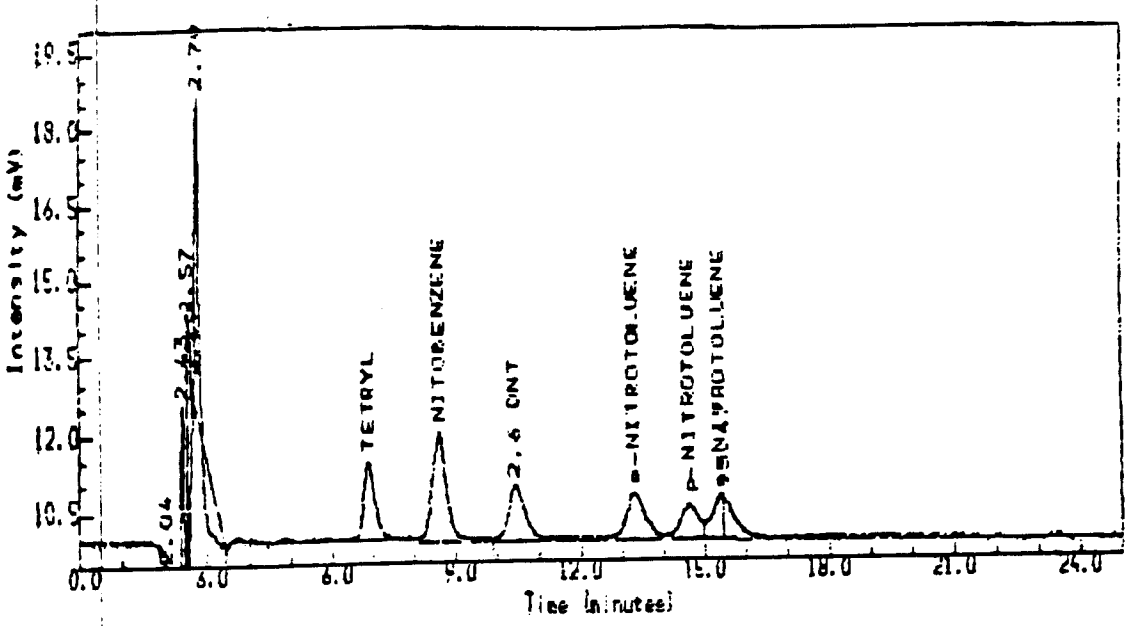
Totals		
Unknowns	34544	N/A
Quantified	12536	38.568
Grand Total	47080	38.568

Reported on 17-NOV-1992 at 09:05

035931

Injection Report

Acquired on 17-NOV-1992 at 09:05



NUSC Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Data Id :
Comment :
Method Title : SPA 8330
Sample Name : LCS#2
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 17

PEAK INFORMATION

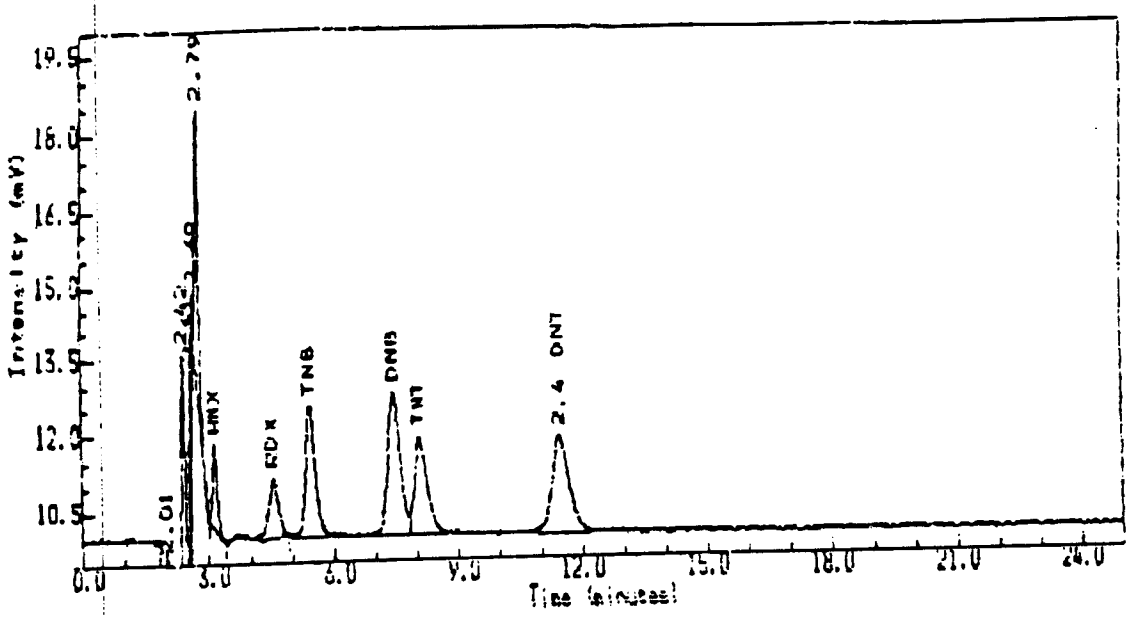
Peak	RT arvg	RT Exp	Hght uV		ug/L	Peak name	Width	RF slope	RF intercept
8	6.893	6.860	1551		5.866	TETRYL	16.8	3.4987	11.6608
9	8.627	8.590	2088	6.25	6.361	NITOBENZENE 102%	21.3	4.3742	1.4263
10	10.431	10.390	1055	6.25	5.790	2,6 DNT 92%	24.8	2.4255	1.9430
11	13.293	13.250	915		8.977	o-NITROTOLUENE	29.1	1.3576	0.9351
12	14.622	14.550	707		6.614	p-NITROTOLUENE	33.6	1.4306	-2.15648
13	15.391	15.350	849	6.25	6.643	m-NITROTOLUENE 106%	29.9A	1.7161	-6.34508

Totals		
Unknowns	27358	N/A
Quantified	7166	40.251
Grand Total	34524	40.251

005932

Injection Report

Acquired on 17-NOV-1992 at 09:39



NUSC Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Runs Id :
Comment :
Method Title : EPA 8330
Sample Name : 4845-1 MS-1
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 18

PEAK INFORMATION

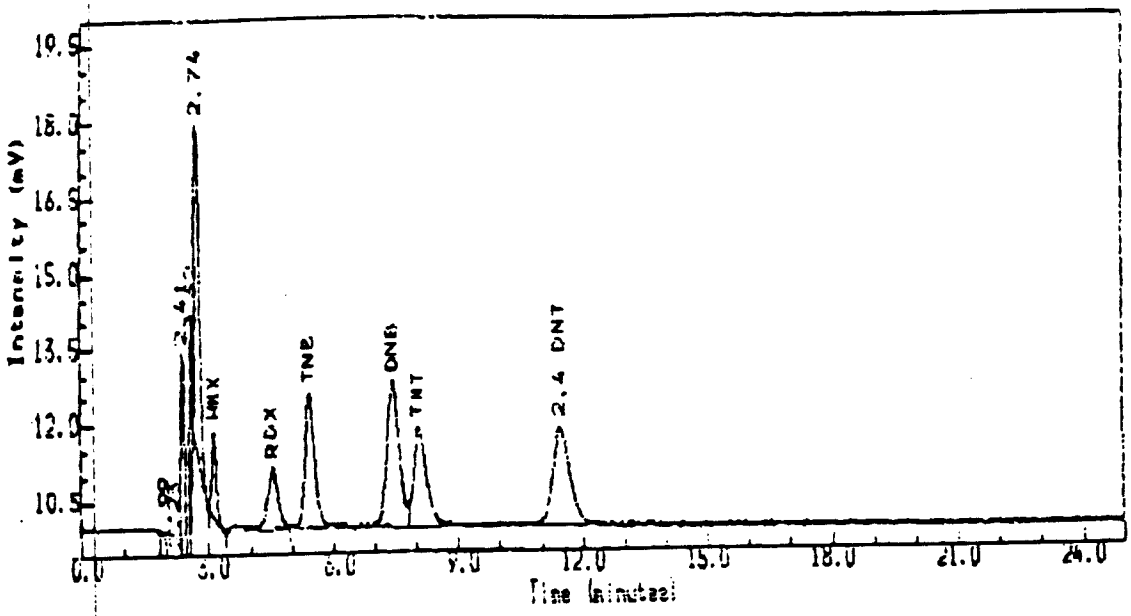
Peak	RT mins	RT Exp	Hght uV		ug/L	Peak name	Width	RF slope	RF intercept
9	3.173	3.180	1686	6.25	5.371	HMX 86%	6.9	3.9402	-6.71792
10	4.573	4.650	1227	6.25	6.061	RDX 97%	14.9	2.5629	-15.94274
11	5.471	5.610	2628		5.882	TNB	14.4	5.7440	-75.21344
12	7.467	7.500	2873		5.922	DNB	19.2	6.0877	-10.98079
13	8.089	8.270	1934	6.25	6.105	TNT 98%	19.2	4.0063	-23.16000
14	11.480	11.500	1924	6.25	6.182	2,4 DNT 99%	26.1	3.9210	-15.12659

Totals		
Unknowns	22108	N/A
Quantified	12272	35.523
Grand Total	34379	35.523

005933

Injection Report

Acquired on 17-NOV-1992 at 10:17



NORC Laboratories, Houston VAX MULTICHROM2

Analyst Name : JB
Line Id :
Comment :
Method Title : EPA 8330
Sample Name : 4645-1 MSD-1
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 19

PEAK INFORMATION

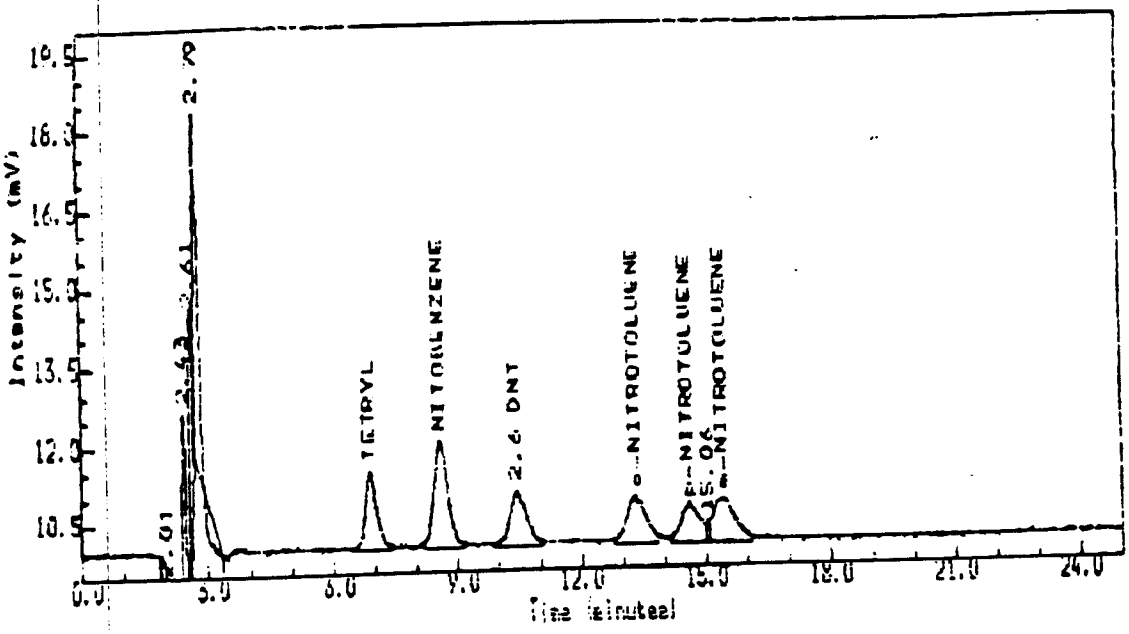
Peak	RT mins	RT Exp	Hght uV		ug/L	Peak name	Width	RF slope	RF intercept
6	3.164	3.180	1719	6.25	5.652	HMX 90%	6.9	3.9402	-6.71792
7	4.569	4.650	1230	6.25	6.272	RDX 100%	15.2	2.5629	-15.94274
8	5.458	5.610	2630		6.077	TNB	14.1	5.7440	-75.21344
9	7.476	7.500	2870		6.107	DNB	19.5	6.0877	-10.98079
10	8.089	8.270	1921	6.25	6.262	TNT 100%	19.2	4.0063	-23.16000
11	11.493	11.500	1936	6.25	6.420	2,4 DNT 103%	25.9	3.9210	-15.12659

Totals		
Unknowns	24368	N/A
Quantified	12306	36.790
Grand Total	36674	36.790

005934

Injection Report

Acquired on 17-NOV-1992 at 10:48



NUSC Laboratories, Houston VAX MULTICHROM2

Syst Name : JS
Lims Id :
Comment :
Method Title : EPA 8330
Sample Name : 4845-1 MS-2
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 20

PEAK INFORMATION

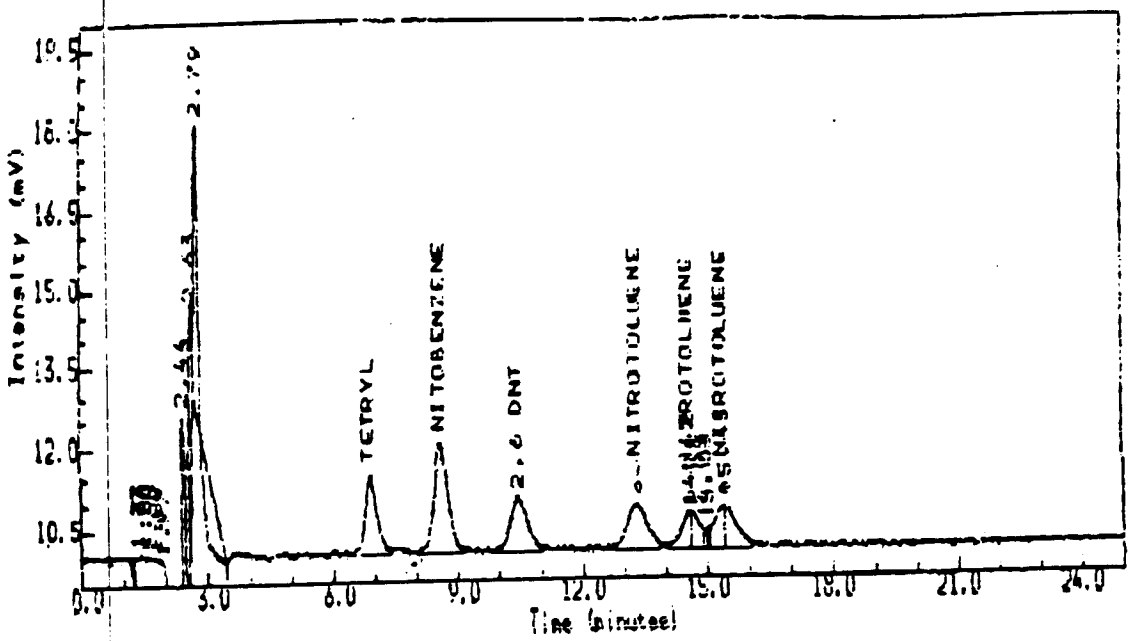
Peak	RT	Rtns RT	Exp	Hght uV		ug/L	Peak name	Width	RF slope	RF intercept
7	6.898	6.860		1520		5.387	TETRYL	17.1	3.4987	11.6608
8	8.613	8.590		2071	625	5.913	NITROBENZENE 95%	21.6	4.3742	1.4263
9	10.449	10.390		1072	625	5.515	2,6 DNT 88%	24.5	2.4255	1.9430
10	13.324	13.250		905		8.326	o-NITROTOLUENE	28.5	1.3576	0.9351
11	14.591	14.550		705		6.182	p-NITROTOLUENE	33.3	1.4306	-2.15648
13	15.409	15.350		849	625	6.228	m-NITROTOLUENE 100%	33.9	1.7161	-6.34508

Totals		
Unknowns	25014	N/A
Quantified	7121	37.551
Grand Total	32136	37.551

005935

Injection Report

Acquired on 17-NOV-1992 at 11:22



[illegible] Laboratories, Houston VAX MULTICHROM2

Analyst Name : JS
Lims Id :
Comment :
Method Title : EPA 8330
Sample Name : 4845-1 MSD-2
Sample Id :
Sample Type : Sample Amount=1.00000
Bottle No : 21

PEAK INFORMATION

Peak	RT	Rtns RT	Exp	Hght uV		ug/L	Peak name	Width	RF slope	RF intercept
12	6.902	6.860		1525		5.244	TETRYL	17.3	3.4987	11.6608
13	8.600	8.590		2061	6.25	5.708	NITOBENZENE 91%	21.9	4.3742	1.4263
14	10.476	10.390		1056	6.25	5.267	2,6 DNT 84%	24.5	2.4255	1.9430
15	13.329	13.250		897		8.003	o-NITROTOLUENE	29.3	1.3576	0.9351
16	14.573	14.550		676		5.744	p-NITROTOLUENE	25.6A	1.4306	-2.15648
20	15.391	15.350		828	6.25	5.896	m-NITROTOLUENE 94%	32.0A	1.7161	-6.34508

Totals		
Unknowns	35940	N/A
Identified	7044	35.861
Total	42984	35.861

005936

APPENDIX 3

EUREKA LABORATORIES, INC.

005937

Corporate Office:
6790 FLORIN PERKINS ROAD
SACRAMENTO, CA 95828
TEL: (916) 381-7953
FAX: (916) 381-4013

Branch Office:
17403 N.E. 28th STREET
REDMOND, WA 98052
TEL: (206) 885-0284
FAX: (206) 885-0284

Air Pollution
Chemical Analysis
Research & Testing
Environmental Studie
Robotics
Toxicology

January 21, 1993

Ms. Mai Tran
U.S. ARMY CORPS OF ENGINEERS
SWD Laboratory
4815 Cass Street
Dallas, TX 75235-8011

Dear Ms. Tran:

In response to your questions concerning the difference in analytical results for SWD Nos. 2-4139 and 2-4145 for ELI Order # 92-11-182, I have reviewed the data with the analyst and can provide the following information:

1. Based on the Chain-of-Custody (C-O-C) SWD Nos. 2-4139 and 2-4145 appeared to be duplicate samples but neither sample was designated as "Free Phase". As stated in the C-O-C, Free Phase samples may contain a high concentration of some analytes and therefore should be treated as aqueous waste. SW-846 recommends a dilution factor of 500 for aqueous waste.

2. Analysis of SWD No. 2-4139 yielded high concentrations of Methylene Chloride ($MeCl_2$) and Trichloroethene (TCE), 251 and 24.3 ppm respectively. Consequently, SWD No. 2-4145 was diluted before analysis along with the Free Phase designated samples.

3. Although the difference in results between SWD Nos. 2-4139 and 2-4145 for $MeCl_2$ and TCE is approximately 60% and 30% respectively, these results indicate general agreement between the samples considering the dilution factor involved. The discrepancy in results could be due to the large dilution factor, which would tend to magnify any difference in analytical results.

I hope this is of help in answering your questions. Please call me if you have further questions.

Sincerely,
EUREKA LABORATORIES, INC.

By: _____
Bonnie Tse
Project Coordinator

BT/hft

005938

APPENDIX 4

005939

MRD Lab Project No. 1803

06 JAN 1993

DEPARTMENT OF THE ARMY
MISSOURI RIVER DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY
OMAHA, NEBRASKA 68102

Subject: Certificate of Analysis (Addendum to Initial Report)

Project: Longhorn AAP - GW Sampling (Explosives), Dallas, TX
Intended Use: Special
Source of Material:

Submitted by: Anhmai Tran, CESWD-ED-L
Date Sampled: 17 - 20 Nov 92 , **Date Received:** 19 - 24 Nov 92
Method of Test or Specification: See attached test result sheets.

References: Southwest Division Laboratory Request No. E85931014 dated 10 Nov 92.

Enclosed is the Analytes and Detection Limits for explosive samples analyzed by MRD Laboratory for this project. Contact David Splichal at 402-444-4318 if you have any questions or comments.

FOR
Mao/glm/444-4304
1/6/93

DEPARTME
Missouri River Divi
Divisio
Omaha

Analytes and

Sample analyzed for: Explos
Extraction/Analysis Method: EPA Me

The complete set of 14 analyzed by the MRD Laboratory compounds is specifically indi they are not detected at the P below.

Compounds		PRACTICA Wa Low-Leve
Octahydro-1,3,5,7-tetranitro-1 tetrazocine		
HMX	2691-41-0	-
Hexahydro-1,3,5-trinitro-1,3,5		
RDX	121-82-4	0.836
1,3,5-Trinitrobenzene		
1,3,5-TNB	99-35-4	0.258
1,3-Dinitrobenzene		
1,3-DNB	99-65-0	0.108
Methyl-2,4,6-trinitrophenylnit:		
Tetryl	479-45-8	-
Nitrobenzene		
NB	98-95-3	-
2,4,6-Trinitrotoluene		
2,4,6-TNT	118-96-7	0.113
4-Amino-2,6-dinitrotoluene		
4-Am-DNT	1946-51-0	0.059
2-Amino-4,6-dinitrotoluene		
2-Am-DNT	355-72-78-2	0.034
2,6-Dinitrotoluene		
2,6-DNT	606-20-2	0.314
2,4-Dinitrotoluene		
2,4-DNT	121-14-2	0.0205
2-Nitrotoluene		
2-NT	88-72-2	-
4-Nitrotoluene		
4-NT	99-99-0	-
3-Nitrotoluene		
3-NT	99-08-1	-

Approved By: David E. Splichal

0.25

0.25

0.25

0.25

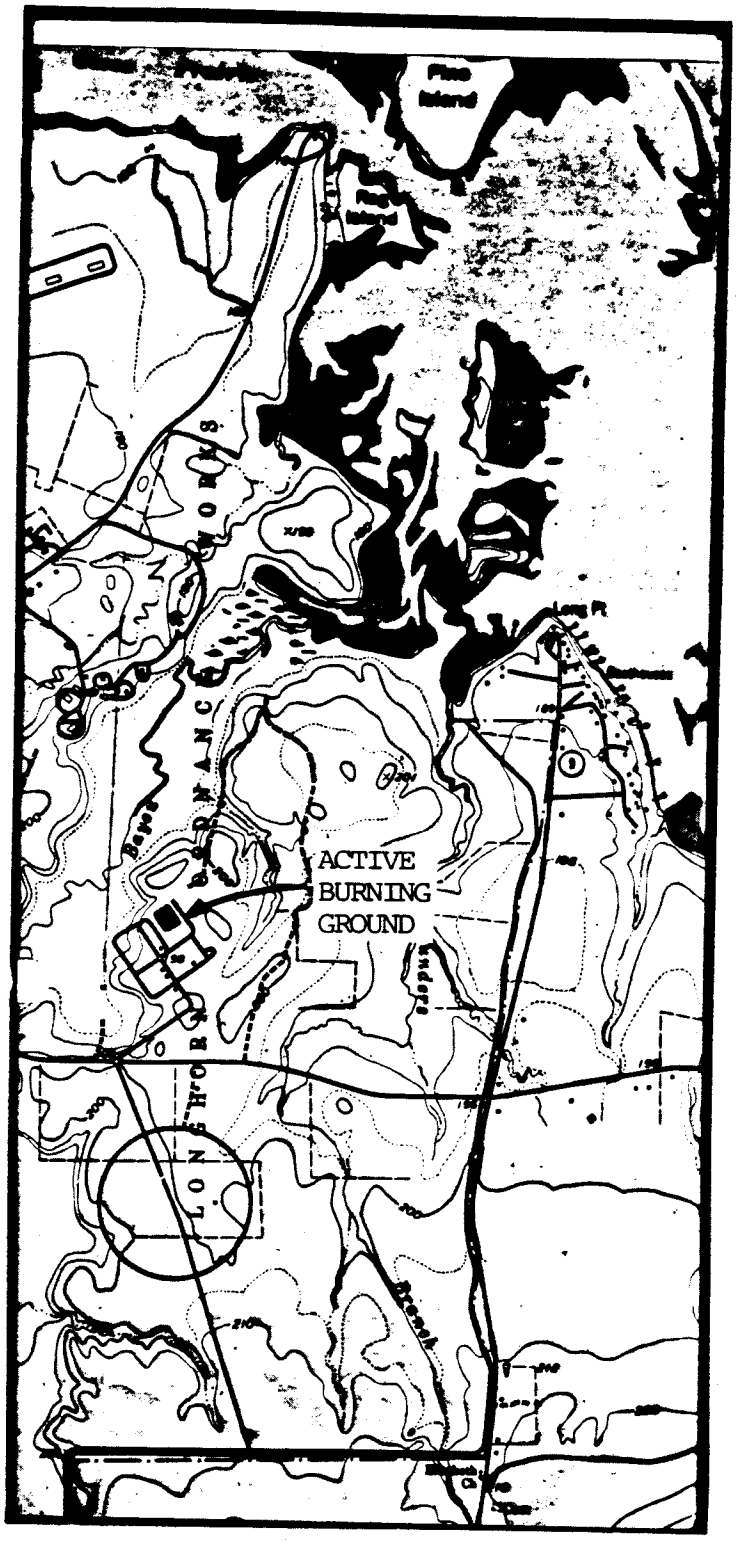
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06 Jan. 93

095942

APPENDIX A
SITE DRAWINGS

005943





LEGEND

Qal — Alluvium

Carrizo Sand

Er — Reklaw Formation

Ewi — Wilcox Group undivided

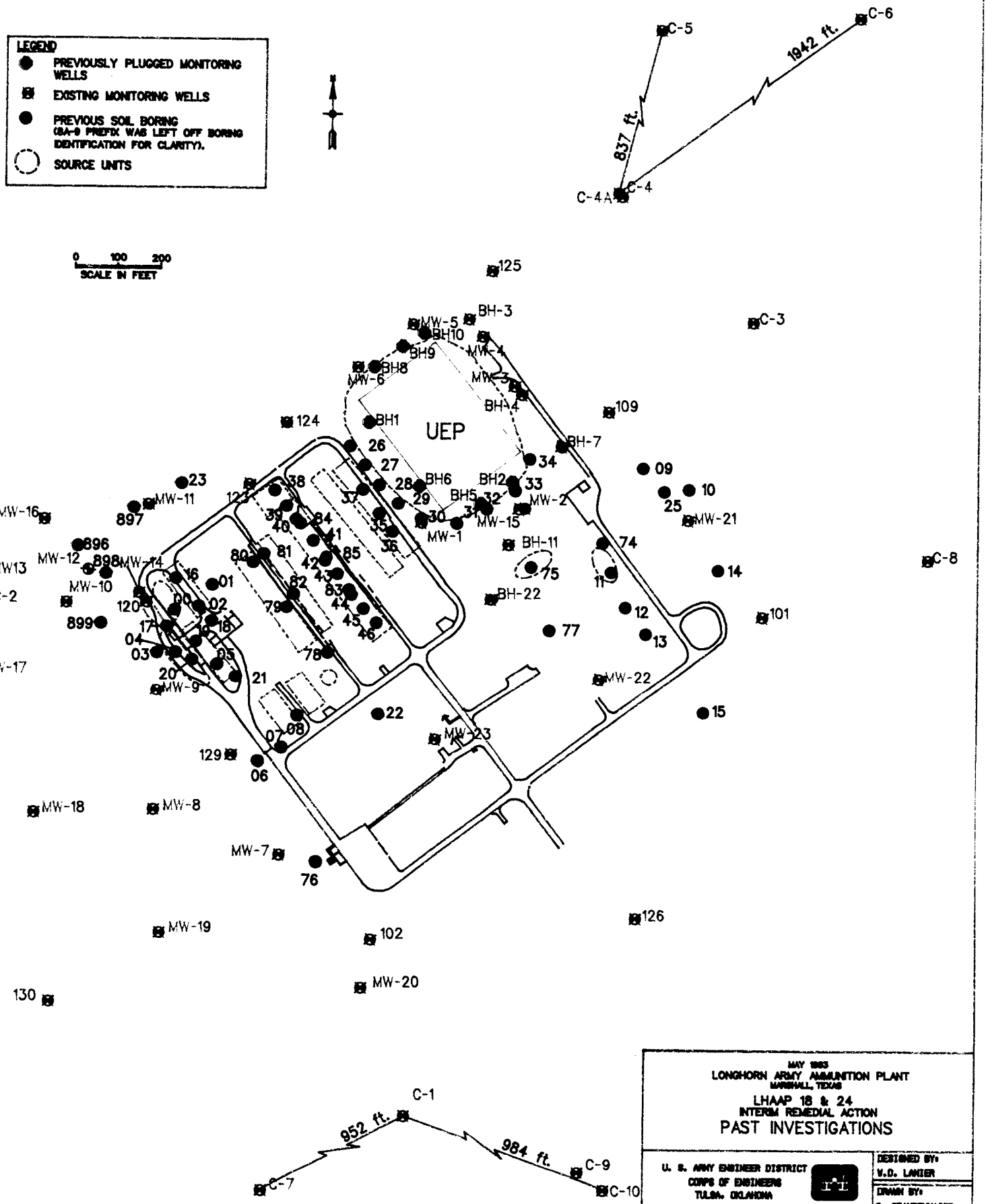
Contour interval 10 feet. Not to scale.

Source: USGS Potters Point Quadrangle, 7.5 minute series, 1978.

Contour interval 100 feet. Scale 1:250,000

Source: Bureau of Economic Geology, Geologic Atlas of Texas, Tyler Sheet, 1965.

FIGURE A-1
GEOLOGY AND TOPOGRAPHY OF
THE ABG AREA



NOTE: LOCATIONS OF SITE FEATURES AND SAMPLING LOCATIONS HAVE BEEN ASSEMBLED FROM REFERENCED DOCUMENTS PREPARED BY VARIOUS AGENCIES.

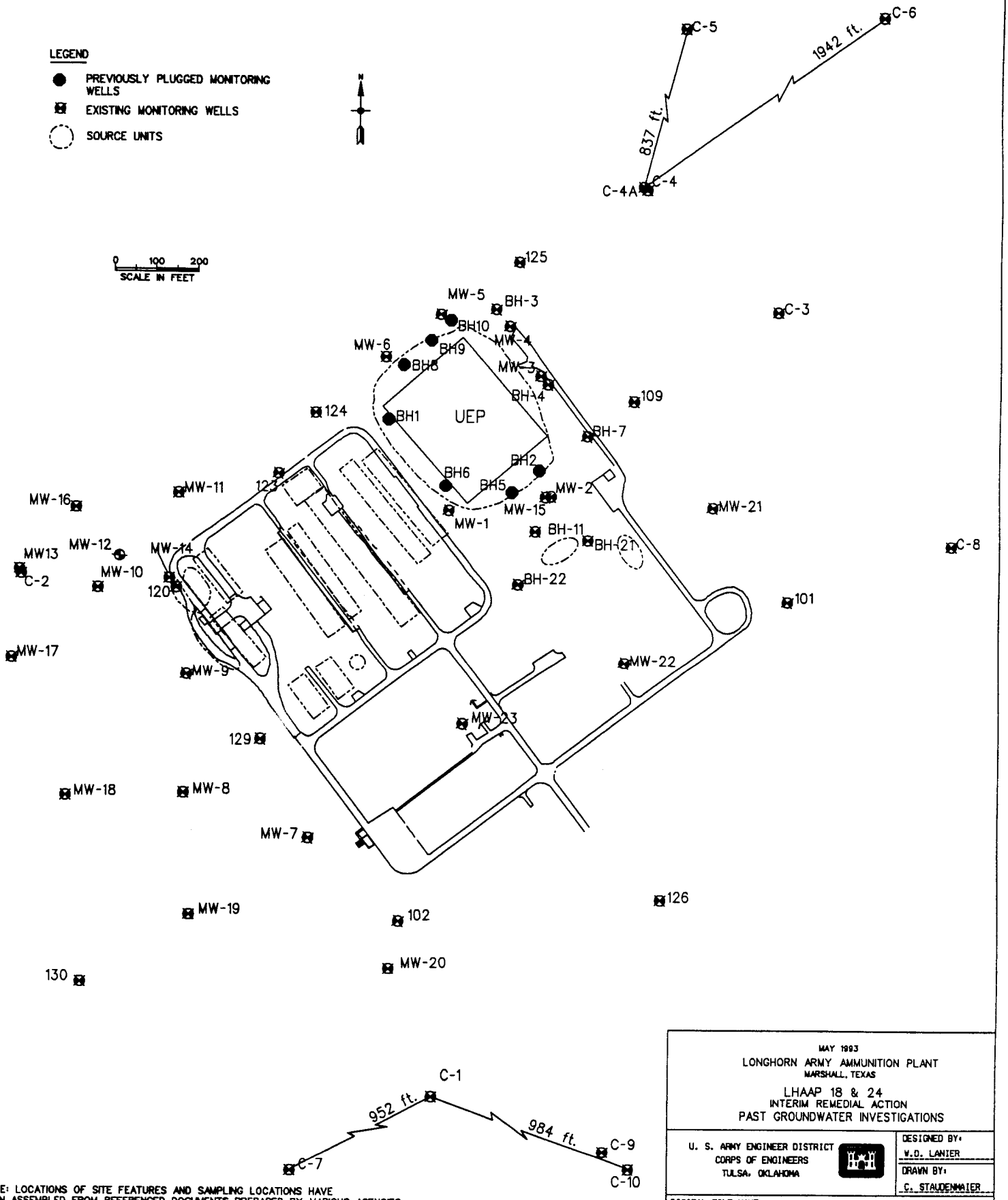
MAY 1993
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
LHAAP 18 & 24
INTERIM REMEDIAL ACTION
PAST INVESTIGATIONS

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

DESIGNED BY: V.D. LANIER
DRAWN BY: C. STAUDENMAIER

DIGITAL FILE NAME: 0A0ST.DGN

FIGURE A-2



NOTE: LOCATIONS OF SITE FEATURES AND SAMPLING LOCATIONS HAVE BEEN ASSEMBLED FROM REFERENCED DOCUMENTS PREPARED BY VARIOUS AGENCIES.

MAY 1993

LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS

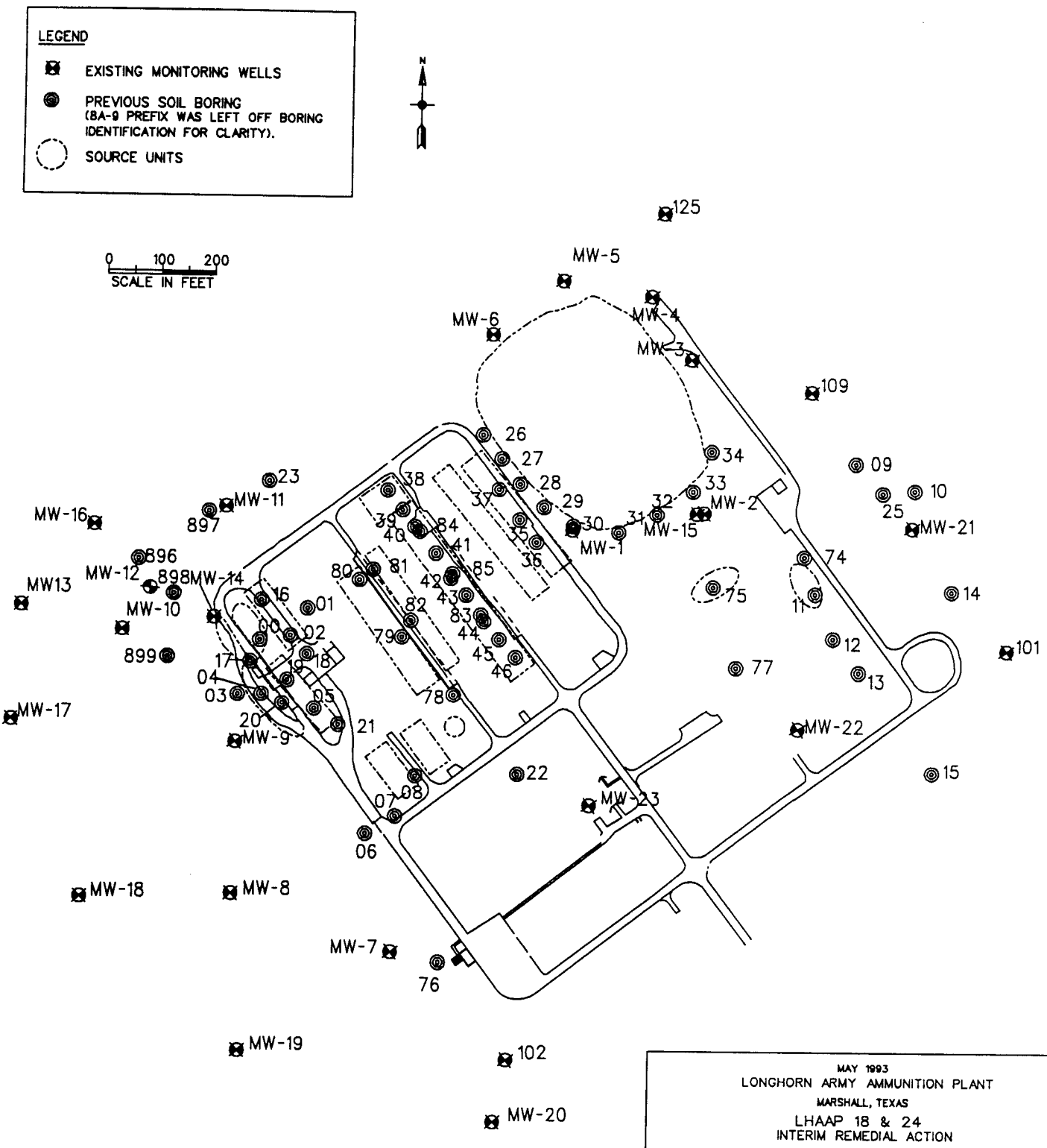
LHAAP 18 & 24
INTERIM REMEDIAL ACTION
PAST GROUNDWATER INVESTIGATIONS

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

DESIGNED BY: W.D. LANIER
DRAWN BY: C. STAUDENMAIER

DIGITAL FILE NAME: GWINVEST.DGN

FIGURE A-3



NOTE: LOCATIONS OF SITE FEATURES AND SAMPLING LOCATIONS HAVE BEEN ASSEMBLED FROM REFERENCED DOCUMENTS PREPARED BY VARIOUS AGENCIES.

MAY 1993
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
LHAAP 18 & 24
INTERIM REMEDIAL ACTION
PAST SOIL INVESTIGATIONS

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

DESIGNED BY: W.D. LANIER
DRAWN BY: C. STAUDENMAIER

DIGITAL FILE NUMBER: SOIL.DGN

FIGURE A-4

005947

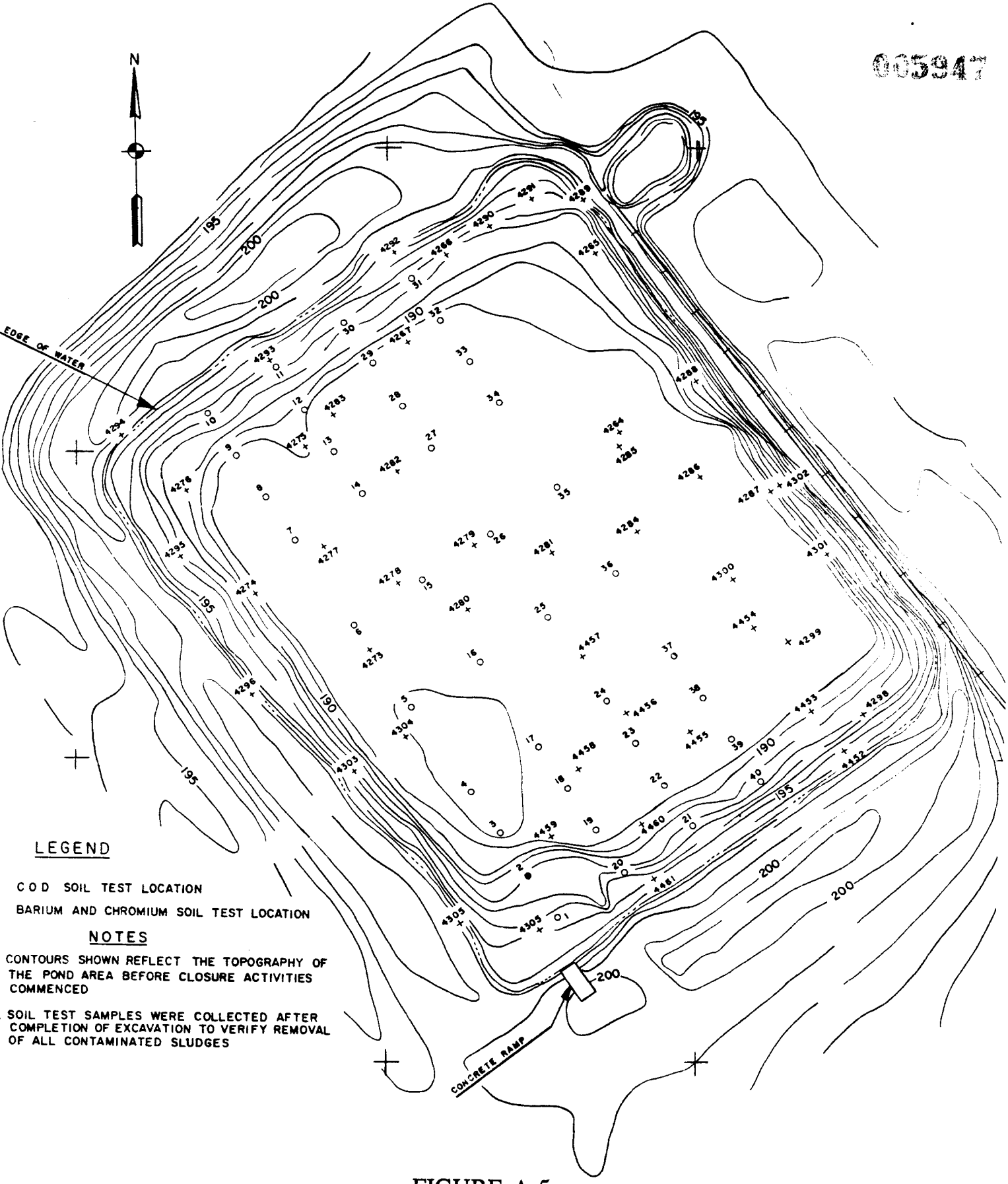


FIGURE A-5

UNLINED EVAPORATION POND SOIL TEST LOCATIONS

30 0 30 60

SCALE IN FEET

CONTOUR INTERVAL = 1.0'

TULSA DISTRICT
U.S. ARMY CORPS OF ENGINEERS

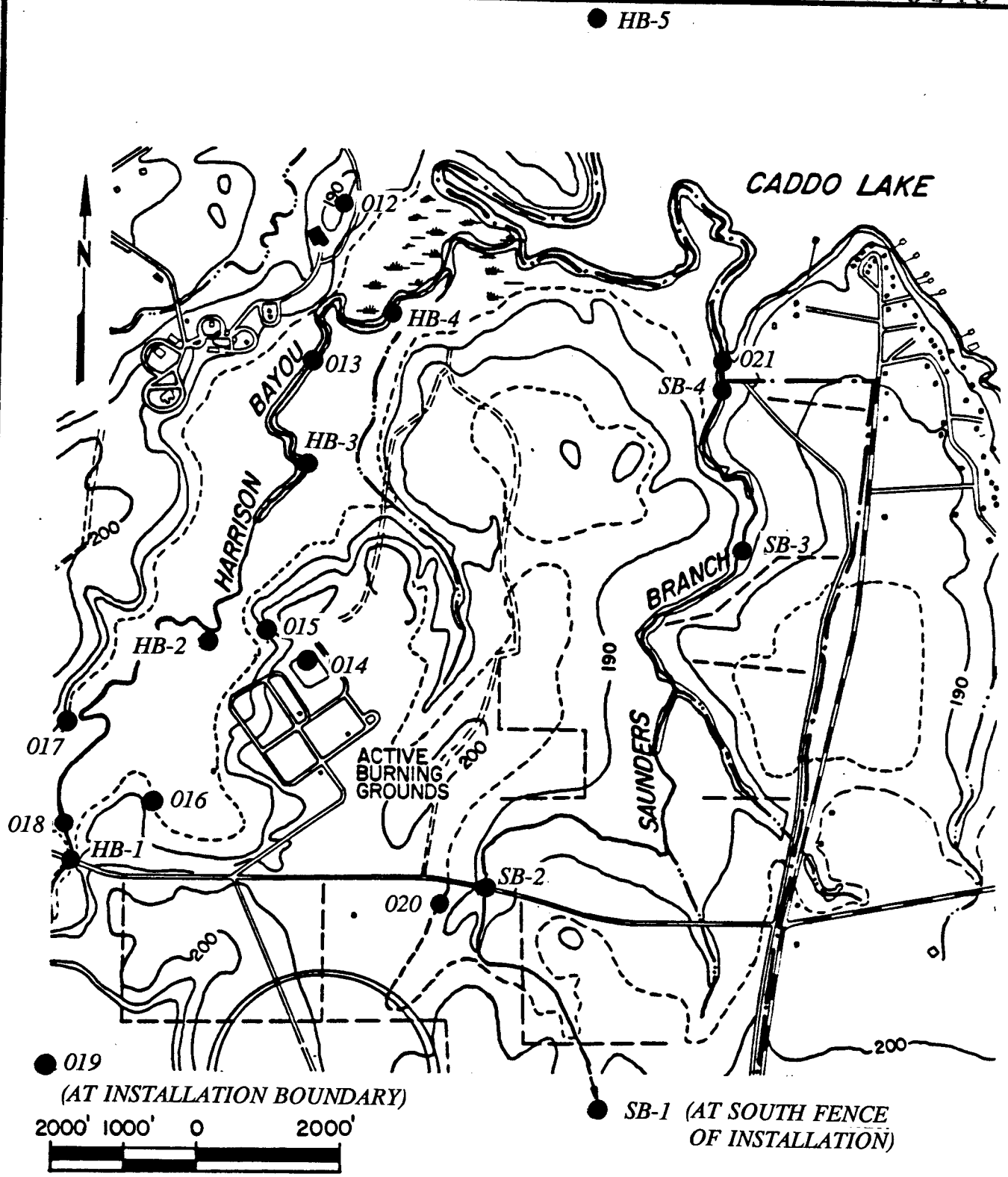
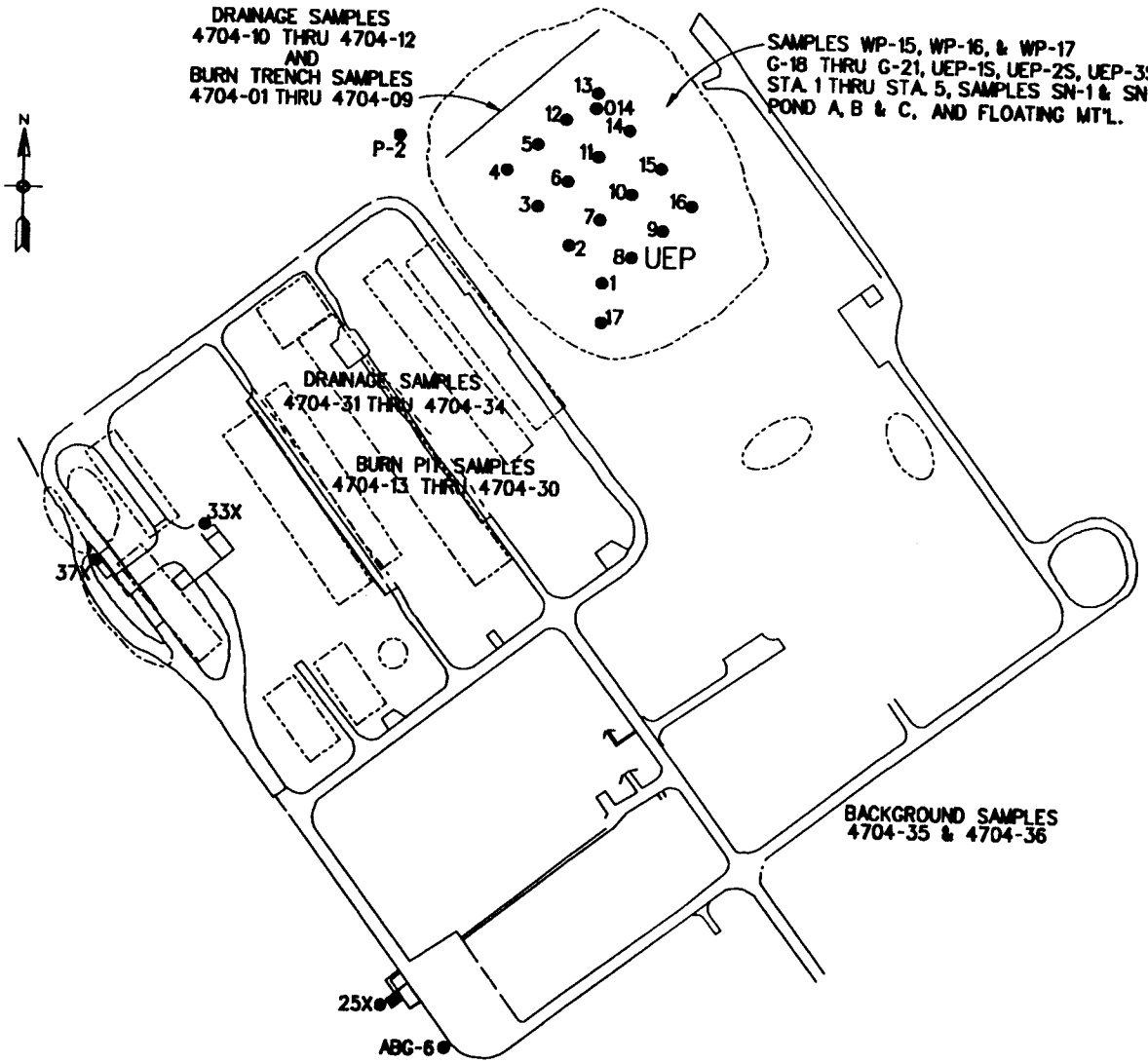


FIGURE A-6

SURFACE WATER/SEDIMENT SAMPLING SITES



NOTE: LOCATIONS OF SITE FEATURES AND SAMPLING LOCATIONS HAVE BEEN ASSEMBLED FROM REFERENCED DOCUMENTS PREPARED BY VARIOUS AGENCIES.

LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
LHAAP 18 & 24
INTERIM REMEDIAL ACTION

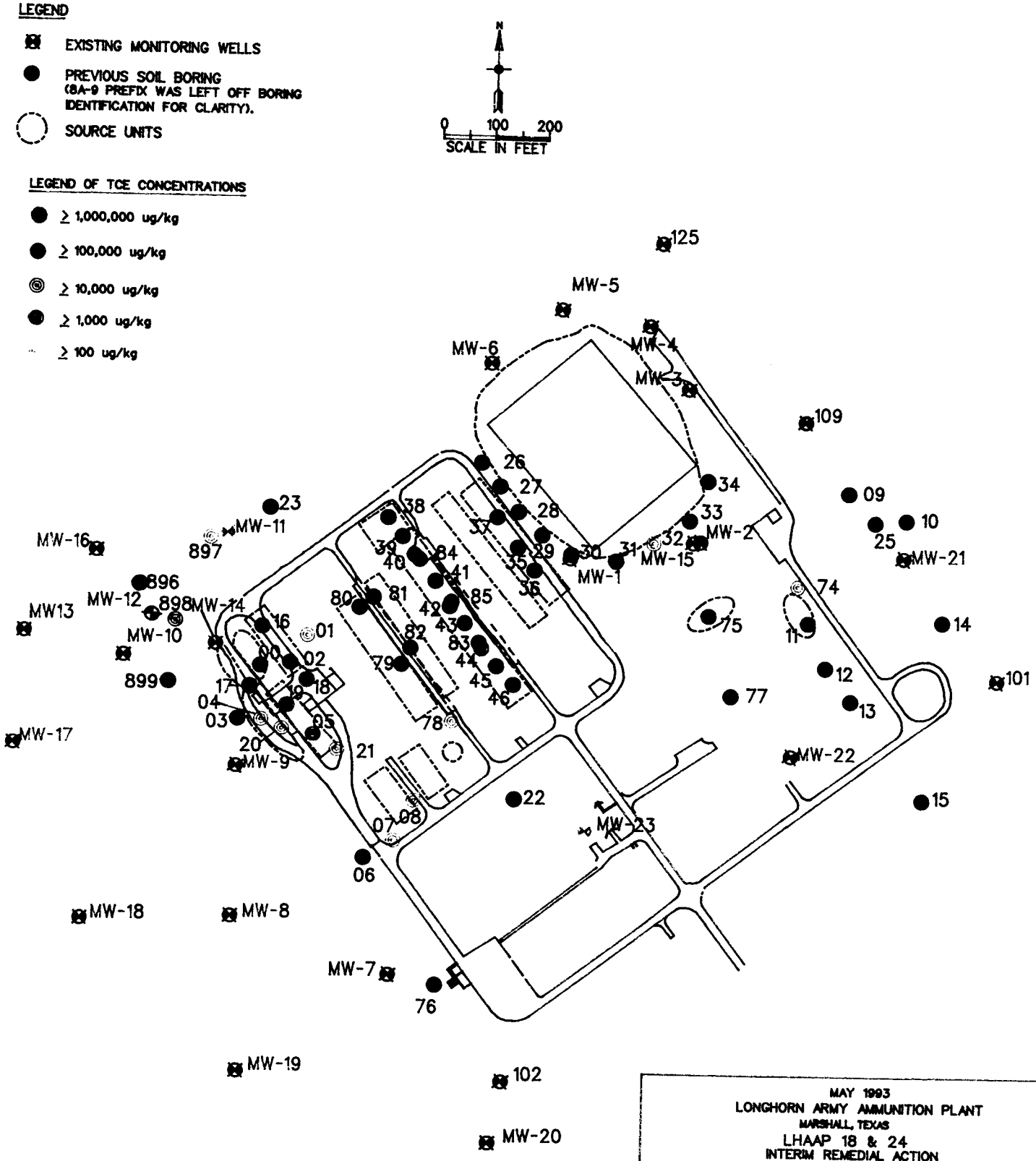
PAST SEDIMENT AND/OR
SURFACE WATER SAMPLE LOCATIONS

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

DESIGNED BY: W.D. LANIER
DRAWN BY: C. STAUDENMAIER

DIGITAL FILE NAME: SED.DGN

FIGURE A-7



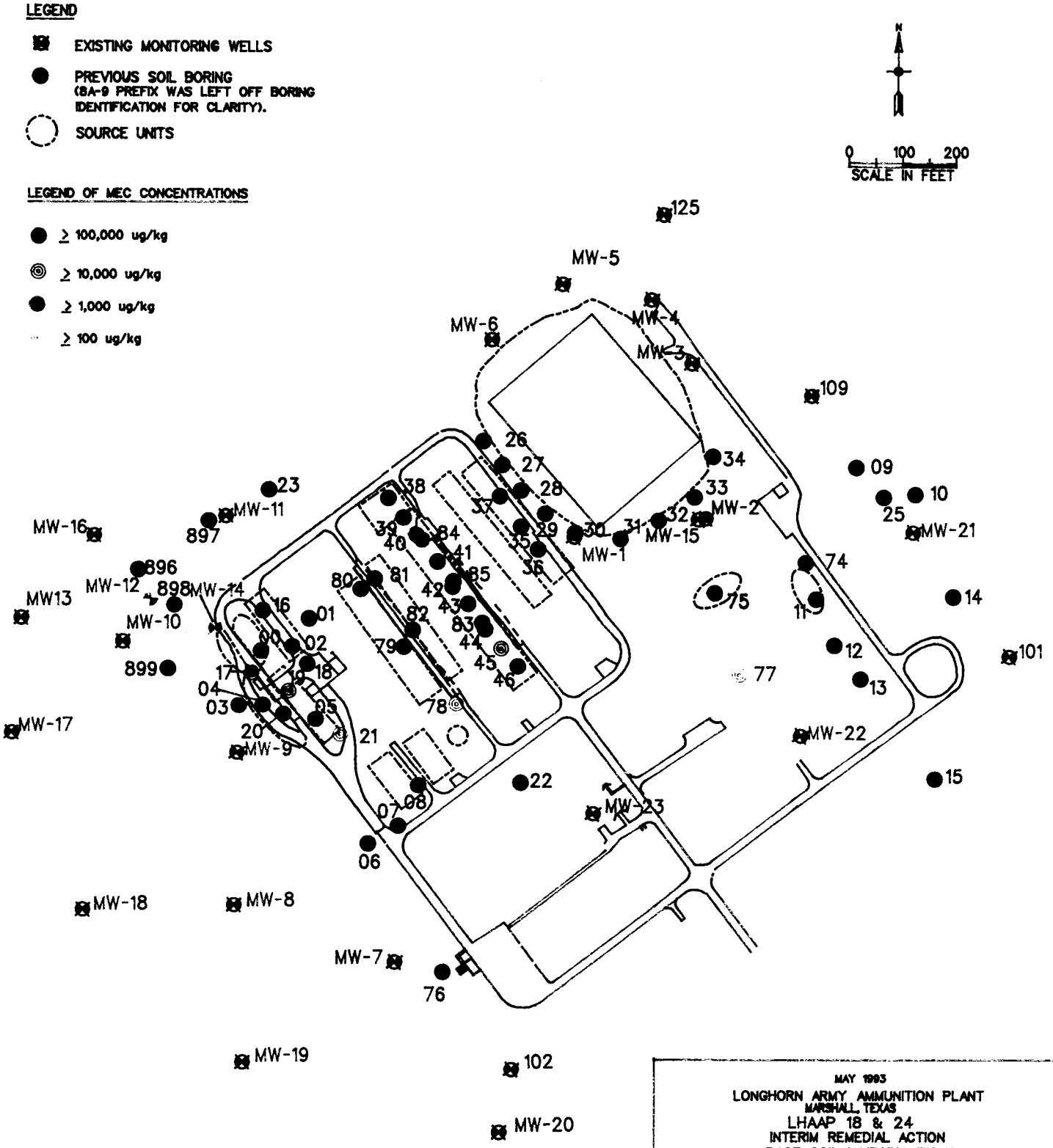
NOTE: LOCATIONS OF SITE FEATURES AND SAMPLING LOCATIONS HAVE BEEN ASSEMBLED FROM REFERENCED DOCUMENTS PREPARED BY VARIOUS AGENCIES.

MAY 1993
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
LHAAP 18 & 24
INTERIM REMEDIAL ACTION
PAST SOIL INVESTIGATIONS
CONCENTRATIONS OF TRICHLOROETHENE

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

DESIGNED BY: V.D. LANIER
DRAWN BY: C. STAUDENMAIER
DIGITAL FILE NUMBER: STCELDON

FIGURE A-8



NOTE: LOCATIONS OF SITE FEATURES AND SAMPLING LOCATIONS HAVE BEEN ASSEMBLED FROM REFERENCED DOCUMENTS PREPARED BY VARIOUS AGENCIES.

MAY 1993

LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
LHAAP 18 & 24
INTERIM REMEDIAL ACTION
PAST SOIL INVESTIGATIONS
CONCENTRATIONS OF METHYLENE CHLORIDE

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

DESIGNED BY: V.D. LANIER
DRAWN BY: C. STAUDENMAIER

DIGITAL FILE NUMBER: SMEC.DGN

FIGURE A-9

005952

APPENDIX B
GROUNDWATER INVESTIGATION RESULTS

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
C-1	11/92	*	1	2	8	<5	543	<10	<15	<2	.03	790	
	4/86	TWC	11	NT	NT	NT	NT	NT	NT	NT	NT	180	
	2/86	NUS	7&11	NT	<60	NT	600	<30	NT	NT	NT	NT	
	11/85	EPA	7	<5	<30	NT	548	<20	<20	<50	0.051	662.7	
	9/84	**	13	NT	<10	NT	500	NT	NT	NT	<0.5	810	
C-2	11/92	*	1	<2	9	<5	363	22	<15	<2	.002	180	
	9/88	SW 846	5	3	70	NT	540	7.8	5.9	<0.4	<0.2	170	
	4/86	TWC	11	NT	NT	NT	NT	NT	NT	NT	NT	170	
	2/86	NUS	7&11	NT	<60	NT	400	<30	NT	NT	NT	NT	
	9/84	**	13	NT	<10	NT	<500	NT	NT	NT	<0.5	200	
C-3	11/92	*	1	4	10	<5	936	<10	<15	<2	.09	420	
	9/88	SW 846	5	8.8	28	NT	730	8	7.8	<0.4	2.3	310	
	2/86	NUS	7&11	NT	<60	NT	300	<30	NT	NT	NT	NT	
	9/84	**	13	NT	<10	NT	<500	NT	NT	NT	<0.5	160	
C-4	11/92	*	1	<2	13	<5	162	<10	<15	<2	.03	38	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/88	SW 846	5	2.5	20	NT	280	6.8	8.5	<0.4	<0.2	41	
	2/86	NUS	7&11	NT	<50	NT	<20	<30	NT	NT	NT	NT	
	11/85	EPA	3	<5	<30	NT	138	<20	<20	<50	0.027	12.3	
	9/84	**	13	NT	<10	NT	<500	NT	NT	NT	<0.5	29	5
C-4A	11/92	*	1	<2	8	<5	184	<10	15	<2	.04	82	
C-5	11/92	*	1	<2	9	<5	77	<10	<15	<2	.004	62	
	9/88	SW 846	5	1.6	21	NT	340	5.8	6.8	<0.4	<0.2	64	
	2/86	NUS	7&11	NT	<50	NT	<20	<30	NT	NT	NT	NT	
	11/85		3	<5	<30	NT	130	<20	<20	<50	0.062	53.4	
	9/84	**	13	NT	10	NT	<500	NT	NT	NT	<0.5	60	6
C-6	11/92	*	1	<2	11	<5	1140	<10	<15	<2	.6	510	
	2/86	NUS	7&11	NT	<50	NT	1400	<30	NT	NT	NT	NT	
	9/84	**	13	NT	28	NT	1400	NT	NT	NT	<0.5	560	
C-7	11/92	*	1	<2	12	<5	180	<10	<15	4	.29	90	
	2/86	NUS	7&11	NT	<50	NT	<20	<30	NT	NT	NT	NT	
C-8	11/92	*	1	<2	6	<5	4060	<10	<15	<2	.13	2400	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	2/86	NUS	7&11	NT	<60	NT	3300	<30	NT	NT	NT	NT	
C-9	11/92	*	1	<2	9	<5	306	<10	<15	<2	.23	4350	
	4/86	TWC	11	NT	NT	NT	NT	NT	NT	NT	NT	4500	
	2/86	NUS	7&11	NT	<60	NT	600	<30	NT	NT	NT	NT	
C-10	11/92	*	1	2	22	<5	546	<10	<15	<2	.07	607	
	4/86		11	NT	NT	NT	NT	NT	NT	NT	NT	260	
	2/86	NUS	7&11	NT	<60	NT	<20	<30	NT	NT	NT	NT	
MW-1	11/18/ 92	*	1	2	5	6	5160	<10	20	<2	.50	1260	
	9/90	----	2	ND	ND	NT	3900	7	NT	ND	0.16	1066	
	6/90	----	2	ND	ND	NT	3130	47	NT	ND	0.12	1135	Magnesium = 87,600
	5/88	***	5	NT	NT	NT	1600	<50	NT	NT	7.6	NT	Cadmium = <0.1 mg/l
MW-2	11/92	*	1	<2	5	6	3125	12	<15	<2	7.60	670	
	9/90	----	2	ND	ND	NT	3300	10	NT	ND	0.07	801	
	6/90	----	2	ND	ND	NT	2960	17	NT	ND	0.05	683	
	5/88	***	5	NT	NT	NT	1600	<50	NT	NT	7.6	NT	Cadmium = 0.1 mg/l
MW-3	11/92	*	1	<2	5	<5	1130	<10	22	<2	.16	440	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/90	----	2	ND	ND	NT	1400	ND	NT	ND	0.4	452	
	6/90	----	2	ND	ND	NT	1400	19	NT	ND	0.62	440	
	9/88	SW 846	5	<1	16	NT	1900	27	24	<0.4	3.2	540	
	5/88	***	5	NT	NT	NT	1400	<50	NT	NT	1	NT	Reportings are of dissolved metals
MW-4	11/92	*	1	2	11	<5	114	70	19	<2	.17	720	
	9/90	----	2	ND	ND	NT	161	22	NT	ND	ND	705	
	6/90	----	2	ND	ND	NT	152	41	NT	ND	ND	796	
	9/88	SW 846	5	<1	12	NT	270	9.8	75	<0.4	<0.2	760	
	8/88	SW 846	5	<0.002	<0.1	NT	<1	0.1	0.11	<0.002	NT	NT	
	5/88	***	5	NT	NT	NT	<500	<50	NT	NT	30	NT	Reportings are of dissolved metals
MW-5	11/92	*	1	<2	5	<5	1539	13	19	<2	3.15	350	
	9/90	----	2	ND	ND	NT	1700	ND	NT	ND	ND	395	
	6/90	----	2	ND	ND	NT	1560	27	NT	ND	ND	408	
	9/88	SW 846	5	<1	10	NT	2000	18	44	<0.4	4.2	420	
	5/88	***	5	NT	NT	NT	1500	<50	NT	NT	3.2	NT	Reportings are of dissolved metals
MW-6	11/92	*	1	4	8	<5	983	<10	65	<2	<.002	415	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

0369

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/90	---	2	ND	ND	NT	1150	ND	NT	ND	ND	400	
	6/90	---	2	ND	ND	NT	1540	227	NT	ND	ND	600	
	5/88	***	5	NT	NT	NT	<500	<50	NT	NT	0.40	NT	Cadmium = <0.01 mg/l
MW-7	11/92	*	1	<2	7	<5	104	16	76	<2	1.30	340	
	9/90	---	2	ND	ND	NT	123	130	NT	ND	ND	324	
	6/90	---	2	ND	ND	NT	84	407	NT	ND	0.014	278	
	9/88	**	2	<1	<10	NT	110	15	23	<0.4	0.25	280	
MW-8	11/92	*	1	<2	7	<5	320	<10	<15	<2	3.40	180	
	9/88	SW 846	5	<1	16	NT	470	12	20	<0.4	6.1	200	
MW-9	11/92	*	1	<2	8	<5	52	<10	<15	<2	0.44	19	
	9/90	---	2	ND	ND	NT	130	42	NT	ND	0.005	28	
	6/90	---	2	ND	ND	NT	67	23	NT	ND	ND	22	
	9/88	SW 846	5	<1	14	NT	130	7.5	12.9	0.5	0.85	43	
MW-10	11/92	*	1	<2	5	<5	483	<10	<15	<2	.07	230	
	9/90	---	2	ND	ND	NT	660	15	ND	ND	ND	233	
	6/90	---	2	ND	ND	NT	700	ND	ND	ND	ND	346	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/88	SW 846	5	<1	20	NT	640	7	28	<0.4	6.1	200	CADMIUM = 24
MW-11	11/92	*	1	<2	7	<5	74	10	<15	<2	.60	55	
	9/90	---	2	ND	ND	NT	170	63	NT	ND	ND	35	
	6/90	---	2	ND	ND	NT	146	24	NT	ND	0.007	8	
	9/88	SW 846	5	<1	13	NT	67	8.2	18	<0.4	<0.2	40	
MW-12	11/92	*	1	2	5	5	169	<10	33	<2	.01	450	
	9/90	---	2	ND	81	NT	260	6	NT	ND	ND	353	
	6/90	---	2	ND	ND	NT	272	9	NT	ND	0.15	331	
	10/88	SW 846	5	<1	20	NT	560	9.2	18	<0.4	2	260	
	9/88	SW 846	5	<0.002	0.22	NT	1.2	0.06	0.09	<0.002	NT	NT	
MW-13	11/92	*	1	<2	5	<5	248	<10	<15	<2	.002	230	
	9/90	---	2	ND	ND	NT	260 *	ND	NT	ND	ND	208	MAGNESIUM = 7300
	6/90	---	2	ND	ND	NT	228	ND	NT	ND	ND	217	MAGNESIUM = 6050
	9/88	SW 846	5	<1	13	NT	280	6.5	6.5	<0.4	2.4	240	
MW-14	11/92	*	1	11	7	6	608	30	23	<2	.30	300	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/90	---	2	ND	ND	NT	1500	26	NT	ND	ND	773	
	6/90	---	2	ND	42	NT	1250	25	NT	ND	ND	1112	
	10/88	SW 846	5	<1	23	NT	1300	7.5	16	<0.4	<0.2	660	
	9/88	SW 846	5	NT	NT	NT	NT	NT	NT	NT	NT	1020	
MW-15	11/92	*	1	4	<5	<5	214	<10	<15	<2	.02	135	
	9/90	---	2	ND	ND	NT	250	ND	NT	ND	ND	168	MAGNESIUM = 7000
	6/90	---	2	ND	ND	NT	200	8	NT	ND	ND	147	MAGNESIUM = 6300
MW-16	11/92	*	1	<2	6	<5	303	<10	<15	<2	.04	170	
MW-17	11/92	*	1	2	5	<5	228	<10	131	<2	.03	220	
MW-18	11/92	*	1	2	5	<5	202	<10	22	<2	.02	120	
MW-19	11/92	*	1	2	11	<5	65	<10	<15	<2	.02	2200	
MW-20	11/92	*	1	2	9	<5	167	15	<15	<2	.021	5.10	
MW-21	11/92	*	1	2	8	<5	5150	70	292	<2	<.002	1400	
MW-22	11/92	*	1	<2	6	7	1931	15	<15	<2	.008	760	
MW-23	11/92	*	1	<2	12	6	1863	178	82	<2	.60	560	
101	1/88		7				900						

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/87		7				4800						
	7/87		7				2010						
	3/87		7				410						
	12/86		7				ND						
	9/86		7				1960						
	5/86		7				ND						
	2/86		7				790						
	9/84	NT	13										
	7/84	NT	13										
	11/82	**	13	58	93.6	NT	279	56.3	64	ND	1.6	2	Mn=452 ug/l
102	11/92	*	1	3	7	<5	1440	<10	<15	<2	.13	22	
	1/88		7				500						
	9/87		7				290						
	7/87		7				270						
	3/87		7				120						

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	12/86		7				ND						
	9/86		7				ND						
	5/86		7				400						
	2/86		7				510						
	9/84	NT	13										
	7/84	NT	13										
	11/82	**	13	160	67.4	ND	365	84.1	233	ND	4.98	3	Mn=476 ug/l
103	12/85	EPA	12	<5	<30	NT	191	<20	<20	<50	0.076	56.4	Na=39,200
	11/82	**	15	ND	15.8	ND	32	13.5	ND	ND	0.91	41	
109	11/92	*	1	3	20	<5	80	<10	<15	<2	.32	1100	
	9/88	SW 846	5	<0.002	<0.1	NT	2.7	0.12	<0.05	<0.002	0.26	760	
	9/88	SW 846	5	<1	18	NT	1500	6.2	5.2	<0.4	NT	NT	
	1/88		7				1500						
	9/87		7				840						
	7/87		7				1200						

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

005961

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	3/87		7				930						
	12/86		7				1500						
	9/86		7				1930						
	6/86		7				1410						
	2/86		7				1400						
	9/84	**	13	NT	<10	NT	1800	NT	NT	NT	800	890	
	7/84	**	13	NT	NT	NT	900	NT	NT	NT	1.9	680	1
	4/83	**	13	ND	ND	ND	869	10.4	ND	ND	14	2037	
110	12/85	EPA	3	7.0	<30	NT	126	23	34	<50	0.074	646.4	Na=882,000
120	11/92	*	1	4	15	6	235	12	47	<2	580	490	
	9/88	SW 846	5	4.7	34	NT	580	11	100	0.5	735	NT	
	1/88		7	ND									
	9/87		7	570									
	7/87		7	360									
	3/87		7	250									
	12/86		7	ND									

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

0156 0

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/86		7	360									
	5/86		7	ND									
	2/86		7	ND									
	9/84	**	13	NT	10	NT	500	NT	NT	NT	260	960	
	7/84	**	13	NT	NT	NT	<500	NT	NT	NT	600	680	
	4/83	**	13	ND	ND	NT	44.2	10.2	64	ND	1170	13750	Mn = 604 ug/l
121	11/92	NT											
	7/84	NT	13										
	11/82	**	15	ND	15.7	ND	75.1	27.7	ND	ND	ND	82	
122	12/86	EPA	3	13.0	<30	NT	1060	<20	<20	<60	0.021	33.4	
	11/82	**	15	ND	ND	ND	217	8.7	ND	ND	ND	328	
123	11/92	NT	13										
	9/88	SW 846	5&13	<1	12	NT	250	6.2	5.9	2.8	NT	13.8	
	1/88		7				ND						
	9/87		7				660						
	7/87		7				360						

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

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ND = Not Detected (detection limit not recorded in report)

0356

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	3/87		7				350						
	12/86		7				ND						
	9/86		7				370						
	6/86		7				410						
	2/86		7				380						
	9/84	NT	13										
	7/84	**	13	NT	NT	NT	<500	NT	NT	NT	1.0	13	2
	11/82	**	13	ND	ND	NT	58.3	40	44	ND	20.5	24	Mn = 72 ug/l
124	11/92	*	1	4	16	<5	117	23	<15	<2	.35	4.30	
	9/88	SW 846	5	1.1	47	NT	590	5.5	10	0.4	NT	13.8	
	1/88		7				ND						
	9/87		7				310						
	7/87		7				170						
	3/87		7				190						
	12/86		7				ND						

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

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SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/86		7				ND						
	5/86		7				ND						
	2/86		7				ND						
	9/84	NT	13										
	7/84	**	13	NT	NT	NT	<500	NT	NT	NT	1.0	32	1
	11/82	**	13	ND	ND	ND	169	11.2	78	ND	1.03	29	Mn = 83 ug/l
125	11/92	NT											
	9/88	SW 846	6	<1	20	NT	420	8.2	<5	<0.4	NT	NT	
	1/88		7				ND						
	9/87		7				460						
	7/87		7				180						
	3/87		7				210						
	12/86		7				ND						
	9/86		7				390						
	5/86		7				1360						

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2 Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite [4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

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SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	2/86		7				2400						
	9/84	**	13	NT	<10	NT	9200	NT	NT	NT	3.0	2000	
	7/84	**	13	NT	NT	NT	7300	NT	NT	NT	3.1	1300	1
	11/82	**	13	ND	ND	140	2210	10.5	377	ND	6.67	2345	Mn = 1340 ug/l
126	11/92	*	1	2	12	<5	287	11	28	<2	.04	1450	
	4/86	TWC	11	NT	NT	NT	NT	NT	NT	NT	NT	1800	
	2/86	NUS	7&11	NT	<50	NT	7400	<30	NT	NT	NT	NT	
	9/84	**	13	NT	<10	NT	12,000	NT	NT	NT	4.0	2500	
	7/84	**	13	NT	NT	NT	8000	NT	NT	NT	1.0	1270	1
	11/82	**	13	ND	ND	120	333	12.1	114	ND	3.2	2725	Mn = 1320 ug/l
129	11/92	*	1	2	6	6	168	<10	<15	<2	.40	24	
	9/88	SW 846	5	<1	31	NT	680	7.5	21	<0.4	NT	NT	
	1/88		7				600						
	9/87		7				860						
	7/87		7				610						
	3/87		7				490						
	12/86		7				ND						

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

0956

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/86		7				810						
	5/86		7				520						
	2/86	NUS	7&11	NT	<60	NT	660	<30	NT	NT	NT	NT	
	9/84	**	13	NT	10	NT	1400	NT	NT	NT	13	340	
	7/84	**	13	NT	NT	NT	1100	NT	NT	NT	NT	NT	2
	11/82	**	13	ND	ND	130	431	11.4	109	ND	99.2	2592	Mn=780 ug/l
130	11/92	*	1	2	11	<5	6200	<10	<15	<2	0.02	1700	
	2/86	NUS	11	NT	<60	NT	<200	<30	NT	NT	NT	NT	
	11/82	**	15	ND	ND	100	105	ND	81	ND	ND	2348	
BH-1	11/92	NT											
	9/84	**	13	NT	17	NT	5800	NT	NT	NT	<0.5	1100	
	7/84	**	13	NT	NT	NT	4500	NT	NT	NT	<1.0	1200	1
	11/82	**	13	ND	17.4	90	624	8.2	38	ND	7.78	981	Mn=460 ug/l
	1/83	**	13	NT	NT	NT	3700	<10	NT	NT	NT	1060	
	8/82	**	13	<10	14	NT	3300	90	NT	<5	2.00	1020	
	5/82	**	13	<10	20	NT	2900	10	NT	<5	10	1030	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

0353

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	2/82	**	13	<10	<10	NT	3600	<10	NT	<5	.10	870	
	11/81	**	13	<10	<10	NT	3300	20	NT	<5	1.00	996	
	2/80	USAEHA	17	NT	ND	NT	2700	ND	NT	NT	<0.1	765	
BH-2	11/92	NT											
	9/84	**	13	NT	12	NT	4000	NT	NT	NT	<.05	540	
	7/84	**	13	NT	NT	NT	2700	NT	NT	NT	NT	NT	
	11/82	**	13	ND	ND	ND	639	9	41	ND	ND	441	Mn = 684 ug/l
	1/83	**	13	NT	NT	NT	2500	<10	NT	NT	NT	460	
	8/82	**	13	<10	10	NT	2200	210	NT	<5	<.05	460	
	5/82	**	13	<10	10	NT	2000	<10	NT	<5	.06	440	
	2/82	**	13	<10	<10	NT	2800	<10	NT	<5	<.05	490	
	11/81	**	13	<10	<10	NT	2600	<10	NT	<5	.07	496	
	2/80	USAEHA	17	NT	ND	NT	3400	ND	NT	NT	2	625	
BH-3	11/92	NT											
	9/84	NT	13										4
	7/84	**	13	NT	NT	NT	4100	NT	NT	NT	<1.0	660	1
	11/82	**	13	ND	ND	100	615	8.9	88	ND	118	711	Mn = 740 ug/l

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

0556

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	1/83	**	13	NT	NT	NT	3400	<10	NT	NT	NT	550	
	8/82	**	13	<10	<10	NT	3300	220	NT	<5	24.00	640	
	5/82	**	13	<10	12	NT	3000	<10	NT	<5	21.30	640	
	2/82	**	13	<10	<10	NT	4000	<10	NT	<5	22.00	620	
	11/81	**	13	<10	14	NT	3800	<10	NT	<5	20.20	629	
	2/80	USAEHA	17	NT	560	NT	5400	ND	NT	NT	<0.1	572	
BH-4	11/92	NT											
	9/84	**	13	NT	19	NT	2200	NT	NT	NT	2.5	330	
	7/84	**	13	NT	NT	NT	2100	NT	NT	NT	2.5	280	3
	11/82	**	13	ND	ND	100	534	ND	ND	ND	ND	545	Mn=204 ug/l
	1/83	**	13	NT	NT	NT	1200	<10	NT	NT	NT	360	
	8/82	**	13	<10	<10	NT	1000	170	NT	<5	8.00	370	
	5/82	**	13	<10	12	NT	1000	<10	NT	<5	5.00	350	
	2/82	**	13	<10	<10	NT	1000	<10	NT	<5	8.40	390	
	11/81	**	13	<10	<10	NT	1200	<10	NT	<5	10.80	412	
	2/80	USAEHA	17	NT	ND	NT	2100	ND	NT	NT	<0.1	362	
BH-5	11/92	NT											

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

000000

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	9/84	NT											
	7/84	NT											
	11/82	**	13	ND	ND	150	797	ND	60	ND	ND	6530	Mn=196 ug/l
	1/83	**	13	NT	NT	NT	2500	<10	NT	NT	NT	530	
	8/82	**	13	<10	<10	NT	2000	210	NT	<5	.3	510	
	5/82	**	13	<10	11	NT	2000	<10	NT	<5	19.00	510	
	2/82	**	13	<10	<10	NT	2000	<10	NT	<5	15.00	48.2	
	11/81	**	13	<10	10	NT	2400	<10	NT	<5	14.40	460	
	2/80	USAEHA	17	NT	ND	NT	2200	ND	NT	NT	2.5	436	
BH-6	11/92	NT											
	9/84	**	13	NT	24	NT	5600	NT	NT	NT	2000	2	
	7/84	**	13	NT	NT	NT	5800	NT	NT	NT	3.7	540	1
	11/82	**	13	ND	13.4	75	648	12.4	55	ND	ND	554	Mn=576 ug/l
	1/83	**	13	NT	NT	NT	3400	<10	NT	NT	NT	580	
	8/82	**	13	<10	35	NT	2700	220	NT	<5	<.05	630	
	5/82	**	13	<10	20	NT	2600	<10	NT	<5	9.00	610	
	2/82	**	13	<10	<10	NT	3500	10	NT	<5	<.05	680	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

005920

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	11/81	**	13	<10	50	NT	3600	<10	NT	<5	6.10	750	
	2/80	USAEHA	17	NT	ND	NT	2200	ND	NT	NT	<0.1	665	
BH-7	11/92	NT											
	9/84	**	13	NT	<10	NT	3100	NT	NT	NT	<0.5	770	
	7/84	**	13	NT	NT	NT	3500	NT	NT	NT	<1.0	660	1
	11/82	**	13	ND	9.3	60	ND	11.7	ND	ND	2.23	264	Mn = 623 ug/l
	1/83	**	13	NT	NT	NT	2800	<10	NT	NT	NT	660	
	8/82	**	13	<10	30	NT	2700	220	NT	<5	<.05	360	
	5/82	**	13	<10	<10	NT	1900	<10	NT	<5	<.05	610	
	2/82	**	13	<10	<10	NT	2700	<10	NT	<5	9.00	610	
	11/81	**	13	<10	14	NT	2400	<10	NT	<5	.05	604	
	2/80	USAEHA	17	NT	ND	NT	1100	ND	NT	NT	0.12	322	
BH-8	11/92	NT											
	9/84	**	13	NT	17	NT	2800	NT	NT	NT	1.0	730	
	7/84	**	13	NT	NT	NT	2600	NT	NT	NT	1.1	660	1
	11/82	**	13	ND	ND	70	608	8.9	39	ND	0.72	1126	Mn = 660 ug/l
	1/83	**	13	NT	NT	NT	1800	<10	NT	NT	NT	680	
	8/82	**	13	<10	30	NT	1600	220	NT	<5	4.00	690	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

035971

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	5/82	**	13	<10	10	NT	2000	<10	NT	<5	3.00	780	
	2/82	**	13	<10	<10	NT	1000	<10	NT	<5	3.00	750	
	11/81	**	13	<10	20	NT	2000	<10	NT	6	1.65	440	
	2/80	USAEHA	17	NT	ND	NT	1300	ND	NT	NT	0.1	562	
BH-9	11/92	NT											
	9/84	NT	13										4
	7/84	NT	13										4
	11/82	**	13	ND	ND	80	32.5	ND	85	ND	22.36	702	Mn = 140 ug/l
	1/83	**	13	NT	NT	NT	2800	<10	NT	NT	NT	460	
	8/82	**	13	<10	<10	NT	2400	180	NT	<5	6.00	470	
	5/82	**	13	<10	<10	NT	2300	<10	NT	<5	6.00	440	
	2/82	**	13	<10	<10	NT	3000	<10	NT	<5	8.00	480	
	11/81	**	13	<10	<10	NT	3000	<10	NT	11	7.86	505	
	2/80	USAEHA	17	NT	ND	NT	3000	ND	NT	NT	2.8	480	
BH-10	11/92	NT											
	9/84	**	13	NT	<10	NT	3000	NT	NT	NT	4.0	820	
	7/84	**	13	NT	NT	NT	2200	NT	NT	NT	1.9	1020	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

035912

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	11/82	**	13	ND	ND	70	18.4	9.6	49	ND	16.7	545	Mn=520
	1/83	**	13	NT	NT	NT	3200	<10	NT	NT	NT	590	
	8/82	**	13	<10	20	NT	1900	140	NT	<5	5.00	620	
	5/82	**	13	<10	<10	NT	2300	<10	NT	<5	4.00	590	
	2/82	**	13	<10	<10	NT	3000	<10	NT	<5	4.00	620	
	11/81	**	13	<10	10	NT	3000	<10	NT	6	3.48	618	
	2/80	USAEHA	17	NT	ND	NT	2000	ND	NT	NT	<0.1	430	
BH-11	11/82	NT											
	9/84	**	13	NT	<10	NT	3000	NT	NT	NT	1.4	650	
	7/84	**	13	NT	NT	NT	2500	NT	NT	NT	1.4	590	
	4/83	**	13									580	Mn=468 ug/l
	1/83	**	13	NT	NT	NT	2000	<10	NT	NT	NT	600	
	8/82	**	13	<10	30	NT	1800	150	NT	<5	<.05	600	
	5/82	**	13	<10	<10	NT	1900	<10	NT	<5	3.00	800	
	2/82	**	13	<10	<10	NT	1600	<10	NT	<5	.60	550	
	11/81	**	13	<10	<10	NT	1000	<10	NT	<5	5.00	552	
	2/80	USAEHA	17	NT	ND	NT	1900	ND	NT	NT	<0.1	602	
BH-17	2/80	USAEHA	17	NT	ND	NT	ND	ND	NT	NT	<0.1	82	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

005913

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	11/82	**	15	ND	18.9	70	ND	10.4	ND	ND	1.12	319	
BH-21	11/92	NT											
	9/84	NT	13										4
	7/84	NT	13										4
	4/83	**	13	ND	ND	ND	66.7	9.8	ND	ND	10.91	580	Mn = 150 ug/l
	1/83	**	13	NT	NT	NT	2100	<10	NT	NT	NT	480	
	8/82	**	13	<10	23	NT	1900	200	NT	<5	<.05	470	
	5/82	**	13	<10	10	NT	1400	<10	NT	<5	5.00	420	
	2/82	**	13	<10	<10	NT	2000	<10	NT	<5	1.00	520	
	11/81	**	13	<10	<10	NT	2100	<10	NT	<5	2.30	558	
	2/80	USAEHA	17	NT	ND	NT	ND	ND	NT	NT	<0.1	667	
BH-22	11/92	NT											
	9/84	**	13	NT	<10	NT	4100	NT	NT	NT	0.5	790	
	7/84	**	13	NT	NT	NT	7400	NT	NT	NT	NT	NT	
	11/82	**	13	ND	8.8	140	963	7.1	74	ND	ND	728	Mn = 596
	1/83	**	13	NT	NT	NT	3300	<10	NT	NT	NT	980	
	8/82	**	13	<10	40	NT	2700	160	NT	<5	<.05	800	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents

COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

SUMMARY TABLE B-1
GROUNDWATER MONITORING
METALS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	Selenium ug/l	Nitrate mg/l	Chloride mg/l	Comments
	5/82	**	13	<10	10	NT	2600	<10	NT	<5	0.79	590	
	2/82	**	13	<10	<10	NT	3000	<10	NT	<5	4	850	
	11/81	**	13	<10	<10	NT	3100	<10	NT	<5	0.44	843	
	2/80	USAEHA	17	NT	NT	NT	2200	ND	NT	NT	0.1	652	

METHODS USED: * 11/92: Arsenic = 7060 Barium, Chromium, Nickel = 6010 Lead = 7421 Thallium = 7841
** 9/84, 7/84, 4/83, 1/83, 8/82, 5/82, 2/82, 11/81: Arsenic = 200.0,206.2/206.3 Barium = 200.0, 208.1 Lead = 200.0, 239.2
Chromium = 200.0, 218.2/218.1 Selenium = 200.0, 270.2/270.3 Nitrate = 352.2/353.1 Chloride = 325.2/325.3
*** 5/88: Barium = 208.1, Chromium = 218.1, Nitrate = 354.1 (EPA)
---- Indicates Analytical Method Not Recorded In Available Documents
COMMENTS: [1]High amount of non-priority pollutants [2]High level of acetone [3]Sample contains 1000 ug/l acrylonitrite
[4]Well damaged [5]Strong hydrocarbon odor @ well head [6]Light hydrocarbon odor @ well head

NT = Not Tested
ND = Not Detected (detection limit not recorded in report)

0159

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
C-1	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	2/86	624	11	NT	13	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	11/85	6240	13	<2	<2										
	9/84	624	11	<10	13	<10	NT	NT	NT	<10	NT	NT	NT	NT	
C-2	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	9/88	8240	6	17	3J	<10	NT	<5	<5	<5	<5	0.8J	<5	<5	
	4/86	TWC	11	<5	12	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	2/86	624	11	NT	10	NT	NT	NT	NT	NT	NT	NT	NT	NT	DUPLICATE MEC = 13
	9/84	624	11	4700	11,000	<1000	NT	NT	<1000	NT	NT	NT	NT	NT	
C-3	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	9/88	8240	6	<5	<5	<10	NT	<5	<5	<5	<5	<5	<5	<5	
	4/86	TWC	11	<5	13	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	2/86	624	11	NT	17	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	9/84	624	11	1300	2200	<1000	NT	NT	<1000	NT	NT	NT	NT	NT	

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

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SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
C-4	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	9/88	8240	5	9	<5	<10	NT	<5	<5	<5	<5	<5	<5	<5	
	9/88	EPA 624	5	<1.9	<2.8	<10	NT	<2.8	<4.7	<2.8	<4.1	<6	<7.2	NT	
	2/86	624	11	NT	17	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	11/85	6240	12	<2	<2	<5	<2	<2	NT	<2	<2	<2		<5	
	9/84	624	11	<10	10	<10	NT	NT	<10	NT	NT	NT	NT	NT	
C-4A	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
C-5	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	9/88	8240	5	77	110	<10	NT	<5	<5	<5	<5	<5	<5	<5	
	2/86	624	11	NT	17	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	11/85	624	12	<2	<2	<5	<2	<2	<2	<2	<2	<2	<2	<5	
	9/84	624	11	2500	5700	<1000	NT	NT	<1000	NT	NT	NT	NT	NT	
C-6	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	2/86	624	11	NT	14	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	9/84	624	11	<10	28	<10	NT	NT	<10	NT	NT	NT	NT	NT	
C-7	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	

TCE = Trichloroethene MEC = Methylene chloride VC = Vinyl chloride TCF = Trichlorofluoromethane
TOL = Toluene EBZ = Ethylbenzene XYL = Total Xylenes PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene 1,1-DCA = 1,1-Dichloroethane 1,2-DCA = 1,2-Dichloroethane Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform CTC = Carbon Tetrachloride 2-CVE = 2-Chloroethyl Vinyl Ether NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane DEPH = Diethylphtatlate ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

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SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	2/86	624	11	NT	16	NT	NT	NT	NT	NT	NT	NT	NT	NT	
C-8	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	15	
	2/86	624	11	NT	14	NT	NT	NT	NT	NT	NT	NT	NT	NT	DUPLICATE BENZENE = 24
C-9	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	4/86	TWC	11	<5	14	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	2/86	624	11	NT	16	NT	NT	NT	NT	NT	NT	NT	NT	NT	
C-10	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	Acetone = 40
	4/86	TWC	11	<5	13	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	2/86	624	11	NT	16	NT	NT	NT	NT	NT	NT	NT	NT	NT	
MW-1	11/92	8240	1	24,300	251,000	<10	1,600	<5	<5	<5	14	9	<5	5	CF = 287 1,1,2-TCE = 25
	9/90	—	2	52,000	1,430,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	---	2	74,000#	2,760,000#	30	ND	2000	34	ND	50	26	7	ND	
	9/88	EPA 624	5	165	4820	<100	<50	<28	<47	<20	<41	<60	<72	NT	
	5/88	8240	5	70	990	<20	NT	<10	<10	<10	<10	<10	<10	NT	
MW-1 FreePhas (2-4140)	11/18 /92	8240	1	49,900	768,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	

TCE = Trichloroethene MEC = Methylene chloride VC = Vinyl chloride TCF = Trichlorofluoromethane
TOL = Toluene EBZ = Ethylbenzene XYL = Total Xylenes PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene 1,1-DCA = 1,1-Dichloroethane 1,2-DCA = 1,2-Dichloroethane Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform CTC = Carbon Tetrachloride 2-CVE = 2-Chloroethyl Vinyl Ether NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane DEPH = Diethylphtatlate ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

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SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
MW-1 + FreePhas (2-4123)	11/92	8240	1	30,000	531,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	
MW-2	11/92	8240	1	199,000	9,080,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	
	9/90	----	2	120,000	4,860,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	190,000#	6,450,000#	ND	ND	7	54	ND	47	31	20	31	
	5/88	8240	5	60,000	2,900,000	<20	NT	660	<5	<10	20	20	<5	NT	1,1,2-TC 1,2,2 TFA =5900 ug/l
MW-2 + FreePhas (2-4124)	11/92	8240	1	236,000	17,800,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	
MW-2** FreePhas (2-4142)	11/92	8240	1	251,000	12,100,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	CF = 2,800
MW-3	11/92	8240	1	315	<10	<10	<5	<5	7	<5	<5	<5	<5	<5	Cis-1,2-DCE = 18
	9/90	----	2	450	ND	ND	ND	ND	9	ND	ND	ND	ND	ND	
	6/90	----	2	450	ND	ND	ND	5	11	ND	ND	ND	ND	ND	
	5/88	8240	5	290	10	<10	NT	<5	6	<5	<5	<5	<5	NT	1,1,2 TC 1,2,2 TFA = 110 ug/l
MW-4	11/92	8240	1	513	51	21	20	<5	9	<5	<5	<5	<5	<5	Cis-1,2-DCE = 96 CF = 5
	9/90	----	2	1000	ND	ND	ND	10	11	ND	ND	ND	ND	ND	
	6/90	----	2	1100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

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SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	5/88	8240	5	1200	20	<10	<10	10	7	<5	<5	<5	<5	<5	1,1,2 TC 1,2,2 TFA=180 ug/l
MW-5	11/92	8240	1	76	<10	<10	14	<5	<5	<5	<5	<5	<5	<5	Cis-1,2-DCE = 12
	9/90	----	2	150	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	140	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	5/88	8240	5	130	300	<10		<5	<5	<5	<5	<5	<5	NT	1,1,2 TC 1,2,2 TFA=120 ug/l
MW-6	11/92	8240	1	60	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	Cis-1,2-DCE = 6
	9/90	----	2	60	63	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	88	70	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	5/88	8240	5	330	1400	<20		<10	<10	<10	<10	<10	<10		1,1,2-TC 1,1,2-TFA=560
MW-7	11/92	8240	1	11,300	<10	<10	117	<5	<5	180	<5	<5	<5	<5	Cis-1,2-DCE = 13 CF=105 CTC=91
	9/90	----	2	8200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	8600	ND	ND	ND	7	ND	ND	ND	ND	ND	ND	
MW-8	11/92	8240	1	6560	<10	<10	28	<5	<5	178	<5	<5	<5	<5	
	9/90	----	2	6300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	8200	ND	ND	ND	ND	ND	170	ND	ND	ND	ND	

TCE = Trichloroethene MEC = Methylene chloride VC = Vinyl chloride TCF = Trichlorofluoromethane
TOL = Toluene EBZ = Ethylbenzene XYL = Total Xylenes PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene 1,1-DCA = 1,1-Dichloroethane 1,2-DCA = 1,2-Dichloroethane Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform CTC = Carbon Tetrachloride 2-CVE = 2-Chloroethyl Vinyl Ether NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane DEPH = Diethylphtatlate ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

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SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
MW-9	11/92	8240	1	3720	<10	<10	42	<5	<5	<5	<5	<5	<5	<5	Cis-1,2-DCE = 51
	9/90	----	2	4700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	4900	ND	ND	ND	19	9	ND	ND	ND	ND	ND	
MW-10	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	9/90	----	2	100	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	77	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	9/88	8240	5	61	1208	<10	NT	<5	<5	<5	<5	<5	<5	<5	
	9/88 DUP	EPA 624	5	<1.9	<2.8	<10	NT	<2.8	<4.7	<2.8	<4.1	<6	<7.2	NT	
MW-11	11/92	8240	1	581	<10	<10	<5	<5	<5	79	<5	<5	<5	<5	Cis-1,2-DCE = 28
	9/90	----	2	630	6	ND	ND	ND	43	ND	ND	ND	ND	ND	
	6/90	----	2	42	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MW-12	11/92	8240	1	8,180	<10	<10	9	<5	10	<5	<5	6	<5	<5	Cis-1,2-DCE = 77
	9/90	----	2	2300	14	ND	ND	28	18	ND	ND	ND	ND	ND	
MW-12	6/90	----	2	17,000	1300	ND	ND	160	67	ND	ND	ND	ND	ND	
MW-13	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

060981

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	9/90	----	2	6	62	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	110	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MW-14	11/92	8240	1	1,540	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	Cis-1,2-DCE = 30
	9/90	----	2	3500	7	ND	ND	31	10	ND	ND	ND	ND	ND	
	6/90	----	2	8200	6	ND	ND	120	26	ND	ND	ND	ND	ND	
MW-15	11/92	8240	1	9,390	68,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	
	9/90	----	2	330	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	6/90	----	2	64	37	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MW-16	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
MW-17	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
MW-18	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5
MW-19	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
MW-20	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
MW-21	11/92	8240	1	5270*	31200*	<10	46300*	<5	8	<5	<5	6	<5	<5	Cis-1,2-DCE = 197 CF = 68 2-CVE = 18

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

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SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
MW-22	11/92	8240	1	227	10	25	<5	<5	<5	<5	<5	8	<5	<5	Total-1,2-DCE=122 CF = 6 Acetone = 160
MW-22** FreePhas (2-4143)	11/92	8240	1	14,450	146,000	<10	6,400	<5	<5	<5	<5	<5	<5	<5	
MW-22 + FreePhas (2-4172)	11/92	8240	1	<2500	<5000	<5000	<2500	<2500	<2500	<2500	<2500	3690	<2500	<2500	Acetone = 89,200
MW-23	11/92	8240	1	467	<10	<10	<5	<5	<5	32	<5	<5	<5	<5	Acetone = 178
MW-23 + FreePhas (2-4173)	11/92	8240	1	<2500	<5000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	Acetone = 137,000
MW-23** FreePhas (2-4144)	11/92	8240	1	8,160	61,500	<10	<5	<5	<5	<5	<5	<5	<5	<5	
101	1/88	EPA 624	7	ND	38										
	9/87	624	7	ND	ND										
	7/87	624	7	ND	7										
	3/87	624	7	ND	6										
	12/86	624	7	ND	4										

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

005883

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	9/86	624	7	ND	ND										
	5/86	624	7	ND	7										
	2/86	624	7	ND	26										
101	4/83	624	13	28	123	NT	NT	NT	NT	NT	NT	NT	NT	NT	
102	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	1/88	624	7	ND	22										
	9/87	624	7	ND	ND										
	7/87	624	7	7	6										
	3/87	624	7	ND	6										
	12/86	624	7	ND	28										
	9/86	624	7	ND	ND										
	5/86	624	7	ND	5										
	2/86	624	7	ND	26										
	11/86	624	5	<2	<2	<5	<2	<2	<2	<2					
	4/83	624	13	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	

TCE = Trichloroethene MEC = Methylene chloride VC = Vinyl chloride TCF = Trichlorofluoromethane
TOL = Toluene EBZ = Ethylbenzene XYL = Total Xylenes PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene 1,1-DCA = 1,1-Dichloroethane 1,2-DCA = 1,2-Dichloroethane Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform CTC = Carbon Tetrachloride 2-CVE = 2-Chloroethyl Vinyl Ether NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane DEPH = Diethylphtatlate ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
109	11/82	624	15	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	4/83	624 & 625	13	29	12	NT	NT	NT	NT	1	NT	NT	NT	NT	1,1,2 TCE=45
	7/84	624	11	<10,000	11,000	<10,000	NT	NT	NT	<10,000	NT	NT	NT	NT	
	9/84	624	11	<50	<50	<50	NT	NT	NT	<50	NT	NT	NT	NT	
	2/86	624	7	110	21										
	5/86	624	7	110	6										
	9/86	624	7	110	ND										
	12/86	624	7	45	33										
	3/87	624	7	140	6										
	7/87	624	7	33	62										
	9/87	624	7	160	ND										
	1/88	624	7	120	80										
	9/88	8240	5	190	98	<13	NT	<6	<6	<6	<6	<6	<6	<6	TOTAL 1,2-DCE=11
	11/92	8240	1	204	<10	<10	326	<5	<5	<5	<5	<5	<5	<5	Cis-1,2-DCE = 13
110	11/86	624	12	<2	<2	<5	<2	<2	<2	<2					

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

005985

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	11/82	624	15	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
120	11/82	624	15	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	4/83	624	13	NT	108	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	7/84	624	11	12,000	140,000	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	
	7/84	624 & 625	3	<10,000	11,000	<1000	NT	NT	NT	<10000	NT	NT	NT	NT	1,2-TDCE = <10000
	9/84	624	11	27,000	300,000	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	
	2/86	624	7	29,000	410,000										
	5/86	624	7	20,000	180,000										
	9/86	624	7	37,000	370,000										
	12/86	624	7	22,000	370,000										
	3/87	624	7	196,000	196,000										
	7/87	624	7	27,000	110,000										
	9/87	624	7	50,000	820,000										
	1/88	624	7	23,000	5400										
	9/88	8240	5	32,000	310,000	<25,000	NT	<13,000	<13,000	<13,000	<13,000	<13,000	<13,000	<13,000	

TCE = Trichloroethene MEC = Methylene chloride VC = Vinyl chloride TCF = Trichlorofluoromethane
TOL = Toluene EBZ = Ethylbenzene XYL = Total Xylenes PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene 1,1-DCA = 1,1-Dichloroethane 1,2-DCA = 1,2-Dichloroethane Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform CTC = Carbon Tetrachloride 2-CVE = 2-Chloroethyl Vinyl Ether NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane DEPH = Diethylphtatlate ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

0 5 5 6

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	11/92	8240	1	67,500	884,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	
120** FreePhas (2-4119)	7/84	624 & 625	3	12,000	140,000	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	1,2-TDCE = <1000
	11/17 /92	8240	1	43,000	460,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	
120 + FreePhas (2-4125)	11/18 /92	8240	1	88,500	1,100,000	<5000	<2500	<2500	<2500	<2500	<2500	<2500	<2500	<2500	
121	11/92	NT													
123	4/83	624	13	312	7	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	7/84	624	11	<1200	4000	<1200	NT	NT	NT	<1200	NT	NT	NT	NT	
	2/86	624	7	ND	26										
	5/86	624	7	ND	7										
	9/86	624	7	ND	ND										
	12/86	624	7	ND	9										
	3/87	624	7	29	28										
	7/87	624	7	ND	3										
	9/87	624	7	4	8										

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

0059

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	1/88	624	7	ND	10										
	9/88	8240	6	<5	<5	<10	NT	<5	<5	<5	<5	<5	<5	<5	
	11/92	NT													
124	11/82	624	15	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	7/84	624 & 625	3	<1200	4000	<1200	NT	NT	NT	<1200	NT	NT	NT	NT	1,2-TDCE = <1200 - high acetone present
	7/84	624 & 625	13	<5000	14000	<5000	NT	NT	NT	<5000	NT	NT	NT	NT	1,2-TDCE = <5000
	2/86	624	7	ND	24										
	5/86	624	7	6	70										
	9/86	624	7	ND	ND										
	12/86	624	7	ND	7										
	3/87	624	7	16	21										
	7/87	624	7	ND	52										
	9/87	624	7	ND	ND										
	1/88	624	7	28	ND										

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

005988

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	9/88	8240	5	80	<5	<10	NT	<5	<5	<5	<5	0.4J	<5	<5	
	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	1,1,1-TCA = 11
125	11/82	624	15	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	4/83	624	13	ND	7	NT	NT	NT	NT	2	NT	55	NT	NT	1,1,2 TCA = 354
	7/84	624	11	<5000	6600	<5000	NT	NT	<5000	NT	NT	NT	NT	NT	
	9/84	624	11	<1000	1300	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	
	2/86	624	7	4	46										
	5/86	624	7	ND	ND										
	9/86	624	7	ND	ND										
	12/86	624	7	ND	7										
	3/87	624	7	ND	6										
	7/87	624	7	ND	ND										
	9/87	624	7	22	17										
	1/88	624	7	ND	ND										
	9/88	8240	5	<50	<50	<100	NT	<50	<50	<50	2J	<50	<50	5J	CHLOROFORM = 27BJ

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

000399

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	11/92	NT													
126	11/82	624	15	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	4/83	624	13	ND	4	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	7/84	624 & 625	3	<2500	5800	<2500	NT	NT	NT	<2500	NT	NT	NT	NT	1,2-TDCE = <2500
	7/84	624	11	<2500	5800	<2500	NT	NT	<2500	NT	NT	NT	NT	NT	
	9/84	624	11	<1000	<1000	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	
	2/86	624	11	NT	15	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	4/86	TWC	11	<5	11	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
129	11/82	624 & 625	13	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	DEPH = 73.0
	7/84	624	3	<2500	5800	<2500	NT	NT	NT	<2500	NT	NT	NT	NT	<2500
	7/84	624	11	11,000	4200	<2000	NT	NT	<2000	NT	NT	NT	NT	NT	
	9/84	624	11	18,000	<1000	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	
	2/86	624	7	7400	31										
	5/86	624	7	3300	12										
	9/86	624	7	13,000	6										

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

05900

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	12/86	624	7	5100	15										
	3/87	624	7	5590	13										
	7/87	624	7	3500	41										
	9/87	624	7	9300	10										
	1/88	624	7	4300	ND										
	11/92	8240	1	1,370	94	<10	86	<5	<5	33	<5	<5	<5	<5	Cis-1,2-DCE = 6 1,1,1-TCA = 12
130	11/82	624	15	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	7/84	624 & 625	3	11,000	4200	<2000	NT	NT	NT	<2000	NT	NT	NT	NT	TRANS 1,2-DCE = <2000
	2/86	624	11		15										
	11/92	8240	1	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	
BH-1	7/84	624	13	<25,000	<25,000	<25,000				<25,000					
	9/84	624	11	1100	1200	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	
	11/92	NT													
BH-2	3/83	624	13	198	712	NT	NT	NT	NT	17	NT	NT	NT	NT	1,2-DCE=46

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

0 0 5 6 8 1

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	7/84	624 & 625	13	8400	250,000	<2000				<2000					TRANS 1,2-DCE = <25,000
	9/84	624 & 625	11	6200	19,000	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	
	11/92	NT													
BH-3	3/83	---	13	30	22,600			240	50	25,800		4340			
	4/83	624	13	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	7/84	624 & 625	13	<2000	13,000	<2000	NT	NT	NT	<2000	NT	NT	NT	NT	TRANS 1,2-DCE = <2000
	11/92	NT													
BH-4	3/83	---	13	140	10,400			150	40	17,700		1140			
	4/83	624	13	ND	7	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	7/84	624 & 625	13	480	18	18				<10					TRANS 1,2-DCE = 27
	9/84	624	11	500	<10	90	NT	NT	NT	<10	NT	NT	NT	NT	
	11/92	NT													
BH-5	3/83	624	13	39,200	8490					680					1,1,2 TCA = 1120
	4/83	624	13	1120	95,960	NT	NT	NT	NT	NT	NT	NT	NT	NT	

TCE = Trichloroethene MEC = Methylene chloride VC = Vinyl chloride TCF = Trichlorofluoromethane
TOL = Toluene EBZ = Ethylbenzene XYL = Total Xylenes PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene 1,1-DCA = 1,1-Dichloroethane 1,2-DCA = 1,2-Dichloroethane Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform CTC = Carbon Tetrachloride 2-CVE = 2-Chloroethyl Vinyl Ether NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane DEPH = Diethylphtatlate ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

266900

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
	7/84	NT	13	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	11/92	NT													
BH-6	3/83	----	13	14,000	14,900	NT	NT	NT	NT	NT	110	NT	NT	NT	Hexachlorobenzene = 66100
	4/83	624	13	1232	NT	NT	NT	NT	NT	1130	72	NT	NT	NT	
	7/84	624	13	52,000	2,000,000	<12,000				<12,000					
	9/84	624	11	120,000	3,300,000	<5000				<5000					
	11/92	NT													
BH-7	4/83	624	13	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	
	7/84	624	3	<5000	6000	<5000				<5000					TRANS 1,2-DCE = <5000
	9/84	624	11	1600	500	880	NT	NT	NT	<250	NT	NT	NT	NT	
	11/92	NT													
BH-8	4/83	624 & 625	13	63	30	NT	NT	NT	NT	12	NT	NT	NT	NT	DEPH = 330
	7/84	624 & 625	13	<10,000	10,000	<10,000				<10,000					TRANS 1,2-DCE = <10,000
	9/84	624	11	250	15	120	NT	NT	NT	<10	NT	NT	NT	NT	
	11/92	NT													

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

000593

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
BH-9	4/83	624 & 625	13	36	251	NT	NT	NT	NT	NT	NT	NT	NT	NT	DEPH = 200
	7/84	NT	13	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	WELL DAMAGE
	11/92	NT													
BH-10	4/83	624	13	63	206	NT	NT	NT	NT	5	NT	NT	NT	NT	
	7/84	624	13	<2000	<2000	<2000				<2000					
	9/84	624	NT	<1000	1900	<1000	NT	NT	NT	<1000	NT	NT	NT	NT	
	11/92	NT													
BH-11	4/83	624 & 625	13	7200						800					1,1,2 DCA = 2150 1,2 DCE = 126
	7/84	624 & 625	13	140,000	1,200,000	<5000				<5000					TRANS 1,2-DCE = <5000
	9/84	624 & 625	11	16,000	1,100,000	<5000	NT	NT	NT	<5000	NT	NT	NT	NT	TRANS 1,2-DCE = 12,000
	11/92	NT													
BH-21	4/83	624	13	86	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	1,1,2 TCA = 2295 1,2 DCE = 118
	7/84	NT	13	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	WELL DAMAGE
	11/92	NT													

TCE = Trichloroethene
MEC = Methylene chloride
VC = Vinyl chloride
TCF = Trichlorofluoromethane
TOL = Toluene
EBZ = Ethylbenzene
XYL = Total Xylenes
PCE = Tetrachloroethene
1,1-DEC = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
Cis-1,2-DCE = Cis-1,2-Dichloroethene
CF = Chloroform
CTC = Carbon Tetrachloride
2-CVE = 2-Chloroethyl Vinyl Ether
NT = Not Tested
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
DEPH = Diethylphtatlate
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

005594

SUMMARY TABLE B-2
GROUNDWATER MONITORING
VOLATILE ORGANICS
LONGHORN ARMY AMMUNITION PLANT

MW #	DATE	METHOD/ AGENCY	DATA REF	TCE ug/l	MEC ug/l	VC ug/l	TCF ug/l	1,1-DCE ug/l	1,1-DCA ug/l	1,2-DCA ug/l	PCE ug/l	TOL ug/l	EBZ ug/l	XYL ug/l	OTHER ug/l
BH-22	7/84	624	13	<2000	4400	<2000				<2000					
	9/84	624 & 625	11	1100	3500	<1000	NT	NT	NT	3200	NT	NT	NT	NT	BIS-PHTHALATE = 430
	11/92	NT													

TCE = Trichloroethene
TOL = Toluene
1,1-DEC = 1,1-Dichloroethene
CF = Chloroform
1,1,2-Trichloro 1,2,2-Trifluoroethane = 1,1,2 TC, 1,2,2 TFA
DMA = Dichloromethane
MEC = Methylene chloride
EBZ = Ethylbenzene
1,1-DCA = 1,1-Dichloroethane
CTC = Carbon Tetrachloride
DEPH = Diethylphtatlate
VC = Vinyl chloride
XYL = Total Xylenes
1,2-DCA = 1,2-Dichloroethane
2-CVE = 2-Chloroethyl Vinyl Ether
TCF = Trichlorofluoromethane
PCE = Tetrachloroethene
Cis-1,2-DCE = Cis-1,2-Dichloroethene
NT = Not Tested
ND = Not Detected (detection limit not reported in available documents)

---- Indicates Analytical method not recorded in available documents.
* Due to high analyte concentration, result was determined by 200 times dilution analysis.
# Indicates Oversaturation = Method detection limit raised five hundred times due to sample dilution.
** Higher detection limit due to matrix interference.
+ Higher detection limit due to high analyte concentration.

005993

SUMMARY TABLE B-3
GROUNDWATER MONITORING
EXPLOSIVES
SUMMARY DATA TABLE

MW #	DATE	METHOD/ AGENCY	DATA REF	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4-DNT ug/l	2-AM-4,6-DNT ug/l	TNT ug/l	4-AM-2,6-DNT ug/l
C-1	11/92	8330	1	1.27	1.88	<0.26	<0.11	<0.55	<0.11	0.06 C	<0.03	NT	<0.06
C-2	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/88	USATHA MA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
C-3	11/92	8330	1	0.70 J	3.5 C	u	u	0.0 P	u	u	0.06		u
	9/88	USATHA MA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
C-4	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/88	USATHA MA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
C-4A	11/92	8330	1	<1	0.0 P	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
C-5	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/88	USATHA MA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
C-6	11/92	8330	1	<1	0.0 P	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
C-7	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
C-8	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
C-9	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
C-10	11/92	8330	1	0.11 JC	1.2 C	<0.26	<0.11	0 P	<0.11	0.13	<0.03	NT	<0.06
MW-1	5/88	COE	5	<300	<300	NT	NT	<300	<100	<100	NT	NT	<100 *
	SPRING 88	USATHA MA D-1	8	NT	NT	2.6	<1	NT	5.6	<1	NT	NT	<1*
	6/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
	9/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
	11/92	8330	1	<1	<0.84	<0.26	0.39 C	<0.55	<0.11	<0.02	<0.03	NT	<0.06

U = Below Detection Limit C = Result unconfirmed due to matrix interference
J = Estimated level below detection limit
P = Unknown compound equivalent detected NT = Not Tested

005696

SUMMARY TABLE B-3
GROUNDWATER MONITORING
EXPLOSIVES
SUMMARY DATA TABLE

MW #	DATE	METHOD/ AGENCY	DATA REF	HMX ug/l	RDX ug/l	1,3,6-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4-DNT ug/l	2-AM-4,6-DNT ug/l	TNT ug/l	4-AM-2,6-DNT ug/l
MW-2	11/92	8330	1	0.0 P	0.0 P	576	<0.11	<0.55	<0.11	<0.02	<0.03	NT	84.0
	9/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	5/88	COE	5	<300	<300	NT	NT	<300	<100	<100	NT	NT	<100 *
MW-3	11/92	8330	1	<1	<0.84	<0.26	0.60 C	0.0 P	0.36 C	0.36 C	0.25 C		<0.06
	9/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	5/88	COE	5	<300	<300	NT	NT	<300	<100	NT	NT	NT	<100 *
MW-4	11/92	8330	1	<1	<0.84	<0.26	0.0 P	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	5/88	COE	5	<300	<300	NT	NT	<300	<100	NT	NT	NT	<100 *
MW-5	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	---	2	ND	ND	NT	NT	ND	ND	ND	NT	NT	
	5/88	COE	5	<300	<300	NT	NT	<300	<300	<100	NT	NT	<100 *
MW-6	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	9/88	USATHAMA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
	5/88	COE	3	<300	<300	NT	NT	<300	<100	<100	NT	NT	<100 *
MW-7	11/92	8330	1	<1	<0.84	<0.26	0.0 P	<0.55	<0.11	<0.02	<0.03	NT	<0.06

U = Below Detection Limit C = Result unconfirmed due to matrix interference
J = Estimated level below detection limit
P = Unknown compound equivalent detected NT = Not Tested

AGS50

SUMMARY TABLE B-3
GROUNDWATER MONITORING
EXPLOSIVES
SUMMARY DATA TABLE

MW #	DATE	METHOD/ AGENCY	DATA REF	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4-DNT ug/l	2-AM-4,6-DNT ug/l	TNT ug/l	4-AM-2,6-DNT ug/l
	9/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
MW-8	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
MW-9	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
MW-10	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
MW-11	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
MW-12	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT
MW-13	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	----	2	u	u	NT	NT	u	u	u	NT	NT	NT

U = Below Detection Limit C = Result unconfirmed due to matrix interference
J = Estimated level below detection limit
P = Unknown compound equivalent detected NT = Not Tested

005998

SUMMARY TABLE B-3
GROUNDWATER MONITORING
EXPLOSIVES
SUMMARY DATA TABLE

MW #	DATE	METHOD/ AGENCY	DATA REF	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4-DNT ug/l	2-AM-4,6-DNT ug/l	TNT ug/l	4-AM-2,6-DNT ug/l
	6/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
MW-14	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	---	2	u	u	NT	NT	u	u	u			
	6/90	---	2	u	u	NT	NT	u	u	u			
MW-15	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	6/90	---	2	u	u	NT	NT	u	u	u	NT	NT	NT
	9/88	USATHA MA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
	9/88 DUP	---	5	<20	<20	NT	NT	<50	NT	NT	NT	NT	NT
MW-16	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
MW-17	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
MW-18	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
MW-19	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	0.10	NT	<0.06
MW-20	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
MW-21	11/92	8330	1	<1	0.0 P	<0.26	0.0 P	<0.55	<0.11	<0.02	<0.03	NT	<0.06
MW-22	11/92	8330	1	<1	0.0 P	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
MW-22	11/92	NT											
MW-23	11/92	8330	1	<1	0.0 P	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
MW-23	11/92	NT											

U = Below Detection Limit C = Result unconfirmed due to matrix interference
J = Estimated level below detection limit
P = Unknown compound equivalent detected NT = Not Tested

005999

SUMMARY TABLE B-3
GROUNDWATER MONITORING
EXPLOSIVES
SUMMARY DATA TABLE

MW #	DATE	METHOD/ AGENCY	DATA REF	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4-DNT ug/l	2-AM-4,6-DNT ug/l	TNT ug/l	4-AM-2,6-DNT ug/l
MW-23	11/92	NT											
101	11/82	USATHAMA	13	NT	NT	15.0	3.35	NT	u	u	NT	NT	NT
102	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	SPRING 88	USATHAMA D-1	8	NT	NT	<1	<1	NT	<1	<1	NT	NT	<1*
	11/82	HPLC	13	NY	NT	53.95	5.74	NT	u	u	NT	NT	NT
109	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	9/88	USATHAMA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
	11/82	HPLC	13	NT	NT	u	u	NT	u	u	NT	NT	NT
120	11/92	8330	1	<1	0.0P	2.51C	0.0P	<0.55	<0.11	<0.02	0.0P	NT	<0.06
120	11/92	NT											
120	11/92	NT											
	9/88	HPLC	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
	11/82	HPLC	13	NT	NT	u	u	NT	u	u	NT	NT	NT
121	11/92	NT											
123	11/92	NT											
	9/88	USATHAMA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
	10/88	USATHAMA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT

U = Below Detection Limit C = Result unconfirmed due to matrix interference
J = Estimated level below detection limit
P = Unknown compound equivalent detected NT = Not Tested

000060

SUMMARY TABLE B-3
GROUNDWATER MONITORING
EXPLOSIVES
SUMMARY DATA TABLE

MW #	DATE	METHOD/ AGENCY	DATA REF	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4-DNT ug/l	2-AM-4,6-DNT ug/l	TNT ug/l	4-AM-2,6-DNT ug/l
	10/88 DUP	USATHAMA	5	<20	<20	NT	NT	<50	<10	<10	NT	NT	NT
	11/82	HPLC	13	NT	NT	u	u	NT	u	u	NT	NT	NT
124	11/92	8330	1	<1	<0.84	<0.26	<0.11	0.0 P	<0.11	<0.02	<0.03	NT	<0.06
	9/88	USATHAMA	5	<26	<22	NT	NT	<26	NT	<10	NT	<14	NT
	9/88 DUP	USATHAMA	5	<20	<20	NT	NT	<50	NT	NT	NT	NT	NT
	11/82	HPLC	13	NT	NT	7.31	u	NT	u	NT	NT	NT	NT
125	11/92	NT											
	11/82	HPLC	13	NT	NT	2.58	u	NT	u	u	NT	NT	NT
126	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	11/82	HPLC	13	NT	NT	u	u	NT	u	u	NT	NT	NT
129	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	11/82	HPLC	13	NT	NT	u	u	NT	u	u	NT	NT	NT
130	11/92	8330	1	<1	<0.84	<0.26	<0.11	<0.55	<0.11	<0.02	<0.03	NT	<0.06
	11/82	HPLC	16	NT	NT	u	u	NT	u	u	NT	NT	NT
BH-1	11/92	NT											
	11/82	HPLC	16	NT	NT	u	u	NT	u	u	NT	NT	NT
BH-2	11/92	NT											
	11/82	HPLC	16	NT	NT	u	u	NT	u	u	NT	NT	NT

U = Below Detection Limit C = Result unconfirmed due to matrix interference
J = Estimated level below detection limit
P = Unknown compound equivalent detected NT = Not Tested

006001

SUMMARY TABLE B-3
GROUNDWATER MONITORING
EXPLOSIVES
SUMMARY DATA TABLE

MW #	DATE	METHOD/ AGENCY	DATA REF	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4-DNT ug/l	2-AM-4,6-DNT ug/l	TNT ug/l	4-AM-2,6-DNT ug/l
BH-3	11/92	NT											
	4/93	HPLC	13	NT	NT	u	u	NT	u	u	NT	NT	NT
BH-4	11/92	NT											
	11/92	HPLC	13	NT	NT	u	u	NT	u	u	NT	NT	NT
BH-5	11/92	NT											
	11/92	HPLC	13	NT	NT	1327	u	NT	u	u	NT	NT	NT
BH-6	11/92	NT											
	11/92	HPLC	13	NT	NT	29.47	NT	NT	NT	NT	NT	NT	NT
BH-7	11/92	NT											
	11/92	HPLC	13	NT	NT	u	u	NT	NT	u	NT	NT	NT
BH-8	11/92	NT											
	11/92	HPLC	13	NT	NT	u	u	NT	NT	u	NT	NT	NT
BH-9	11/92	NT											
	11/92	HPLC	13	NT	NT	u	u	NT	NT	u	NT	NT	NT
BH-10	11/92	NT											
	11/92	HPLC	13	NT	NT	u	u	NT	NT	u	NT	NT	NT
BH-11	11/92	NT											
	SPRING 88	USATHM A D-1	8	NT	NT	61	NT	NT	3.8	<1	NT	NT	<1*

U = Below Detection Limit C = Result unconfirmed due to matrix interference
J = Estimated level below detection limit
P = Unknown compound equivalent detected NT = Not Tested

200900

SUMMARY TABLE B-3
GROUNDWATER MONITORING
EXPLOSIVES
SUMMARY DATA TABLE

MW #	DATE	METHOD/ AGENCY	DATA REF	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4-DNT ug/l	2-AM-4,6-DNT ug/l	TNT ug/l	4-AM-2,6-DNT ug/l
	4/83	HPLC	13	NT	NT	106.38	9.8	NT	NT	NT	NT	NT	NT
BH-17	11/82	HPLC	15	NT	NT	u	u	NT	u	u	NT	NT	NT
BH-21	11/92	NT											
	11/82	HPLC	13	NT	NT	34.20	u	NT	6.37	u	NT	NT	NT
BH-22	11/92	NT											
	11/82	HPLC	15	NT	NT	u	u	NT	u	u	NT	NT	NT

* 2,6 DNT

U = Below Detection Limit C = Result unconfirmed due to matrix interference
J = Estimated level below detection limit
P = Unknown compound equivalent detected NT = Not Tested

000603

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
C-1	9/85	625	11	<5	<4	4	
	9/84	625	11	NT	NT	<10	
C-2	11/92	8270	1	<10	<10	<40	
	9/84	625	11	NT	NT	<10	
C-3	11/92	8270	1	<10	12	<40	
	9/84	625	11	NT	NT	<10	
C-4	11/92	8270	1	<10	19	92	
	9/85	625	12	<4	<4	4	
	9/84	625	11	NT	NT	<10	
C-4A	11/92	8270	1	18	31	<40	
C-5	11/92	8270	1	<10	<10	<40	
	11/85	625	12	<4	<4	<4	
	9/85	625	11	<5	NT	<4	
	9/84	625	11	NT	NT	<10	
C-6	11/92	8270	1	<10	28	52	
	9/84	625	11	NT	NT	<10	
C-7	11/92	8270	1	<10	<10	<40	

000004

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
C-8	11/92	8270	1	<10	<10	<40	
C-9	11/92	8270	1	<10	<10	<40	
C-10	11/92	8270	1	11	18	59	
MW-1	11/92	8270	1	<10	<10	62	
	5/88	420.1	5	<0.004	NT	NT	
MW-2	11/92	8270	1	<10	<10	<40	DIMETHYL PHTHALATE=22 BENZYL ALCOHOL=37
	5/88	420.1	5	<4	NT	NT	
MW-3	11/92	8270	1	<10	<10	<40	
	5/88	420.1	5	<4	NT	NT	
MW-4	11/92	8270	1	<10	<10	<40	
	5/88	420.1	5	<4	NT	NT	
MW-5	11/92	8270	1	<10	<10	<40	
	5/88	420.1	5	<4	NT	NT	
MW-6	11/92	8270	1	<10	<10	<40	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

500990

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
	5/88	420.1	3	<4	NT	NT	
MW-7	11/92	8270	1	<10	<10	<40	
MW-8	11/92	8270	1	<10	<10	<40	
MW-9	11/92	8270	1	<10	<10	<40	
MW-10	11/92	8270	1	<10	<10	<40	
MW-11	11/92	8270	1	<10	<10	<40	
MW-12	11/92	8270	1	<10	<10	<40	
MW-13	11/92	8270	1	<10	<10	<40	
MW-14	11/92	8270	1	<10	<10	<40	
MW-15	11/92	8270	1	<10	<10	<40	
MW-16	11/92	8270	1	<10	<10	<40	
MW-17	11/92	8270	1	<10	<10	<40	
MW-18	11/92	8270	1	<10	<10	<40	
MW-19	11/92	8270	1	<10	<10	<40	
MW-20	11/92	8270	1	<10	<10	<40	
MW-21	11/92	8270	1	<10	<10	<40	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

000006

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
MW-22	11/92	8270	1	<10	<10	<40	
MW-23	11/92	8270	1	<10	<10	<40	
101	11/82	625	14	<2	NR	NR	Phthalic acid=78
102	11/92	8270	1	<10	<10	<40	
	11/82	625	14	<2	NR	NR	
103	11/85	625	12	<4	<4	5	
109	11/92	8270	1	<10	<10	<40	
	9/84	625	11	NT	NT	24	
110	11/85	625	12	<4	<4	<4	di-n-butyl phthalate=3
120	11/92	8270	1	<10	<10	<40	
	11/85	625	12	NT	NT	<10	
	11/82	625	14	<2	NR	NR	
122	11/85	625	12	<4	<4	5	
123	11/82	625	14	<2	NR	NR	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-Ethylhexyl) Phthalate
NT = Not tested
NR = Not recorded

006001

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
124	11/92	8270	1	<10	<10	<40	
125	9/84	625	11	NT	NT	<11	
126	11/92	8270	1	<10	<10	<40	
	9/84	625	11	NT	NT	13	
	11/82	625	14	<2	NR	NR	
129	11/92	8270	1	<10	<10	<40	
	9/84	625	11	NT	NT	37	
	4/83	USATHAMA	13	NR	NR	NR	Diethyl phthalate=73
	11/82	625	14	<2	NR	NR	
BH-1	9/84	625	11	NT	NT	<10	
	1/83	420.2	13	30	NR	NR	
	8/82	420.2	13	20	NR	NR	
	5/82	420.2	13	20	NR	NR	
	2/82	420.2	13	10	NR	NR	
	11/81	420.2	13	20	NR	NR	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

030098

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
	1980	AEHA	17	<10	NR	NR	
BH-2	9/84	625	11	NT	NT	45	N-nitrosodi phenylmine=10
	4/83	USATHAMA	13	NR	NR	NR	Diethyl phthalate=243
	1/83	420.2	13	10	NR	NR	
	11/82	625	14	NR	NR	NR	Diethyl phthalate=243
	8/82	420.2	13	10	NR	NR	
	5/82	420.2	13	10	NR	NR	
	2/82	420.2	13	<10	NR	NR	
	11/81	420.2	13	10	NR	NR	
	1980	AEHA	17	<10	NR	NR	
BH-3	1/83	420.2	13	20	NR	NR	
	8/82	420.2	13	20	NR	NR	
	5/82	420.2	13	10	NR	NR	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

600909

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
	5/82	420.2	13	40	NR	NR	
	2/82	420.2	13	40	NR	NR	
	11/81	420.2	13	40	NR	NR	
	1980	AEHA	17	10	NR	NR	
BH-6	9/84	625	11	NT	NT	<10	
	11/82	625	15	NR	NR	NR	Dibutyl phthalate=8
	8/82	420.2	13	20	NR	NR	
	5/82	420.2	13	20	NR	NR	
	2/82	420.2	13	20	NR	NR	
	11/81	420.2	13	20	NR	NR	
	1980	AEHA	17	<10	NR	NR	
BH-7	9/84	625	11	NT	NT	31	
	1/83	420.2	13	10	NR	NR	
	8/82	420.2	13	10	NR	NR	
	5/82	420.2	13	<10	NR	NR	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

006010

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
	2/82	420.2	13	<10	NR	NR	
BH-8	9/84	625	11	NT	NT	<10	
	4/83	USATHAMA	13	NR	NR	NR	Diethyl phthalate=330
	11/82	625	14	NR	NR	NR	Diethyl phthalate=330
	1/83	420.2	13	10	NR	NR	
	8/82	420.2	13	10	NR	NR	
	5/82	420.2	13	10	NR	NR	
	2/82	420.2	13	10	NR	NR	
	11/81	420.2	13	<10	NR	NR	
	1980	AEHA	17	10	NR	NR	
BH-9	4/83	USATHAMA	13	NR	NR	NR	Diethyl phthalate=200
	1/83	420.2	13	<10	NR	NR	
	11/82	625	14	NR	NR	NR	Diethyl phthalate=200

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

006011

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
	8/82	420.2	13	<10	NR	NR	
	5/82	420.2	13	<10	NR	NR	
	3/82	420.2	13	<10	NR	NR	
	2/82	420.2	13	<10	NR	NR	
	11/81	420.2	13	<10	NR	NR	
	1980	AEHA	17	<10	NR	NR	
BH-10	9/84	625	11	NT	NT	<10	
	1/83	420.2	13	10	NR	NR	
	11/82	625	15	NR	NR	NR	Dibutyl phthalate=16
	8/82	420.2	13	<10	NR	NR	
	5/82	420.2	13	10	NR	NR	
	2/82	420.2	13	<10	NR	NR	
	11/81	420.2	13	10	NR	NR	
	1980	AEHA	17	20	NR	NR	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

060212

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
BH-11	9/84	625	11	NT	NT	<40	Dimethyl phthalate=44
	4/83	USATHAMA	13	NR	NR	NR	Dimethyl phthalate=52 Diethyl phthalate=35
	1/83	420.2	13	40	NR	NR	
	11/82	625	14	NT	NT	NT	Diethyl phthalate=35
	8/82	420.2	13	30	NR	NR	
	5/82	420.2	13	20	NR	NR	
	2/82	420.2	13	10	NR	NR	
	11/81	420.2	13	20	NR	NR	
	1980	AEHA	17	<10	NR	NR	
BH-12	1980	AEHA	17	<10	NR	NR	
BH-13	11/85	625	12	<4	<4	4	
	1980	AEHA	17	10	NR	NR	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

000613

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
BH-18	11/85	625	12	<4	<4	5	
BH-21	1/83	420.2	13	<10	NR	NR	
	1/83	420.2	13	<10	NR	NR	
	8/82	420.2	13	<10	NR	NR	
	5/82	420.2	13	<10	NR	NR	
	2/82	420.2	13	10	NR	NR	
	11/81	420.2	13	10	NR	NR	
BH-22	9/84	625	11	NT	NT	430	
	1980	AEHA	17	<10	NR	NR	
	1/83	420.2	13	<10	NR	NR	
	8/82	420.2	13	<10	NR	NR	
	5/82	420.2	13	10	NR	NR	
	2/82	420.2	13	<10	NR	NR	
	11/81	420.2	13	20	NR	NR	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

010900

SUMMARY TABLE B-4
GROUNDWATER MONITORING
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

WELL NO.	SAMPLE DATE	METHOD	REF. DOC.	PHENOL ug/l	DNOP ug/l	DEPH ug/l	OTHER
BH-23	1980	AEHA	17	50	NR	NR	

DNOP = Di-n-octyl phthalate
DEHP = bis (2-ethylhexyl) phthalate
NT = Not tested

000015

APPENDIX C
SOIL/SOLID SAMPLE INVESTIGATION RESULTS

SUMMARY TABLE C-1
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
METALS
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	ARSENIC mg/kg	LEAD mg/kg	CADMIUM mg/kg	BARIUM mg/kg	CHROMIUM mg/kg	ZINC mg/kg	NICKEL mg/kg
MW-1	9/87	2	1.6	10	<0.05	27	10	9	5.3
	9/87	10	1.1	6.9	<0.05	27	<5	21	6.9
MW-2	8/87	2	2.9	21	<0.05	27	15	49	7.6
	8/87	10	1.3	10	<0.05	58	5.2	41	14
MW-3	9/87	2	<1	4.1	<0.5	21	10	7.9	5.4
	9/87	10	<1	6.8	<0.5	<20	<5	7.6	4
	9/87	15	1.2	7.3	<0.5	<20	<5	11	5.3
MW-4	9/87	2	2.8	14	<0.5	<20	19	5.4	4.3
	9/87	10	<1	3.8	<0.5	31	<5	5.5	3.8
	9/87	15	1	7.4	<0.5	26	<5	7.4	4.6
MW-5	9/87	2	<1	6.7	<0.5	73	10	18	8.4
	9/87	10	<1	2.5	<0.5	57	<5	13	4.7
	9/87	17	1.6	7.6	<0.5	68	5.8	16	7.6
MW-6	9/87	2	1.4	12	0.8	68	10	17	8.6
	9/87	10	<1	8	<0.5	59	<5	11	2.7
	9/87	18	<1	8.3	0.8	29	7.4	18	3.5
MW-7	6/88	2	<1	4.5	<0.5	23	<5	14	5.6
	6/88	10	<1	11	1.1	96	9.7	9.4	2.6
MW-8	7/88	2	<1	6.4	1.5	28	<5	7.5	<1
	7/88	10	<1	1.6	<0.5	20	<5	4.7	1.6
MW-9	7/88	2	<1	6.3	1.9	51	<5	5.5	1.8
	7/88	10	1.4	3.1	0.9	29	<5	10	2.5
MW-10	7/88	2	<1	7.4	1.7	<20	<5	3.4	<1

NR=NOT RECORDED
NOTE: WHEN DUPLICATE ANALYSIS WAS PERFORMED, HIGHEST CONCENTRATION WAS USED IN SUMMARY TABLE.

ANALYTICAL METHODS USED FOR METALS WERE EPA METHODS: ARSENIC 7060, BARIUM 7080, CADMIUM 7130, CHROMIUM 7190, LEAD 7420, NICKEL 7520, SELENIUM 7740 and ZINC 7950.

SUMMARY TABLE C-1
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
METALS
(Borings MW-1 thru MW-15, MW-21 thru MW-23,
8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	ARSENIC mg/kg	LEAD mg/kg	CADMIUM mg/kg	BARIUM mg/kg	CHROMIUM mg/kg	ZINC mg/kg	NICKEL mg/kg
	7/88	10	<1	1	<0.5	<20	<5	2.8	1
MW-11	7/88	2	<1	4.5	1.6	43	<5	3	1.1
	7/88	10	<1	1.6	0.6	<20	<5	3.8	<1
MW-12	7/88	2	<1	17	3.3	180	8	14	5.6
	7/88	10	1.1	7.1	3.8	34	5.8	17	7.5
MW-13	9/88	2	0.78	9.8	4.8	11	6.8	NR	NR
	9/88	10	0.13	2.6	1.9	15	1.9	NR	NR
MW-14	8/88	2	1.2	10	3.2	200	9.9	12	5.5
	8/88	10	<1	6.9	3.1	28	5.6	13	5.6
MW-15	9/88	2	1.1	13	7	70	15	NR	NR
	9/88	10	<1	7.3	4.2	92	5.4	NR	NR
MW-21	9-89	4	1.46	22.9	11.3	155.0	23.5	33.1	10.2
	9-89	10	1.87	21.5	10.7	249.0	17.9	80.2	21.5
MW-22	8-89	4	1.43	16.4	5.54	216	13.5	15.3	7.49
	8-89	10	1.3	14.4	7.07	228	13.6	53.7	21.8
MW-23	8-89	4	1.2	11.2	2.74	118	8.04	11.4	4.76
	8-89	10	1.96	22.6	5.02	215	10.8	50.6	18.0
8A-896	5/88	4	< 1	5.0	2	<20	< 5	21	3.0
	5/88	8	< 1	3	2	<20	< 5	24	2
8A-897	5/88	4	< 1	8.0	NR	31	7.0	28	4.0
	5/88	8	< 1	3.0	3	<20	< 5.0	25	2.0
8A-898	4/88	4	< 1	< 1	< 0.5	<20	< 5	4	2
	4/88	8	< 1	< 1	< 0.5	<20	< 5	5	< 1
8A-899	5/88	4	< 1	4	2	110	5.0	31	3

NR=NOT RECORDED
NOTE: WHEN DUPLICATE ANALYSIS WAS PERFORMED, HIGHEST CONCENTRATION WAS USED IN SUMMARY TABLE.

ANALYTICAL METHODS USED FOR METALS WERE EPA METHODS: ARSENIC 7060, BARIUM 7080, CADMIUM 7130, CHROMIUM 7190, LEAD 7420, NICKEL 7520, SELENIUM 7740 and ZINC 7950.

SUMMARY TABLE C-1
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
METALS
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	ARSENIC mg/kg	LEAD mg/kg	CADMIUM mg/kg	BARIUM mg/kg	CHROMIUM mg/kg	ZINC mg/kg	NICKEL mg/kg
	5/88	8	< 1	3	2	<20	< 5	34	3
8A-900	3/88	4	1.3	14	< 0.5	22	< 5	5	3
	3/88	8	< 1	13	< 0.5	<20	< 5	4	1
8A-901	3/88	4	1.8	22	< 0.5	20	5.7	7	3
	3/88	8	< 1	13	< 0.5	<20	< 5	4	1
8A-902	3/88	14	2.7	190	2.63	1,500	130	90	3
	3/88	18	< 1	4	< 0.5	<20	< 5	8	4
8A-903	3/88	4	< 1	23	< 0.5	100	6	15	3
	3/88	8	< 1	9	< 0.5	26	< 5	6	2
8A-904	3/88	4	1.3	18	< 0.5	120	5.4	11	2
	3/88	8	< 1	10	< 0.5	87	< 5	4	< 1
8A-905	3/88	4	< 1	200	1.7	1,000	120	160	5
	3/88	8	2.9	17	< 0.5	290	< 5	7	2
8A-906	3/88	4	1.2	16	< 0.5	56	< 5	9	3
	3/88	8	< 1	2	< 0.5	63	< 5	18	3
8A-907	3/88	4	< 1	11	< 0.5	71	< 5	8	4
	3/88	8	1.1	12	0.6	130	< 5	19	7
8A-908	3/88	4	< 1	7	< 0.5	82	< 5	17	3
	3/88	8	< 1	10	< 0.5	93	< 5	21	6
8A-909	4/88	4	1.2	24	< 0.5	160	5.6	38	8
	4/88	8	< 1	31	1.0	420	7.8	96	45
8A-910	5/88	4	2.6	19	6.9	290	16	69	24
	5/88	8	1.3	9	4.0	150	7	66	14
8A-911	4/88	4	<1	21	< 0.5	70	< 5	11	5

NR=NOT RECORDED
NOTE: WHEN DUPLICATE ANALYSIS WAS PERFORMED, HIGHEST CONCENTRATION WAS USED IN SUMMARY TABLE.

ANALYTICAL METHODS USED FOR METALS WERE EPA METHODS: ARSENIC 7060, BARIUM 7080, CADMIUM 7130, CHROMIUM 7190, LEAD 7420, NICKEL 7520, SELENIUM 7740 and ZINC 7950.

SUMMARY TABLE C-1
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
METALS
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	ARSENIC mg/kg	LEAD mg/kg	CADMIUM mg/kg	BARIUM mg/kg	CHROMIUM mg/kg	ZINC mg/kg	NICKEL mg/kg
	4/88	8	1.6	8	< 0.5	120	< 5	38	11
8A-912	4/88	SUR-FACE	2.5	13	2.4	200	< 5	42	4
	4/88	1.0	1.6	6	< 0.5	47	< 5	10	1
	4/88	4	1.4	10	< 0.5	57	5.7	9	4
	4/88	8	1.5	5	< 0.5	49	< 5	55	7
8A-913	4/88	4	< 1	< 1	< 0.5	69	< 5	6	< 1
	4/88	8	< 1	< 1	< 0.5	62	< 5	18	5
8A-914	3/88	4	< 1	7	< 0.5	66	< 5	4	2
	3/88	8	< 1	< 1	< 0.5	120	< 5	19	5
8A-915	5/88	4	1.4	15	6.0	120	12	38	9.0
	5/88	8	1.1	14	6.0	190	12	80	15
BORINGS 8A-916 THRU 8A-921 WERE E.P. TOXICITY SAMPLES AND ARE MEASURED IN mg/l									
8A-916	5/88	9	< 0.01	0.09	< 0.01	4.1	< 0.01	NR	NR
	5/88	14	< 0.01	< 0.05	< 0.01	0.22	<0.01	NR	NR
	5/88	20	< 0.01	< 0.05	0.01	0.11	< 0.01	NR	NR
8A-917	5/88	2	< 0.01	< 0.05	< 0.01	0.23	< 0.01	NR	NR
	5/88	6	< 0.01	< 0.05	< 0.01	0.22	< 0.01	NR	NR
	5/88	12	< 0.01	< 0.05	0.01	0.23	0.02	NR	NR
8A-918	5/88	16	< 0.01	< 0.05	0.01	0.06	< 0.01	NR	NR
	5/88	18.4	< 0.01	< 0.05	< 0.01	6.1	0.68	NR	NR
	5/88	26	< 0.01	< 0.05	< 0.01	0.15	< 0.01	NR	NR
8A-919	5/88	18	< 0.01	< 0.05	< 0.01	0.40	< 0.01	NR	NR
	5/88	22	< 0.01	< 0.05	0.01	0.48	< 0.01	NR	NR

NR=NOT RECORDED
NOTE: WHEN DUPLICATE ANALYSIS WAS PERFORMED, HIGHEST CONCENTRATION WAS USED IN SUMMARY TABLE.

ANALYTICAL METHODS USED FOR METALS WERE EPA METHODS: ARSENIC 7060, BARIUM 7080, CADMIUM 7130, CHROMIUM 7190, LEAD 7420, NICKEL 7520, SELENIUM 7740 and ZINC 7950.

SUMMARY TABLE C-1
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
METALS
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	ARSENIC mg/kg	LEAD mg/kg	CADMIUM mg/kg	BARIUM mg/kg	CHROMIUM mg/kg	ZINC mg/kg	NICKEL mg/kg
	BORINGS 8A-916 THRU 8A-921 WERE E.P. TOXICITY SAMPLES AND ARE MEASURED IN mg/l								
	5/88	28	< 0.01	< 0.05	< 0.01	0.12	< 0.01	NR	NR
8A-920	5/88	3	< 0.01	< 0.05	< 0.01	0.11	< 0.01	NR	NR
	5/88	7	< 0.01	< 0.05	< 0.01	0.06	< 0.01	NR	NR
	5/88	13	0.02	0.06	0.01	0.73	0.48	NR	NR
8A-921	5/88	12	0.01	<0.05	< 0.01	0.29	< 0.01	NR	NR
	5/88	16	< 0.01	< 0.04	0.02	0.17	< 0.01	NR	NR
	5/88	22	< 0.01	< 0.05	< 0.01	0.22	< 0.01	NR	NR
	DATE SAMPLED	DEPTH (FT)	ARSENIC mg/kg	LEAD mg/kg	CADMIUM mg/kg	BARIUM mg/kg	CHROMIUM mg/kg	ZINC mg/kg	NICKEL mg/kg
8A-974	7-89	4	1.66	17.0	7.94	74.3	10.9	31.9	10.0
	7-89	10	< 1	11.8	4.11	33.2	11.4	50.5	15.8
	7-89	20	3.4	17.7	8.10	193	15.8	67.4	22.9
8A-975	7-89	5.5	< 1.0	10.9	2.91	136	8.08	36.2	6.26
	7-89	10	< 1	16.4	3.17	82.3	9.42	95.2	6.44
	7-89	21	2.07	15.4	6.52	199	13.5	58.3	19.6
8A-976	7-89	4	1.42	41.6	6.57	267	15.8	53.0	18
	7-89	10	2.01	13.8	5.61	115	11.1	43.8	15.4
	7-89	16	2.2	8.55	2.15	27.3	5.13	12.0	5.2
8A-977	7-89	4	< 1	16.7	5.27	159	12.4	13.4	3.86
	7-89	10	< 1	7.25	1.04	127	6.67	26.4	6.76
	7-89	20	< 1	16.1	6.01	163	12.2	12.8	13.6
8A-978	7-89	4	< 1	8.42	2.66	43.4	6.59	20.1	7.34
	7-89	10	2.2	6.34	3.70	68.5	5.8	19.6	6.87

NR=NOT RECORDED
NOTE: WHEN DUPLICATE ANALYSIS WAS PERFORMED, HIGHEST CONCENTRATION WAS USED IN SUMMARY TABLE.

ANALYTICAL METHODS USED FOR METALS WERE EPA METHODS: ARSENIC 7060, BARIUM 7080, CADMIUM 7130, CHROMIUM 7190, LEAD 7420, NICKEL 7520, SELENIUM 7740 and ZINC 7950.

SUMMARY TABLE C-1
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
METALS
(Borings MW-1 thru MW-15, MW-21 thru MW-23,
8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	ARSENIC mg/kg	LEAD mg/kg	CADMIUM mg/kg	BARIUM mg/kg	CHROMIUM mg/kg	ZINC mg/kg	NICKEL mg/kg
	7-89	16	1.4	5.43	2.34	46.3	4.49	102.0	6.08
8A-979	7-89	4	2.67	15.0	5.94	83.7	13.6	26.9	7.08
	7-89	7	1.10	7.22	2.29	112	8.78	13.9	4.12
8A-980	7-89	4	1.17	14.6	6.80	69.2	12.3	24.3	6.07
	7-89	6	3.1	13.4	5.95	58.0	10.8	30.2	10.2
8A-981	7-89	1	1.32	29.6	4.28	264	12.2	43.3	5.09
	7-89	4	< 1	8.0	1.06	32.3	6.65	14.8	2.59
	7-89	7	1.83	15.3	7.50	293	15.0	38.4	15.1
8A-982	7-89	4	< 1	10.2	2.38	52.5	8.01	23.1	5.85
	7-89	10	1.57	13	5.66	52.7	10.4	36.7	13.6
8A-983	7-89	20	1.02	5.98	2.63	50.2	5.47	23.4	7.2
8A-984	7-89	10	< 1	5.82	1.69	17.8	4.69	25.1	4.18
8A-984	7-89	14.0	1.91	9.71	3.10	23.2	6.53	24.5	8.14
8A-985	7-89	14	26.5	9.18	4.96	71.7	8.16	32.9	12.5
8A-986 BG	7-89	4	< 1	11.9	2.54	77.1	11.2	16.7	4.48
	7-89	10	1.52	14.1	1.04	126	10.8	31.2	10.4
	7-89	22	< 1	11.5		32.2	5.61	11.2	4.33

NR=NOT RECORDED
NOTE: WHEN DUPLICATE ANALYSIS WAS PERFORMED, HIGHEST CONCENTRATION WAS USED IN SUMMARY TABLE.

ANALYTICAL METHODS USED FOR METALS WERE EPA METHODS: ARSENIC 7060, BARIUM 7080, CADMIUM 7130, CHROMIUM 7190, LEAD 7420, NICKEL 7520, SELENIUM 7740 and ZINC 7950.

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
MW-1	9/87	2	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	9/87	10	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
MW-2	8/87	2	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	8/87	10	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
MW-3	9/87	2	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	9/87	10	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 28
	9/87	15	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 20
MW-4	9/87	2	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	9/87	10	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 38
	9/87	15	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 33
MW-5	9/87	2	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	9/87	10	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 19

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK
J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

000029

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
	9/87	17	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 34
MW-6	9/87	2	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 12
	9/87	10	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 28
	9/87	18	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	ACETONE 26
MW-7	7/88	2	<6	0.9J	<12	<6	<6	<6	<6	<6	<6	<6	
	7/88	10	<6	<6	<13	<6	<6	<6	<6	<6	<6	<6	
MW-8	7/88	10	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
MW-9	7/88	2	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
MW-10	7/88	2	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
	7/88	10	<6	44	<12	<6	<6	<6	<6	<6	<6	<6	
MW-11	7/88	2	<6	<6	<13	<6	<6	<6	<6	<6	<6	<6	
	7/88	10	<6	140	<13	<6	14	<6	<6	<6	<6	<6	
MW-12	7/88	2	<6	33	<12	<6	<6	<6	<6	<6	<6	<6	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

000024

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
	7/88	10	670	23J	<63	<31	<31	<31	<31	<31	<31	<31	
MW-13	9/88	2	2J	<6	<13	<6	<6	<6	<6	<6	<6	<6	ACETONE 44
	9/88	10	<6	<6	<13	<6	<6	<6	<6	<6	<6	<6	ACETONE 23
MW-14	8/88	2	<6	<6	<11	<6	<6	<6	<6	0.6J	<6	<6	ACETONE 31
	8/88	10*	680E	26	<12	6J	<6	<6	<6	0.5J	<6	<6	ACETONE 340
MW-15	9/88	2	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE 13
	9/88	10	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE 8J
MW-21	9/89	4	11	<6	<12	<6	<6	<6	<6	<6	<6	<6	
	9/89	10	7	8	<12	<6	<6	<6	<6	<6	<6	<6	CHLFRM 4BJ
MW-22	8/89	4	14	<6	<13	<6	<6	<6	<6	1J	<6	<6	CHLFRM 5BJ

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
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J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

009035

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
	8/89	10	16	<6	<13	<6	<6	<6	<6	<6	<6	4J	CHLFRM 7B
MW-23	8/89	4	6BJ	13	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE = 140B TCF=27
	8/89	5	6BJ	66	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE = 39B TCF=130
	8/89	10	8B	150	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE = 69B TCF=160
8A-896	5/88	4	<5	81	<10	<5	<5	<5	<5	<5	<5	<5	
	5/88	8	<5	1400	<10	<5	24	<5	<5	<5	<5	<5	
8A-897	5/88	4	<5	19	<10	<5	<5	<5	<5	<5	<5	<5	
	5/88	8	<10	550	<20	10	31	<10	<10	<10	<10	<10	
8A-898	4/88	4	1,050	<25	<50	90	<25	<25	<25	<25	<25	<25	
	4/88	8	123,090	40,660	<500	2130	<250	<250	<250	<250	<250	<250	
8A-899	5/88	4	<5	69	<10	<5	<5	<5	<5	<5	<5	<5	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

92900

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
	5/88	8	<5	2840	<10	85	<5	<5	<5	<5	<5	<5	
8A-900	3/88	4	<15	567	<30	17	<15	<15	<15	<15	<15	<15	
	3/88	8	<5	2172	785	1636	157	28	8	<5	<5	<5	
	3/88	8 (DUP)	<85	4,860	<170	1979	<85	<85	<85	<85	<85	<85	
8A-901	3/88	4	<5	9	<10	8	<5	<5	<5	<5	<5	<5	
	3/88	8	<15	331	<30	74	<15	<15	<15	<15	<15	<15	
8A-902	3/88	14	<625	46,910	<1250	153,300	<625	2539	2410	2450	<625	<625	1,1-DCE=750
	3/88	18	30,335	42,180	<170	<85	<85	110	1110	380	<85	<85	1,1-DCE=133
	3/88	18 (DUP)	742,050	254,700	<3000	<1500	<1500	<1500	4880	<1500	<1500	<1500	
8A-903	3/88	4	<5	220	<10	16	<5	<5	<5	<5	<5	<5	
	3/88	8	<25	2,079	<50	144	<25	<25	<25	<25	<25	<25	
8A-904	3/88	4	<5	86	51	3628	<5	<5	<5	<5	<5	<5	ACETONE =40

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK
J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

120900 000621

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
	3/88	4 (DUP)	<70	226	<140	8395	<70	<70	<70	<70	<70	<70	
	3/88	8	59	88	<10	69	<5	<5	<5	<5	<5	<5	STYRENE =17
8A-905	3/88	4	<625	78,870	<1250	39,840	<625	<625	<625	<625	10,665	<625	
	3/88	8	<625	21,880	<1250	14,645	<625	<625	<625	<625	1390	<625	STYRENE =16,660
8A-906	3/88	4	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	
	3/88	8	<5	4J	<10	<5	<5	<5	<5	<5	<5	<5	
8A-907	3/88	4	<5	14	<10	<5	<5	<5	<5	<5	<5	<5	
	3/88	4 (DUP)	<5	86	51	3628	<5	<5	<5	<5	<5	<5	
	3/88	4 (DUP)	<70	226	<140	8395	<70	<70	<70	<70	<70	<70	
	3/88	8	<5	103	<10	<5	<5	<5	<5	<5	<5	<5	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

006028

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
	3/88	8 (DUP)	59	88	<10	69	<5	<5	<5	<5	<5	<5	STYRENE =17
8A-908	3/88	4	<5	14	<10	<5	<5	<5	<5	<5	<5	<5	
	3/88	8	<5	270	<10	<5	<5	<5	<5	<5	<5	<5	
8A-909	4/88	4	<5	16	<10	<5	<5	<5	<5	<5	<5	<5	
	4/88	8	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
8A-910	5/88	4	<5	15	<10	<5	<5	<5	<5	<5	<5	<5	
	5/88	8	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
8A-911	4/88	4	<5	2279	<10	1219	<5	<5	<5	<5	<5	<5	
	4/88	8	4318	3228	<10	194	<5	<5	<5	<5	<5	<5	
8A-912	4/88	4	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	4/88	8	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
8A-913	4/88	4	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	4/88	8	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK
J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

006029

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
8A-914	3/88	4	8	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	3/88	8	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
8A-915	5/88	4	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	5/88	8	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	
BORINGS 8A-916 THRU 8A-921 WERE E.P. TOXICITY SAMPLES MEASURED IN ug/l													
8A-916	5/88	9	<5	7	<10	<5	<5	<5	<5	<5	<5	NR	
	5/88	14	<5	1,800	<10	89	<5	<5	<5	<5	<5	NR	
	5/88	20	61	640	<10	<5	65	<5	<5	<5	<5	NR	
8A-917	5/88	2	230	330	<10	<5	<5	<5	<5	<5	<5	NR	
	5/88	6	7,200	1,000,000	<10	360	<5	40	1000	10,000	900	890	
	5/88	12	11,000	24,000	<10	1,050	130	<5	70	<5	<5	NR	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

000090

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
BORINGS 8A-916 THRU 8A-921 WERE E.P. TOXICITY SAMPLES MEASURED IN ug/l													
8A-918	5/88	16	820	770	<10	500	<5	<5	<5	<5	<5	NR	
	5/88	18.4	200	550	<10	6,600	340	45	160	30	100	1200	
	5/88	26	2,200	1,300	<10	35	880	<5	<5	<5	<5	NR	
8A-919	5/88	18	<5	36	<10	<5	<5	<5	<5	<5	18	NR	BENZENE =1200
	5/88	22	880	1,200	<10	170	<5	<5	<5	<5	<5	NR	
	5/88	28	29,000	1,700	<10	<5	<5	<5	<5	<5	<5	NR	
8A-920	5/88	3	510	33	<10	<5	<5	<5	<5	<5	<5	NR	
	5/88	7	<5	<5	<10	<5	<5	<5	<5	<5	<5	NR	
	5/88	13	<5	160	<10	140	<5	<5	<5	<5	<5	NR	
8A-921	5/88	12	<5	8	<10	<5	<5	<5	<5	<5	<5	NR	
	5/88	16	<5	<5	<10	<5	<5	<5	<5	<5	<5	NR	
	5/88	22	200	210	<10	<5	<5	<5	<5	<5	<5	NR	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

0060031

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
8A-926	8/88	4	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<7	<7	<13	<7	<7	<7	<7	<7	<7	<7	
8A-927	8/88	4	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
8A-928	8/88	4	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE 21
8A-929	8/88	4	<6	<6	<13	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	<6	<13	<6	<6	<6	<6	<6	<6	<6	
8A-930	8/88	4	<6	0.9J	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	8	<12	<6	<6	<6	<6	<6	<6	<6	
8A-931	8/88	4	<6	91	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE 14
	8/88	10	<6	920E	<12	57	<6	19	64	<6	<6	<6	
8A-932	8/88	4	<6	8	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	4J	<12	<6	<6	<6	<6	<6	<6	<6	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

006032

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
8A-933	8/88	4	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	<6	<13	<6	<6	<6	<6	<6	<6	<6	
8A-934	8/88	4	<6	<6	<13	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
8A-935	8/88	4	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	<6	<12	<6	2J	<6	<6	<6	<6	<6	
8A-936	8/88	4	<6	<6	<13	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
8A-937	8/88	4	<6	<6	<12	<6	<6	<6	13	<6	<6	<6	1,1,1-TCA=31
	8/88	10	3J	<6	<13	<6	<6	<6	<6	<6	<6	<6	
8A-938	8/88	4	<6	1J	<11	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	
8A-939	8/88	4	<6	650E	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	2500E	<120	<61	<61	<61	<61	<61	<61	<61	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

000338

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
8A-940	8/88	4	22,000	430,000 E	<3000	14000	4600	<1500	4500	34,000	2900	1000J	ACETONE 33,000
	8/88	10	420,000 E	150,000 E	<3000	350J	120,000 E	<1500	16,000	6700	18,000	6100	ACETONE 20,000
8A-941	8/88	4	4J	90B	<13	<6	<6	<6	<6	<6	<6	<6	ACETONE 46
	8/88	10	<6	9B	<13	3J	<6	<6	<6	<6	<6	<6	
8A-942	8/88	4	<62	38BJ	<120	<62	<62	<62	<62	690	3300E	830	
	8/88	10	15	46B	<13	140	<6	0.8J	1J	8	28	<6	ACETONE 150
8A-943	8/88	4	<6	4BJ	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE 18
	8/88	10	<6	19B	<13	18	<6	<6	<6	<6	<6	<6	
8A-944	8/88	4	<290	140BJ	<590	<290	<290	<290	<290	280J	1100	3000	ACETONE 9900
	8/88	10	4500	3800	<7300	<3600	<3600	<3600	2300J	1700J	7200	<3600	STYRENE 35,000

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE; J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
B=COMPOUND FOUND IN BLANK CHLFRM=CHLOROFORM

009004

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
8A-945	8/88	4	310	54B	<57	<28	<28	<28	110	23J	70	610	ACETONE 1900E
	8/88	10	16,000	1700	<3300	<1600	<1600	<1600	<1600	<1600	<1600	<1600	
8A-946	8/88	4	<6	3BJ	<12	<6	<6	<6	<6	<6	<6	<6	
	8/88	10	<6	2BJ	<12	<6	<6	<6	<6	<6	<6	<6	
8A-974	7/89	4	<6	25	<12	<6	<6	<6	<6	0.2J	<6	<6	ACETONE =40
	7/89	10	5BJ	95	<12	4J	<6	<6	<6	<6	<6	<6	ACETONE =7J
	7/89	20	5BJ	270E	<13	10	<6	<6	<6	<6	<6	<6	ACETONE =45
8A-975	7/89	5.5	820	<30	<61	<30	<30	<30	<30	<25	<30	59	ACETONE =11,000
	7/89	10	2900E	58	<61	230	<30	<30	<30	40	12J	66	ACETONE =2900E
	7/89	21	5200B	2100	<1600	<790	590J	<790	<790	1700B	<790	2500	ACETONE =2800B

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

000035

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
8A-976	7/89	4	15	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	7/89	10	13	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	7/89	16	14	7	<10	<5	<5	<5	<5	<5	<5	<5	
8A-977	7/89	4	9	<6	<12	<6	<6	<6	<6	<6	<6	<6	
	7/89	10	56	3J	56	<6	<6	<6	<6	<6	<6	<6	
	7/89	20	210	66	<63	<32	<32	<32	<32	<32	<32	<32	
8A-978	7/89	4	11	78	<12	2J	<6	<6	<6	<6	<6	<6	ACETONE =74
	7/89	10	9	15	<12	<6	<6	<6	<6	<6	<6	<6	
	7/89	16	750B	300E	<1200	<620	<620	<620	<620	250J	<620	400J	CHLFRM= 340BJ
8A-979	7/89	4	17	<6	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE =100
	7/89	7	17	<6	<12	<6	<6	<6	<6	1J	<6	<6	ACETONE =99
8A-980	7/89	4	10	5J	<12	<6	<6	<6	<6	<6	<6	<6	
	7/89	6	6	30	<12	3J	<6	<6	<6	<6	<6	<6	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

960936

SUMMARY TABLE C-2
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
VOCs
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, 8A-926 thru 8A-946,and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	MEC ug/kg	TCE ug/kg	VC ug/kg	1,2-DCE ug/kg	1,2-DCA ug/kg	1,1-DCA ug/kg	PCE ug/kg	TOL ug/kg	EBZ ug/kg	XYL ug/kg	OTHER ug/kg
8A-981	7/89	1	27	<7	<14	<7	<7	<7	<7	<7	<7	<7	ACETONE =84
	7/89	4	<6	<6	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE =11J
	7/89	7	6J	13	<12	<6	<6	<6	2J	<6	<6	2J	ACETONE =5J
8A-982	7/89	4	10	13	<12	<6	<6	<6	<6	<6	<6	<6	ACETONE =20
	7/89	10	15	43	<13	<6	<6	<6	<6	<6	<6	<6	ACETONE =16
8A-983	7/89	20	3800	<800	<1600	<800	<800	<800	<800	<800	<800	<800	
8A-984#	7/89	14	$6x10^5$E	$2.2x10^5$ E	<12,000	<6200	37,000	<6200	<6200	25,000	<6200	<6200	
8A-985#	7/89	14	2,100E	93	<13	110	<6	<6	<6	4J	<6	7	CHLFRM 14
8A 986# BG	7/89	10	8	<5	<10	<5	<5	<5	<5	<5	<5	<5	
	7/89	22	10	<5	<10	<5	<5	<5	<5	<5	<5	<5	

ANALYTICAL METHOD USED FOR DETECTION OF VOLATILE ORGANICS WAS EPA METHOD 8240.

E=ESTIMATED VALUE ABOVE LINEAR RANGE;
B=COMPOUND FOUND IN BLANK

J=ESTIMATED VALUE BELOW QUANTITATION LIMIT
CHLFRM=CHLOROFORM

006037

SUMMARY TABLE C-3
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
EXPLOSIVES
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	HMX ug/g	RDX ug/g	TETRYL ug/g	2,4-DNT ug/g	TNT ug/g	2,6-DNT ug/g	OTHER ug/g
MW-1	9/87	2	0.31	<0.05	<0.05	<0.05	<0.05	<0.05	
	9/87	10	0.21	<0.05	<0.05	<0.05	<0.05	<0.05	
MW-2	8/87	2	0.28	<0.05	<0.05	<0.05	<0.05	<0.05	
	8/87	10	0.18	<0.05	<0.05	<0.05	<0.05	<0.05	
MW-3	9/87	2	<0.05	0.22	<0.05	<0.05	<0.05	<0.05	
	9/87	10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	9/87	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
MW-4	9/87	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	9/87	10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	9/87	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
MW-5	9/87	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	9/87	10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	9/87	17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
MW-6	9/87	2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	9/87	10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
	9/87	18	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
MW-7	7/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	7/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
MW-8	7/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	7/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
MW-9	7/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	7/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
MW-10	7/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	7/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
MW-11	7/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	7/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
MW-12	7/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	7/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	

SUMMARY TABLE C-3
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
EXPLOSIVES
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	HMX ug/g	RDX ug/g	TETRYL ug/g	2,4-DNT ug/g	TNT ug/g	2,6-DNT ug/g	OTHER ug/g
MW-13	9/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	9/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
MW-14	8/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	8/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
MW-15	8/88	2	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	8/88	10	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
MW-21	9/89	4	<10	<10	<10	<10	<10	<10	
	9/89	10	<10	<10	<10	<10	<10	<10	
MW-22	8/89	4	<10	<10	<10	<10	<10	<10	
	8/89	10	<10	<10	<10	<10	<10	<10	
MW-23	8/89	4	<10	<10	<10	<10	<10	<10	
	8/89	10*	<10	<10	<10	<10	<10	<10	
8A-896	5/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	5/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
8A-897	5/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	5/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
8A-898	4/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	4/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-899	5/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
	5/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	<0.8	
8A-900	3/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-901	3/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-902	3/88	14	<1.6	<1.8	26.6	5.7	<0.8	NR	
	3/88	18	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	18 (DUP)	<1.6	<1.8	<5.5	<0.8	<0.8	NR	

ANALYTICAL METHOD USED FOR EXPLOSIVES WAS USATHAMA METHOD 8H.

NR=NOT RECORDED
B=COMPOUND DETECTED IN BLANK
NA=NOT ANALYZED FOR
J=ESTIMATED VALOW BELOW QUANTITATION LIMIT

SUMMARY TABLE C-3
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
EXPLOSIVES
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	HMX ug/g	RDX ug/g	TETRYL ug/g	2,4-DNT ug/g	TNT ug/g	2,6-DNT ug/g	OTHER ug/g
8A-903	3/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	8	<1.6	<1.8	26.6	5.7	<0.8	NR	
8A-904	3/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	4 (DUP)	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-905	3/88	4	<1.6	<1.8	17.4	<0.8	<0.8	NR	
	3/88	8	<1.6	<1.8	9.5	<0.8	<0.8	NR	
8A-906	3/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-907	3/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-908	3/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-909	4/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	4/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-910	5/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	5/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-911	4/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	4/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-912	4/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	4/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-913	4/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	4/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-914	3/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	3/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
8A-915	5/88	4	<1.6	<1.8	<5.5	<0.8	<0.8	NR	
	5/88	8	<1.6	<1.8	<5.5	<0.8	<0.8	NR	

ANALYTICAL METHOD USED FOR EXPLOSIVES WAS USATHAMA METHOD 8H.

NR=NOT RECORDED
B=COMPOUND DETECTED IN BLANK
NA=NOT ANALYZED FOR
J=ESTIMATED VALOW BELOW QUANTITATION LIMIT

SUMMARY TABLE C-3
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
EXPLOSIVES
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	HMX ug/g	RDX ug/g	TETRYL ug/g	2,4-DNT ug/g	TNT ug/g	2,6-DNT ug/g	OTHER ug/g
BORINGS 8A-916 thru 8A-921 WERE E.P. TOXICITY SAMPLES MEASURED IN mg/l									
BORE HOLE NO.	SAMPLE DATE	DEPTH (FT)	HMX mg/l	RDX mg/l	TETRYL mg/l	2,4-DNT mg/l	TNT mg/l	2,6-DNT mg/l	OTHER
8A-916	5/88	9	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	14	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	20	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
8A-917	5/88	2	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	6	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	12	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
8A-918	5/88	16	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	18.4	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	26	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
8A-919	5/88	18	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	22	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	28	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
8A-920	5/88	3	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	7	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	13	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
8A-921	5/88	12	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	16	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
	5/88	22	<0.01	<0.01	<0.3	<0.01	NA	<0.01	
BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	HMX ug/g	RDX ug/g	TETRYL ug/g	2,4-DNT ug/g	TNT ug/g	2,6-DNT ug/g	OTHER ug/g
8A-974	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	10	<10	<10	<10	<10	<10	<10	
	7/89	20	<10	<10	<10	<10	<10	<10	
8A-975	7/89	5.5	<10	<10	<10	<10	<10	<10	
	7/89	10	<10	<10	<10	<10	<10	<10	
	7/89	21	<10	<10	<10	<10	<10	<10	

ANALYTICAL METHOD USED FOR EXPLOSIVES WAS USATHAMA METHOD 8H.

NR=NOT RECORDED
B=COMPOUND DETECTED IN BLANK
NA=NOT ANALYZED FOR
J=ESTIMATED VALOW BELOW QUANTITATION LIMIT

SUMMARY TABLE C-3
LHAAP 18 & 24
BURNING GROUND 3 & UEP
SOIL SAMPLING
EXPLOSIVES
(Borings MW-1 thru MW-15, MW-21 thru MW-23, 8A-896 thru 8A-921, and 8A-974 thru 8A-986)

(ALL DATA RETRIEVED FROM RFI PHASE I AND II REPORT 1989)

BORE HOLE NO.	DATE SAMPLED	DEPTH (FT)	HMX ug/g	RDX ug/g	TETRYL ug/g	2,4-DNT ug/g	TNT ug/g	2,6-DNT ug/g	OTHER ug/g
8A-976	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	10	<10	<10	<10	<10	<10	<10	
	7/89	16	<10	<10	<10	<10	<10	<10	
8A-977	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	10	<10	<10	<10	<10	<10	<10	
	7/89	20	<10	<10	<10	<10	<10	<10	
8A-978	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	10	140	<10	<10	<10	<10	<10	
	7/89	16	750B	<10	<10	<10	<10	<10	
8A-979	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	7	<10	<10	<10	<10	<10	<10	
8A-980	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	6	<10	<10	<10	<10	<10	<10	
8A-981	7/89	1	<10	<10	<10	<10	<10	<10	
	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	7	<10	<10	<10	<10	<10	<10	
8A-982	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	10	<10	<10	<10	<10	<10	<10	
8A-983	7/89	20	<10	<10	<10	<10	<10	<10	
8A-984	7/89	14	70	<10	<10	<10	<10	<10	
8A-985	7/89	14	<10	<10	<10	<10	<10	<10	
8A-986 BG	7/89	4	<10	<10	<10	<10	<10	<10	
	7/89	10	481	<10	<10	<10	<10	<10	
	7/89	22	<10	<10	<10	<10	<10	<10	

ANALYTICAL METHOD USED FOR EXPLOSIVES WAS USATHAMA METHOD 8H.

NR=NOT RECORDED
B=COMPOUND DETECTED IN BLANK
NA=NOT ANALYZED FOR
J=ESTIMATED VALOW BELOW QUANTITATION LIMIT

SUMMARY TABLE C-4
SEMI VOLATILES IN SOIL
LONGHORN ARMY AMMUNITION PLANT
BURNING GROUND 3 AND UNLINED EVAPORATION POND

BORING NO.	DATE	DEPTH	NAPHTHALENE ug/kg	2-METH NAPHTHALENE ug/kg	FLUORENE ug/kg	PHENANTHRENE ug/kg	FLUORANTHENE ug/kg	PYRENE ug/kg	DEPH ug/kg	OTHER ug/kg
8A-983	7/89	10'	620	3200	460	660	37J	26J	89J	***
8A-984	8/89	10'	440J	1100	<750	<750	<750	<750	<750	***
8A-985	7/89	10'	<390	<390	<390	<390	<390	<390	<390	
8A-986	8/89	22'	<790	<790	<790	<790	<790	<790	<790	

METHOD: EPA 625

REFERENCE DOCUMENT: RFI, ACTIVE BURNING GROUND AND UNLINED EVAPORATION POND, PHASE II FIELD DATA - SEPTEMBER 1989.

J = ESTIMATED VALUE (BELOW QUANTITATION LIMIT)

DEPH = bis (2-ETHYLHEXYL) PHTHALATE

*** = LIST OF TENTATIVELY IDENTIFIED COMPOUNDS ATTACHED

006043

006044

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

9-89(983(10)

ame: SWL-TULSA Contract: SWCORP

Lab Code: SWOK Case No.: SWCORP SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 29359

Sample wt/vol: 30.0 (g/mL) G Lab File ID: A1476

Level: (low/med) LOW Date Received: 07/29/89

% Moisture: not dec. 21 dec. ____ Date Extracted: 08/23/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 08/29/89

GPC Cleanup: (Y/N) N pH: 5.3 Dilution Factor: 1.00

Number TICs found: 20

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	1120214	Undecane (8CI9CI)	9.49	2500	J
2.	1120214	Undecane (8CI9CI)	10.99	7600	J
	6044719	Dodecane, 6-methyl- (8CI9CI)	11.17	2700	J
	17057828	1H-Indene, 2,3-dihydro-1,2-d	11.65	2300	J
5.		UNKNOWN COMPOUND	11.84	1400	J
6.	90120	Naphthalene, 1-methyl- (8CI9	12.29	7200	J
7.	629594	Tetradecane (8CI9CI)	13.52	7600	J
8.	575439	NAPHTHALENE, 1,6-DIMETHYL- (	13.65	3600	J
9.	544763	HEXADECANE (8CI9CI)	14.24	6300	J
10.	2131411	NAPHTHALENE, 1,4,5-TRIMETHYL	15.02	3200	J
11.		UNKNOWN PNA	15.24	2900	J
12.	2245387	NAPHTHALENE, 1,6,7-TRIMETHYL	15.40	5500	J
13.		UNKNOWN COMPOUND	15.77	5100	J
14.	7225663	TRIDECANE, 7-HEXYL- (8CI9CI)	16.74	10000	J
15.	1921706	PENTADECANE, 2,6,10,14-TETRA	16.82	4100	J
16.	20959335	HEPTADECANE, 7-METHYL- (8CI9	17.14	2800	J
17.	638368	HEXADECANE, 2,6,10,14-TETRAM	17.77	5900	J
18.	629925	NONADECANE (8CI9CI)	18.57	9300	J
19.	112958	EICOSANE (8CI9CI)	19.42	8000	J
20.	112958	EICOSANE (8CI9CI)	20.24	5500	J

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO. 026045

9-982(984(10))

'ame: SWL-TULSA Contract: SWCORP

Lab Code: SWOK Case No.: SWCORP SAS No.: _____ SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 29885

Sample wt/vol: 30.0 (g/mL) G Lab File ID: F4555

Level: (low/med) LOW Date Received: 08/05/89

% Moisture: not dec. 12 dec. _____ Date Extracted: 08/16/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 09/11/89

GPC Cleanup: (Y/N) Y pH: 5.0 Dilution Factor: 1.0

Number TICs found: 20 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN COMPOUND	4.25	1500	J
2.	1120214	Undecane (8CI9CI)	9.45	1600	J
		UNKNOWN COMPOUND	10.80	910	J
4.	112403	Dodecane (8CI9CI)	10.92	3300	J
5.	6044719	Dodecane, 6-methyl- (8CI9CI)	11.10	830	J
6.	62016346	Octane, 2,3,7-trimethyl- (9C	11.89	910	J
7.		UNKNOWN COMPOUND	12.95	17000	J
8.	74645980	Dodecane, 2,7,10-trimethyl-	13.17	1200	J
9.	629629	PENTADECANE (8CI9CI)	13.44	4200	J
10.	569415	NAPHTHALENE, 1,8-DIMETHYL- (	13.74	990	J
11.		UNKNOWN COMPOUND	14.00	990	J
12.	17312537	DECANE, 3,6-DIMETHYL- (8CI9C	14.14	1400	J
13.	629629	PENTADECANE (8CI9CI)	14.55	2800	J
14.	112958	EICOSANE (8CI9CI)	15.59	1100	J
15.		UNKNOWN COMPOUND	16.37	1900	J
16.		UNKNOWN COMPOUND	17.02	2700	J
17.		UNKNOWN COMPOUND	17.95	3000	J
18.		UNKNOWN COMPOUND	19.15	3300	J
19.		UNKNOWN COMPOUND	20.85	3600	J
20.		UNKNOWN COMPOUND	24.17	9900	J

APPENDIX D
SEDIMENT/SURFACE WATER INVESTIGATIONS RESULTS

SUMMARY TABLE D-1
SURFACE WATER/AQUEOUS LAYER SAMPLING
METALS
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION POND

SAMPLE #	REFER-ENCE	DATE SAMPLED	METHOD	pH	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	OTHER ug/l	Comment
013	13	JULY 83	USATHAMA 1 B	NT	< 6	< 7.49	< 50	< 11.4	16.5	< 30	Al=2154.7	Tl and Ni by method 1 M
014	14	DEC 82-JAN 83	USATHAMA 1 B	NT	< 6	8.80	< 6.64	1620.00	< 6.64	57.0	STRONTIUM = 14,400	Tl and Ni by method 1 M
015	14	JULY 83	USATHAMA 1 B	NT	< 6	< 7.49	< 50	758.0	7.30	< 30	Al=126.0	Tl and Ni by method 1 M
016	13	JULY 83	USATHAMA 1 B	NT	< 6	< 7.49	< 50	< 11.4	34.50	< 30	Be=58.0	Tl and Ni by method 1 M
017	13	JULY 83	USATHAMA 1 B	NT	< 6	20.10	40.0	< 11.4	8.40	15.0	Al=337	Tl and Ni by method 1 M
018	13	JULY 83	USATHAMA 1 B	NT	< 6	23.9	< 50	< 11.4	10.50	59.0	Al=407.00	Tl and Ni by method 1 M
019	13	JULY 83	USATHAMA 1 B	NT	< 6	8.10	< 50	< 11.4	< 6.64	47.0	Al=340.0 Sr=92.0	Tl and Ni by method 1 M
020	13	JULY 83	USATHAMA 1 B	NT	< 6	32.50	< 50	< 11.4	8.20	69.0	Al=226.0 Sr=44.00	Tl and Ni by method 1 M
021	13	JULY 83	USATHAMA 1 B	NT	< 6	< 7.49	< 50	404.00	83.7	71.0	Al=355.00 Mn=115.00	Tl and Ni by method 1 M
ABG-6	4	SEPT 89	SW 6010	7.4	< 1	< 10.0	NT	NT	< 5.0	< 10.0		method SW 7060 for As
UEP-1	19	OCT-NOV 82	++	10.5	NT	0.40	NT	28.5	1.1	NT		AQUEOUS LAYER
UEP-2	19	OCT-NOV 82	++	10.5	NT	0.21	NT	36	0.19	NT		AQUEOUS LAYER
UEP-3	19	OCT-NOV 82	++	10.5	NT	0.22	NT	40	0.32	NT		AQUEOUS LAYER
UEP-4	19	OCT-NOV 82	++	10.5	0.018	0.22	NT	42	0.38	NT		AQUEOUS LAYER
UEP-5	19	OCT-NOV 82	++	10.5	0.016	0.88	NT	5	3	NT		AQUEOUS LAYER
UEP-6	19	OCT-NOV 82	++	10.5	NT	0.12	NT	43	0.20	NT		AQUEOUS LAYER
UEP-7	19	OCT-NOV 82	++	10.5	NT	0.15	NT	39	0.26	NT		AQUEOUS LAYER
UEP-8	19	OCT-NOV 82	++	10.5	NT	0.10	NT	39	0.11	NT		AQUEOUS LAYER

000041

SUMMARY TABLE D-1
SURFACE WATER/AQUEOUS LAYER SAMPLING
METALS
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION POND

SAMPLE #	REFER-ENCE	DATE SAMPLED	METHOD	pH	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	OTHER ug/l	Comment
UEP-9	19	OCT-NOV 82	++	11.0	NT	0.11	NT	37	0.12	NT		AQUEOUS LAYER
UEP-10	19	OCT-NOV 82	++	11.0	NT	0.06	NT	40	0.03	NT		AQUEOUS LAYER
UEP-11	19	OCT-NOV 82	++	11.0	NT	0.04	NT	41	0.02	NT		AQUEOUS LAYER
UEP-12	19	OCT-NOV 82	++	11.0	NT	0.09	NT	35	0.57	NT		AQUEOUS LAYER
UEP-13	19	OCT-NOV 82	++	11.0	NT	0.03	NT	36	0.07	NT		AQUEOUS LAYER
UEP-14	19	OCT-NOV 82	++	11.0	NT	0.05	NT	40	NT	NT		AQUEOUS LAYER
UEP-15	19	OCT-NOV 82	++	11.0	NT	0.04	NT	35	NT	NT		AQUEOUS LAYER
UEP-16	19	OCT-NOV 82	++	11.0	NT	0.03	NT	39	NT	NT		AQUEOUS LAYER
FLOATING MT'L.	19	OCT-NOV 82	++	NT	0.27	0.14	NT	100	NT	NT		
SB-1	11	FEB 86	* NUS	7.2	NT	NT	NT	30 ppm	NT	NT		
SB-2	11	FEB 86	NUS	6.8	NT	NT	NT	60 ppm	NT	NT		
SB-3	11	FEB 86	NUS	5.9	NT	NT	NT	280 ppm	NT	NT		
SB-4	11	FEB 86	NUS	NT	NT	NT	NT	200 ppm	NT	NT		
HB-1	4	AUG-SEPT 89	SW 6010	NT	<1.0	<10.0	NT	88.8	<5.0	10.0	Chloride= 30.0 mg/L	Ba-SW 7060
	11	FEB 86	NUS	6.8	NT	NT	NT	80 ppm	NT	NT		
HB-2	4	AUG-SEPT 89	SW 6010	NT	<1	<10.0	NT	128	<5.0	<10.0	Zn=8.25 ug/L, Chloride= 36.7 mg/L	
	11	FEB 86	NUS	6.7	NT	NT	NT	140	NT	NT		
HB-3	4	AUG-SEPT 89	SW 6010	NT	<1	<10	NT	110	<5.0	<10.0	Chloride= 36.3 mg/L	

006048

SUMMARY TABLE D-1
SURFACE WATER/AQUEOUS LAYER SAMPLING
METALS
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION POND

SAMPLE #	REFER-ENCE	DATE SAMPLED	METHOD	pH	Arsenic ug/l	Lead ug/l	Thallium ug/l	Barium ug/l	Chromium ug/l	Nickel ug/l	OTHER ug/l	Comment
	11	FEB 86	NUS	6.4	NT	NT	NT	240	NT	NT		
HB-4	4	AUG-SEPT 89	SW 6010	NT	1.2	<10.0	NT	160	<5.0	<10.0	Nitrates=0.99 mg/L, Chloride=37.0 mg/L	
	11	FEB 86	NUS	6.4	NT	NT	NT	280	NT	NT		
HB-5	4	AUG-SEPT 89	SW 6010	NT	<1.0	<10.0	NT	105	<5.0	<10.0	Chloride=35.0	
	11	FEB 86	NUS	NT	<1.0	<10.0	NT	105	<5.0	<10.0	Chloride=35.0 mg/L	

++ USATHAMA METHODS: EPS Certified Methods, derived from the EPA 600 series methods and/or EPA-600/4-79-020

* NUS = ANALYSIS PERFORMED BY NUS LABORATORY, HOUSTON, TX.

SW = EPA METHOD REFERENCE

009049

SUMMARY TABLE D-1 (cont'd)
WASTEWATER SAMPLING
METALS
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION POND

SAMPLE #	REF.	DATE SAMPLED	METHOD/ AGENCY	pH	Arsenic mg/l	Lead mg/l	Thallium mg/l	Barium mg/l	Chromium mg/l	Nickel mg/l	OTHER mg/l	COMMENTS
STA-1	10	JUNE 84	SWD *	10.09	0.01	0.13	NT	25	0.01	NT	TDS=1100 SODIUM=600 Mg=110	
STA-2	10	JUNE 84	SWD	10.31	0.01	0.11	NT	21	0.01	NT	TDS=1100 SODIUM=560 Mg=110	
STA-3	10	JUNE 84	SWD	10.18	0.01	0.10	NT	24	0.01	NT	TDS=1100 SODIUM=580 Mg=110	
STA-4	10	JUNE 84	SWD	10.11	0.01	0.09	NT	24	0.01	NT	TDS=1100 SODIUM=730 Mg=110	
STA-5	10	JUNE 84	SWD	9.99	0.01	0.10	NT	27	0.01	NT	TDS=1100 SODIUM=740 Mg=120	

SWD*: ANALYSIS PERFORMED BY SOUTHWEST DIVISION LABORATORY, U.S. ARMY CORPS OF ENGINEERS. INFORMATION CONCERNING SPECIFIC TESTING METHODS ARE UNAVAILABLE.

SUMMARY TABLE D-1 (cont'd)
SURFACE WATER SAMPLING
METALS
BLDGS 25X, 33X, 37X (SUMP)

SAMPLE NUMBER	REF.	DATE SAMPLED	METHOD	pH (field/lab)	ARSENIC mg/l	LEAD mg/l	THALLIUM mg/l	BARIUM mg/l	CHROMIUM mg/l	NICKEL mg/l	OTHER mg/l	COMMENTS
25X	20	20 JUL 82	*	10.3/10.0	NT	0.013	NT	2.0	0.295	NT	Mg=86.6 ZINC=0.26	NITRITE NITRATE-N=0.85
37X	20	21 JUL 82	*	8.7/8.5	NT	NT	NT	NT	0.010	NT	Mg=1.41 ZINC=0.13	NITRITE NITRATE-N=0.01
33X	20	21 JUL 82	*	8.3/7.1	NT	NT	NT	0.81	0.006	NT	Mg=17.1 ZINC=0.36	NITRITE NITRATE-N=0.08

* METALS: EPA Atomic Absorption via direct aspiration following Section 4.13 for total metals. (Storet)
Nitrate/Nitrite nitrogen on sludge samples by salt-leaching followed by cadmium reduction. ID 418 C
NT-NOT TESTED

050969

SUMMARY TABLE D-1 (cont'd)
SURFACE WATER SAMPLING
METALS
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION POND

SAMPLE NO.	REF.	DATE SAMPLED	METHOD	pH	ARSENIC mg/l	LEAD mg/l	BARIUM mg/l	CHRO-MIUM mg/l	NICKEL mg/l	OTHER mg/l	COMMENTS
UEP-1	13	JAN 29, 1984	+++	9.6	ND	ND	3370	97	NT	Sr=26,600 Mg=124,000	
UEP-2	13	JAN 29, 1984	+++	9.6	ND	5	2730	57	NT	Sr=26,500 Mg=115,000	
UEP-3	13	JAN 29, 1984	+++	9.6	ND	ND	2910	40	NT	Sr=26,200 Mg=119,000	
UEP-4	13	JAN 29, 1984	+++	9.7	ND	5	2560	44	NT	Sr=26,800 Mg=123	

+++ Methods of Chemical Analysis of Water and Wastes, 1971, EPA, National Environmental Research Center, Analytical Quality Control Laboratory; Metals (Atomic Absorption Methods).

SUMMARY TABLE D-1 (cont'd)
SURFACE WATER SAMPLES
METALS
FROM BURNING GROUND, POT CLEANUP AREA, AND INDUSTRIAL WASTE POND
LONGHORN ARMY AMMUNITION PLANT
(mg/l unless otherwise noted)

SAMPLE NO.	REF	SAMPLE DATE	METHOD	pH at Sample point	Ar-senic	Lead	Thal-lium	Barium	Chromium	OTHER	COMMENT
P-2	18	AUG 76	*	7.0	NT	< 0.1	NT	1.87	0.026	Cd=<0.005 TDS=268 NH_3-N=0.06 Mg=23	
WP-15	18	AUG 76	*	6.5	NT	< 0.1	NT	20.7	< 0.025	Cd=17.4 TDS=2728 NH_3-N=0.20 Mg=142.6	

000051

SUMMARY TABLE D-1 (cont'd)
SURFACE WATER SAMPLES
METALS
FROM BURNING GROUND, POT CLEANUP AREA, AND INDUSTRIAL WASTE POND
LONGHORN ARMY AMMUNITION PLANT
(mg/l unless otherwise noted)

SAMPLE NO.	REF	SAMPLE DATE	METHOD	pH at Sample point	Ar-senic	Lead	Thal-lium	Barium	Chromium	OTHER	COMMENT
WP-16	18	AUG 76	*	6.5	NT	0.27	NT	19.5	< 0.025	Cd=16.7 TDS=2710 NH_3-N=0.22 Mg=137.4	
WP-17	18	AUG 76	*	6.5	NT	< 0.1	NT	20.3	< 0.025	Cd=16.8 TDS=2696 NH_3-N=0.22 Mg=140.7	
G-18	18	AUG 76	*	NT	NT	156 mg/kg	NT	NT	NT	Cd=2 mg/kg Mg=3252 mg/kg	
G-19	18	AUG 76	*	NT	NT	239 mg/kg	NT	NT	NT	Cd=2.4 mg/kg Mg=4007 mg/kg	
G-20	18	AUG 76	*	NT	NT	1593 mg/kg	NT	NT	NT	Cd=17.8 mg/kg Mg=12062 mg/kg	
G-21	18	AUG 76	*	NT	NT	1149 mg/kg	NT	NT	NT	Cd=8.8 mg/kg Mg=122,75 7 mg/kg	
DS-28	18	AUG 76	*	6.0	NT	< 0.1	NT	0.88	< 0.025	Cd=0.006 TDS=84 Mg=0.76 mg/kg NH_3-N=<0.1	

* Methods for Chemical Analysis of Water and Wastes, 1971, EPA, National Environmental Research Center, Analytical Quality Control Laboratory; Metals (Atomic Absorption methods) pg H3, Preliminary Treatment of Samples, Para 4.1.3 pg. 88.

250000 00603

Nitrates: Technicon Auto Analyzer, Industrial Method 33-69W, preceded by sample treatment with Aluminum Hydroxide Suspension, as in Standard Methods, p. 235.

Standard Methods for the Examination of Water and Wastewater, 13th edition, 1971, 1971, American Public Health Association, NY, NY, 1971, 224 E, Dissolved Matter, pg. 539. Evaporated filtrate from Standard Methods, 224 C, Total Suspended Matter, p. 517.

SUMMARY TABLE D-1 (cont'd)
UNLINED EVAPORATION PIT SUPERNATANT
STANDARD ANALYTICAL RESULTS COMPARED WITH 1976
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	REF	SAMPLE DATE	METHOD	pH	TDS mg/l	TVS mg/l	COD mg/l	NH_3-N mg/l	CHLORIDE mg/l	SULFATES mg/l
SN-1	16	9/80 - 5/81	USATHAMA	9.28	1202	398	127.6	0.82	385	< 0.5
SN-2	16	9/80 - 5/81	USATHAMA	9.58	1260	451	166.9	0.40	350	< 0.5
1976 Avg. Results	16	1976	USATHAMA	4.1	2711	U	45	6.4	817	23

TDS=total dissolved solids
TVS=total volatile solids
COD=chemical oxygen demand

SUMMARY TABLE D-1 (cont'd)
UNLINED EVAPORATION PIT SUPERNATANT
HEAVY METALS CHARACTERIZATION COMPARED WITH 1976
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	REF	DATE SAMPLED	METHOD	Arsenic mg/l	Barium mg/l	Magnesium mg/l	Manganese mg/l	Lead mg/l	Cadmium mg/l	Chromium mg/l
SN-1	16	9/80 - 5/81	USATHAMA	U	10.5	108	0.076	U	U	U
SN-2	16	9/80 - 5/81	USATHAMA	U	9.3	108	0.076	U	U	U
1976 Avg. Results	16	1976	USATHAMA	U	20.2	140	0.145	0.09	0.011	U

U - Under Detection Limit

000053

SUMMARY TABLE D-1 (cont'd)
SURFACE WATER SAMPLES
METALS
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	REF	DATE SAMPLED	METHOD	Strontium mg/l	Iron mg/l	Barium mg/l	Magnesium mg/l
POND A	17	FEB 80	USATHAMA	19.1	0.44	52.0	68.9
POND B	17	FEB 80	USATHAMA	19.0	0.44	52.0	96.9
POND C	17	FEB 80	USATHAMA	18.8	0.44	55.0	95.2
DRAINAGE DITCH	17	FEB 80	USATHAMA	0.99	0.10	0.91	146

060054

SUMMARY TABLE D-2
SURFACE WATER SAMPLING
VOLATILE ORGANIC COMPOUNDS (VOCs)
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION POND
(ug/l)

SAMPLE NUMBER	REF.	DATE SAMPLED	METHOD	MEC	TCE	VC	TCF	1,1 DCE	1,2 DCA	PCE	TOL	EBZ	XYL-ENES	OTHER
013	13	JULY 83	USATHAMA 2 J	NT	< 1.0	NT	NT	NT	NT	NT	NT	NT	NT	
014	15	DEC 82-JAN 83	USATHAMA 2 P	NT	45	NT	NT	NT	NT	35	NT	NT	NT	*
015	13	JULY 83	USATHAMA 2 J	NT	< 1.0	NT	NT	NT	NT	NT	NT	NT	NT	
016	13	JULY 83	USATHAMA 2 J	NT	< 1.0	NT	NT	NT	NT	NT	NT	NT	NT	
017	13	JULY 83	USATHAMA 2 J	NT	< 1.0	NT	NT	NT	NT	NT	NT	NT	NT	
018	13	JULY 83	USATHAMA 2 J	NT	< 1.0	NT	NT	NT	NT	NT	NT	NT	NT	
019	13	JULY 83	USATHAMA 2 J	NT	< 1.0	NT	NT	NT	NT	NT	NT	NT	NT	
020	13	JULY 83	USATHAMA 2 J, 1X	NT	<1.0	NT	NT	NT	NT	NT	NT	NT	NT	phenol= 12
021	13	JULY 83	USATHAMA 2 J	NT	<1.0	NT	NT	NT	NT	NT	NT	NT	NT	
ABG-6	11	SEPT 89	8240	< 5	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	

* Nitrate 165,500 ug/l
Sulfate 12,860 ug/l
Chloride 14,000 ug/l
Flouride 66,000 ug/l

CS0900

SUMMARY TABLE D-2 (cont'd)
AQUEOUS LAYER SAMPLING
VOCs
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION PIT

(mg/l)

SAMPLE NUMBER	REF.	DATE SAMPLED	METHOD	MEC	TCE	VC	TCF	1,1 DCE	1,2 DCA	PCE	TOL	EBZ	XY-LENES	* OTHER
UEP-1	13	JAN 29, 1984	624	730	7	< 3	< 3	< 3	< 3	60	40	< 3	NT	410
UEP-2	13	JAN 29, 1984	624	770	9	< 3	< 3	< 3	< 3	120	55	< 3	NT	570
UEP-3	13	JAN 29, 1984	624	650	3	< 3	< 3	< 3	< 3	25	3	< 3	NT	240
UEP-4	13	JAN 29, 1984	624	800	9	< 3	< 3	< 3	< 3	130	50	< 3	NT	780
HARRISON BAYOU IN UG/L														
HB-1	4	AUG-SEPT 89	USATHA MA	3 J	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	
HB-2	4	AUG-SEPT 89	USATHA MA	< 5	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	
HB-3	4	AUG-SEPT 89	USATHA MA	< 5	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	
HB-4	4	AUG-SEPT 89	USATHA MA	< 5	< 5	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	
HB-5	4	AUG-SEPT 89	USATHA MA	< 5	< 5.	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	

* 1,1,1-Trichloroethane

006056

SUMMARY TABLE D-2 (cont'd)
UEP SUPERNATANT
VOCs
LONGHORN ARMY AMMUNITION PLANT
REFERENCE: 16
(mg/L)

SAMPLE NO.	DATE SAMPLED	METHOD	BENZENE	MEC	NAPTHALENE	TOL	1,1,1 TCA	XYL	TCE
S-1	9/80 - 5/81	USATHAMA	< 0.002	0.031*	<0.010	0.006	0.025	< 0.002	0.075
S-2	9/80 - 5/81	USATHAMA	< 0.002	0.044*	<0.010	0.004	0.012	< 0.002	0.041

MEC - Methylene Chloride
TCE - Trichloroethylene
XYL - Xylenes
TOL - Toluene
TCA=Trichloroethane
* Concentrations reported may result from contamination during storage.

SUMMARY TABLE D-2 (cont'd)
WASTE WATER SAMPLING
VOCs
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION PIT
(mg/l)

SAMPLE #	REF	SAMPLE DATE	METHOD	MEC	TCE	VC	TCF	1,1 DCE	1,2 DCA	PCE	TOL	EBZ	ACE-TONE	BEN-ZENE
STA-1	10	JUNE 84	SWD	0.126	0.017	NT	NT	NT	< 0.002	.012	0.004	< 0.001	.131	<0.001
STA-2	10	JUNE 84	SWD	0.085	0.018	NT	NT	NT	< 0.002	.012	0.004	< 0.001	.181	<0.001
STA-3	10	JUNE 84	SWD	0.079	0.020	NT	NT	NT	< 0.002	.022	0.004	< 0.001	.097	0.0011
STA-4	10	JUNE 84	SWD	0.048	0.020	NT	NT	NT	< 0.002	.027	0.007	< 0.001	.146	0.140
STA-5	10	JUNE 84	SWD	0.047	0.029	NT	NT	NT	< 0.002	.023	0.006	0.001	.167	0.011

SWD*: Testing performed by Southwest Division Lab., U.S. Army Corps of Engineers. Information concerning specific testing methods are unavailable.

000571

SUMMARY TABLE D-3
SURFACE WATER SAMPLING
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION PIT

SAMPLE #	REF.	SAMPLE DATE	METHOD	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4 DNT ug/l	2 AM-4,6-DNT ug/l	2,6-DNT ug/l	NITRO-BENZENE ug/l
013	13	JULY 83	USA-THAMA 7 V	NT	NT	< 1.08	< 1.68	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76
014	5	DEC 82-JAN 83	USA-THAMA 7 V	NT	NT	< 1.08	4.3	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76
015	13	JULY 83	USA-THAMA 7 V	NT	NT	< 1.08	< 1.68	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76
016	13	JULY 83	USA-THAMA 7 V	NT	NT	< 1.08	< 1.68	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76
017	13	JULY 83	USA-THAMA 7 V	NT	NT	< 1.08	< 1.68	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76
018	13	JULY 83	USA-THAMA 7 V	NT	NT	< 1.08	< 1.68	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76
019	13	JULY 83	USA-THAMA 7 V	NT	NT	< 1.08	< 1.68	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76
020	13	JULY 83	USA-THAMA 7 V	NT	NT	< 1.08	< 1.68	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76
021	13	JULY 83	USA-THAMA 7 V	NT	NT	< 1.08	< 1.68	NT	< 1.46	< 0.89	NT	< 1.20	< 0.76

006058

SUMMARY TABLE D-3
SURFACE WATER SAMPLING
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION PIT

SAMPLE #	REF.	SAMPLE DATE	METHOD	HMX ug/l	RDX ug/l	1,3,5-TNB ug/l	1,3-DNB ug/l	TETRYL ug/l	2,4,6-TNT ug/l	2,4 DNT ug/l	2 AM-4,6-DNT ug/l	2,6-DNT ug/l	NITRO-BENZENE ug/l
HB-1	4	AUG-SEPT 89	HPLC	< 10.0	< 10.0	NT	NT	< 10.0	NT	< 10.0	NT	NT	TNT= <10.0
HB-2	4	AUG-SEPT 89	HPLC	< 10.0	< 10.0	NT	NT	< 10.0	NT	< 10.0	NT	NT	TNT= <10.0
HB-3	4	AUG-SEPT 89	HPLC	< 10.0	< 10.0	NT	NT	< 10.0	NT	< 10.0	NT	NT	TNT= <10.0
HB-4	4	AUG-SEPT 89	HPLC	< 10.0	< 10.0	NT	NT	< 10.0	NT	< 10.0	NT	NT	TNT= <10.0
HB-5	4	AUG-SEPT 89	HPLC	< 10.0	< 10.0	NT	NT	< 10.0	NT	< 10.0	NT	NT	TNT= <10.0

000059

SUMMARY TABLE D-4
SURFACE WATER
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	SAMPLE DATE	METHOD/ AGENCY	REF. DOC.	PHENOL mg/l	DNOP mg/l	DEPH mg/l	OTHER/ COMMENTS
013	7/83	625	13	NT	NT	NT	
	11/82	EPS 1X	15	NT	NT	NT	***
014	1/83	EPS	13	NT	NT	NT	PHOSPHORIC ACID=345
	11/82	EPS 1X	15	NT	NT	NT	***
015	7/83	625	13	NT	NT	NT	***
	11/82	EPS 1X	15	NT	NT	NT	***
016	7/83	625	13	NT	NT	NT	***
017	7/83	625	13	NT	NT	NT	***
019	7/83	625	13	8	NT	NT	6-Bromohex-anone=346
25X	7/83	625	13	0.09	NT	NT	BLDG. SUMP
33X	7/83	625	13	0.03	NT	NT	BLDG. SUMP
37X	7/83	625	13	0.05	NT	NT	BLDG. SUMP
UEP 1	1/84	AEHA	13	<0.01	<10	<10	2-NITRO-PHENOL=3
	OCT. & NOV. 82	NUS	13	<1	<0.01	<0.01	AQUEOUS LAYER
UEP 2	1/84	AEHA	13	<0.01	TRACE	TRACE	NAPTHALENE=20

006060

SUMMARY TABLE D-4
SURFACE WATER
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	SAMPLE DATE	METHOD/ AGENCY	REF. DOC.	PHENOL mg/l	DNOP mg/l	DEPH mg/l	OTHER/ COMMENTS
	OCT. & NOV. 82	NUS	13	<1	<0.01	<0.01	AQUEOUS LAYER
UEP 3	1/84	AEHA	13	<0.01	TRACE	TRACE	2-NITRO-PHENOL=30
	OCT. & NOV. 82	NUS	13	<1	<0.01	<0.01	AQUEOUS LAYER
UEP 4	1/84	AEHA	13	<0.01	TRACE	400	2-NITRO-PHENOL=30
	OCT. & NOV. 82	NUS	13	<1	<0.01	<0.01	AQUEOUS LAYER
UEP 5	OCT. & NOV. 82	NUS	13	0.6	<0.01	<0.01	AQUEOUS LAYER
UEP 6	OCT. & NOV. 82	NUS	13	<1	<0.01	<0.01	AQUEOUS LAYER
UEP 7	OCT. & NOV. 82	NUS	13	<1	<0.01	<0.01	AQUEOUS LAYER
UEP 8	OCT. & NOV. 82	NUS	13	<1	<0.01	<0.01	AQUEOUS LAYER
UEP 9	OCT. & NOV. 82	NUS	13	<1	<0.01	<0.01	AQUEOUS LAYER

DNOP= Di-N-Octyl Phthalate
DEPH= bis (2-ethylhexyl) Phthalate
***= ALL SEMI VOLATILES ANALYZED FOR WERE UNDER DETECTION LIMITS

000051

SUMMARY TABLE D-4
SURFACE WATER
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	SAMPLE DATE	METHOD/ AGENCY	REF. DOC.	PHENOL mg/l	DNOP mg/l	DEPH mg/l	OTHER/ COMMENTS
UEP 10	OCT. & NOV. 82	NUS	13	4	<0.01	<0.01	AQUEOUS LAYER
UEP 11	OCT. & NOV. 82	NUS	13	4	<0.01	<0.01	AQUEOUS LAYER
UEP 12	OCT. & NOV. 82	NUS	13	5	<0.01	<0.01	AQUEOUS LAYER
UEP 13	OCT. & NOV. 82	NUS	13	6	<0.01	<0.01	AQUEOUS LAYER
UEP 14	OCT. & NOV. 82	NUS	13	8	<0.01	<0.01	AQUEOUS LAYER
UEP 15	OCT. & NOV. 82	NUS	13	7	<0.01	<0.01	AQUEOUS LAYER
UEP 16	OCT. & NOV. 82	NUS	13	5	<0.01	<0.01	AQUEOUS LAYER
SN-1	9/80 - 5/81	AEHA	16	0.08	NT	NT	
SN-2	9/80 - 5/81	AEHA	16	0.01	NT	NT	
POND C	2/80	USATHAMA	17	0.09	NT	NT	

DNOP= Di-N-Octyl Phthalate
DEPH= bis (2-ethylhexyl) Phthalate
***= ALL SEMI VOLATILES ANALYZED FOR WERE UNDER DETECTION LIMITS

000662

SUMMARY TABLE D-4
SURFACE WATER
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	SAMPLE DATE	METHOD/ AGENCY	REF. DOC.	PHENOL mg/l	DNOP mg/l	DEPH mg/l	OTHER/ COMMENTS
WP-15	8/76	27-71W	18	0.20	NT	NT	WASTE POND SUPERNATANT
WP-16	8/76	27-71W	18	0.22	NT	NT	WASTE POND SUPERNATANT
WP-17	8/76	27-71W	18	0.22	NT	NT	WASTE POND SUPERNATANT

DNOP= Di-N-Octyl Phthalate
DEPH= bis (2-ethylhexyl) Phthalate
***= ALL SEMI VOLATILES ANALYZED FOR WERE UNDER DETECTION LIMITS

000063

SUMMARY TABLE D-5
SEDIMENT SAMPLING
METALS
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION PIT

SAMPLE # REFERENCE	REF.	DATE SAMPLED	METHOD	Arsenic ug/g	Lead ug/g	Thallium ug/g	Barium ug/g	Chromium ug/g	Nickel ug/g	OTHER ug/g	Comment
013	13	JULY 83	USATHAMA 1 J	1.0	32.9	< 3	< 11.4	16.5	< 0.5	< 0.99	Tl, Cr, Ni by method 1 N
014	15	DEC 82-JAN 83	USATHAMA 1 J	< 0.3	72.2	< 3	1031.00	< 0.6	6.0	Al=1142.4	Tl, Cr, Ni by method 1 N
015	13	JULY 83	USATHAMA 1 J	< 0.3	10.1	< 3	130.7	6.7	< 0.5	1347.3	Tl, Cr, Ni by method 1 N
016	13	JULY 83	USATHAMA 1 J	< 0.3	9.9	< 3	< 11.4	7.1	< 0.5	Al=1281.4	Tl, Cr, Ni by method 1 N
017	13	JULY 83	USATHAMA 1 J	< 0.3	32.1	< 3	333.0	9.1	15.0	Al=1520.7 Mn=1032.3	Tl, Cr, Ni by method 1 N
018	13	JULY 83	USATHAMA 1 J	< 0.3	11.3	< 3	133.0	5.0	6.0	Al=1502.2 Mn=426.3	Tl, Cr, Ni by method 1 N
019	13	JULY 83	USATHAMA 1 J	< 0.3	22.6	< 3	175.8	11.4	6.0	Al=967.2 Mn=239.2	Tl, Cr, Ni by method 1 N
020	13	JULY 83	USATHAMA 1 J	< 0.3	30.7	< 3	42.1	4.3	2.0	Al=1486.0 Mn=139.4	Tl, Cr, Ni by method 1 N
021	13	JULY 83	USATHAMA 1 J	< 0.3	30.3	< 3	168.2	8.0	6.0	Al=702 Mn=143.4	Tl, Cr, Ni by method 1 N
ABG-6	11	SEPT 89	7.4	NT	NT	NT	28.5	< 5.0	< 10.0	NT	
UEP-1	19	OCT-NOV 82	++	NT	930	NT	6400	1.1	NT	NT	
UEP-2	19	OCT-NOV 82	++	NT	280	NT	5500	0.19	NT	NT	
UEP-3	19	OCT-NOV 82	++	NT	190	NT	4900	0.32	NT	NT	
UEP-4	19	OCT-NOV 82	++	NT	200	NT	5800	0.38	NT	NT	
UEP-5	19	OCT-NOV 82	++	NT	220	NT	7400	3.0	NT	NT	
UEP-6	19	OCT-NOV 82	++	NT	200	NT	4800	0.20	NT	NT	
UEP-7	19	OCT-NOV 82	++	NT	470	NT	3600	0.26	NT	NT	
UEP-8	19	OCT-NOV 82	++	NT	840	NT	3000	0.11	NT	NT	
UEP-9	19	OCT-NOV 82	++	NT	270	NT	4600	0.12	NT	NT	
UEP-10	19	OCT-NOV 82	++	NT	290	NT	5200	0.03	NT	NT	
UEP-11	19	OCT-NOV 82	++	NT	240	NT	5100	0.02	NT	NT	

000094

SUMMARY TABLE D-5
SEDIMENT SAMPLING
METALS
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION PIT

SAMPLE # REFERENCE	REF.	DATE SAMPLED	METHOD	Arsenic ug/g	Lead ug/g	Thallium ug/g	Barium ug/g	Chromium ug/g	Nickel ug/g	OTHER ug/g	Comment
UEP-12	19	OCT-NOV 82	++	NT	60	NT	3900	0.51	NT	NT	
UEP-13	19	OCT-NOV 82	++	NT	130	NT	6100	0.07	NT	NT	
UEP-14	19	OCT-NOV 82	++	NT	310	NT	6300	NT	NT	NT	
UEP-15	19	OCT-NOV 82	++	NT	330	NT	3400	NT	NT	NT	
UEP-16	19	OCT-NOV 82	++	NT	280	NT	3700	NT	NT	NT	

++ METHODS: pH = STANDARD METHODS, Electrochemical*
METALS (Total barium, lead, and chromium), **EPA, Atomic Absorption via direct aspiration following section 4.13 for total metals. 01034, 01045
Arsenic **EPA, Atomic Absorption via cold vapor techniques

NT=Not Tested

* American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 15TH ED., 1980.
** US Environmental Protection Agency, Manual of Methods for Chemical Analysis of Water and WasEnvironmental Monitoring and Support Laboratory, Cincinnati, Ohio, 1979.

SUMMARY TABLE D-5 (cont'd)
LHAAP BURNING GROUND 3
SEDIMENT SAMPLING
BLDGS 25X, 33X, 37X (SUMP)
ALL MEASUREMENTS - ug/l

SAMPLE NUMBER	REF.	DATE SAMPLED	METHOD	pH	ARSENIC	BARIUM	CHROMIUM	LEAD	MAGNESIUM	ZINC	NITRITE /NI-TRATE-N
37X	20	21 JUL 82	*	NT	28	350	72	57	2150	1900	580
33X	20	21 JUL 82	*	NT	55	660	67	110	1960	47	1700

* METALS: EPA Atomic Absorption via direct aspiration following Section 4.13 for total metals. (Storet)
Nitrate/Nitrite nitrogen on sludge samples by salt-leaching followed by cadmium reduction. ID 418 C

000953

SAMPLE NO. & DESCRIPTION (BURN TRENCH) ALL DATA SAMPLED JULY/AUG 1981 REFERENCE: 21	SUMMARY TABLE D-5 (cont'd) SEDIMENT SAMPLING EP TOXICITY (mg/l)							
	Arsenic	Barium	Cadmium	Chromium	Mercury	Lead	Selenium	Silver
4704-001 Pt. 1, residue	<0.5	24	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-002, Pt. 1, 0-6 in.	<0.5	<10	<0.1	<0.5	<0.02	1.6	<0.1	<0.5
4704-003, Pt. 1, 6-18 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-004, Pt. 2, residue	<0.5	139	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-005, Pt. 2, 0-6 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-006, Pt. 2, 6-18 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-007, Pt. 3, residue	<0.5	200	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-008, Pt. 3, 0-6 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-009, Pt. 3, 6-18 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-010, DRAINAGE AREA	<0.5	<10	<0.1	<0.5	<0.02	4.8	<0.1	<0.5
4704-011, DRAINAGE AREA, 30 FT. AWAY	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-012, DRAINAGE AREA, 50 FT. AWAY	<0.5	45	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5

Methods: Testing performed by USATHAMA. Specific information on methods used is unavailable.

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SAMPLE NO. & DESCRIPTION (BURN PAD) JULY/AUG 1981 REFERENCE: 21	SUMMARY TABLE D-5 (cont'd) SEDIMENT EP TOXICITY (mg/l)							
	Arsenic	Barium	Cadmium	Chromium	Mercury	Lead	Selenium	Silver
4704-013, Pit 2, Pt. 1, residue	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-014, Pit 2, Pt. 1, 0-6 in.	<0.5	<10	<0.1	<0.5	<0.02	1.6	<0.1	<0.5
4704-015, Pit 2, Pt. 1, 6-18 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-016, Pit 2, Pt. 2, residue	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-017, Pit 2, Pt. 2, 0-6 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-018, Pit 2, Pt. 2, 6-18 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-019, Pit 5, Pt. 3, residue	<0.5	46	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-020, Pit 5, Pt. 3, 0-6 in.	<0.5	11	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-021, Pit 5, Pt. 3, 6-18 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-022, Pit 5, Pt. 2, residue	<0.5	609	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-023, Pit 5, Pt. 2, 0-6 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-024, Pit 5, Pt. 2, 6-18 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-025, Pit 10, Pt. 1, residue	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-026, Pit 10, Pt. 1, 0-6 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-027, Pit 10, Pt. 1, 6-18 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5

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4704-028, Pit 10, Pt. 2, residue	<0.5	143	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-029, Pit 10, Pt. 2, 0-6 in.	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-030, Pit 10, Pit 2	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-0031 DRAINAGE AREA	<0.5	<10	<0.1	<0.5	<0.02	0.7	<0.1	<0.5
4704-0032 DRAINAGE AREA	<0.5	19	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-033, DRAINAGE AREA	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-034, DRAINAGE AREA	<0.5	87	<0.1	<0.5	<0.02	1.5	<0.1	<0.5
4704-035, Upslope Background	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5
4704-036, Upslope Background	<0.5	<10	<0.1	<0.5	<0.02	<0.5	<0.1	<0.5

Detection Limits/RCRA Criteria Limit (mg/l)
Arsenic - 0.5/5.0
Barium - 10/100
Cadmium - 0.1/1.0
Chromium - 0.5/5.0
Mercury - 0.02/0.2
Lead - 0.5/5.0
Selenium - 0.1/1.0
Silver - 0.5/5.0

Methods: All testing for samples in Burn Trench, Burn Pad, and Drainage Area in July/August 1981 performed by USATHMA. Details of specific methods used are unavailable.

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SUMMARY TABLE D-5 (cont'd)
UEP SEDIMENT LAYER
TOXIC EXTRACTION PROCEDURE ANALYSES -
ALL DATA FROM OCT/NOV 1982 SAMPLING
REFERENCE: 19

SAMPLE PT.	Arsenic mg/l	Barium mg/l	Cadmium mg/l	Chromium mg/l	Lead mg/l	Mercury mg/l	Selenium mg/l	Silver mg/l
UEP-1	NT	94	NT	NT	0.12	NT	NT	NT
UEP-2	NT	22	NT	NT	0.014	NT	NT	NT
UEP-3	NT	14	NT	NT	0.21	NT	NT	NT
UEP-4	NT	25	NT	NT	0.18	NT	NT	NT
UEP-5	NT	13	NT	NT	0.10	NT	NT	NT
UEP-6	NT	27	NT	0.08	0.17	NT	NT	NT
UEP-7	NT	38	NT	NT	0.054	NT	NT	NT
UEP-8	NT	70	NT	0.13	0.40	NT	NT	NT
UEP-9	NT	29	NT	NT	0.64	NT	NT	NT
UEP-10	NT	29	NT	NT	0.12	NT	NT	NT
UEP-11	NT	19	NT	NT	0.084	NT	NT	NT
UEP-12	NT	15	NT	NT	0.15	NT	NT	NT
UEP-13	NT	4.4	NT	0.09	0.17	NT	NT	NT
UEP-14	NT	39	NT	0.09	0.17	NT	NT	NT
UEP-15	NT	7.2	NT	NT	0.086	NT	NT	NT
UEP-16	NT	22	NT	0.29	0.13	NT	NT	NT
UEP-17	NT	82	NT	NT	0.15	NT	NT	NT
LIMIT OF DETECTION	0.010	1.0	0.1	0.05	0.010	NT	0.01	0.1

Methods: (Total Barium, Cadmium, Chromium, Lead, and Silver), EPA, Manual of Methods for Chemical Analysis of Water and Wastewater, Environmental monitoring and support Lab, Cincinnati, OH., Atomic Absorption via direct Aspiration following section 4.13 for total metals. Liquid samples for Cr, Pb, Ag were analyzed by the atomic Absorption furnace techniques following Section 4.13 for total metals. Total As and Se also by 4.13. Mercury was by EPA, Atomic Absorption via cold vapor technique.

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SUMMARY TABLE D-5 (cont'd)
UEP SOIL LAYER
TOXIC EXTRACTION PROCEDURE ANALYSES -
ALL DATA FROM OCT/NOV 1982
REFERENCE: 19

SAMPLE PT.	Arsenic mg/l	Barium mg/l	Cadmium mg/l	Chromium mg/l	Lead mg/l	Mercury mg/l	Selenium mg/l	Silver mg/l
UEP-1	NT	2.3	NT	NT	0.038	0.007	NT	NT
UEP-2	NT	4.2	NT	NT	0.043	NT	NT	NT
UEP-3	0.016	2.3	NT	NT	0.037	NT	NT	NT
UEP-4	NT	3.4	NT	NT	0.045	NT	NT	NT
UEP-5	NT	2.6	NT	NT	0.032	NT	NT	NT
UEP-6	NT	2.4	NT	NT	0.081	0.006	NT	NT
UEP-7	NT	6.1	NT	NT	0.022	NT	NT	NT
UEP-8	NT	3.2	NT	NT	0.031	NT	NT	NT
UEP-9	NT	2.8	NT	NT	0.014	NT	NT	NT
UEP-10	NT	2.1	NT	NT	0.022	NT	NT	NT
UEP-11	NT	2.6	NT	NT	0.079	NT	NT	NT
UEP-12	NT	2.8	NT	NT	NT	NT	NT	NT
UEP-13	NT	1.4	NT	NT	0.025	NT	NT	NT
UEP-14	NT	2.3	NT	NT	0.020	NT	NT	NT
UEP-15	NT	2.0	NT	NT	0.062	NT	NT	NT
UEP-16	NT	2.4	NT	NT	0.054	NT	NT	NT
LIMIT OF DETECTION	0.010	1.0	0.1	0.05	0.010	0.005	0.01	0.1

Methods: (Total Barium, Cadmium, Chromium, Lead, and Silver), EPA, Manual of Methods for Chemical Analysis of Water and Wastewater, Environmental monitoring and support Lab, Cincinnati, OH., Atomic Absorption via direct Aspiration following section 4.13 for total metals. Liquid samples for Cr, Pb, Ag were analyzed by the atomic Absorption furnace techniques following Section 4.13 for total metals. Total As and Se also by 4.13. Mercury was by EPA, Atomic Absorption via cold vapor technique.

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SUMMARY TABLE D-5 (cont'd)
SOIL ANALYSES AFTER REMOVAL OF SLUDGES
UNLINED EVAPORATION POND - LHAAP
METALS
REFERENCE: 10

SAMPLE NO.	SAMPLE DATE	METHOD	CHROMIUM ug/g	BARIUM ug/g
S-1	11/21/85	USATHAMA	17	151
S-2	11/21/85	USATHAMA	27	151
S-3	11/21/85	USATHAMA	9.7	45
S-4	11/21/85	USATHAMA	10	61
S-5	11/21/85	USATHAMA	16	96
S-6	11/21/85	USATHAMA	9.0	409
S-7	11/21/85	USATHAMA	9.7	325
S-8	11/21/85	USATHAMA	13	36
S-9	11/21/85	USATHAMA	18	156
S-10	11/21/85	USATHAMA	14	74
S-11	11/21/85	USATHAMA	12	144
S-12	11/21/85	USATHAMA	17	219
S-13	11/21/85	USATHAMA	11	264
S-14	11/21/85	USATHAMA	14	223
S-15	11/21/85	USATHAMA	5.1	268
S-16	11/21/85	USATHAMA	11	138
S-17	11/21/85	USATHAMA	12	42
S-18	11/21/85	USATHAMA	6.8	49
S-19	11/21/85	USATHAMA	8.0	100
S-20	11/21/85	USATHAMA	9.4	49
S-21	11/21/85	USATHAMA	13	190
S-22	11/21/85	USATHAMA	4.9	69

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SUMMARY TABLE D-5 (cont'd)
SOIL ANALYSES AFTER REMOVAL OF SLUDGES
UNLINED EVAPORATION POND - LHAAP
METALS
REFERENCE: 10

SAMPLE NO.	SAMPLE DATE	METHOD	CHROMIUM ug/g	BARIUM ug/g
S-23	11/21/85	USATHAMA	5.0	71
S-24	11/21/85	USATHAMA	20	319
S-25	11/21/85	USATHAMA	14	443
S-26	11/21/85	USATHAMA	11	124
S-27	11/21/85	USATHAMA	15	173
S-28	11/21/85	USATHAMA	16	377
S-29	11/21/85	USATHAMA	13	367
S-30	11/21/85	USATHAMA	15	143
S-31	11/21/85	USATHAMA	23	106
S-32	11/21/85	USATHAMA	21	156
S-33	11/21/85	USATHAMA	21	57
S-34	11/21/85	USATHAMA	11	93
S-35	11/21/85	USATHAMA	19	96
S-36	11/21/85	USATHAMA	25	160
S-37	11/21/85	USATHAMA	24	71
S-38	11/21/85	USATHAMA	17	46
S-39	11/21/85	USATHAMA	18	60
S-40	11/21/85	USATHAMA	15	90

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SUMMARY TABLE D-5 (cont'd)
UEP BENTHIC SEDIMENT
METALS
UNLINED EVAPORATION PIT - LONGHORN ARMY AMMUNITION PLANT
REFERENCE: 16
(mg/L)

SAMPLE NO.	DATE SAMPLED	METHOD	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
UEP-1S	MAR-SEPT 81	USATHAMA	U	92	0.015	U	U	U	U	U
UEP-2S	MAR-SEPT 81	USATHAMA	NT	NT	NT	NT	NT	NT	NT	NT
UEP-3S	MAR-SEPT 81	USATHAMA	U	87	0.015	U	U	U	U	U
EP TOXICITY MAX. CONC.	MAR-SEPT 81	USATHAMA	5.0	100.0	1.0	5.0	5.0	0.2	1.0	5.0

SUMMARY TABLE D-5 (cont'd)
SEDIMENT SAMPLING
LONGHORN ARMY AMMUNITION PLANT

SAMPLE #	REF. DOC.	SAMPLE DATE	COD RESULTS (ug/g)	METHOD/ AGENCY
4264	10	10/24/85	2450	USATHAMA
4256	10	10/24/85	3300	USATHAMA
4266	10	10/24/85	8160	USATHAMA
4267	10	10/24/85	3300	USATHAMA
4273	10	10/26/85	1100	USATHAMA
4274	10	10/26/85	750	USATHAMA
4275	10	10/26/85	4100	USATHAMA
4276	10	10/26/85	1900	USATHAMA
4277	10	10/26/85	1600	USATHAMA

000073

SUMMARY TABLE D-5 (cont'd) SEDIMENT SAMPLING LONGHORN ARMY AMMUNITION PLANT				
SAMPLE #	REF. DOC.	SAMPLE DATE	COD RESULTS (ug/g)	METHOD/ AGENCY
4278	10	10/26/85	1400	USATHAMA
4279	10	10/26/85	1250	USATHAMA
4280	10	10/26/85	1250	USATHAMA
4281	10	10/26/85	2080	USATHAMA
4282	10	10/26/85	1600	USATHAMA
4283	10	10/26/85	1400	USATHAMA
4284	10	10/26/85	1750	USATHAMA
4285	10	10/26/85	1750	USATHAMA
4286	10	10/26/85	1600	USATHAMA
4287	10	10/26/85	17,500	USATHAMA
4287	10	RETEST	7200	USATHAMA
4288	10	10/26/85	8500	USATHAMA
4289	10	10/26/85	12,500	USATHAMA
4290	10	10/26/85	2400	USATHAMA
4291	10	10/26/85	5300	USATHAMA
4292	10	10/26/85	2400	USATHAMA
4293	10	10/26/85	3400	USATHAMA
4294	10	10/26/85	21,900	USATHAMA
4294	10	RETEST	3300	USATHAMA
4295	10	10/26/85	5900	USATHAMA
4296	10	10/26/85	3750	USATHAMA
4298	10	10/28/85	3300	USATHAMA
4299	10	10/28/85	1200	USATHAMA

006074

SUMMARY TABLE D-5 (cont'd) SEDIMENT SAMPLING LONGHORN ARMY AMMUNITION PLANT				
SAMPLE #	REF. DOC.	SAMPLE DATE	COD RESULTS (ug/g)	METHOD/ AGENCY
4300	10	10/28/85	2000	USATHAMA
4301	10	10/28/85	6100	USATHAMA
4303	10	10/28/85	13,900	USATHAMA
4304	10	10/28/85	1200	USATHAMA
4305	10	10/28/85	4000	USATHAMA
4306	10	10/28/85	1100	USATHAMA
4452	10	11/9/85	4700	USATHAMA
4453	10	11/9/85	2000	USATHAMA
4454	10	11/9/85	2000	USATHAMA
4455	10	11/9/85	2000	USATHAMA
4456	10	11/9/85	2400	USATHAMA
4457	10	11/9/85	2800	USATHAMA
4458	10	11/9/85	2000	USATHAMA
4459	10	11/9/85	2000	USATHAMA
4460	10	11/9/85	2400	USATHAMA
4461	10	11/9/85	7400	USATHAMA

006073

TABLE D-6
UNLINED EVAPORATION PIT - LONGHORN ARMY AMMUNITION PLANT
UEP BENTHIC SEDIMENT
SUMMARY TABLE
REFERENCE: 16
(mg/L)

SAMPLE NO.	DATE SAMPLED	METHOD	PCB SCAN	BENZENE	HCA	MEK	KETONE	NAP	TOL	XYL	TCE
UEP-1S	MAR-SEPT 81	USATHAMA	U	< 1.0	< 0.04%	< 1.0	< 1.0	< 0.04%	3.0	< 1.0	65
UEP-2S	MAR-SEPT 81	USATHAMA	U	< 0.5	< 0.04%	< 0.5	< 0.5	< 0.04%	TRACE	TRACE	NT
UEP-3S	MAR-SEPT 81	USATHAMA	U	< 0.5	< 0.04%	< 0.5	< 0.5	< 0.04%	5.0	0.8	NT

HCA - Hexachloroethane
MEK - Methylethyl ketone
NAP - Napththalene
TOL - Toluene
XYL - Xylenes
TCE - Trichloroethylene
U - Under Detection

000076

SUMMARY TABLE D-7
SEDIMENT SAMPLING
EXPLOSIVES
LHAAP BURNING GROUND 3 AND UNLINED EVAPORATION PIT
ug/g

SAMPLE NO.	REF.	SAMPLE DATE	METHOD	HMX	RDX	1,3,5-TNB	1,3-DNB	TETRYL	2,4,6-TNT	2,4 DNT	2 AM-4,6-DNT	2,6-DNT	OTHER
013	13	JULY 83	USA-THAMA 7 W	NT	NT	< 0.71	< 0.5	NT	< 0.73	< 0.5	NT	< 0.61	*<1.15
014	13	DEC 82-JAN 83	USA-THAMA 7 W	NT	NT	< 0.71	< 0.5	NT	< 0.73	< 0.5	NT	< 0.61	*<1.15
015	13	JULY 83	USA-THAMA 7 W	NT	NT	< 0.71	< 0.5	NT	< 0.73	< 0.5	NT	< 0.61	*<1.15
016	13	JULY 83	USA-THAMA 7 W	NT	NT	< 0.71	< 0.5	NT	< 0.73	< 0.5	NT	< 0.61	*<1.15
017	13	JULY 83	USA-THAMA 7 W	NT	NT	< 0.71	12.2	NT	3.9	< 0.5	NT	15	*<1.15
018	13	JULY 83	USA-THAMA 7 W	NT	NT	< 0.71	< 0.5	NT	< 0.73	< 0.5	NT	< 0.61	*<1.15
019	13	JULY 83	USA-THAMA 7 W	NT	NT	< 0.71	< 0.5	NT	< 0.73	< 0.5	NT	< 0.61	*<1.15
020	13	JULY 83	USA-THAMA 7 W	NT	NT	< 0.71	< 0.5	NT	< 0.73	< 0.5	NT	< 0.61	*<1.15
021	13	JULY 83	USA-THAMA 7 W	NT	NT	< 0.71	< 0.5	NT	< 0.73	< 0.5	NT	< 0.61	*<1.15

* NITROBENZENE

000077

SAMPLE NO. & DESCRIPTION (BURN TRENCH) ALL DATA SAMPLED JULY/AUG 1981 REFERENCE: 21	TABLE D-7 (cont'd) SEDIMENT SAMPLING EXPLOSIVES (ug/g)					
	HMX	RDX	TETRYL	2,4,6 TNT	2,6 DNT	2,4-DNT
4704-001 Pt. 1, residue	<1	<1	<1	<1	<1	<1
4704-002, Pt. 1, 0-6 in.	<1	<1	<1	<1	<1	<1
4704-003, Pt. 1, 6-18 in.	<1	<1	<1	<1	<1	<1
4704-004, Pt. 2, residue	<1	<1	<1	<1	<1	<1
4704-005, Pt. 2, 0-6 in.	<1	<1	<1	<1	<1	<1
4704-006, Pt. 2, 6-18 in.	<1	<1	<1	<1	<1	<1
4704-007, Pt. 3, residue	<1	<1	<1	<1	<1	<1
4704-008, Pt. 3, 0-6 in.	<1	<1	<1	<1	<1	<1
4704-009, Pt. 3, 6-18 in.	<1	<1	<1	<1	<1	<1
4704-010, DRAINAGE AREA	<1	<1	<1	<1	<1	<1
4704-011, DRAINAGE AREA, 30 FT. AWAY	<1	<1	<1	<1	<1	<1
4704-012, DRAINAGE AREA, 50 FT. AWAY	<1	<1	<1	<1	<1	<1

Detection limit for explosives = 1.0 ug/g
Methods: Testing performed by USATHAMA. Specific information on methods used is unavailable.

SAMPLE NO. & DESCRIPTION (BURN PAD) JULY/AUG 1981 REFERENCE: 21	TABLE D-7 (cont'd) SEDIMENT SAMPLING EXPLOSIVES (ug/g)					
	HMX	RDX	TETRYL	2,4,6 TNT	2,6 DNT	2,4-DNT
4704-013, Pit 2, Pt. 1, residue	<1	<1	<1	<1	<1	<1
4704-014, Pit 2, Pt. 1, 0-6 in.	<1	<1	<1	<1	<1	<1
4704-015, Pit 2, Pt. 1, 6-18 in.	<1	<1	<1	<1	<1	<1
4704-016, Pit 2, Pt. 2, residue	<1	<1	<1	<1	<1	<1
4704-017, Pit 2, Pt. 2, 0-6 in.	<1	<1	<1	<1	<1	<1
4704-018, Pit 2, Pt. 2, 6-18 in.	<1	<1	<1	<1	<1	<1
4704-019, Pit 5, Pt. 3, residue	<1	<1	<1	<1	<1	<1
4704-020, Pit 5, Pt. 3, 0-6 in.	<1	<1	<1	<1	<1	<1
4704-021, Pit 5, Pt. 3, 6-18 in.	<1	<1	<1	<1	<1	<1
4704-022, Pit 5, Pt. 2, residue	<1	<1	<1	<1	<1	<1
4704-023, Pit 5, Pt. 2, 0-6 in.	<1	<1	<1	<1	<1	<1
4704-024, Pit 5, Pt. 2, 6-18 in.	<1	<1	<1	<1	<1	<1
4704-025, Pit 10, Pt. 1, residue	<1	<1	<1	<1	<1	<1

006078

SAMPLE NO. & DESCRIPTION (BURN PAD) JULY/AUG 1981 REFERENCE: 21	TABLE D-7 (cont'd) SEDIMENT SAMPLING EXPLOSIVES (ug/g)					
	HMX	RDX	TETRYL	2,4,6 TNT	2,6 DNT	2,4-DNT
4704-027, Pit 10, Pt. 1, 6-18 in.	<1	<1	<1	<1	<1	<1
4704-028, Pit 10, Pt. 2, residue	<1	<1	<1	<1	<1	<1
4704-029, Pit 10, Pt. 2, 0-6 in.	<1	<1	<1	<1	<1	<1
4704-030, Pit 10, Pit 2	<1	<1	<1	<1	<1	<1
4704-0031 DRAINAGE AREA	<1	<1	<1	<1	<1	<1
4704-0032 DRAINAGE AREA	<1	<1	<1	<1	<1	<1
4704-033, DRAINAGE AREA	<1	<1	<1	<1	<1	<1
4704-034, DRAINAGE AREA	<1	<1	<1	<1	<1	<1
4704-035, Upslope Background	<1	<1	<1	<1	<1	<1
4704-036, Upslope Background	<1	<1	<1	<1	<1	<1

080900

SUMMARY TABLE D-8
SEDIMENT
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	SAMPLE DATE	METHOD/ AGENCY	REF. DOC.	PHENOL mg/l	DNOP mg/l	DEPH mg/l	OTHER/ COMMENTS
013	7/83	625	13	NT	NT	NT	*
	11/82	EPS 1X	15	NT	NT	NT	*
014	11/82	EPS 1X	15	NT	NT	NT	DIETHYL PHTHALATE=2
015	7/83	625	13	NT	NT	NT	*
	11/82	EPS 1X	15	NT	NT	NT	*
016	7/83	625	13	NT	NT	NT	*
017	7/83	625	13	NT	NT	NT	*
018	7/83	625	13	NT	NT	NT	*
UEP 1	NOV & DEC 1982	NUS	13	<5	<10	50	
UEP 2	NOV & DEC 1982	NUS	13	TRACE	<10	10	
UEP 3	NOV & DEC 1982	NUS	13	TRACE	<10	5	
UEP 4	NOV & DEC 1982	NUS	13	NT	NT	NT	
UEP 5	NOV & DEC 1982	NUS	13	<5	<10	30	

000981

SUMMARY TABLE D-8
SEDIMENT
SEMI VOLATILES
LONGHORN ARMY AMMUNITION PLANT

SAMPLE NO.	SAMPLE DATE	METHOD/ AGENCY	REF. DOC.	PHENOL mg/l	DNOP mg/l	DEPH mg/l	OTHER/ COMMENTS
UEP 6	NOV & DEC 1982	NUS	13	<5	<10	6	DIETHYL PHTHALATE =TRACE
UEP 7	NOV & DEC 1982	NUS	13	<5	<10	70	DIETHYL PHTHALATE=11
UEP 8	NOV & DEC 1982	NUS	13	<5	<10	70	DIETHYL PHTHALATE=4
UEP 9	NOV & DEC 1982	NUS	13	<5	<10	45	DIETHYL PHTHALATE=9
UEP 10	NOV & DEC 1982	NUS	13	<5	<10	60	DIETHYL PHTHALATE=10
UEP 11	NOV & DEC 1982	NUS	13	<5	<10	70	DIETHYL PHTHALATE=20
UEP 12	NOV & DEC 1982	NUS	13	<5	<10	100	DIETHYL PHTHALATE=30
UEP 13	NOV & DEC 1982	NUS	13	<5	<10	10	DIETHYL PHTHALATE=4
UEP 14	NOV & DEC 1982	NUS	13	TRACE	<10	10	DIETHYL PHTHALATE=4

DNOP = Di-n-Octyl Phthalate
DEPH = bis (2-ethylhexyl) phthalate
* = All semi volatiles analyzed for were below detection limits.
NUS = Laboratory performing analysis, specific methods are unavailable.

000301

006083

APPENDIX E
AERIAL PHOTOGRAPHS



FIGURE E-1
1954 AERIAL PHOTOGRAPH
ACTIVE BURNING GROUND
WITHOUT UNLINED EVAPORATION POND

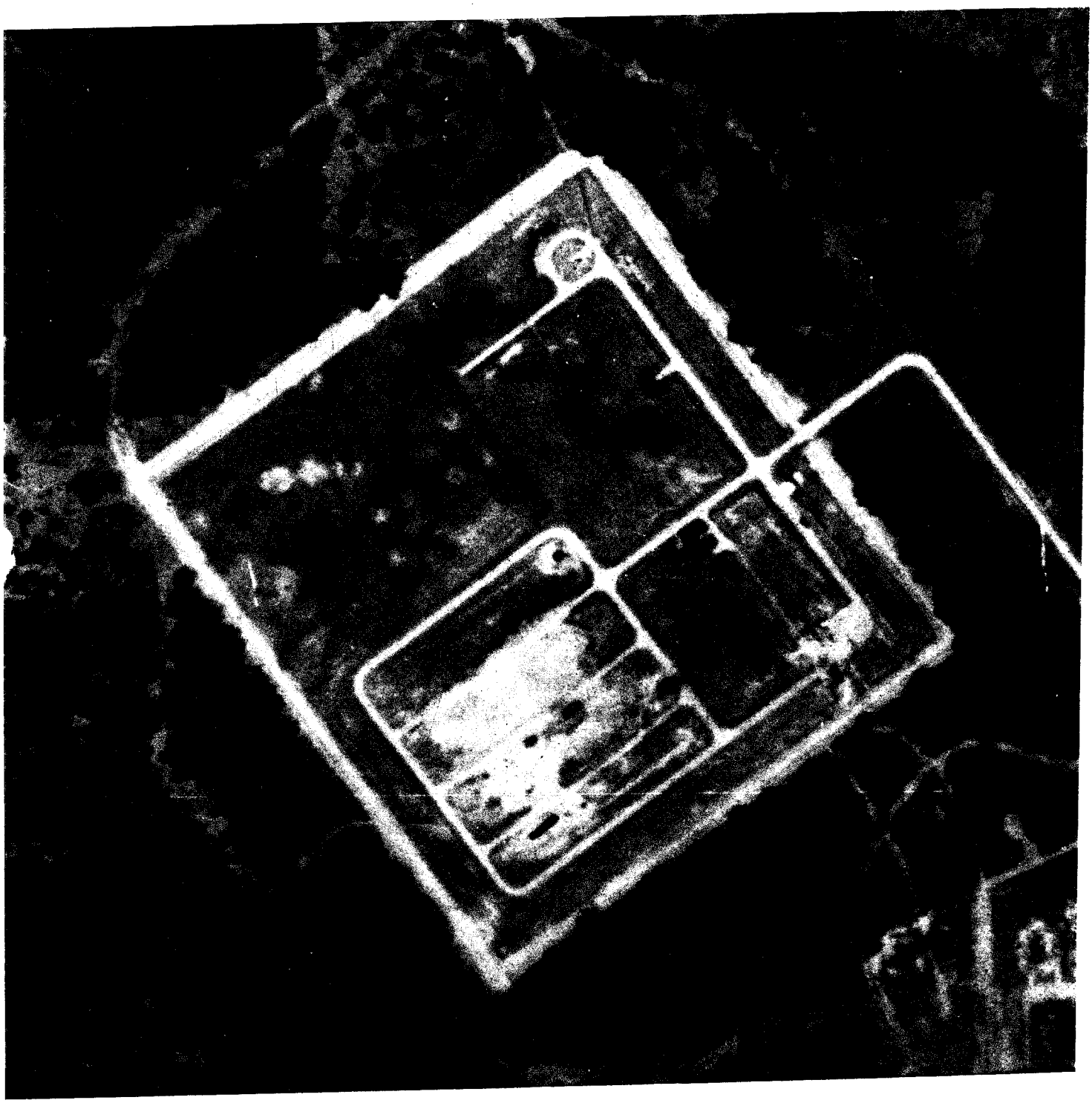
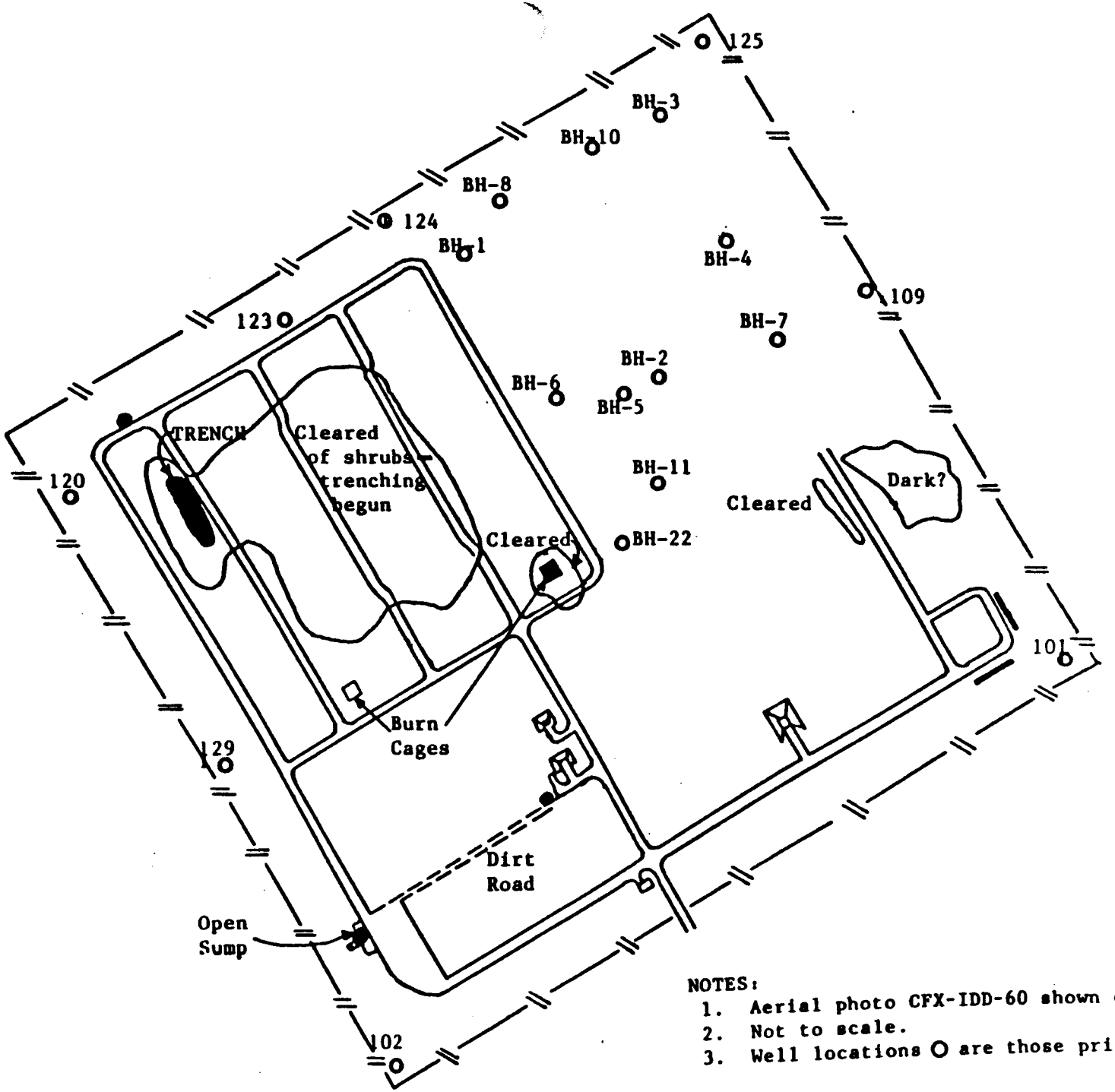


FIGURE E-2
1963 AERIAL PHOTOGRAPH (CFX-IDD-60)
ACTIVE BURNING GROUND
4-30-63



NOTES:
1. Aerial photo CFX-IDD-60 shown on Figure 10.
2. Not to scale.
3. Well locations O are those prior to 1987.

Figure E-3 Sketch of Active Burning Ground Features from Aerial Photo CFX-IDD-60, 4-30-63.

980086

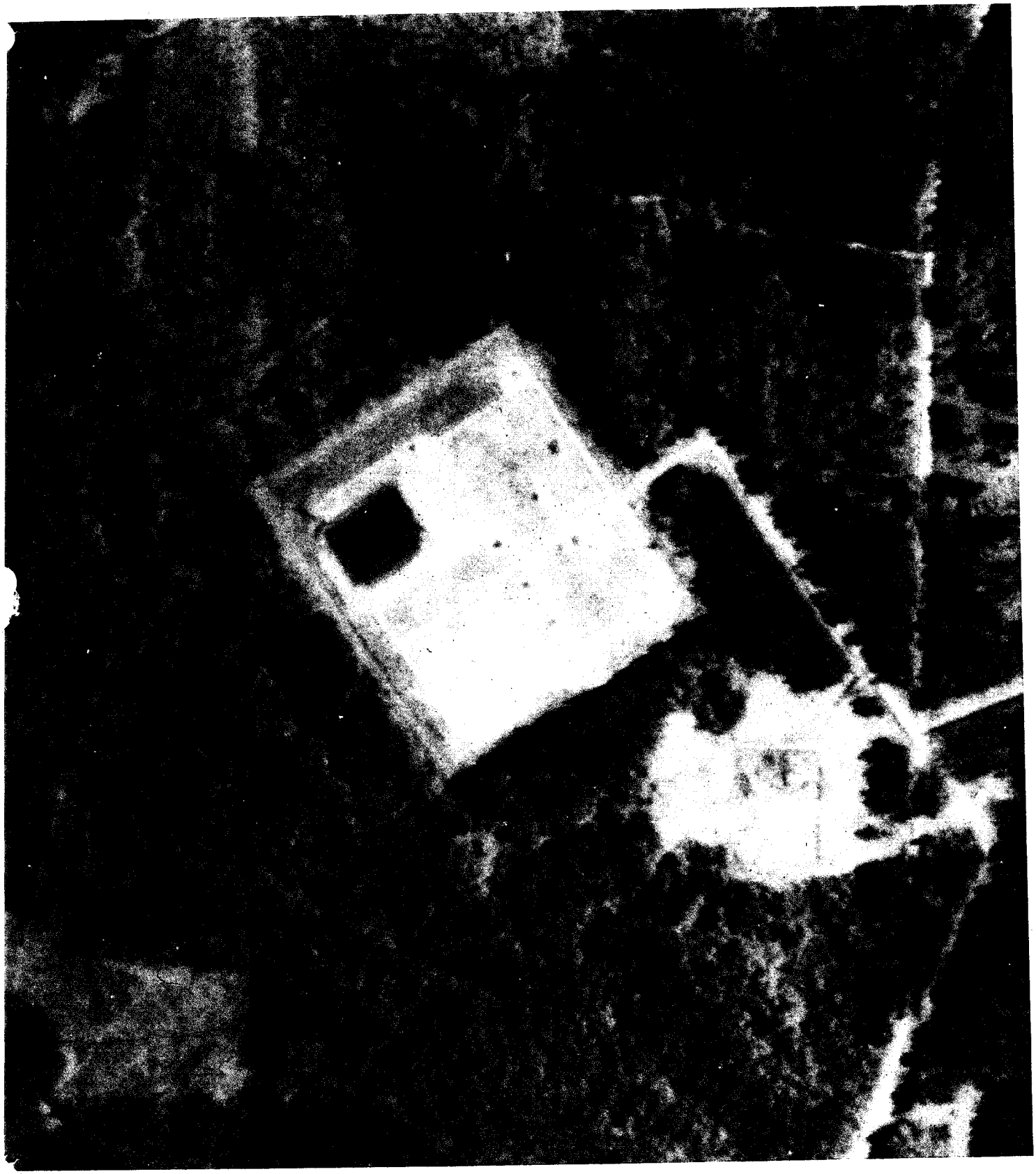


FIGURE E-6
1978 AERIAL PHOTOGRAPH
ACTIVE BURNING GROUND AND UNLINED EVAPORATION POND



FIGURE E-7
1980 AERIAL PHOTOGRAPH
ACTIVE BURNING GROUND AND UNLINED EVAPORATION POND

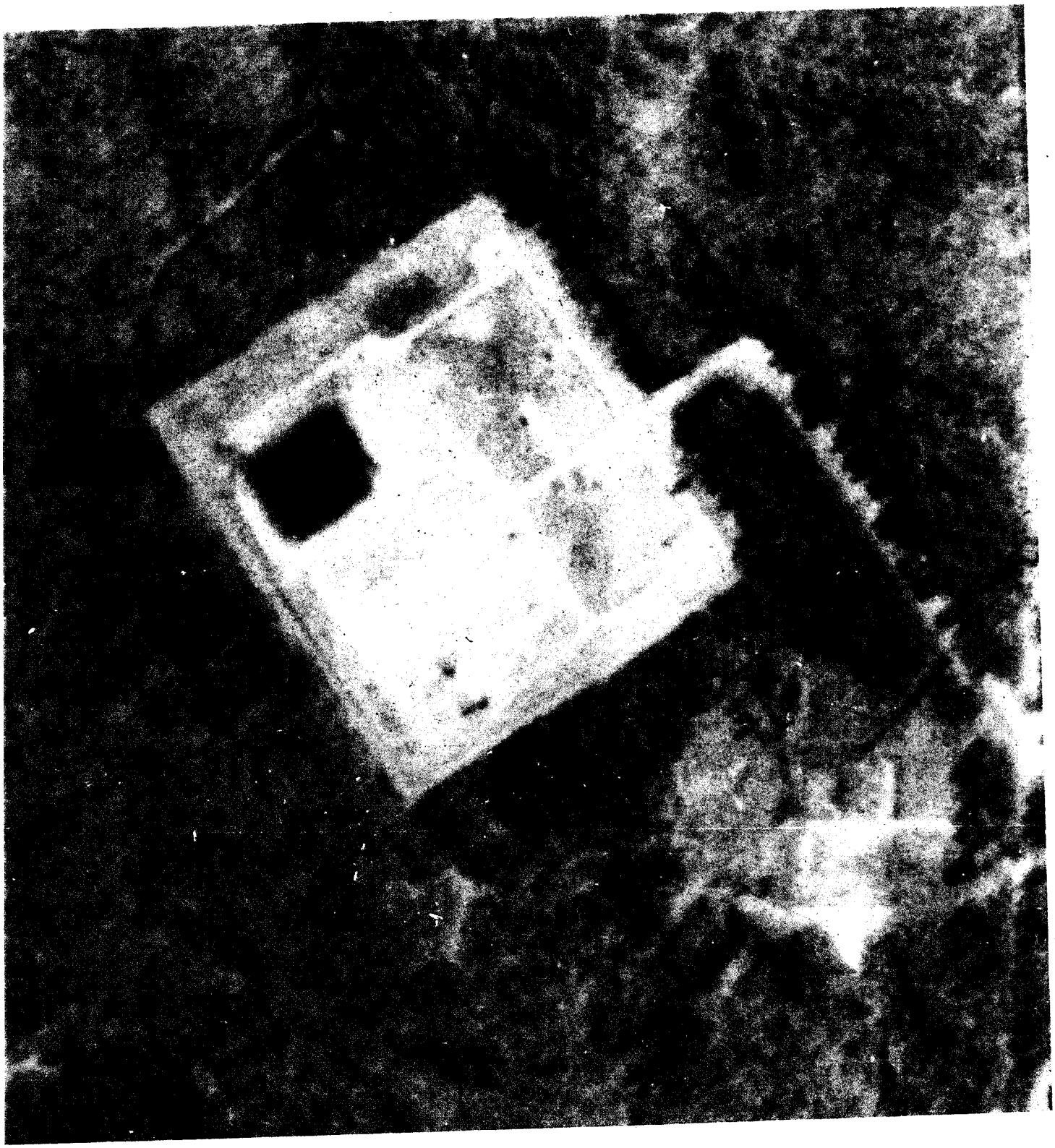


FIGURE E-8
1985 AERIAL PHOTOGRAPH
ACTIVE BURNING GROUND AND
UNLINED EVAPORATION POND

006090

APPENDIX F
ENGINEERING PROPERTIES TABLE

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
MW-1 ref.6	20-24.2	CL	0.0	31.0	46.7	22.3	33	13							26.3			2.18×10^{-4}					
	24.2-26.4	SM	0.0	76.0	18.7	5.3			0	0.15	0.085	0.0337	1.4	4.5	27.4								
	26.5-31.5	CL	0.0	18.0	35.1	46.9	30	19							17.9								
	31.5-34.4	CL-ML	0.0	10.0	36.2	53.8	30	12							22.9								
MW-2 ref.6	20.4-26.0	SM	0.0	59.0	26.7	14.3			0	0.11	0.44	0.0026	6.68	43.2	26.9			5.21×10^{-5}					
	27.0-34.0	CL-ML	0.0	13.0	43.5	45.5	23	7							21.9								
	34.0-38.0	ML	0.0	30.0	51.6	18.4									22.9								
	38.0-39.9	CL-ML	0.0	21.0	66.1	12.9	24	6							21.9								
	39.9-40.4	CH	0.0	3.0	26.0	71.0	73	57							26.8								
MW-3	20.5-25.5	ML	0.0	42.0	41.5	16.5			1						19.8			1.91×10^{-4}					
	25.5-29.0	ML	0.0	44.0	41.7	14.3			1	0.08	0.037	0.0019	9.33	42.7	21.8								
	29.0-34.0	CL-ML	0.0	14.0	61.2	24.8	25	6							25.3								

HOLE - Indicates the hole designation
DEPTH - Sampling depth from ground surface
USCS CLASS - Unified soil classificatio system
%GR - Percent gravel in the sample
%SA - Percent sand in the sample
%ML - Percent silt in the sample
%CY - Percent clay in the sample
LL - Liquid limit from Atterberg Limit Test

PI - Plastic Index from Atterberg Limit Test
LS - Linear Shrinkage
D_{60} - Diameter of soil particle size at 60% finer
D_{30} - Diameter of soil particle size at 30% finer
D_{10} - Diameter of soil particle size at 10% finer
C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

000091

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	34.0-37.8	CL	0.0	18.0	53.0	29.0	28	11							23.0								
	37.8-39.4	CL-ML	0.0	26.0	50.7	23.3	23	7							22.1								
	39.4-43.5	CL-ML	0.0	34.0	49.8	16.2			1						22.1								
	43.5-46.0	ML	0.0	59.0	32.6	6.1			1						25.5								
MW-4 ref.6	15.0-17.1	CL	1.0	42.0	45.3	11.7	26	9		0.08	0.061	0.0201	1.90	4.8	23.0			$3.00x10^{-4}$					
	17.1-19.9	SM	0.0	54.0	32.6	13.4			1						22.8								
	26.9-29.0	CL	0.0	31.0	46.5	22.5	27	10							27.2								
	29.0-32.2	CH	0.0	8.0	45.1	46.9	51	33							25.9								
	32.2-38.1	CL	0.0	21.0	55.8	23.2	29	13							21.4								
	38.1-42.0	SP-SM	0.0	90.0	6.3	3.7			0	0.24	0.165	0.0739	1.56	3.2	26.4								
	42.0-43.0	SC	0.0	62.0	23.3	14.7	40	21		0.11	0.059	0.0015	20.80	76.2	20.7								

HOLE - Indicates the hole designation
DEPTH - Sampling depth from ground surface
USCS CLASS - Unified soil classificatio system
%GR - Percent gravel in the sample
%SA - Percent sand in the sample
%ML - Percent silt in the sample
%CY - Percent clay in the sample
LL - Liquid limit from Atterberg Limit Test

PI - Plastic Index from Atterberg Limit Test
LS - Linear Shrinkage
D_{60} - Diameter of soil particle size at 60% finer
D_{30} - Diameter of soil particle size at 30% finer
D_{10} - Diameter of soil particle size at 10% finer
C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

260900

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	43.0-43.6	CL	0.0	15.0	42.0	43.0	30	16							23.8								
MW-5 ref.6	19.5-24.5	SM	0.0	58.0	29.6	12.4	NP		1	0.10	0.055	0.0027	11.32	38.5	23.3			$1.69x10^{-4}$					
	24.5-28.0	SM	0.0	64.0	27.4	8.6	NP		0	0.12					24.0								
	28.0-29.8	CL	0.0	8.0	37.3	54.7	32	17							25.6								
	29.8-31.5	SM	0.0	58.0	30.2	11.8	NP		0	0.11	0.0055	0.0026	10.12	42.2	26.4								
	31.5-34.5	CL	0.0	8.0	43.9	48.1	31	16							24.9								
	34.5-36.4	CL	0.0	20.0	59.0	21.0	25	9							22.2								
	36.4-40.8	CL-ML	0.0	39.0	44.8	16.2	28	7							25.5								

HOLE - Indicates the hole designation
DEPTH - Sampling depth from ground surface
USCS CLASS - Unified soil classificatio system
%GR - Percent gravel in the sample
%SA - Percent sand in the sample
%ML - Percent silt in the sample
%CY - Percent clay in the sample
LL - Liquid limit from Atterberg Limit Test

PI - Plastic Index from Atterberg Limit Test
LS - Linear Shrinkage
D_{60} - Diameter of soil particle size at 60% finer
D_{30} - Diameter of soil particle size at 30% finer
D_{10} - Diameter of soil particle size at 10% finer
C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

006093

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
MW-6 ref.6	18.0-19.5	SM	0.0	65.0	23.3	11.7	NP		2	0.15	0.061	0.0032	7.94	45.7	23.7			$5.45x10^{-5}$					
	19.5-22.0	ML	0.0	21.0	51.2	27.8	31	8							32.3								
	27.0-32.0	CH	0.0	5.0	36.2	58.8	55	36							26.7								
	37.0-42.2	CL-ML	0.0	18.0	53.9	28.1	26	6							24.6								
	42.2-45.8	ML	0.0	42.0	47.9	10.1	NP		2	0.08	0.039	0.0049	4.03	15.7	27.9								
MW-7 ref.6	10.0-15.0	CL-ML	0.0	48.0	37.4	14.6	24	5	4						24.4			$2.39x10^{-5}$	-5				
	15.0-17.0	SM	0.0	76.0	14.6	9.4	NP		0	0.19	0.092	0.0065	6.81	29.3	23.3								
	17.0-19.0	ML	0.0	44.0	43.7	12.3	NP		2						20.3								
	19.0-21.0	SM	0.0	81.0	9.9	9.1	NP		0	00.23	0.134	0.0075	10.23	30.9	25.3								
	21.0-27.0	CH-SH	0.0	19.0	48.7	32.3	31								20.3								
MW-8 ref.6	11.5-13.0	SM	0.0	78.0	10.2	11.8	NP		0	0.13	0.086	0.0022	25.41	62.4	29.8			$2.99x10^{-5}$					

HOLE - Indicates the hole designation
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%ML - Percent silt in the sample
%CY - Percent clay in the sample
LL - Liquid limit from Atterberg Limit Test

PI - Plastic Index from Atterberg Limit Test
LS - Linear Shrinkage
D_{60} - Diameter of soil particle size at 60% finer
D_{30} - Diameter of soil particle size at 30% finer
D_{10} - Diameter of soil particle size at 10% finer
C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

000094

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	13.8-14.4	CL	0.0	29.0	52.4	18.6	29	11							25.8								
	14.4-17.5	ML	0.0	12.0	76.4	11.6	NP		2	0.05	0.027	0.0021	7.04	22.5	23.5								
	17.5-18.4	CH-SH	0.0	5.0	35.6	59.4	51	34							24.1								
	23.4-28.0	CL	0.0	14.0	59.3	26.7	29	14							24.2								
	30.0-32.0	CH-SH	0.0	14.0	35.2	50.8	48	33							21.4								
MW-9 ref.6	12.5-13.1	CH-SH	0.0	21.0	28.9	50.1	50	34							24.6			$1.58x10^{-5}$					
	13.1-16.0	SM	0.0	72.0	18.9	9.1	NP		2	0.14	0.074	0.0064	5.95	22.2	30.4								
	16.0-19.0	CH-SH	0.0	3.0	42.5	54.5	59	43							25.5								
	19.0-24.0	CH-SH	0.0	20.0	60.8	19.2	34	21							19.1								
	26.0-27	CH-SH	0.0	5.0	44.3	50.7	50	34							19.8								
MW-10 ref.6	5.1-7.2	CL	0.0	26.0	54.4	19.6	25	12							22.6			$5.71x10^{-5}$					
	7.2-9.2	SM	0.0	53.0	40.1	6.9	NP		0	0.09	0.051	0.0120	2.26	7.9	23.4								

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C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

000095

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	11.2-13.0	SM	0.0	57.0	38.5	4.5	NP		0	0.10	0.057	0.0211	1.57	4.6	26.3								
	13.0-18.0	ML	0.0	45.0	44.0	11.0	NP		2	0.08	0.042	0.0034	6.61	24.0	22.2								
	19.5-23.5	SP-SM	0.0	88.0	5.3	6.7	NP		0	0.15	0.100	0.0562	1.19	2.7	31.4								
	23.5-28.5	SM	0.0	65.0	27.3	7.7	NP		0	0.11	0.066	0.0083	4.62	13.6	24.8								
	28.5-32.0	SM	0.0	62.0	31.2	6.8	NP		0	0.11	0.60	0.0085	3.89	12.9	28.6								
	32.0-34.5	SM	0.0	55.0	29.9	15.1	NP		1	0.10	0.041	0.0014	11.89	68.4	25.7								
MW-11 ref.6	3.9-5.0	CL	0.0	37.0	40.2	22.8	33	18							15.2			$1.51x10^{-4}$					
	6.0-8.0	SM	0.0	69.0	22.6	8.4	NP		1	0.12	0.72	0.0102	4.34	11.5	20.7								
	8.0-10.0	SM	0.0	71.0	24.8	4.2	NP		0	0.12	0.074	0.0354	1.27	3.4	29.1								
W-12 ref.6	4.0-6.0	CL	0.0	24.0	41.7	34.3	23	10							24.7			$2.58x10^{-5}$					
	17.0-22.0	SM	0.0	69.0	25.1	5.9	NP		0	0.12	0.072	0.0256	1.7	4.7	22.6								
	22.0-27.0	SM	0.0	63.0	30.7	6.3	NP		0	0.11	0.062	0.0161	2.16	6.9	25.0								

HOLE - Indicates the hole designation
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C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

000096

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	27.0-28.0	SM	0.0	57.0	34.4	8.6	NP		1	0.11	0.051	0.0077	3.12	14.0	27.9								
MW-13 ref.6	17.0-22.0	SM	0.0	80.00	10.9	9.1	NP		0	0.18	0.095	0.0107	4.79	16.6	26.0			$3.31x10^{-4}$					
	26.0-28.0	SM	0.0	58.0	29.7	12.3	NP		2	0.10	0.047	0.0033	6.53	30.6	25.9								
	28.0-29.0	CL-ML	0.0	39.0	37.1	23.9	25	7							23.9								
MW-14 ref.6	11.0-16.0	SM	0.0	66.0	28.4	5.6	NP		0	0.12	0.068	0.0219	1.8	5.3	22.3			$4.8x10^{-4}$					
	20.0-22.5	ML	0.0	5.0	38.8	56.2	NP		1						22.1								
	23.8-26.0	SM	0.0	66.0	26.7	7.3	NP		1	0.13	0.066	0.0149	2.23	8.9	20.9								
	26.0-27.8	CL	0.0	40.0	37.1	22.9	26	8							22.2								
	37.8-42.8	SM	0.0	79.0	13.9	7.1	NP		1	0.17	0.093	0.0156	3.25	10.9	28.3								
	42.8-47.8	SP-SM	0.0	91.0	5.0	4.0	NP		0	0.25	0.163	0.0818	1.32	3.0	26.1								
MW-15 ref.6	40.0-46.5	SC	0.0	54.0	35.5	10.5	30	14		0.10	0.047	0.0041	5.36	23.5	25.5			$2.40x10^{-3}$					

HOLE - Indicates the hole designation
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%CY - Percent clay in the sample
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PI - Plastic Index from Atterberg Limit Test
LS - Linear Shrinkage
D_{60} - Diameter of soil particle size at 60% finer
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D_{10} - Diameter of soil particle size at 10% finer
C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content
%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

000097

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	46.5-47.0	SM	0.0	58.0	33.8	8.2	NP		0	0.10	0.057	0.0144	2.4	6.6	28.4								
BH-1 ref.7	0-3	ML	1	31	68		22.3	2.9								118	$8.2X10^{-6}$		.34	.51	1.78	1.82	14
	5-6.5	CL	0	39.3	60.7		29.8	8.9							2.68	94.2		$2.08X10^{-6}$	.35	.54	1.74		
	14-16	ML	3	18	79		35.9	9.2								73	$3.3X10^{-8}$		.46	.85	1.46	1.79	16.5
	24-26	SM	0	77	23												$1.8X10^{-7}$						
	40-43	ML	2	29	69		32.8	5.5								91			.45	.83	1.47		
	43-45	SM	0	63	37		29.2	4.6								101	$1.1X10^{-6}$		.41	.69	1.6		
	48-50	ML	0	22	78		38.5	9.7															
BH-2 ref.7	4-6	ML	2	19	79		26.8	4.3								110	$3.4X10^{-7}$		.4	.66	1.62	1.84	12.7
	9-11	ML	0	22	78		40.8	7.7								117	$9.1X10^{-8}$		.59	1.46	1.10	1.75	16.2

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MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

006098

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{sp} g/cm^2	OMC
	29-31	SM	4	59	37		NP									101	4.2X 10^{-7}		.44	.79	1.51	1.86	12.5
BH-3 ref.7	5-8	SM	1	50	49		21.8	1.2								102	4.3X 10^{-7}		.4	.68	1.60	1.90	14.0
	10-13	SM	0	56	44		NP									102	9.3X 10^{-7}		.39	.64	1.64	1.81	12.5
BH-4 ref.7	5-7	ML	1	28	71		32	7															
	9-11	SM	0	61	39		NP																
	14-16	ML	0	42	58		21.5	1.6								141	2.75X10^{-7}		.29	.41	1.88		
	34-36	SM	0	69	31		NP																
	48-50	SM	0	62	38		NP																
BH-5 ref.7	4-6	SM-ML	4	51	45		30	4.2															
	6-8	SM	1	53	46		21.3	1.1															
	9-11	CL	0	24.5	75.5		30	9.4							26	113	2.04X10^{-7}		.37	.6	1.64		
	14-16	SM-ML	3	57	40		33.5	NA								99	2.1X 10^{-7}		.44	.78	1.51	1.86	13.5

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K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
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e - void ratio
γ_d g/cm^2 - dry density
γ_{sp} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

000099

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
BH-6 ref.7	4-6	SM-SC	1	61	38		20	NA															
	9-11	ML-SM	0	54	46		46.6	12.1															
	13-15	CL	0	26	74		35.7	13.5							22	108	$2.85X10^{-8}$		.35	.54	1.72	1.81	15
	29-31	SM	0	85	15		NP																
BH-7 ref.7	3-6	CL-ML	3	32	65		28	8.1								100	$1.6X10^{-7}$		.49	.97	1.36	1.82	16
	8-10	ML	0	33	67		25.5	NA															
	13-15	SM	0	60	40		NP																
BH-8 ref.7	5-9	CL	0	17.5	82.5		31	12							22.1	108	$7.37X10^{-8}$		.35	.54	1.72		
	11-15	CL	2	20	78		20.5	2.8								107	$2.0X10^{-7}$		.35	.53	1.76	1.86	13.5
	15-20	ML	0	40	60		29.8	3.8								97	$3.6X10^{-7}$		.48	.91	1.41	1.82	14.2
	20-25	ML	0	35	65		25.8	2.7								98	$1.9X10^{-7}$		.44	.77	1.52	1.87	13.8

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K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
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e - void ratio
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OMC - Optimum moisture content

006100

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
BH-9 ref.7	5-7	CL	1	21		78	18.8	0.0								99	$5.9X10^{-8}$		.42	.73	1.57	1.86	13
	10-12	CL	0	22.7		77.3	29.5	8.3							23.7	100	$6.81X10^{-8}$		.39	.63	1.63		
	15-17	SM	0	56		44	NP									100	$2.2X10^{-6}$		.41	.71	1.57		
BH-10 ref.7	8-10	ML	0	37.9		62.1	21.6	3.2								95	$4.76X10^{-7}$		.35	.55	1.71		
	13-15	ML	0	41		59	23.5	5.1															
	18-20	SM-ML	0	54		46	21.9	3.4								98	$1.8X10^{-7}$		.38	.6	1.68		
BH-11 ref.7	28-30	SM	0	76.5		23.5	20.6	0.0							20	84	$2.69X10^{-6}$		.39	.63	1.62	1.82	10.5
BH-17	5-8	ML	0	40		60	21.3	0.3								102	$1.6X10^{-7}$		.40	.67	1.61		
	10-14	SM	0	72		28	NP									87	$8.3X10^{-7}$		.41	.71	1.57	1.78	13.2
	15-19	SM	0	76		24	25	0.0								95	$1.2X10^{-6}$		.39	.65	1.63	1.8	13.5

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D_{60} - Diameter of soil particle size at 60% finer
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C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

006101

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	30-40	OL	6	17	77		42	8.0								89	1.9X 10^{-7}		.53	1.12	1.4	1.6	19.5
BH-18 ref.7	5-8	OL/CL	0	18	82		48	20.9															
	15-17	SM	0	80	20		NP									103	2.0X 10^{-7}		.36	.56	1.68		
	25-27	SM	0	73	27		NP																
101 ref.8	11-11.5	CL					30	13															
	15.5-16				74																		
	16-16.5	CL					39	23															
102 ref.8	15-15.5	CL																					
	16-20	SM			71.2													9.9X 10^{-5}					
	20-20.5	SM	0	67.3	10.2	22.5																	
	22.5-25	CL					33	0															
	30.5-31	CL			63.6																		
109 ref.8	20.5-21.5	SM			1.7	21.3																	

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USCS CLASS - Unified soil classificatio system
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D_{60} - Diameter of soil particle size at 60% finer
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MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

006102

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	22.5-23	ML			53.2																		
	25.8-26.5	CL					41	23															
	26.5-27	SM			17.2	9.1																	
120 ref.8	10-10.5	SM			38.4																		
123 ref.8	5.5-6	SM			8.1	18.5																	
	10.5-11	SM																1.2X 10^{-3}					
	12.5-13	ML			58.6																		
124 ref.8	5.8-6.4	ML			66.4																		
	6.4-7	ML			60.7																		
	10.5-11.25	SM	0	86.8	14.2													6.9X 10^{-3}					
	21.5-22	SM	0	66.6	33.4																		
	26-26.5	SM	0	58.7	37.3	4																	
125 ref.8	10.5-11	SM	0	54	15	31																	
	15.5-16	ML			89.9																		

HOLE - Indicates the hole designation
DEPTH - Sampling depth from ground surface
USCS CLASS - Unified soil classificatio system
%GR - Percent gravel in the sample
%SA - Percent sand in the sample
%ML - Percent silt in the sample
%CY - Percent clay in the sample
LL - Liquid limit from Atterberg Limit Test

PI - Plastic Index from Atterberg Limit Test
LS - Linear Shrinkage
D_{60} - Diameter of soil particle size at 60% finer
D_{30} - Diameter of soil particle size at 30% finer
D_{10} - Diameter of soil particle size at 10% finer
C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

006103

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
	17.5-18	CL			98.1																		
	20-20.5	CL			80.3																		
	22-22.5	SM	0	62	19	21																	
	25.5-26	CH-CL				59	16																
	26-26.5	CL			93.8																		
129 ref.8	20.3-21	SM	0	87.6	.7	11.7												$9.7X10^{-3}$					
	25.2-26	SM	0	68.8	31.2																		
	30.5-31	ML			74.4																		
	31.5-32	ML			61.9																		
	34.5-35	ML			65.7																		
130 ref.8	11-11.5	SM	0	61.2	38.8																		
C-1 ref.8																		$1.99X10^{-4}$					
C-2 ref.8																		$7.4X10^{-6}$					

HOLE - Indicates the hole designation
DEPTH - Sampling depth from ground surface
USCS CLASS - Unified soil classificatio system
%GR - Percent gravel in the sample
%SA - Percent sand in the sample
%ML - Percent silt in the sample
%CY - Percent clay in the sample
LL - Liquid limit from Atterberg Limit Test

PI - Plastic Index from Atterberg Limit Test
LS - Linear Shrinkage
D_{60} - Diameter of soil particle size at 60% finer
D_{30} - Diameter of soil particle size at 30% finer
D_{10} - Diameter of soil particle size at 10% finer
C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

006104

TABLE F
RESULTS OF ENGINEERING TESTING
OF SOIL SAMPLES FROM MONITORING WELL BORINGS AT LHAAP 18 & 24

HOLE	DEPTH	USCS CLASS	%GR	%SA	%SL	%CY	LL	PI	LS	D_{60}	D_{30}	D_{10}	C_C	C_U	MC	%S	K cm/s	K_{IN} cm/s	n	e	γ_d g/cm^2	γ_{SP} g/cm^2	OMC
C-3 ref.8																		5.2X 10^{-5}					
C-4 ref.8																		2.3X 10^{-5}					
C-5 ref.8																		8.7X 10^{-5}					
C-6 ref.8																		2.6X 10^{-5}					

Refernces
6. Groundwater Quality Assessment Phase I , Longhorn Army Ammunition Plant Karnack, Texas, Volum e4 Appendix AA and BB, Prepared for U.S.Army Engineering Division, Huntsville Corps of Engineers by Fort Worth District, U.S. Army Corps of Engineers .

7. LAND DISPOSAL STUDY NO. 38-26-0104-81, Longhorn Army Ammunition Plant, Marshall, Texas, 23 January - 8 February 1980, prepared by U.S. Army Environmental Hygiene Agency, Aberdeen Proving Ground, Md.

8. Groundwater Contamination Related to Seepage from an Unlined Evaporation Pond, March 15, 1985, Vol II, Appendices A-I. Prepared By Camp Dresser & McKee INC. for U.S. Army Engineering Division, Huntsville.

HOLE - Indicates the hole designation
DEPTH - Sampling depth from ground surface
USCS CLASS - Unified soil classificatio system
%GR - Percent gravel in the sample
%SA - Percent sand in the sample
%ML - Percent silt in the sample
%CY - Percent clay in the sample
LL - Liquid limit from Atterberg Limit Test

PI - Plastic Index from Atterberg Limit Test
LS - Linear Shrinkage
D_{60} - Diameter of soil particle size at 60% finer
D_{30} - Diameter of soil particle size at 30% finer
D_{10} - Diameter of soil particle size at 10% finer
C_C - Compression Index
C_U - Uniformity Coefficient
MC - Moisture Content

%S - Percent saturation
K cm/s - Hydraulic Conductivity from laboratory
K_{IN} cm/s - Hydraulic Conductivity from insitu slug test
n - porosity
e - void ratio
γ_d g/cm^2 - dry density
γ_{SP} g/cm^2 - density from specific gravity
OMC - Optimum moisture content

006105

APPENDIX G
SOIL GAS SURVEY

006107

Tracer Research Corporation



SHALLOW SOIL GAS INVESTIGATION
AT
LONGHORN AMMUNITION PLANT
MARSHALL, TEXAS

OCTOBER, 1987

PREPARED FOR:

US ARMY ENGINEER DISTRICT
FORT WORTH
PO Box 17300
Fort Worth, Texas 76102

SUBMITTED BY

Tracer Research Corporation



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FIGURE 1

SAMPLING LOCATION AND TCE MAP..... ATTACHED

INTRODUCTION

A shallow soil gas investigation was conducted by Tracer Research Corporation at the Longhorn Army Ammunition Plant in Marshall, Texas. The investigation was conducted August 28 to October 1, 1987 under contract to the U. S. Army Corps of Engineers.

For this survey, a total of 60 soil gas samples were taken and analyzed for trichloroethene (TCE). Additionally, the first 14 samples were analyzed for methylene chloride (CH_2Cl_2). The main purpose was to delineate the extent of subsurface TCE contamination. The results are condensed in Appendix A. A map showing sampling locations and TCE concentrations (Figure 1) is attached.



BACKGROUND ON THE METHODOLOGY

The presence of volatile organic chemicals (VOCs) in shallow soil gas indicates the observed compounds may either be in the vadose zone near the probe or in groundwater below the probe. The soil gas technology is most effective in mapping low molecular weight halogenated solvent chemicals and petroleum hydrocarbons possessing high vapor pressures and low aqueous solubilities. These compounds readily partition out of the groundwater and into the soil gas as a result of their high gas/liquid partitioning coefficients. Once in the soil gas, VOCs diffuse vertically and horizontally through the soil to the ground surface where they dissipate into the atmosphere. The contamination acts as a source and the above ground atmosphere acts as a sink, and typically a concentration gradient develops between the two. The concentration gradient in soil gas between the source and ground surface may be locally distorted by hydrologic and geologic anomalies (e.g. clays, perched water); however, soil gas mapping generally remains effective because distribution of the contamination is usually broader in areal extent than the local geologic barriers and is defined using a large data base. The presence of geologic obstructions on a small scale tends to create anomalies in the soil gas-groundwater correlation, but generally does not obscure the broader areal picture of the contaminant distribution.



SAMPLING AND ANALYTIC PROCEDURES

Tracer Research Corporation utilized an analytical field van which was equipped with two gas chromatographs and two Spectra Physics SP4270 computing integrators. In addition, the van has two built-in gasoline powered generators which provide the electrical power (110 volts AC) to operate all of the gas chromatographic instruments and field equipment. A specialized hydraulic mechanism consisting of two cylinders and a set of jaws was used to drive and withdraw the sampling probes. Probes consist of 7-foot lengths of 3/4 inch diameter steel pipe which are fitted with detachable drive points. A hydraulic hammer was used to assist in driving probes past cobbles and through unusually hard soil.

Soil gas samples were collected by driving a hollow steel probe to a depth between 2 feet and 6 feet into the ground. The above-ground end of the sampling probes were fitted with a steel reducer and a length of polyethylene tubing leading to a vacuum pump. Five to 10 liters of gas was evacuated with a vacuum pump. During the soil gas evacuation, samples were collected by inserting a syringe needle through a silicone rubber segment in the evacuation line and down into the steel probe. Ten milliliters of gas were collected for immediate analysis in the TRC analytical field van. Soil gas was subsampled (duplicate injections) in volumes ranging from 1 µL to 2 mL, depending on the VOC concentration at any particular location.

A gas chromatograph equipped with an electron capture detector was used for analyses of methylene chloride and TCE. Nitrogen was used as the carrier gas.



Detection limits are a function of the injection volume as well as the detector sensitivity for individual compounds. Thus, the detection limit varies with the sample size. Generally, the larger the injection size the greater the sensitivity. However, peaks for compounds of interest must be kept within the linear range of the detector. If any compound has a high concentration, it is necessary to use small injections, and in some cases to dilute the sample to keep it within linear range. This may cause decreased detection limits for other compounds in the analyses. The detection limits range down to 0.0001 µg/L for compounds such as TCA and PCE depending on the conditions of the measurement, in particular, the sample size. If any component being analyzed is not detected, the detection limit for that compound in that analysis is given as a "less than" value (e.g. <0.0001 µg/L). This number is calculated from the current response factor, the sample size, and the estimated minimum peak size (area) that would have been visible under the conditions of the measurement.

QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Tracer Research Corporation's normal quality assurance procedures were followed in order to prevent any cross-contamination of soil gas samples.

- Steel probes are used only once during the day and then washed with high pressure soap and hot water spray or steam-cleaned to eliminate the possibility of cross-contamination. Enough probes are carried on each van to avoid the need to reuse any during the day.

- Probe adaptors (steel reducer and tubing) are used once during the course of the day and cleaned at the end of each working day by baking in the GC oven. The tubing is replaced periodically as needed during the job to insure cleanliness and good fit.

- Silicone tubing (connecting the adaptor to the vacuum pump) is replaced as needed to insure proper sealing around the syringe needle. This tubing does not directly contact soil gas samples.

- Glass syringes are usually used for only one sample per day and are washed and baked out at night. If they must be used twice, they are purged with carrier gas (nitrogen) and baked out between probe samplings.

- Septa through which soil gas samples are injected into the chromatograph are replaced on a daily basis to prevent possible gas leaks from the chromatographic column.

- Analytical instruments are calibrated each day by the use of chemical standards prepared in water by serial dilution from commercially available pure chemicals. Calibration checks are also run after approximately every five soil gas sampling locations.

- 2 cc subsampling syringes are checked for contamination prior to sampling each day by injecting nitrogen carrier gas into the gas chromatograph.

- Prior to sampling each day, system blanks are run to check the sampling apparatus (probe, adaptor, 10 cc syringe) for contamination by drawing ambient air from above ground through the system and comparing the analysis to a concurrently sampled air analysis.



- All sampling and 2 cc subsampling syringes are decontaminated each day and no such equipment is reused before being decontaminated. Microliter size subsampling syringes are reused only after a nitrogen carrier gas blank is run to insure it is not contaminated by the previous sample.

- Soil gas pumping is monitored by a vacuum gauge to insure that an adequate gas flow from the vadose zone is maintained. A negative pressure (vacuum) of 2 in. Hg less than the maximum capacity of the pump (evacuation rate >0.02 cfm) usually indicates that a reliable gas sample cannot be obtained because the soil has a very low air permeability.



APPENDIX A: CONDENSED DATA

U.S. ARMY CORPS OF ENGINEERS/LONGHORN-KARNACK, TEXAS

Sample	Depth	Date	CH2CL2 (ug/l)	TCE (ug/l)
SG01	3.5'	09/28	<0.2	2
SG02	3'	09/28	<0.03	0.2
SG03	5'	09/28	<0.02	0.001
SG04	4'	09/28	<0.008	<0.0001
SG05	2.5'	09/28	<0.02	0.0004
SG06	4.5'	09/28	<0.02	0.1
SG07	4.5'	09/28	<170	6,500
SG08	3'	09/28	<0.02	0.1
SG09	2'	09/28	<0.02	0.02
SG10	2.5'	09/28	<0.3	5
SG11	4'	09/28	<0.3	10
SG12	4'	09/28	<170	290
SG13	3'	09/28	<3	50
SG14	4.5'	09/28	<0.3	0.2
SG15	3.5'	09/29	N/A	4
SG16	4.5'	09/29	N/A	0.04
SG17	3'	09/29	N/A	0.07
SG18	3.5'	09/29	N/A	2
SG19	4.5'	09/29	N/A	0.007
SG20	3'	09/29	N/A	17
SG21	4.5'	09/29	N/A	0.009
SG22	4'	09/29	N/A	0.05
SG23	4.5'	09/29	N/A	0.3
SG24	5'	09/29	N/A	0.07
SG25	5.5'	09/29	N/A	0.02
SG26	5'	09/29	N/A	0.0007
SG27	4.5'	09/29	N/A	0.005
SG28	3.5'	09/29	N/A	<0.0004
SG29	5'	09/29	N/A	0.007
SG30	5'	09/29	N/A	0.006
SG31	3'	09/29	N/A	0.002
SG32	5'	09/29	N/A	<0.0004
SG33	5'	09/29	N/A	0.02
SG34	3.5'	09/30	N/A	0.0001

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by S. Cherba

Checked by M. Roddy

Proofed by L. Laplander

Tracer Research Corporation



006116

U.S. ARMY CORPS OF ENGINEERS/LONGHORN-KARNACK, TEXAS

Sample	Depth	Date	CH2CL2 (ug/l)	TCE (ug/l)
SG35	5.5'	09/30	N/A	<0.0004
SG36	4.5'	09/30	N/A	0.004
SG37	5'	09/30	N/A	0.006
SG38	6'	09/30	N/A	0.004
SG39	4.5'	09/30	N/A	430
SG40	5.5'	09/30	N/A	1
SG41	5'	09/30	N/A	0.07
SG42	3'	09/30	N/A	0.03
SG43	6'	09/30	N/A	0.02
SG44	4.5'	09/30	N/A	0.04
SG45	4'	09/30	N/A	<0.0004
SG46	4.5'	09/30	N/A	<0.0004
SG47	5'	09/30	N/A	0.001
SG48	4.5'	09/30	N/A	0.1
SG49	5.5'	09/30	N/A	4
SG50	4'	09/30	N/A	0.05
SG51	5.5'	10/01	N/A	<0.0004
SG52	4.5'	10/01	N/A	4
SG53	5'	10/01	N/A	1
SG54	4'	10/01	N/A	0.0009
SG55	5'	10/01	N/A	45
SG56	3'	10/01	N/A	0.02
SG57	3.5'	10/01	N/A	0.008
SG58	3.5'	10/01	N/A	<0.0004
SG59	2.5'	10/01	N/A	<0.0004
SG60	3'	10/01	N/A	?

Notations:
I interference with adjacent peaks
NA not analyzed

Analyzed by S. Cherba

Checked by M. Roddy

Proofed by L. Laplander

Tracer Research Corporation



006117

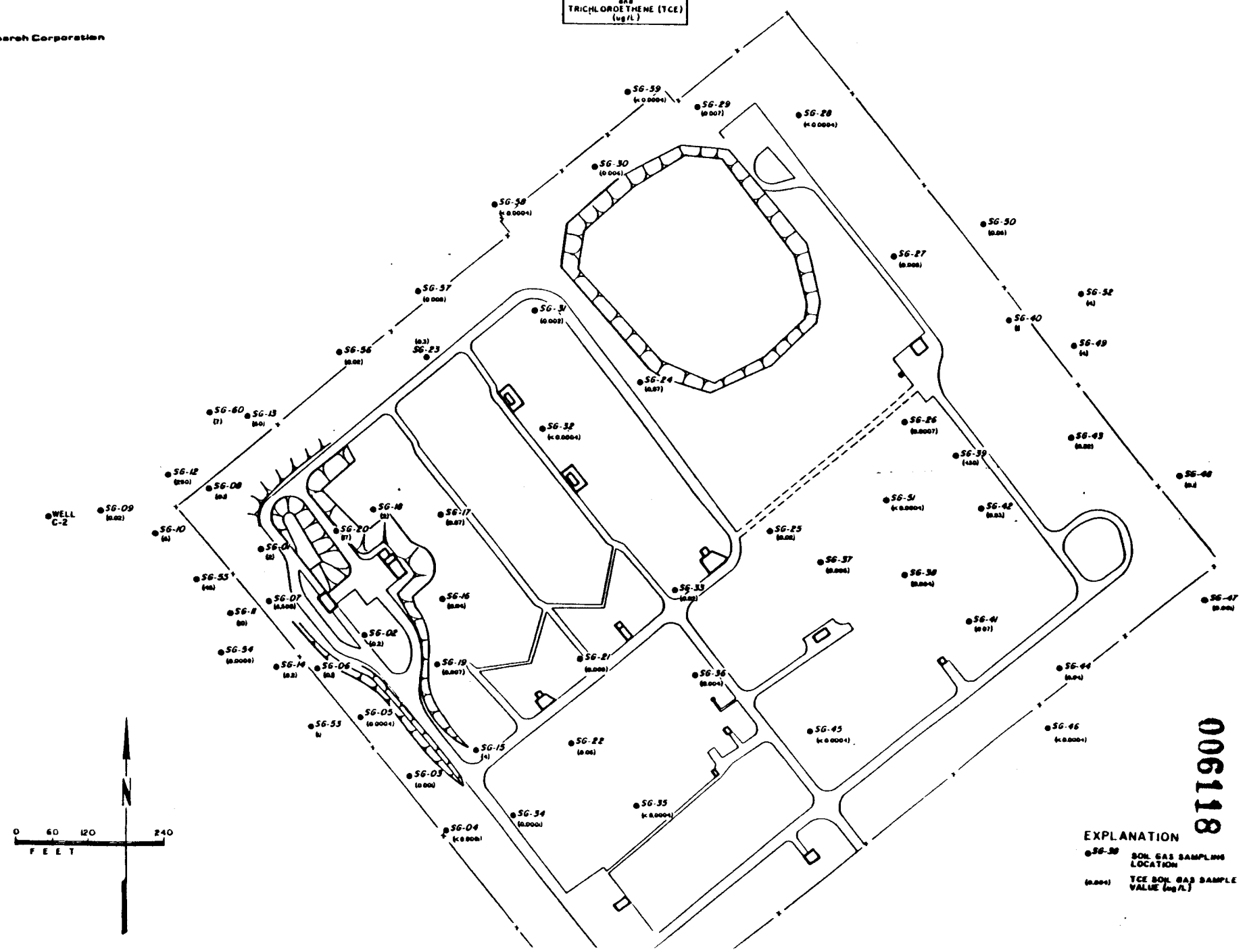
FIGURE 1

LONGHORN ARMY AMMUNITION PLANT

MARSHALL, TEXAS

SAMPLING LOCATIONS and TRICHLOROETHENE (TCE) (ug/L)

Tracer Research Corporation



EXPLANATION

SG-59 SOIL GAS SAMPLING LOCATION

(0.004) TCE SOIL GAS SAMPLE VALUE (ug/L)

006118

APPENDIX H
BORE HOLE LOGS AND WELL SCHEMATICS

006120

Hole No. 8A-902

BORING LOG	DIVISION SOUTHWESTERN	INSTALLATION FORT WORTH DISTRIC	SHEET 1 of 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION (Coordinates or Station) GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL) NGVD	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 8A-902		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 25 MAR 88	COMPLETED 25 MAR 88
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE APPROX 190	
9. TOTAL DEPTH OF HOLE 25.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	%
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
		0.0 TO 0.2'		
		ASPHALT ROADWAY		
		0.2' TO 0.8'		
		SAND / GRAVEL BASE		
		0.8' TO 6.0'+/-		
		CLAY FILL: MEDIUM PLASTICITY: LIGHT GRAY WITH RED & YELLOWISH BROWN: VERY STIFF: DAMP: SILTY: SLIGHTLY SANDY		
		6.0'+/- TO 9.0'+/-		
		SAND FILL: FINE GRAINED: RED: MEDIUM: DAMP-MOIST: SLIGHTLY CLAYEY		
10		9.0'+/- TO 12.5'		
		CLAY FILL: LOW PLASTICITY: RED WITH LIGHT GRAY & YELLOW: STIFF: MOIST: VERY SANDY: WITH SMALL POCKETS OF PLASTIC LIGHT GRAY CLAY		
	DEBRIS	12.5' TO 13.5'		
		SAND / CLAY FILL: DARK BROWN & BLACK: VERY MOIST - WET: WITH SMALL FERRUGINOUS GRAVEL & TRACE OF FOREIGN MATTER: WITH A WEAK ODOR		
NOV 89 172.5		13.5' TO 14.3'		
20	ODOR	STRAW / WOOD SHAVINGS: FILL: IN A SANDY CLAY BINDER: BROWN-BLACK: SOFT-MEDIUM: WET: WITH STRONG SHARP ODOR		
		14.3' TO 18.0'		
25.0		CLAY: MEDIUM PLASTICITY: GRAY TO GRAYISH BROWN: FROM 16.0': STIFF-VERY STIFF: DAMP: SILTY: SLIGHTLY SANDY FROM 16.0': WITH WEAK ODOR		
		18.0' TO 20.0'		
30		SILT: LOW PLASTICITY: LIGHT GRAY & YELLOWISH BROWN: MEDIUM - STIFF: MOIST-VERY MOIST: VERY SANDY: WITH WEAK ODOR		
		20.0' TO 22.0'		
		SAND: FINE GRAINED: LIGHT GRAY & YELLOWISH BROWN: MEDIUM: VERY MOIST - WET: VERY SILTY: (BORDERS A SANDY SILT): WITH A WEAK ODOR		
		22.0' TO 25.0' T.D.		
		SILT: LOW PLASTICITY: LIGHT GRAY WITH YELLOWISH BROWN: MEDIUM: WET: SANDY: WITH WEAK ODOR		
40		T.D. 25.0'		

CONTAMINANT	PPM
Tetryl	26.6
TNT	5.7

CONTAMINANT	PPB
1,1-DCE	750
1,1-DCA	2539
1,2-DCE	153,380
TCE	46,931
PCE	2,410
Toluene	2,450

CONTAMINANT	PPB
VC	30,335
1,1-DCE	183
1,1-DCA	110
TCE	42,180
1,1,2-TCA	830
4-M-2-P	698
PCE	1,110
Toluene	360

WATER LEVEL:
NOTE: FREE WATER ENTERED DURING DRILLING -
WATER LEVEL WAS AT 12.0' AT 08:20 HRS. ON 28 MAR 88 WITH BORING CLOSED IN AT 12.5'

mc ↑ w/ ↓
TCE ↓ w/ ↓

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 2

f:/ed/drawing/longhorn/1824/chemlo Dec. 10, 1992 13:59:31

006121

Hole No. BA-904

BORING LOG	DIVISION SOUTHWESTERN	INSTALLATION FORT WORTH DISTRICT	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. BA-904		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 13	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 18 MAR 88	COMPLETED 18 MAR 88
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE APPROX 179	
9. TOTAL DEPTH OF HOLE 15.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
		0.0 TO 2" ASPHALT ROADWAY		
		2" TO 0.9' GRAVEL/SAND BASE		
	DEBRIS	0.9' TO 3.0' CLAY FILL: LOW-MEDIUM PLASTICITY, BROWN, STIFF, MOIST, SILTY, WITH TRACE OF SAND, GRAVELLY WITH FERRUGINOUS GRAVEL & CONCRETIONS		
NOV 89 173 +/-				
10	ODOR	3.0' TO 3.6' SAND FILL: FINE GRAINED, RED, MEDIUM, MOIST, SILTY, WITH CLAY POCKETS		
		3.6' TO 6.5 SILT FILL: LOW PLASTICITY, REDDISH BROWN & LIGHT GRAY, MEDIUM, MOIST, SANDY, SLIGHTLY CLAYEY, WITH SMALL AMOUNT OF FOREIGN MATTER		
20		6.5' TO 15.0' T.D. SAND: FINE GRAINED, LIGHT GRAY WITH BROWN, MEDIUM, MOIST TO SATURATED FROM 7.4', SILTY, STRONG SHARP ODOR FROM 7.4', VERY CLAYEY & VERY MOIST FROM 12.1'-15.0' (BORDERS A VERY SANDY CLAY)		
30		T.D. 15.0'		
40				

CONTAMINANT	PPB
VC	51
Acetone	40
1,1-DCE	6
1,2-DCE	8395
Chloroform	7
TCE	226

CONTAMINANT	PPB
MC	59
1,1-DCE	69
TCE	88
Styrene	17

WATER LEVEL:
NOTE: AUGERED INTO FREE WATER FROM 7.4'+/-, BORING LEFT OPEN
NOTE:
WATER LEVEL WAS AT 2.0' ON 21 MAR 88 AT 08:10 HRS WITH BORING CLOSED IN AT 2.5'

SWL 350
SEP 80

PROJECT LONGHORN AAP | HOLE NO.

FIGURE 3

006122

Hole No. 8A-905

BORING LOG	DIVISION SWD	INSTALLATION FT WORTH DISTRICT	SHEET 1 of 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION (Coordinates or Station) GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 8A-905		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 14	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 22 MAR 88	COMPLETED 22 MAR 88
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE APPROX 181	
9. TOTAL DEPTH OF HOLE 15.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
0	DEBRIS	0.0 TO 5.0'+/- FILL: 0.0 - 1.4': SAND: FINE GRAINED, REDDISH BROWN, MEDIUM, MOIST, SILTY 1.4' - 3.0': SILT: LOW PLASTICITY, YELLOWISH BROWN & GRAY, STIFF, DAMP, VERY SANDY, WITH CARBON STAINS 3.0' - 3.4': SAND: FINE GRAINED, GRAYISH BROWN WITH YELLOWISH BROWN, MEDIUM, VERY MOIST - WET, SILTY 3.4' - 3.9': CLAY: LOW PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, STIFF, DAMP, VERY SANDY 3.9' - 5.0': WOOD SHAVINGS / SAWDUST: WITH SMALL AMOUNT OF SILT BINDER, DARK GRAY, SOFT - VERY SOFT, SATURATED, WITH A VERY STRONG SHARP ODOR 5.0' TO 7.0' SILT: LOW PLASTICITY, GRAYISH BROWN, MEDIUM, MOIST, VERY SANDY (NOTE: BORDERS A SILTY SAND), WITH A STRONG SHARP ODOR 7.0' TO 15.0' T.D. SAND: WITH A STRONG SHARP ODOR 7.0' - 9.0': FINE GRAINED, GRAYISH BROWN WITH YELLOWISH BROWN, MEDIUM, WET, VERY SILTY 9.0' - 10.3': FINE GRAINED, YELLOWISH BROWN, MEDIUM, VERY MOIST - WET, VERY CLAYEY (NOTE: BORDERS A SANDY CLAY) 10.3' - 15.0': FINE GRAINED, YELLOWISH BROWN WITH GRAY, MEDIUM, SATURATED, SILTY, GRAY WITH YELLOWISH BROWN FROM 12.3' & WET T.D. 15.0'		CONTAMINANT / PPM: Tetryl 17.4 CONTAMINANT / PPB: 1,2-DCE 39,840; TCE 78,870; EB 10,665
NOV 89 173+/-				
10	ODOR			CONTAMINANT / PPM: Tetryl 9.5 CONTAMINANT / PPB: 1,2-DCE 14,645; TCE 21,880; EB 1,390; Styrene 16,660
20				WATER LEVEL: NOTE: ABUNDANT FREE WATER ENTERED DURING DRILLING FROM 3.9', BORING LEFT OPEN, BORING HAD CLOSED IN AT 2.4' WITH NO FREE WATER ABOVE
30				
40				

1,2 DCE ↓ w/ ↓ TCE ↓ w ↓

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 4

006123

Hole No. 8A-916

BORING LOG	DIVISION SWD	INSTALLATION FORT WORTH DIST	SHEET 1 of 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. 8A-916		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0	
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 12 MAY 88; COMPLETED 12 MAY 88	
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE APPROX 186	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING N/A	
9. TOTAL DEPTH OF HOLE 21.0'		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
10	DEBRIS	0.0' TO 0.3' ASPHALT SURFACE 0.3' TO 0.9' GRAVEL BASE 0.9' TO 9.0' CLAY/SAND FILL: VERY STIFF, LOW - MEDIUM PLASTICITY, CLAY WITH FINE GRAINED SAND, LIGHT GRAY, YELLOWISH BROWN & RED, DAMP 9.0' TO 10.8' SAND/CLAY FILL: FINE GRAINED SAND WITH MEDIUM CLAY, GRAY, VERY MOIST - WET, WITH ROOTS & TRACE OF STRAW/HAY & MEDIUM STRONG ODOR		CONTAMINANT / PPB Benzene 7 TCE 7 •••
NOV 89 172.5+/-	ODOR	10.8' TO 15.7' CLAY: 10.8' TO 13.7': MEDIUM PLASTICITY, GRAY, VERY SILTY, MEDIUM, VERY MOIST, WITH CARBON MATTER & ROOTS 13.7' TO 15.7': LOW - MEDIUM PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF - VERY STIFF, DAMP, SANDY, VERY SILTY (BORDERS A SILT)		CONTAMINANT / PPB 1,1,1-TCA 13 1,2-DCE 89 TCE 1,800 •••
20		15.7' TO 21.0' T.D. SAND: 15.7' - 17.0': FINE GRAINED, LIGHT GRAY & YELLOWISH BROWN MEDIUM, VERY MOIST, VERY SILTY 17.0' - 21.0': FINE GRAINED, YELLOWISH BROWN & LIGHT GRAY MEDIUM, SATURATED, SLIGHTLY SILTY T.D. 21.0'		CONTAMINANT / PPB 1,2-DCA 65 Benzene 7 MC 61 TCE 640 •••
30				••• HOLD TIMES EXCEEDED. UNITS INCORRECT. QUESTIONABLE
40				WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 12.0'+/- - 13.7'/- AND FROM 15.7' - 21.0' 24 HOUR OBSERVATION: FREE WATER LEVEL WAS AT 9.1' WITH BORING CLOSED IN FROM 11.2'

SWL 350
SEP 80

PROJECT LONGHORN AAP | HOLE NO.

FIGURE 5

006124

Hole No. 8A-900

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION (Coordinates or Station) GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (MSL or USL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 8A-900		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 23 MAR 88	COMPLETED 23 MAR 88
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE APPROX 178	
9. TOTAL DEPTH OF HOLE 15.0'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH (a)	SYMBOL (b)	CLASSIFICATION OF MATERIALS (Description) (c)	SAMPLE LOCATION	CHEMICAL ANALYSES (d)
		0.0' TO 4.0'+/- FILL: 0.0' - 2.0'+/-: SAND: FINE GRAINED, REDDISH BROWN, MEDIUM, VERY MOIST, VERY SILTY 2.0'+/- - 4.0'+/-: SILT: LOW PLASTICITY, LIGHT REDDISH BROWN & DARK GRAYISH BROWN, MEDIUM, VERY MOIST, VERY SANDY 4.0'+/- TO 6.0': SILT: LOW - MEDIUM PLASTICITY, LIGHT GRAY, MEDIUM, MOIST - VERY MOIST, CLAYEY, VERY SANDY 6.0' TO 8.0' CLAY: MEDIUM - HIGH PLASTICITY, GRAY WITH LIGHT RED, MEDIUM - STIFF, DAMP - MOIST, SLIGHTLY SILTY 8.0' TO 15.0' T.D. SAND: FINE GRAINED, YELLOWISH BROWN WITH GRAY TO GRAY FROM 12.0'+/-, MEDIUM, SATURATED, VERY SILTY, CONTAINS A WEAK ODOR T.D. 15.0'		CONTAMINANT / PPB 1,2-DCE 17 TCE 567 CONTAMINANT / PPB VC 78 1,1-DCE 92 1,1-DCA 28 1,2-DCE 1,974 1,2-DCA 157 TCE 4,860 PCE 8
NOV 89 172.5				
10	ODOR			
20				
30				
40				

WATER LEVEL:
NOTE: ABUNDANT FREE WATER IN BORING DURING DRILLING. LEVEL WAS AT 1.0' ON 24 MAR 88 AT 1110 HRS WITH BORING CLOSED AT 1.5'

TCE ↑ w/L

1,2 DCE ↑ w/L

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 7

Hole No. 8A-919

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. 8A-919		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 16 MAY 88	COMPLETED 16 MAY 88
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE APPROX 194	
9. TOTAL DEPTH OF HOLE 29.0'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS	SAMPLE LOCATION	CHEMICAL ANALYSES
10		0.0' TO 15.0'+/- SAND / CLAY FILL: FINE GRAINED SAND & VERY STIFF LOW - MEDIUM PLASTICITY CLAY, DAMP - MOIST, WITH CARBON STAINS FROM 10.0'+/-, VERY SANDY FROM 13.5'+/- 15.0'+/- TO 19.9' SAND: FINE GRAINED, LIGHT GRAY & YELLOWISH BROWN, MEDIUM, DAMP - MOIST, SILTY, ROOT ZONE, WITH A STRONG SHARP ODOR 19.9' TO 21.0' CLAY: LOW - MEDIUM PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF, MOIST, SILTY, SANDY, WITH STRONG SHARP ODOR 21.0' TO 29.0' T.D. SAND: FINE GRAINED, LIGHT GRAY & YELLOWISH BROWN, MEDIUM, SATURATED TO VERY MOIST FROM 27.6', SILTY TO VERY CLAYEY FROM 27.6', WITH A STRONG SHARP ODOR T.D. 29.0'		WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING AUGERING FROM 21.0'+/- - 29.0'. 24 HOUR OBSERVATION: BORING HAD CLOSED IN AT 13.6' WITH NO FREE WATER ABOVE
20	STRONG ODOR			CONTAMINANT PPB TCE 36 *** CONTAMINANT PPB Chloroform 10 MC 880 1,2-DCE 170 TCE 1,200 *** CONTAMINANT PPB MC 29,000 TCE 1,700 *** *** RESULTS QUESTIONABLE, HOLDING TIMES EXCEEDED
NOV 89 173+/-				
30				
40				

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 8

006126

Hole No. 8A-940

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION (Coordinates or Station) GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (MSL or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and File number) 8A-940		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 13	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 17 AUG 88	COMPLETED 17 AUG 88
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 190 +/-	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING N/A	
9. TOTAL DEPTH OF HOLE 10.0'		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
10	STRONG ODOR	0.0' TO 0.3' SAND FILL: FINE GRAINED, REDDISH BROWN, MEDIUM, DAMP, SILTY, GRAVELLY 0.0' TO 0.8' CLAY FILL: MEDIUM - HIGH PLASTICITY, RED WITH BROWN & LIGHT GRAY, VERY STIFF - HARD, DAMP, WITH TRACE OF SILT & SAND 0.8' TO 1.5' SILT FILL: LOW PLASTICITY, GRAYISH BROWN, MEDIUM, DAMP, VERY SANDY 1.5' TO 10.0' T.D. CLAY: 1.5' - 6.0': MEDIUM - HIGH PLASTICITY DOWN TO MEDIUM PLASTICITY FROM 4.0', LIGHT GRAY & RED, HARD, DAMP, SLIGHTLY SANDY FROM 4.0', CONTAINS A STRONG SHARP ODOR 6.0' - 8.9': MEDIUM - HIGH PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, VERY STIFF - HARD, DAMP, WITH TRACE OF SILT & SAND, CONTAINS A STRONG SHARP ODOR 8.9' - 10.0': LOW - MEDIUM PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF, DAMP - MOIST, VERY SILTY, SANDY, CONTAINS A STRONG SHARP ODOR T.D. 10.0'		1988 CONTAMINANT PPB MC 22,000 Acetone 33,000 1,2-DCE 14,000 1,2-DCA 4,600 TCE [illegible],000E PCE 4,500 Toluene 34,000 EB 2,900 1989 CONTAMINANT PPB 2-Methylnapthalene 1,100 1988 CONTAMINANT PPB MC 420,000E Acetone 20,000 Chloroform 3,200 1,2-DCA 120,000E 1,1,1-TCA 2,200 TCE 150,000E PCE 16,000 Toluene 6,700 EB 18,000 Xylenes 6,100 1,2-Dibenzene 9,300 1989 CONTAMINANT PPB MC 600,000 1,2-DCA 37,000 TCE 2,200,000E Toluene 25,000
20	NOV 89 174+/-			
30				
40				

WATER LEVEL:
NOTE: NO FREE WATER IN BORING DURING DRILLING AND DRY AFTER 24 HOURS

TCE ↑ w/D
mc ↑ w/D

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 9

006127

Hole No. 8A-984

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP (RFI - PHASE II)		10. SIZE AND TYPE OF BIT 8" AUG/3" SHELBY	
2. LOCATION (Coordinates or Station) SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and File number) 8A-984		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 2 AUG 89	COMPLETED 2 AUG 89
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 190 +/-	
9. TOTAL DEPTH OF HOLE 16.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	%
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
	ODOR	0.0' TO 0.3' GRAVEL FILL (CRUSHED ROCK): LOOSE 0.3' TO 1.7' CLAY FILL: MEDIUM - HIGH PLASTICITY, RED WITH LIGHT GRAY, HARD, DAMP, WITH TRACE OF SAND, NO ODOR 1.7' TO 2.3' SILT FILL: LOW PLASTICITY, DARK BROWN, STIFF, DAMP, VERY SANDY, WITH SCATTERED GRAVEL & WEAK ODOR 2.3' TO 4.5' CLAY FILL: MEDIUM - HIGH PLASTICITY, PURPLE & RED, VERY STIFF - HARD, DAMP, WEAK ODOR 4.5' TO 9.5' CLAY: 4.5' - 6.5': MEDIUM - HIGH PLASTICITY, RED & LIGHT BLUE GRAY, VERY STIFF, DAMP, WITH TRACE OF SILT & SAND FROM 6.0', WEAK ODOR 6.5' - 9.0': MEDIUM - HIGH PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, VERY STIFF TO HARD FROM 7.0', DAMP TO DRY FROM 7.0', WITH TRACE OF SILT & SAND TO SILTY FROM 7.0' 9.0' - 9.5': LOW - MEDIUM PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF - VERY STIFF, DAMP, SANDY, MOD. STRONG ODOR 9.5' TO 16.0' T.D. SILT: LOW PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF TO MEDIUM FROM 15.8', DAMP TO VERY MOIST FROM 15.8', VERY SANDY WITH THIN SILTY CLAY LAYERS, WITH CARBON STAINS & MOD. STRONG ODOR T.D. 16.0'		1988 CONTAMINANT PPB MC 22,000 Acetone 33,000 1,2-DCE 14,000 1,2-DCA 4,600 TCE 30,000E PCE 4,500 Toluene 34,000 EB 2,900 1989 CONTAMINANT PPB 2-Methylnapthalene 1,100 1988 CONTAMINANT PPB MC 420,000E Acetone 20,000 Chloroform 3,200 1,2-DCA 120,000E 1,1,1-TCA 2,200 TCE 150,000E PCE 16,000 Toluene 6,700 EB 18,000 Xylenes 6,100 1,2-Dibenzene 9,300 1989 CONTAMINANT PPB MC 600,000 1,2-DCA 37,000 TCE 2,200,000E Toluene 25,000
10				
NOV 89 174+/-				
20				
30				
40				

WATER LEVEL:
NOTE: FREE WATER ENTERED BOTTOM OF BORING UPON COMPLETION
24 HOUR OBSERVATION:
FREE WATER LEVEL WAS AT 13.7' WITH BORING CLOSED IN AT 14.0'

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 10

Hole No. 8A-942

006128

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION (Coordinates or Station) GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 8A-942		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0	
5. NAME OF DRILLER T.SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 18 AUG 88 COMPLETED 18 AUG 88	
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 193 +/-	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING N/A	
9. TOTAL DEPTH OF HOLE 10.0'		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
	ODOR	0.0' TO 0.6' SAND FILL: FINE GRAINED, REDDISH BROWN, MEDIUM, DAMP, GRAVELLY, VERY SILTY 0.6' TO 1.6' CLAY FILL: MEDIUM PLASTICITY, YELLOWISH BROWN WITH RED & LIGHT GRAY, VERY STIFF, DAMP, SLIGHTLY SILTY, WITH SAND POCKETS		1988 CONTAMINANT / PPB Toluene 690 EB 3,300E Xylenes 830
10		1.6' TO 3.6' SAND FILL: FINE GRAINED, GRAYISH BROWN, MEDIUM, DAMP, SILTY, CONTAINS A WEAK ODOR 3.6' TO 5.4' CLAY FILL: LOW - MEDIUM PLASTICITY, YELLOWISH BROWN & RED, STIFF, MOIST, SILTY & SANDY, WITH CARBON STAINS, CONTAINS A WEAK TO MODERATELY STRONG ODOR		1988 CONTAMINANT / PPB Acetone 150 1,2-DCE 140 TCE 468 Toluene 8 EB 28
NOV 89 20 174+/-		5.4' TO 10.0' T.D. CLAY: 5.4' - 9.4': MEDIUM PLASTICITY, LIGHT GRAY, RED & YELLOWISH BROWN, VERY STIFF, DAMP, SLIGHTLY SILTY & SANDY, CONTAINS A WEAK ODOR 9.4' - 10.0': MEDIUM - HIGH PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, HARD, DAMP, CONTAINS A WEAK ODOR T.D. 10.0'		1989 CONTAMINANT / PPB NONE DETECTED 1989 CONTAMINANT / PPB MC 2100E 1,2-DCE 110 TCE 93 Xylenes 7
30				WATER LEVEL: NOTE: NO FREE WATER IN BORING DURING DRILLING AND DRY AFTER 24 HOURS
40				

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 11

Hole No. 8A-985

006129

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP (RFI - PHASE II)		10. SIZE AND TYPE OF BIT 8" AUG/3" SHELBY	
2. LOCATION (Coordinates or Station) SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and File number)	8A-985	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9; UNDISTURBED 0	
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 27 JUL 89 COMPLETED 27 JUL 89	
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 194 +/-	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING N/A %	
9. TOTAL DEPTH OF HOLE 16.0'		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
10	ODOR	0.0' TO 1.0' CLAY: MEDIUM - HIGH PLASTICITY, RED & LIGHT GRAY WITH YELLOWISH BROWN, STIFF - VERY STIFF, DAMP - MOIST 1.0' TO 2.9' SILT: LOW PLASTICITY, GRAYISH BROWN, MEDIUM, WET, VERY SANDY (BORDERS A SAND), WITH CARBON STAINS, CONTAINS A MOD. STRONG FUEL ODOR 2.9' TO 12.2' CLAY: 2.9' - 5.0': MEDIUM PLASTICITY, RED GRAY & BROWN, STIFF - VERY STIFF, DAMP, WITH FERRUGINOUS & CARBON STAINS, MODERATELY SILTY & SANDY, (CONTAINS A MODERATELY STRONG ODOR 5.0' - 8.0': MEDIUM DOWN TO LOW PLASTICITY FROM 7.0', LIGHT BLUE GRAY WITH RED, VERY STIFF, DAMP, MODERATELY SANDY TO SANDY FROM 7.0', SILTY, (CONTAINS A WEAK FUEL ODOR) 8.0' - 12.2': MEDIUM - HIGH PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, VERY STIFF - HARD, DAMP, WITH OCCASIONAL SAND LAMINATION (CONTAINS A VERY WEAK FUEL ODOR) 12.2' TO 16.0' T.D. SILT: LOW PLASTICITY, REDDISH BROWN, YELLOWISH BROWN & LIGHT GRAY, MEDIUM, VERY MOIST TO WET FROM 15.5', VERY SANDY WITH SAND LAMINATIONS, (NO ODOR DETECTED) T.D 16.0'		1988 CONTAMINANT / PPB Toluene 690 EB 3,300E Xylenes 830 1988 CONTAMINANT / PPB Acetone 150 1,2-DCE 140 TCE 468 Toluene 8 EB 28 1989 CONTAMINANT / PPB NONE DETECTED 1989 CONTAMINANT / PPB MC 2100E 1,2-DCE 110 TCE 93 Xylenes 7
20	NOV 89 194.7'			
30				
40				

WATER LEVEL:
NOTE: SLOW SEEPAGE DURING DRILLING FROM 1.0'+/- - 2.9'+/-. WET FROM 15.5'+/-.
BORING LEFT OPEN
24 HOUR OBSERVATION:
FREE WATER LEVEL WAS AT 6.5' WITH BORING CLOSED IN AT 8.8'

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 12

Hole No. 8A-944

006130

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. 8A-944		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 18 AUG 88	COMPLETED 18 AUG 88
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 196 +/-	
9. TOTAL DEPTH OF HOLE 10.0'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
10	ODOR	0.0' TO 5.0' CLAY FILL: 0.0' - 1.0': MEDIUM - HIGH PLASTICITY, RED & REDDISH BROWN, VERY STIFF, DAMP, WITH TRACE OF SILT & SAND, CONTAINS A WEAK ODOR 1.0' - 2.0': LOW - MEDIUM PLASTICITY, GRAY WITH RED, VERY STIFF, DAMP, WITH SAND POCKETS, CONTAINS A WEAK ODOR 2.0' - 3.4': LOW PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY, STIFF - VERY STIFF, DAMP, VERY SANDY, CONTAINS A MODERATELY STRONG ODOR 3.4' -5.0': MEDIUM PLASTICITY, LIGHT GRAY WITH YELLOWISH BROWN, MEDIUM - STIFF, MOIST - VERY MOIST, SILTY, WITH TRACE OF SAND, WITH SCATTERED CARBON STAINS, CONTAINS A MODERATELY STRONG ODOR 5.0' TO 6.1' SAND FILL: FINE - MEDIUM GRAINED, GRAYISH BROWN, MEDIUM, VERY MOIST, CLAYEY, WITH CARBON MATTER, CONTAINS A MODERATELY STRONG - STRONG ODOR 6.1' TO 10.0' T.D. CLAY: 6.1' - 9.3': MEDIUM - HIGH PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF - VERY STIFF, DAMP - MOIST, SILTY, WITH TRACE OF SAND, CONTAINS A MODERATELY STRONG ODOR 9.3' - 10.0': LOW PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY, MEDIUM, VERY MOIST, VERY SANDY (BORDERS A CLAYEY SAND), CONTAINS A WEAK ODOR T.D. 10.0'		1988 CONTAMINANT / PPB Acetone 9,900 EB 1,100 Styrene 2,100 Xylenes 3,000 1988 CONTAMINANT / PPB MC 4,500 Carbon Disulfide 13,000 TCE 3,800 EB 7,200 Styrene 35,000 1989 CONTAMINANT / PPB Naphthalene 620 2-Methylnapthalene 3,200 Fluorene 460 Phenanthrene 660 1989 CONTAMINANT / PPB MC 3,800
20				
NOV 89 174+/-				
30				WATER LEVEL: NOTE: NO FREE WATER IN BORING DURING DRILLING AND DRY AFTER 24 HOURS
40				

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 13

Hole No. BA-983

006131

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP (RFI - PHASE II)		10. SIZE AND TYPE OF BIT 8"AUG/3" SHELBY	
2. LOCATION (Coordinates or Station) SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) BA 983		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 8	UNDISTURBED
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 26 JUL 89	COMPLETED 26 JUL 89
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 196 +/-	
9. TOTAL DEPTH OF HOLE 22.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	%
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
10	ODOR	0.0' TO 4.2' CLAY 0.0' - 1.0': MEDIUM PLASTICITY, RED WITH LIGHT GRAY, STIFF, MOIST, MODERATELY SILTY & SANDY, WITH SURFACE GRAVEL 1.0' - 4.2': MEDIUM PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF - VERY STIFF, DAMP, SILTY, SLIGHTLY SANDY, WITH SAND LAMINATIONS FROM 3.0' 4.2' TO 5.8' SAND: FINE - MEDIUM GRAINED, LIGHT BROWN, REDDISH BROWN & LIGHT GRAY, MEDIUM, MOIST, WITH CLAY LAMINATIONS, (CONTAINS A WEAK TO MODERATELY STRONG FUEL ODOR) 5.8' TO 7.0' CLAY: LOW - MEDIUM PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, MEDIUM - STIFF, MOIST - VERY MOIST, WITH SAND LAMINATIONS, SILTY, (WEAK ODOR) 7.0' TO 10.0' CLAY: MEDIUM - HIGH PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF - VERY STIFF, DAMP, (WEAK FUEL ODOR) 10.' TO 11.8' SILT: LOW - MEDIUM PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY, MEDIUM, VERY MOIST, SANDY, (WEAK FUEL ODOR)		1988 CONTAMINANT / PPB Acetone 9,900 EB 1,100 Styrene 2,100 Xylenes 3,000 1988 CONTAMINANT / PPB MC 4,500 Carbon Disulfide 13,000 TCE 3,800 EB 7,200 Styrene 35,000 1989 CONTAMINANT / PPB Naphthalene 620 2-Methylnapthalene 3,200 Fluorene 460 Phenanthrene 660
20		11.8' TO 13.5' CLAY: MEDIUM PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, VERY STIFF, DAMP, SILTY, WITH SAND LAMINATIONS & CARBON STAINS, (WEAK FUEL ODOR) 13.5' TO 15.0' SAND: FINE GRAINED, YELLOWISH BROWN, MEDIUM, DAMP, SILTY, (WEAK FUEL ODOR) 15.0' TO 16.5' CLAY: MEDIUM PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, STIFF - VERY STIFF, DAMP, SLIGHTLY SILTY & SANDY, (WEAK ODOR) 16.5' TO 19.5' SILT: LOW PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, MEDIUM - STIFF, DAMP - MOIST, SANDY, (VERY WEAK FUEL ODOR) 19.5' TO 22.0' T.D. SAND: FINE - MEDIUM, YELLOWISH BROWN, MEDIUM, VERY MOIST - WET, MODERATELY SILTY, (NO ODOR) T.D. 22.0'		1989 CONTAMINANT / PPB MC 3,800
NOV 89 174+/-				WATER LEVEL: SOME FREE WATER ENTERED BORING FROM 19.5'+/- - 22.0'+/- AFTER COMPLETION OF DRILLING 24 HOUR OBSERVATION: BORING HAD CLOSED IN AT 16.4' WITH NO FREE WATER ABOVE
30				
40				

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 14

Hole No. 8A-945

006132

BORING LOG	DIVISION SWD	INSTALLATION FORT WORTH DIST	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION (Coordinates or Station) GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and File number)	8A-945	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 18 AUG 88	COMPLETED 18 AUG 88
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 196' +/-	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING N/A	%
9. TOTAL DEPTH OF HOLE 10.0'		19. SIGNATURE OF INSPECTOR JACLIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
	ODOR	0.0 TO 0.4' CLAY FILL: MEDIUM - HIGH PLASTICITY, YELLOWISH BROWN, LIGHT GRAY & RED, VERY STIFF, DAMP 0.4' TO 3.4' CLAY: 0.4' - 1.4': LOW - MEDIUM PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, STIFF - VERY STIFF, DAMP, SILTY, MODERATELY SANDY, WITH CARBON STAINS & A MODERATELY STRONG ODOR 1.4' - 3.4': LOW PLASTICITY, YELLOWISH BROWN & LIGHT GRAY STIFF, DAMP, VERY SILTY, VERY SANDY, (BORDERS A SANDY SILT), CONTAINS A MODERATELY STRONG ODOR 3.4' TO 6.2' SAND: FINE GRAINED, YELLOWISH BROWN WITH LIGHT GRAY, MEDIUM, MOIST - VERY MOIST, SILTY, CONTAINS A MODERATELY STRONG ODOR 6.2' TO 10.0' T.D. CLAY: LOW PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, STIFF, MOIST, SANDY, VERY SILTY (BORDERS A SANDY SILT), CONTAINS A MODERATELY STRONG ODOR T.D. 10.0'		CONTAMINANT / PPB Acetone 4,700 MC 310 TCE 54 PCE 110 EB 70 Styrene 480 Xylenes 610 CONTAMINANT / PPB MC 16,000 TCE 1,700 WATER LEVEL: NOTE: NO FREE WATER IN BORING DURING DRILLING AND DRY AFTER 24 HOURS
10				
20				
NOV 89 174+/-				
30				
40				

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 15

Hole No. 8A-943

006133

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION (Coordinates or Station) GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (MSL or ASL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 8A-943		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0	
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 18 AUG 88; COMPLETED 18 AUG 88	
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 194 +/-	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING N/A %	
9. TOTAL DEPTH OF HOLE 10.0'		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
10	ODOR	0.0' TO 1.0' (FILL) CLAY: MEDIUM PLASTICITY, RED, YELLOWISH BROWN & LIGHT GRAY, HARD, DAMP, SLIGHTLY SILTY & SANDY 1.0' TO 2.1' SAND FILL: FINE GRAINED, LIGHT BROWN, MEDIUM, DAMP, SILTY 2.1' TO 10.0' T.D. CLAY: 2.1' - 3.6': MEDIUM - HIGH PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY, STIFF - VERY STIFF, DAMP - MOIST, WITH SCATTERED CARBON STAINS, WITH TRACE OF SILT & SAND, CONTAINS A MODERATELY STRONG ODOR 3.6' - 5.6': LOW PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY & RED, STIFF, MOIST, VERY SILTY & SANDY, CONTAINS A WEAK ODOR 5.6' - 7.0': MEDIUM - HIGH PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, STIFF - VERY STIFF, DAMP - MOIST, SLIGHTLY SILTY, CONTAINS A WEAK ODOR 7.0' - 8.1': MEDIUM - HIGH PLASTICITY, LIGHT GRAY WITH YELLOWISH BROWN, HARD, DAMP, CONTAINS A WEAK ODOR 8.1' - 10.0': MEDIUM PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY, STIFF, MOIST, SLIGHTLY SILTY & SANDY, WITH SCATTERED CARBON STAINS, CONTAINS A WEAK ODOR T.D. 10.0'		CONTAMINANT / PPB: Acetone 18 CONTAMINANT / PPB: 1,2-DCE 18; TCE 198
20	NOV 89 174+/-			
30				
40				

WATER LEVEL:
NOTE: NO FREE WATER IN BORING DURING DRILLING AND DRY AFTER 24 HOURS

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 16

Hole No. 8A-911

006134

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 8" AUGER	
2. LOCATION (Coordinates or Station) GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN (Ber or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 8A-911		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 14; UNDISTURBED 0	
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 1 APR 88; COMPLETED 1 APR 88	
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE APPROX 195	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING	%
9. TOTAL DEPTH OF HOLE 15.0'		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH (a)	SYMBOL (b)	CLASSIFICATION OF MATERIALS (Description) (c)	SAMPLE LOCATION	CHEMICAL ANALYSES
10		0.0 TO 1.0' SILT MEDIUM PLASTICITY, YELLOWISH BROWN, MEDIUM, WET, CLAYEY, MODERATELY SANDY 1.0' TO 15.0' T.D. CLAY: 1.0' - 2.7': MEDIUM-HIGH PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY, MEDIUM - STIFF, MOIST, SILTY, WITH TRACE OF SAND 2.7' - 5.5': MEDIUM - HIGH PLASTICITY, REDDISH BROWN, RED & LIGHT GRAY DOWN TO REDDISH BROWN & RED FROM 4.7', VERY STIFF - HARD, DAMP 5.5' - 7.5': LOW PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, VERY STIFF, DAMP, VERY SANDY 7.5' - 8.0': MEDIUM PLASTICITY, LIGHT GRAY WITH YELLOWISH BROWN, STIFF, MOIST, SILTY, SLIGHTLY SANDY 8.0' - 10.1': MEDIUM - HIGH PLASTICITY, LIGHT GRAY & YELLOWISH BROWN, HARD, DAMP 10.1' - 12.0': MEDIUM PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, STIFF, MOIST, VERY SILTY, MODERATELY SANDY 12.0' - 15.0': MEDIUM - HIGH PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY DOWN TO LIGHT GRAY WITH YELLOWISH BROWN FROM 13.2', HARD, DAMP, WITH TRACE OF SILT & SAND T.D. 15.0'		CONTAMINANT / PPB 1,2-DCE 1,219 TCE 2,279 CONTAMINANT / PPB MC 4,318 1,1-DCE 14 1,2-DCE 194 Chloroform 5 TCE 3,228
20				
NOV 89 174+/-				
30				
40				

WATER LEVEL:
NOTE: FREE WATER ENTERING FROM UPPER 1.0'+/- DURING DRILLING, LEVEL WAS AT 0.2' ON 4 APRIL 88 WITH BORING CLOSED IN AT 5.0'

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 17

Hole No. 8A-975

006135

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP (RFI - PHASE II)		10. SIZE AND TYPE OF BIT 8" AUG/3" SHELBY	
2. LOCATION SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. 8A-975		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 15	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 20 JUL 89	COMPLETED 20 JUL 89
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 195 +/-	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING N/A	X
9. TOTAL DEPTH OF HOLE 23.0'		19. SIGNATURE OF INSPECTOR DEBORAH C. FITZGERALD	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
	DEBRIS	0.0' TO 11.0' CLAY FILL: 0.0' - 3.5': YELLOW - BROWN, GRAY & RED, DAMP TO 1.0', BECOMING MOIST, MED. STIFF, MED. PLASTICITY, VERY SILTY, SANDY, SCATTERED CARBON STAINS		CONTAMINANT / PPB MC 820 Acetone 660 Xylenes 59
	DEBRIS	3.5' - 3.8': ABUNDANT METAL CASINGS & DEBRIS IN GREEN SANDY CLAY & LOOSE BLACK SANDY MATRIX		
10	DEBRIS	3.8' - 5.0': GRAY & RED, MOIST, VERY STIFF, MED - HIGH PLASTICITY, VERY SANDY		CONTAMINANT / PPB MC 2,900 Acetone 2,000 TCE 58 Toluene 40 Xylenes 66
		5.0' - 6.0': ABUNDANT METAL CASINGS & DEBRIS IN GREEN SANDY CLAY & LOOSE BLACK SANDY MATRIX, SLIGHT CARBON ODOR		
	ODOR	6.0' - 8.5': RED & GRAY, DAMP, VERY STIFF, MED - HIGH PLASTICITY, VERY SILTY, BECOMES VERY SANDY FROM 7.0', SOLVENT ODOR		CONTAMINANT / PPB Acetone 2,800 MC 5,200B 1,2-DCA 590 TCE 2,100 Toluene 1,700B Xylenes 2,500
		8.5' - 10.0': AS ABOVE, SILTY, SLIGHTLY SANDY, SCATTERED CARBON STAINS, SOLVENT ODOR		
20		10.0' - 11.0': GRAY & YELLOW - BROWN, VERY MOIST TO WET, SLIGHTLY STIFF, LOW - MED PLASTICITY, VERY SANDY, SOME METAL CASINGS & DEBRIS, SOLVENT ODOR		
NOV 89 174+/-		11.0' TO 23.0' T.D. CLAY: 11.0' - 12.0': GRAY & YELLOW - BROWN, MOIST, VERY STIFF, MED - HIGH PLASTICITY, SCATTERED CARBON STAINS		WATER LEVEL: FREE WATER ENTERED BORING AT 3.0'+/- DURING DRILLING. LEVEL WAS AT 14.8' WITH HOLE CAVED TO 18.6' 24 HOURS AFTER DRILLING
30		12.0' - 23.0': YELLOW - BROWN & GRAY, SLIGHTLY MOIST, SLIGHTLY STIFF, LOW - MED PLASTICITY, VERY SILTY, SANDY, ALTERNATING WITH VERY SANDY SILTY CLAY / CLAYEY SILTY SAND, BECOMES VERY MOIST FROM 17.0' WITH VERY WET ZONE AT 22.0', VERY STRONG SOLVENT ODOR T.D. 23.0'		
40				

SWL 350
SEP 80

PROJECT | HOLE NO

FIGURE 18

Hole No. 8A-931

006136

BORING LOG	DIVISION: SWD	INSTALLATION: FWD	SHEET 1 OF 1 SHEETS
1. PROJECT: LONGHORN AAP		10. SIZE AND TYPE OF BIT	
2. LOCATION: GROUNDWATER QUALITY ASSESMENT		11. DATUM FOR ELEVATION SHOWN:	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): 8A-931		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11	UNDISTURBED 0
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 15 AUG 88	COMPLETED 15 AUG 88
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 198 +/-	
9. TOTAL DEPTH OF HOLE: 10.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A	
		19. SIGNATURE OF INSPECTOR: JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
10		0.0' TO 0.9' CLAY FILL: LOW - MEDIUM PLASTICITY, BROWN WITH RED, VERY STIFF, DAMP, SLIGHTLY SILTY & SANDY 0.9' TO 2.2' SILT: LOW PLASTICITY, YELLOWISH BROWN, STIFF, DRY, VERY SANDY (BORDERS A SILTY SAND) 2.2' TO 10.0' T.D. CLAY: 2.2' - 3.9': MEDIUM PLASTICITY, YELLOWISH BROWN WITH RED, HARD, DAMP, WITH TRACE OF SAND 3.9' - 8.8': MEDIUM - HIGH PLASTICITY, LIGHT GRAY WITH RED TO YELLOWISH BROWN & RED AT 5.9', HARD, DAMP, WITH TRACE OF FINE SAND FROM 5.9' 8.8' - 10.0': LOW - MEDIUM PLASTICITY, YELLOWISH BROWN & LIGHT GRAY, MEDIUM - STIFF, VERY MOIST, VERY SILTY, SANDY T.D. 10.0'		CONTAMINANT / PPB 1,2-DCE 9 TCE 91 CONTAMINANT / PPB Acetone 14 1,1-DCE 49 1,1-DCA 19 1,2-DCE 57 1,1,1-TCA 13 TCE 920E PCE 64 WATER LEVEL: NOTE: NO FREE WATER IN BORING DURING DRILLING AND DRY AFTER 24 HOURS
20				
NOV 89 174.5				
30				
40				

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 19

Hole No. 8A-978

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP (RFI - PHASE II)		10. SIZE AND TYPE OF BIT 8" AUG/3" SHELBY	
2. LOCATION (Coordinates or Station) SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 8A-978		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 15	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
		16. DATE HOLE STARTED 1 AUG 89	COMPLETED 1 AUG 89
7. THICKNESS OF OVERBURDEN		17. ELEVATION TOP OF HOLE 192 +/-	
8. DEPTH DRILLED INTO ROCK		18. TOTAL CORE RECOVERY FOR BORING N/A	
9. TOTAL DEPTH OF HOLE 18.0'		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
10		0.0' TO 0.4' SILT: LOW PLASTICITY, REDDISH BROWN, VERY STIFF, DAMP, SANDY 0.4' TO 3.9' CLAY: MEDIUM - HIGH PLASTICITY, RED & LIGHT GRAY, VERY STIFF - HARD, DAMP 3.9' TO 9.2' SAND: FINE GRAINED, REDDISH BROWN, MEDIUM, DAMP DOWN TO WET FROM 9.0+/-, SILTY 9.2 TO 9.7' CLAY: MEDIUM - HIGH PLASTICITY, LIGHT GRAY WITH YELLOWISH BROWN, VERY STIFF, DAMP 9.7' TO 18.0' T.D. SAND: FINE GRAINED, REDDISH BROWN - YELLOWISH BROWN WITH LIGHT GRAY, MEDIUM, MOIST DOWN TO WET FROM 16.0+/-, SILTY T.D. 18.0'		CONTAMINANT / PPB MC 11 Acetone 74 TCE 78 CONTAMINANT / PPB MC 9 TCE 15 HMX 140 CONTAMINANT / PPB MC 14 1,1-DCE 6 TCE 300E Benzene 5 Toluene 6 Chlorobenzene 6 HMX 19
NOV 89 174+/-				
20				
30				
40				

WATER LEVEL:
NOTE: SOME FREE WATER ENTERING FROM 9.0' - 9.2' AND 16.0' - 18.0'
24 HOUR OBSERVATION:
FREE WATER LEVEL WAS AT 8.5' WITH BORING CLOSED IN AT 8.7'

SWL 350
SEP 80

PROJECT | HOLE NO.

006137

FIGURE 20

Hole No. 8A-981

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP (RFI - PHASE II)		10. SIZE AND TYPE OF BIT 8" AUG/3" SHELBY	
2. LOCATION (Coordinates or Station) SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) 8A-981		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN DISTURBED 14	UNDISTURBED 0
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 31 JUL 89	COMPLETED 31 JUL 89
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 183 +/-	
9. TOTAL DEPTH OF HOLE 9.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	%
		19. SIGNATURE OF INSPECTOR JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
		0.0' TO 1.0' SAND FILL: FINE GRAINED, YELLOWISH BROWN, MEDIUM, DAMP, SILTY 1.0' TO 2.0' SILT FILL: LOW - MEDIUM PLASTICITY, REDDISH BROWN - YELLOWISH BROWN & GRAY, VERY STIFF, DAMP, SANDY, WITH LAMINATIONS OF WHITE RESIDUE & CARBON STAINS 2.0' TO 8.7' SILT: LOW PLASTICITY, YELLOWISH BROWN, STIFF, DAMP, CLAYEY, SANDY 8.7' TO 9.0' T.D. SAND: FINE GRAINED, YELLOWISH BROWN & LIGHT GRAY, MEDIUM, WET, CLAYEY T.D. 9.0'		CONTAMINANT PPB MC 27 Acetone 84 CONTAMINANT PPB NONE DETECTED CONTAMINANT PPB TCE 13
10 NOV 89 173+/-				
20				WATER LEVEL: NOTE: FREE WATER ENTERED BORING FROM 8.7'+/- 24 HOUR OBSERVATION: FREE WATER LEVEL WAS AT 2.2' WITH BORING CLOSED IN AT 3.5'
30				
40				

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 21

Hole No. 8A-986

BORING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT: LONGHORN AAP (RFI - PHASE II)		10. SIZE AND TYPE OF BIT: 8" AUG/3" SHELBY	
2. LOCATION (Coordinates or Station): SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (GS or MSL)	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and File number): 8A-986		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 12; UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 2 AUG 89; COMPLETED 2 AUG 89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 194 +/-	
9. TOTAL DEPTH OF HOLE: 24.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: JACKIE R. STOKES	

DEPTH	SYMBOL	CLASSIFICATION OF MATERIALS (Description)	SAMPLE LOCATION	CHEMICAL ANALYSES
0		0.0' TO 2.6' SILT 0.0' - 0.9': LOW PLASTICITY, LIGHT GRAYISH BROWN, STIFF, DAMP, VERY SANDY 0.9' - 2.0': LOW PLASTICITY, REDDISH BROWN, STIFF, DAMP, VERY SANDY 2.0' - 2.6': LOW PLASTICITY, GRAYISH BROWN - REDDISH BROWN, MEDIUM, VERY MOIST, SANDY		CONTAMINANT / PPB MC 9 TCE 5
10		2.6' TO 9.0' CLAY: 2.6' - 4.3': MEDIUM - HIGH PLASTICITY, RED WITH GRAY, VERY STIFF - HARD, DAMP, SANDY & LOW PLASTICITY FROM 4.0' 4.3' - 9.0': MEDIUM PLASTICITY, YELLOWISH BROWN WITH LIGHT GRAY, VERY STIFF DOWN TO STIFF FROM 7.0', DAMP DOWN TO MOIST FROM 7.0', SILTY, WITH TRACE OF SAND		CONTAMINANT / PPB MC 8 HMX 481
20		9.0' TO 13.0' SILT: MEDIUM TO LOW PLASTICITY FROM 11.0', YELLOWISH BROWN & LIGHT GRAY, MEDIUM, MOIST - VERY MOIST, CLAYEY, MOD. SANDY TO SANDY FROM 11.0'		CONTAMINANT / PPB MC 10
NOV 89 172.65		13.0' TO 14.0' CLAY: MEDIUM PLASTICITY, YELLOWISH BROWN & LIGHT GRAY VERY STIFF, DAMP, SILTY, WITH TRACE OF SAND & SMALL CARBON STAINS		
30		14.0' TO 16.8' SILT: LOW PLASTICITY, YELLOWISH BROWN & LIGHT GRAY MEDIUM - STIFF, MOIST, SANDY TO VERY SANDY FROM 16.0' 16.8' TO 21.0' CLAY: MEDIUM - HIGH PLASTICITY, YELLOWISH BROWN & LIGHT GRAY VERY STIFF, DAMP, SILTY, WITH TRACE OF SAND FROM 20.0' 21.0' TO 24.0' T.D. SILT: LOW - MEDIUM PLASTICITY, YELLOWISH BROWN & LIGHT GRAY MEDIUM, VERY MOIST, SANDY T.D. 24.0'		WATER LEVEL: NOTE: FREE WATER ENTERED BOTTOM OF BORING UPON COMPLETION 24 HOUR OBSERVATION: FREE WATER LEVEL WAS AT 21.8' WITH BORING CLOSED IN AT 22.0'
40				

SWL 350
SEP 80

PROJECT | HOLE NO.

FIGURE 22

LOGS OF BORINGS FOR EXISTING USAEHA WELLS

+ plugged

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006141

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 1

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
	BS	Medium brown silty sand, fine in grain size.	Hit stone.
		Stone	Possible backfill for berm of pond.
5	ST	Medium brown fine silty sand with some clay	Very, moist
10		Tan fine silty sand with some clay	Wet - auger sat for 2 days before finishing.
	BS		
15		Medium brown silty sand with clay	Damp

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006142

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS 1LT Corbitt
Mr. Kestner

DRILL RIG Acker II BORE HOLE 1

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Med brown silty sand with clay	WT
20			
25			
30			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 1

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Medium brown silty sand with clay	
35			
40	MB		
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006144

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 1

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty sand with clay	
		Gray clay mixed with sand	
	MB		
50		Bottom of hole	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006145

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of berm

DRILL RIG Acker II BORE HOLE 2

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown fine silty sand.	Fairly dry.
5	BS		
10	BS	Brick red fine silty sand with some clay	Fairly dry
		Tan fine silty sand with some clay	Getting wet
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006146

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of berm

DRILL RIG Acker II BORE HOLE 2

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan fine silty sand with some clay	Getting wet
20			
25			WT
		Light tan silty sand with very little clay	Wet
30			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006147

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of berm

DRILL RIG Acker II BORE HOLE 2

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Light tan silty sand with very little clay	
35			
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006148

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of berm

DRILL RIG Acker II BORE HOLE 2

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Light tan silty sand with very little clay	
50			Well 52' deep
55		Tan clay, medium plastic	
		Bottom of hole	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006149

DRILLING LOG

PROJECT 38-26-0104 DATE 25 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

North side of rocket. Wash rock. Surface disturbed

DRILL RIG Acker II BORE HOLE 3

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Medium brown fine silty sand.	Damp
5	BS	Tan fine silty sand with some clay.	
10	BS		Wet
15			Water running out of hole.

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006150

DRILLING LOG

PROJECT 38-26-0104 DATE 25 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

North side of rocket. Wash rock.

Surface disturbed.

DRILL RIG Acker II BORE HOLE 3

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand with some clay	
20			
25			
30			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006151

DRILLING LOG

PROJECT 38-26-0104 DATE 25 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

North side of Rocket. Wash rack.
Surface disturbed

DRILL RIG Acker II BORE HOLE 3

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand with some clay	
35			
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006152

PROJECT 38-26-0104 DATE 25 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

North side of Rocket. Wash rack.
Surface disturbed

DRILL RIG Acker II BORE HOLE 3

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
45		Medium brown silty clay.	Hangs to auger
50			WT
		Bottom of hole	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006153

DRILLING LOG

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

10 feet to east side of road

DRILL RIG Acker II BORE HOLE 4

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan fine silty sand with some clay	
			Water
			WT
20			
25			
30			

USAEHA Form 95, 12 Aug 74

Page 1 of 4 missing in all copies provided.

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006154

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

10 feet to east side of road

DRILL RIG Acker II BORE HOLE 4

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan fine silty sand with some clay	
35	MB		
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006155

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

10 feet to east side of road

DRILL RIG Acker II BORE HOLE 4

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan fine silty sand with some clay	
		Medium brown silty clay.	Hangs to auger
50		Bottom of hole	
55			
60			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006150

DRILLING LOG

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 5

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Gravel, reddish in color	
		Medium brown, silty sand	
5	MB	Tan silty sand with some clay	
	MB	Brown fine sand silt	
	MB	Brick red fine silty sand with some clay.	Fairly dry
10			
15	MB 14-16'	Tan silty fine sane with clay.	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006157

DRILLING LOG

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 5

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan silty fine sand with clay	
20			
25			WT
30			Wet

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006158

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 5

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
35		Tan silty fine sand with clay	
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006159

DRILLING LOG

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 5

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
45		Medium brown silty clay.	Hangs to auger.
50			
55			
60		Bottom of hole	Well depth 60 feet

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006160

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of berm

DRILL RIG Acker II BORE HOLE 6

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty sand.	Moist
5	BS	Brown silty sand	
10	BS	Brick red silty clay with fine sand	
		Light tan silty fine sand with some clay.	Moist
15	BS		

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006161

DRILLING LOG

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of berm

DRILL RIG Acker II BORE HOLE 6

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Light tan silty fine sand with some clay.	
20			Water
25		Light tan sandy silt	
30	SS 29-31 ft		Water

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 28-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of berm

DRILL RIG Acker II BORE HOLE 6

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
	BS	Light tan sandy silt	
35			
40		Medium brown silty clay	
45			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006163

DRILLING LOG

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 6

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
50		Gray fine sandy clay	Well depth
60		BOTTOM OF HOLE	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006164

DRILLING LOG

PROJECT 38-26-0104 DATE 27 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Edge of Road

DRILL RIG Acker II BORE HOLE 7

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Medium brown silty sand	
		Tan silty sand, fine	Moist Moist
5	BS		
10	BS		
			Water
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006165

DRILLING LOG -

PROJECT 38-26-0104 DATE 27 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner
Edge of Road

DRILL RIG Acker II BORE HOLE 7

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
	BS	Tan silty sand, fine	Moist
20			
			Water
30			
35			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006166

DRILLING LOG

PROJECT 38-26-0104 DATE 27 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Edge of Road

DRILL RIG Acker II BORE HOLE 7

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan silty sand, fine	Moist
40		Tan fine silty sand w clay	
45		Gray fine sandy clay	
50		BOTTOM OF HOLE	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006167

DRILLING LOG

PROJECT 38-26-0104 DATE 27 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Edge of Road

DRILL RIG Acker II BORE HOLE 7

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
55			
60			Well depth

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006168

DRILLING LOG

PROJECT 38-26-0104 DATE 27 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 8

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium Brown silty sand; some clay	Moist
5	MB		
		Brown fine silty sand	
10	MB		
		Tan fine silty sand w some clay	
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006169

DRILLING LOG

PROJECT 38-26-0104 DATE 27 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 8

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
	MB	Tan fine silty sand_w some clay	
			Wet
20	MB		
25		Medium to fine sandy silt	Wet
			Water
30			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006170

PROJECT 38-26-0104 DATE 27 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 8

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
40			
45		Tan silty clay	
	MB		
50			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006171

DRILLING LOG

PROJECT 38-26-0104 DATE 27 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 8

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan silty clay	
55		Gray sandy clay	
			Well depth
60		BOTTOM OF HOLE	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006172

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 9

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand	
	MB		
		Brown fine silty sand	
5			
	MB		
10			
		Tan fine silty sand w some clay	
	MB		
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006173

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 9

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand w some clay	
	MB		
20			Wet
25			Water level
30			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006174

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 9

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand w some clay	
35			
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006175

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 9

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand w some clay	
		Brick red & gray silty clay	Wet
50			
			Well depth
55			
		Brown fine silty sand w clay	Dry
60		BOTTOM OF HOLE	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006176

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 10

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Brown silty sand	Moist
10		Tan fine silty sand w some clay	Moist
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006177

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 10

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand w some clay	Moist
20			Water
			Water level
25			
	MB		
30			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006178

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 10

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
35			
40		Medium brown clay	
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006179

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Top of Berm

DRILL RIG Acker II BORE HOLE 10

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
	PB	Medium brown clay	
			Well depth
50			
55		BOTTOM OF HOLE	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006180

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 11

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
5		Medium Brown silty sand	
10		Brick red firm silty sand	
		Tan firm silty sand	
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006181

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 11

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan firm silty sand	
20			
25			Getting wet
30			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006182

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 11

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
35		Tan firm silty sand	
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006183

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 11

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan firm silty sand	
		Brick red silty clay	Dry
50		BOTTOM OF HOLE	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

006184

PROJECT 38-26-0104 DATE 2 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestne

Old Road Bed to Burning Cage

DRILL RIG Acker II BORE HOLE 21

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Brick red gravel & silty sand w some clay	
		Brown silty sand w clay	
		Tan silty sand w clay	
5		Brick red silty sand w clay	
		Tan silty sand	Damp
10		Dark tan silty sand w some clay	
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006185

DRILLING LOG

PROJECT 38-26-0104 DATE 2 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Old Road Bed to Burning Cage

DRILL RIG Acker II BORE HOLE 21

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Dark tan silty sand w some clay	
20			Getting wet; Water level
25			
30			Wet

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006186

DRILLING LOG

PROJECT 38-26-0104 DATE 2 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Old Road Bed to Burning Cage

DRILL RIG Acker II BORE HOLE 21

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Dark tan silty sand w some clay	
35		Tan intermixed w gray silty clay	
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006187

DRILLING LOG

PROJECT 38-26-0104 DATE 2 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Old Road Bed to Burning Cage

DRILL RIG Acker II BORE HOLE 21

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan intermixed w-gray silty clay	
50		BOTTOM OF HOLE	

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 006188

DRILLING LOG

PROJECT 38-26-0104 DATE 2 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 22

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty sand w some clay	
		Brown silty sand w some clay	
5			
		Tan silty sand	
10			
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006189

DRILLING LOG

PROJECT 38-26-0104 DATE 2 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 22

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan silty sand	
35		Gray sandy clay	Hangs to auger
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

006190

DRILLING LOG

PROJECT 38-26-0104 DATE 2 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 22

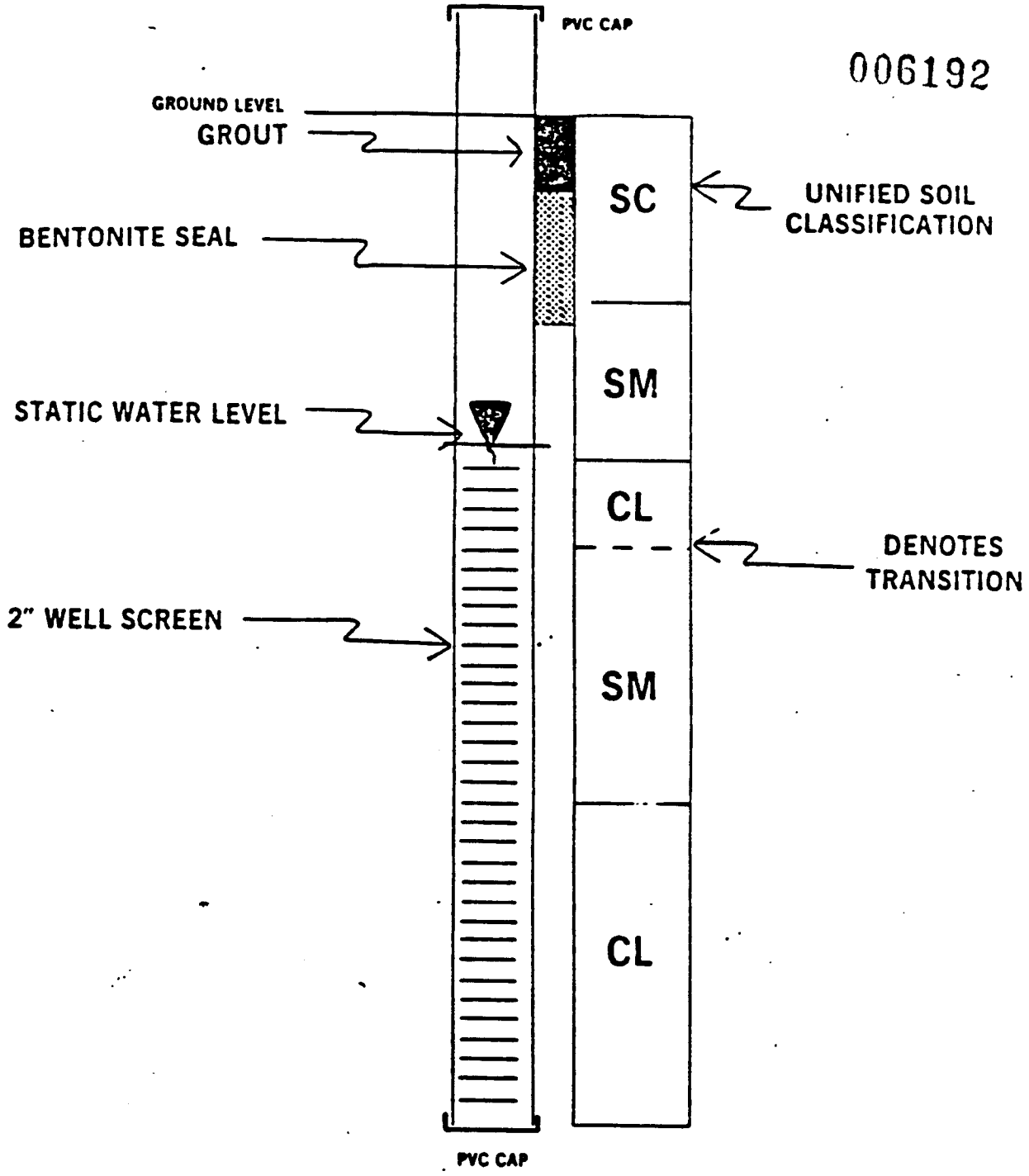
FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Gray sandy clay	Hangs to auger
50		BOTTOM OF HOLE	

USAEHA Form 95, 12 Aug 74

LOGS OF WELL BORINGS AND WELL CONSTRUCTION DETAILS
USTHAMA WELLS

TYPICAL WELL LEGEND

006192

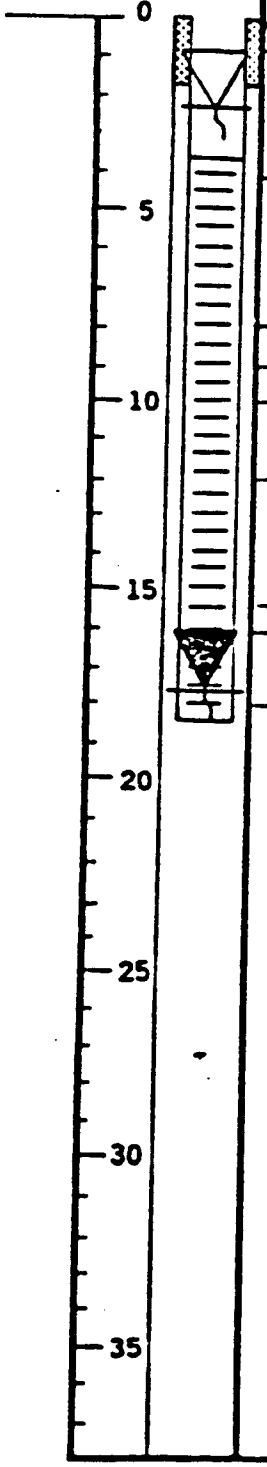


SOURCE: ENVIRONMENTAL PROTECTION SYSTEMS, INC. - 1983

CONTAMINATION SURVEY
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS

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

006193



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM		Silty sand		
SM	1/1 2/1 2/3	Silty sand Light brownish grey mottled w/yellowish brown	15	
CL	10/18 /20	Very sandy clay 45% sand Light olive grey mottled w/light olive brown		
SC		Clayey sand *		
CL		Sandy clay **	35	
SC	3/5 /7	Clayey sand Light olive grey mottled w/light**		
CL		Sandy clay 25% fine sand Light grey mottled w/olive		
ML	1/1	Sandy silt seam	74	
CL	/7	Sandy clay 25% fine sand Light olive grey mottled w/light**		

*Light olive grey mottled w/light olive brown
**olive brown

*BLOWS PER 6 INCH USING 18 24 or 36 SPLITSPOON

VERTICAL SCALE 1" = 5.0'

WELL 101 DATE DRILLED 6/24/82
STUDY AREA Active Burning Grounds

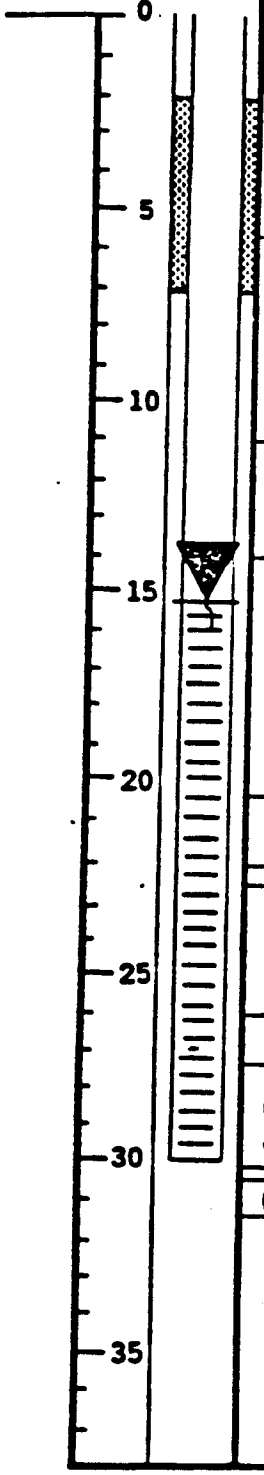
ELEVATION TOP OF STEEL CASING = 197.28
ELEVATION TOP OF PVC RISER = 197.09
ELEVATION OF GROUND SURFACE = 195.84

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

006194



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM		Silty sand		
SM	1/2 2/2	Silty sand Yellowish red	12	
SM-SC	2/5	Slightly clayey silty sand 15% clay 15% silt Olive brown	30	
CL	3/6 0/10 12/12	Sandy clay 25% fine sand Light brownish grey mottled w/yellowish brown		
SC		Clayey sand Light brownish grey mottled w/ yellowish brown	20	
SM + CL	3/3 3/7 5/4	Silty sand w/seams of clay 80% silty sand mixture 20% sandy clay Light yellowish brown Sandy clay 40% fine sand	71.2 50.6 32.7	9.9 x 10^{-5} ft/min
CL	2/2 3/6	Sandy clay 40% fine sand Light brownish grey mottled with*		
SM	8/9	Silty sand seam	25	
CL	5/6	Sandy clay Light brownish grey mottled w/yellowish brown		
CL	7/15 /20	Clay w/seam of iron rock		
CL+ SM		Sandy clay w/seams of silty sand Light grey 70% clay Olive yellow 30% silty sand	63.6	
**				
CL	9/7 /8	Sandy clay		

* with yellowish brown
** Silt sand mixture (ML-SM)

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

VERTICAL SCALE 1" = 5.0'

WELL 102 DATE DRILLED 6/25/82
STUDY AREA Active Burning Grounds

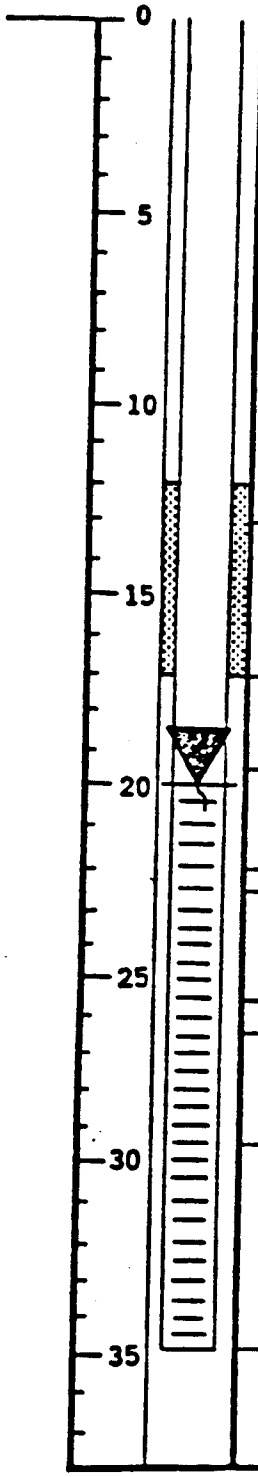
ELEVATION TOP OF STEEL CASING = 194.33
ELEVATION TOP OF PVC RISER = 193.63
ELEVATION OF GROUND SURFACE = 191.34

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

006195



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM-SP	4/5 4/5	Silty sand Yellowish brown	10	
CL	7/8 5/8	Slightly sandy clay 20% fine sand Pale brown mottled w/yellowish brown		
CL	7/11 11/1 3/4 8/8 11/18	Slightly sandy clay 10% fine sand Pale brown mottled w/yellowish brown		
SM	5/6 7/9 8/8	Silty sand Pale brown mottled with yellowish brown	15	
ML		Sandy clay & silt 20% fine sand mixture Pale brown w/yellowish brown		
SM	8/8 8/8	Silty sand Yellowish brown	23.0	
CL	12/20	Clay w/silty sand seams	53.2	
ML-SM		Sandy silt mixture Pale brown mottled w/yellowish brown		
CL	3/4	Clay		
SM	10/20	Silty sand Pale brown mottled w/yellowish brown	26.3	
CL	3/5 5/5 5/5	Clay Pale brown & yellowish red		

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

VERTICAL SCALE 1" = 5.0'

WELL 109 DATE DRILLED 6/10/82
STUDY AREA Active Burning Grounds

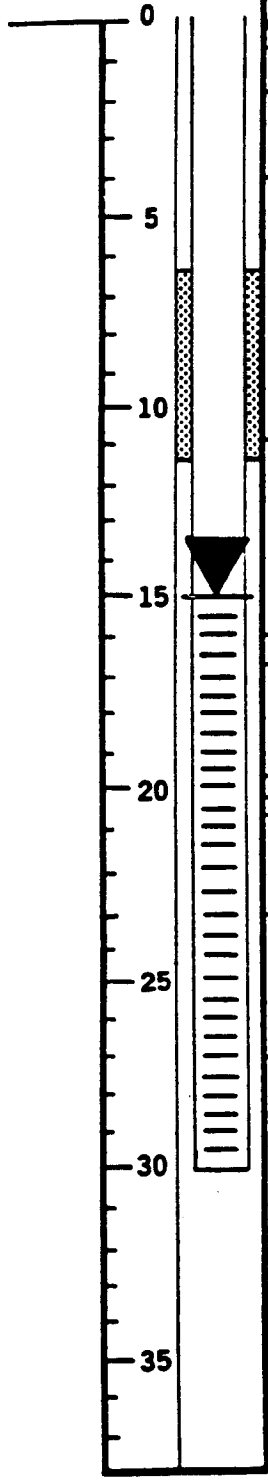
ELEVATION TOP OF STEEL CASING = 196.90
ELEVATION TOP OF PVC RISER = 196.72
ELEVATION OF GROUND SURFACE = 195.94

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

006196



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM		Silty sand		
SM	8/12 13/7	Slightly silty sand	10	
SC		Clayey silty sand Very pale brown & yellowish brown	30	
SC	3/7 11/14	Very clayey sand §5% fine sand Light grey mottled w/red and yellowish brown	45	
SC-SM	7/11 13/17 6/11 13/15	Slightly clayey silty sand Light grey mottled w/yellowish brown 10% clay 15% silt	25	
CL+SM		Silty sand & sandy clay		
CL		Sandy clay 20% fine sand Light grey mottled w/yellowish brown		
ML		Black sandy silt		
CL	3/6	Slightly sandy clay seam		
SC	10/15	Clayey sand Light brownish grey & pale brown	40	
CL	6/10 /17	Slightly silty clay w/silty sand seams Pale brown & brownish yellow		
SM	27/35	Clayey silty sand Dark greyish brown 5% clay 20% silt	25	
	30/55	Greyish brown & yellowish brown		

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

VERTICAL SCALE 1" = 5.0'

WELL 114 DATE DRILLED 7/15/82

STUDY AREA Former TNT Production Area

ELEVATION TOP OF STEEL CASING = 243.96 ft

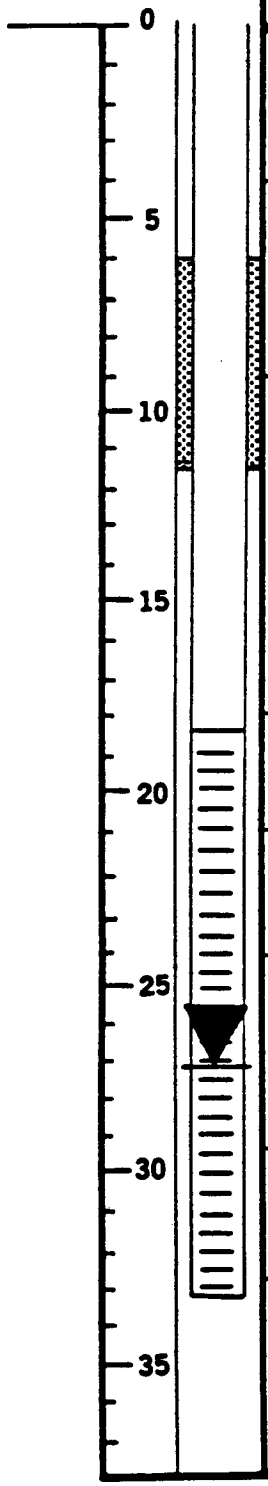
ELEVATION TOP OF PVC RISER = 242.88 ft

ELEVATION OF GROUND SURFACE = 241.13 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



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM	8/15 /17	Silty sand Pale brown mottled w/yellowish brown	15	
CL	5/7 11/14	Sandy clay 30% fine sand Grey mottled w/yellowish red		
SC	7/12 15/18	Clayey sand 60% fine sand Light brownish grey mottled w/yellowish brown		
	5/11 15/19	Clayey sand Light brownish grey mottled w/yellowish brown		
SC+ SC-SP	6/9	Clayey sand w/seams of slightly clayey sand Tl brownish grey w/yellowish brown		
CL	14/18	Sandy clay 25% fine sand w/seam of dark grey clay		
SM-ML	18/20 22/25	Clayey silty sand Dark greyish brown 5% clay 30% silt	35	
SM+CL	27/41	Silty sand w/some clay layers 80% fine sand Olive brown 20% clay		

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

VERTICAL SCALE 1" = 5.0'

WELL 115 DATE DRILLED 7/14/82

STUDY AREA Former TNT Production Area

ELEVATION TOP OF STEEL CASING = 224.88 ft

ELEVATION TOP OF PVC RISER = 224.38 ft

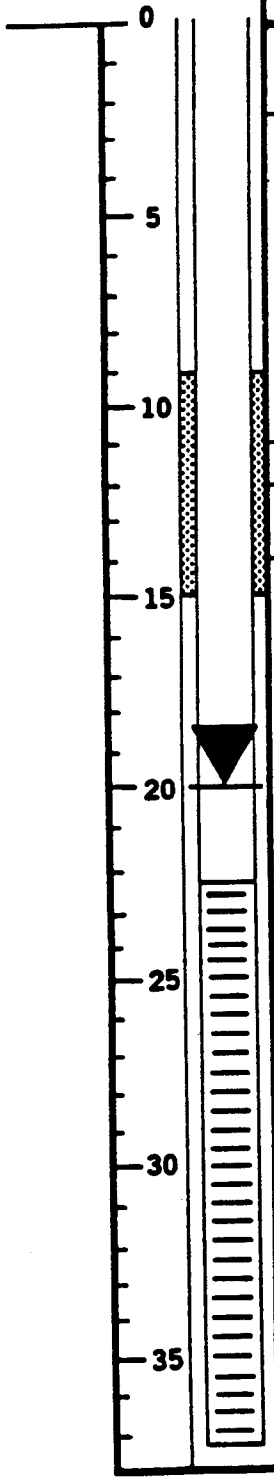
ELEVATION OF GROUND SURFACE = 221.90 ft

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

006198



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM	3/2 1/1	Silty sand Reddish brown	15	
SC	2/2	Clayey sand Light grey	30	
CL	3/7	Sandy clay 15% fine sand Light grey mottled w/red		
SC	12/15 16/19	15% silt Clayey silty sand 15% clay Light grey mottled w/strong brown	30	
SM	6/10 14/17	Silty sand -lt. grey w/strong brn.	15	
SM+SC +CL	29/30	Thin layers of silty sand, clay sand and sandy clay		
ML-CL	7/11 12/17 19/23	Sandy clay & silt 20% fine sand Light grey mottled w/yellowish brown		
CL	10/12 13/15 22/27 11/17 23/37 42/52	Clay layers w/very thin seams of grey silty sand Very dark grey		
ML-SM	13/22 /45	Silty sand mixture Dark greyish brown 55% silt 45% sand	55	
SM-CL	12/19	Transitional		
CL	/35	Slightly sandy clay*10% fine sand		
N/A		Sandy lignite		

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

VERTICAL SCALE 1" = 5.0'

WELL 116 DATE DRILLED 6/3/82

STUDY AREA Former TNT Production Area

ELEVATION TOP OF STEEL CASING = 216.32 ft

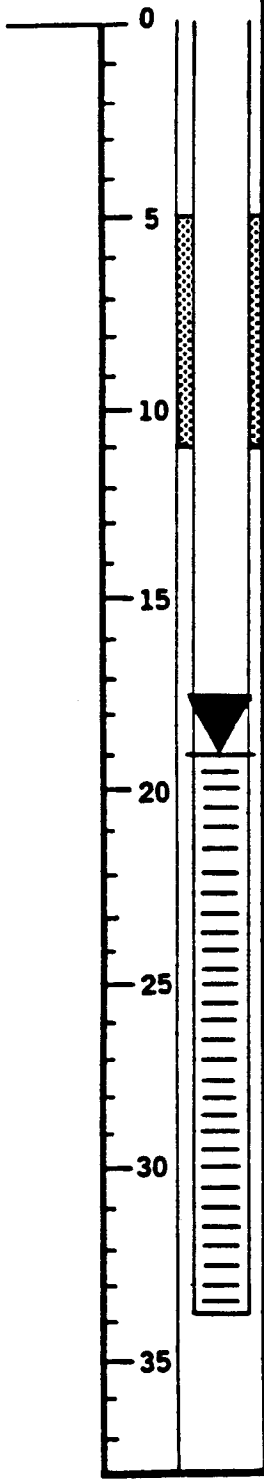
ELEVATION TOP OF PVC RISER = 216.21 ft

ELEVATION OF GROUND SURFACE = 213.47 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



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM	8/10 /8	Silty sand Light grey	30	
CL	8/18 /25	Sandy clay 30% fine sand Light grey mottled w/brownish yellow		
CL	5/12	Sandy clay 15% fine sand Light grey mottled w/brownish yellow		
SC-SP	18/2	Slightly clayey sand seam	10	
CL		Sandy clay Light grey mottled w/brownish yellow		
SC-SP	6/8	Slightly clayey sand seam	30	
CL+SC	9/10	Sandy clay w/clayey sand seams 15% fine sand Lt grey w/brownish yellow		
SC	5/6	Clay sand	15	
CL	7/8	Sandy clay 20% fine sand Lt. grey w/brownish yellow		
SC	5/6	Clayey sand Lt. grey w/brownish yellow	15	
SC	7/7	Clayey sand	30	
SM	7/9 15/20 15/25 /30	Slightly clayey silty sand Strong brown mottled with yellowish brown 5% clay 35% silt		

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

VERTICAL SCALE 1" = 5.0'

WELL 117 DATE DRILLED 7/12/82

STUDY AREA Former TNT Production Area

ELEVATION TOP OF STEEL CASING = 213.72 ft

ELEVATION TOP OF PVC RISER = 213.38 ft

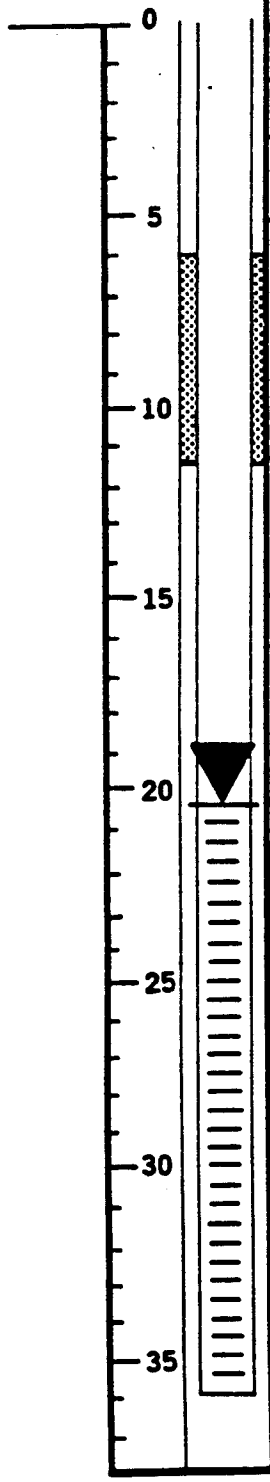
ELEVATION OF GROUND SURFACE = 210.92 ft

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

006300



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SC-CL	5/6	Clayey sand 55% fine sand Reddish grey & red mottled	45	
SM	/5	Dry silty sand Light grey	20	
SC-CL		Clayey sand Reddish grey & red mottled	45	
SM-SC	8/16 20/27	Slightly clayey silty sand 5% clay 25% silt Light yellowish brown mottled yellowish brown	30	
SM-SC	8/15 15/20	Clayey sand 80% fine sand Light yellowish brown mottled w/yellowish brown		
SM	8/15	Silty sand seam	15	
SM-SC	19/25	Slightly clayey silty sand 5% clay 25% silt Light yellowish brown mottled w/yellowish brown	30	
SM	6/11 15/20	Silty sand Yellowish brown	25	
CL+SM		Thinly bedded clay & silty sand		
SM	15/15 18/20	Seam of slightly clayey silty sand		
CL+SC		Clay & clayey sand		
	15/25 /30	Dark grey to light grey		

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

VERTICAL SCALE 1" = 5.0'

WELL 118 DATE DRILLED 7/13/82

STUDY AREA Former TNT Production Area

ELEVATION TOP OF STEEL CASING = 219.21 ft

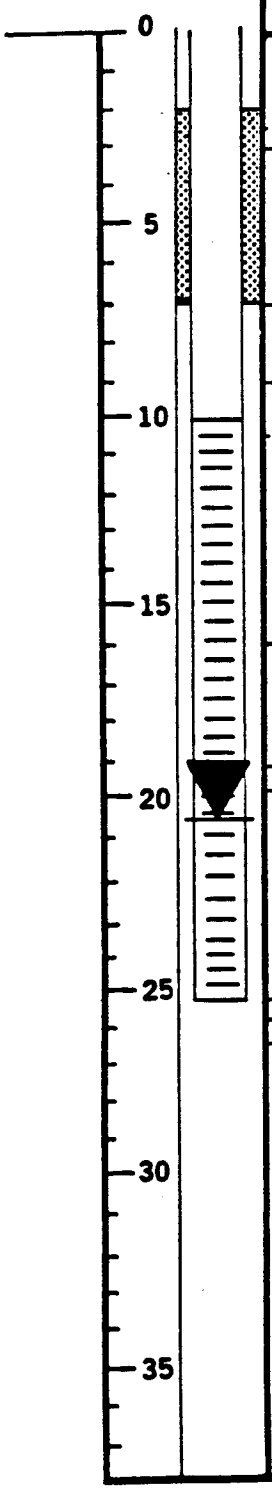
ELEVATION TOP OF PVC RISER = 218.62 ft

ELEVATION OF GROUND SURFACE = 216.28 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



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM	2/1 1/1	Very silty sand	30	
SM-SC	1/1	Clayey silty sand		
CL	3/9 12/12 /20	Sandy clay 20% fine sand Pinkish grey mottled w/strong brown		
SC		Clayey sand Lt. brownish grey w/brownish yellow	25	
SM+CL		Silty sand layers w/some clay layers		
CL+ML	12/12 /20 3/8	Sandy clay & silt mixture 25% fine sand Light brownish grey mottled w/yellowish brown		
CL	12/20	Clay 10% fine sand Grey		
ML		Cemented sandy silt seam		
CL	15/20	Slightly sandy silty clay 10% fine sand Light olive grey		
ML	15/20	Cemented sandy silt seam		
CL	/25	Clay		

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

VERTICAL SCALE 1" = 5.0'

WELL 119 DATE DRILLED 6/22/82

STUDY AREA Former TNT Production Area

ELEVATION TOP OF STEEL CASING = 222.95 ft

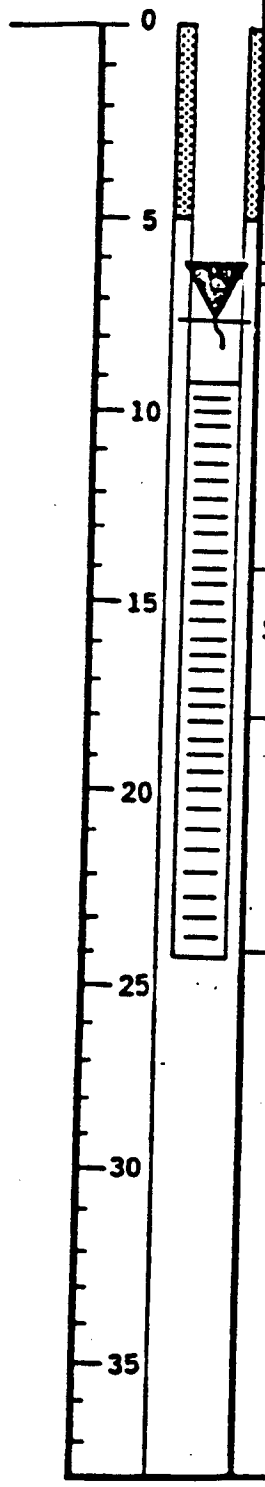
ELEVATION TOP OF PVC RISER = 222.16 ft

ELEVATION OF GROUND SURFACE = 219.84 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



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	PLASTICITY
SM	5/5 5/9	Silty sand		
SM	/20	Silty sand		
SM	5/7	Slightly clayey silty sand Lt. olive grey mottled w/olive	25	
SC	12/20	Clayey sand		
SP-SM	5/8 9/5 5/4	Silty sand Light olive grey mottled w/olive grey	38.4	
SM+CL	2/2 3/4 4/4	Silty sand w/clay seams Light olive grey w/some strong brown 15% clay		
SM	4/4 7/9	Silty sand Light olive grey	25	

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

VERTICAL SCALE 1" = 5.0'

WELL 120 DATE DRILLED 6/26/82

STUDY AREA Active Burning Grounds

ELEVATION TOP OF STEEL CASING = 183.08

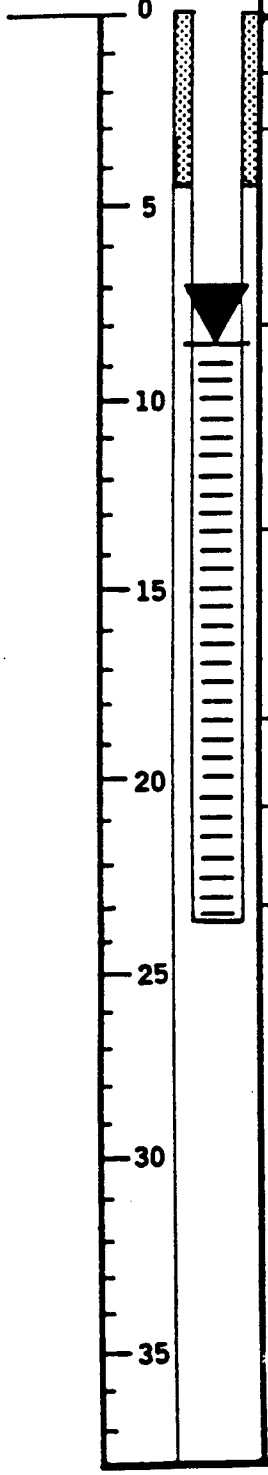
ELEVATION TOP OF PVC RISER = 182.85

ELEVATION OF GROUND SURFACE = 210.28

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



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM	4/4	Slightly silty sand Greyish brown & yellowish brown	10	—
SC-SM	6/6	Slightly clayey silty sand	25	
SM	1/1 0/1	Silty sand	20	
SM	1/4 3/5	Slightly silty sand	15	2.4 x 10^{-3} ft/min
ML-CL	4/6 9/13	Clayey sandy silt mixture Grey mottled w/yellowish brown 20% clay	70.4 65.6	
CL	6/8 11/15	Slightly sandy clay 5% fine sand light grey mottled w/yellowish brown		
CL-SC		Sandy clay 40% fine sand Light grey mottled w/yellowish brown		

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

VERTICAL SCALE 1" = 5.0'

WELL 122 DATE DRILLED 7/15/82

STUDY AREA Old Landfill

ELEVATION TOP OF STEEL CASING = 187.25 ft

ELEVATION TOP OF PVC RISER = 186.19 ft

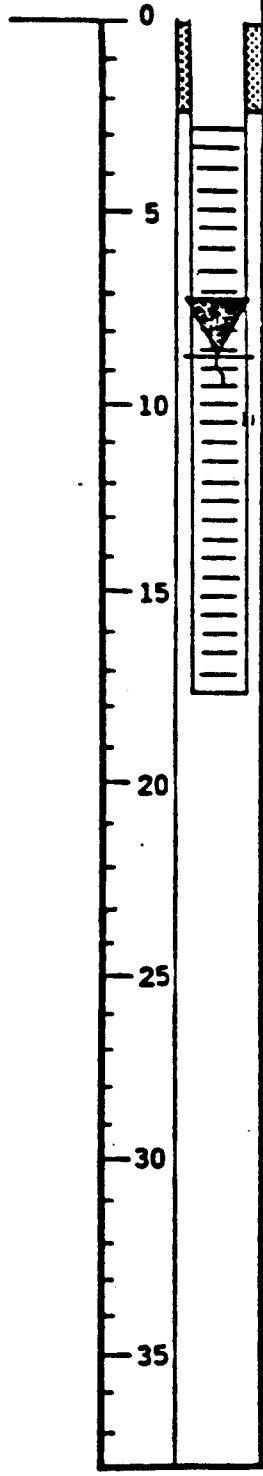
ELEVATION OF GROUND SURFACE = 184.43 ft

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

006204



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER FORMA-TION
SM	2/1	Silty sand *	15	
SC	2/4 4/6	Clayey sand Light yellowish brown mottled w/yellowish brown	20	
SM		Slightly silty sand	10	
CL	2/3	Seam of sandy clay	32.2	
SC	7/8	Clayey sand **		
CL	9/9	Seam of sandy clay [70% fine sand		
SC		Clayey sand		
SM	5/5	Silty sand Olive	25.4	1.2 x 10^{-3} ft/min
SM	5/9 10/6	Slightly clayey silty sand	40	
M.-SM		Very sandy silt ***	58.6	
SM+ CL		Silty sand w/clay seams		
CL	3/7	Clay lt. olive grey w/olive		
SM	7/9	Silty sand seam		
CL	9/10 10/12 /18	Sandy clay 20% fine sand Light olive grey mottled w/olive		

*Light yellowish brown
**Light yellowish brown mottled w/yellowish brown
***Yellowish brown
[Pinkish grey

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

VERTICAL SCALE 1" = 5.0'

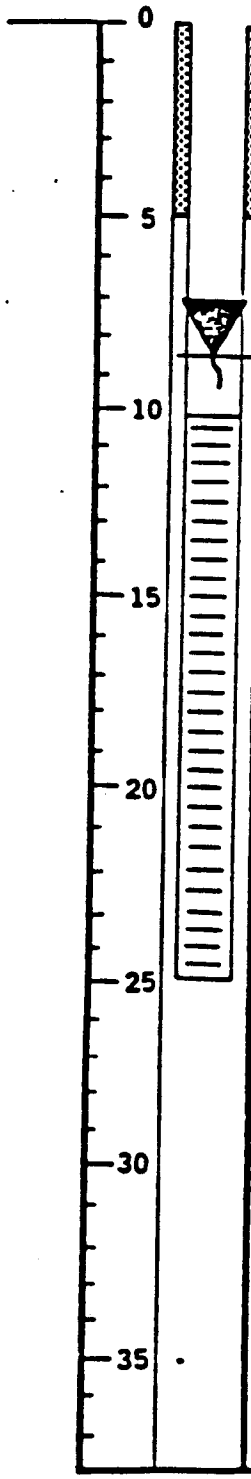
WELL 123 DATE DRILLED 6/26/82
STUDY AREA Active Burning Grounds
ELEVATION TOP OF STEEL CASING = 186.13
ELEVATION TOP OF PVC RISER = 185.03
ELEVATION OF GROUND SURFACE = 183.55

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

006205



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM		Silty sand		
SC	5/8	Dark yellowish brown clayey sand		
SM	4/3	Silty sand Dark yellowish brown	15	
SC		Slightly clayey sand	12	
ML	3/12 25/2	Very sandy silt Very pale brown w/brownish yellow	66.4 60.7	
SC		Clayey sand seam *		
SM	9/8 7/6	Slightly silty sand Dark yellowish brown	14.2	6.9×10^{-3} ft/min
CL	3/5 7/9	Sandy clay 20% fine sand Light grey mottled with brownish yellow		
SM	1/2 3/3	Silty sand	33.4	
	3/5 /5	Light grey mottled with brownish yellow	41.3	
		*Light grey and brownish yellow		

*BLOWS PER 6 INCH USING 1⅜ 24.or 36 SPLITSPOON

VERTICAL SCALE 1" = 5.0'

WELL 124 DATE DRILLED 7/10/82
STUDY AREA Active Burning Grounds

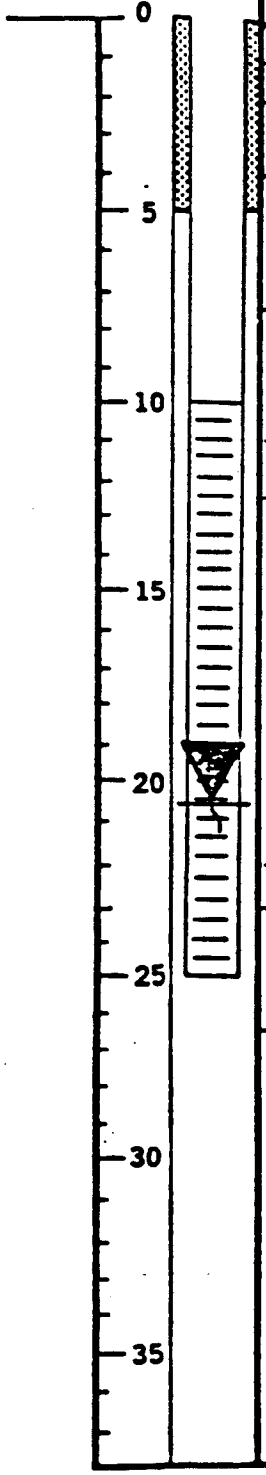
ELEVATION TOP OF STEEL CASING = 186.16
ELEVATION TOP OF PVC RISER = 185.24
ELEVATION OF GROUND SURFACE = 183.05

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

006206



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER HORIZ. PERMEABILITY
SP		Slightly silty sand *		
SM	5/4	Silty sand**	30	
SC	3/5 6/8	Clayey sand Lt. yellowish brown w/yellowish red	30	
SC	5/6 8/11 12/1[illegible]	Slightly clayey sand Light brownish grey mottled w/yellowish red	15	
SM-		Silty sand Light brownish grey	20	
		Transition to	46.7	
SM	5/9 8/7	Very silty sand Light brownish grey	45	
	9/8			
		Clayey silt w/seams of sandy clay 40% fine sand	89.9	
	5/6			
ML + CL	6/8 9/10	Light yellowish brown mottled w/yellowish red	98.1	
			80.3	
	3/4 8/8			
SM	11/10	Silty sand	38.0	
CL	4/5 /7	Sandy clay 5-15% fine sand Light yellowish brown mottled w/yellowish red	93.8	

* Dark yellowish brown

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

VERTICAL SCALE 1" = 5.0'

WELL 125 DATE DRILLED 6/10/82

STUDY AREA Active Burning Grounds

ELEVATION TOP OF STEEL CASING = 196.04

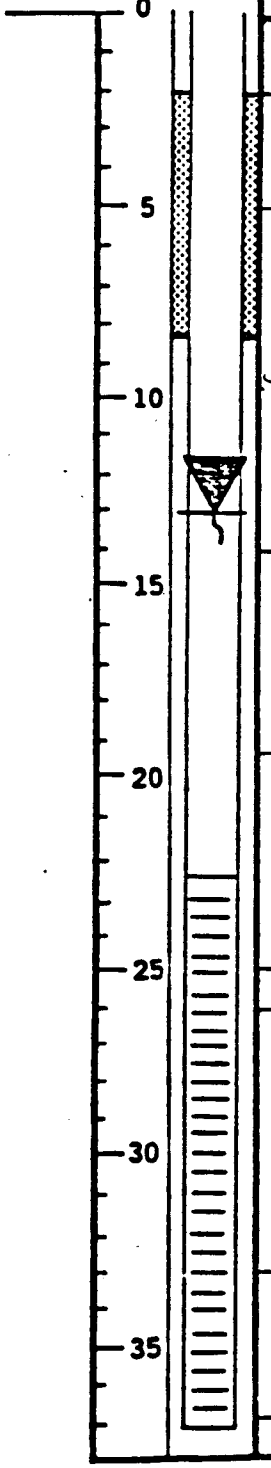
ELEVATION TOP OF PVC RISER = 194.99

ELEVATION OF GROUND SURFACE = 193.01

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



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM	2/2 2/4	Clayey silty sand Lt. yellowish brown w/strong brown	20	
CL		Slightly sandy clay 15% fine sand		
SM-SC	12/20 /20 12/12 15/15	Slightly cemented & highly compacted clayey silty sand 15% silt 7% clay Pinkish grey mottled w/strong brown	22.0	
SM	7/9 9/11	Silty sand Pinkish grey mottled w/strong brown	20	
CL	15/15 19/20	Slightly sandy clay w/seams of silty sand Pinkish grey mottled w/strong brown		
SM		Slightly clayey silty sand		
CL	10/10 12/12 5/10 11/12	Slightly sandy clay 7% fine sand Pinkish grey mottled w/strong brown		
SM	1/0 0/0	Silty sand Pinkish grey	15	

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

VERTICAL SCALE 1" = 5.0'

WELL 126 DATE DRILLED 6/28/82

STUDY AREA Active Burning Grounds

ELEVATION TOP OF STEEL CASING = 199.10

ELEVATION TOP OF PVC RISER = 198.68

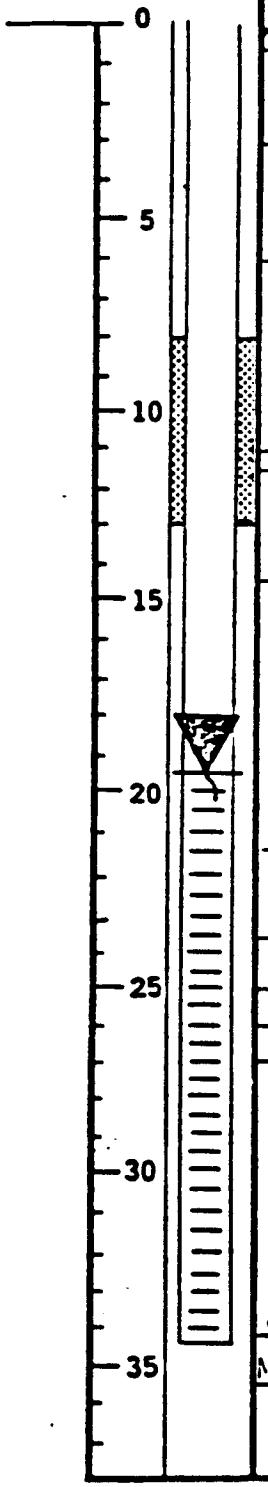
ELEVATION OF GROUND SURFACE = 196.21

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

006208



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	WATER PERMEABILITY
SM		Silty sand		
SM	4/5 /4	Very silty sand Strong brown	30	
CL	4/5	Very sandy clay 40% fine sand Pale brown & red		
SC	11/12	Clayey sand Light grey mottled with yellowish brown	20	
SM	4/7	Silty sand		
SC	9/10	Clayey sand Light grey mottled with yellowish brown	20	
SM	7/7 9/9	Silty sand	15	9.7 x 10^{-3} ft/min
		Very pale brown mottled with strong brown	12.4	
SC	3/3 3/3	Clayey sand Very pale brown mottled with strong brown		
CL		Sandy clay seam		
SM		Silty sand-lt. yellowish brown	31.2	
CL	10/14 7/7	Slightly sandy clay 15% fine sand		
ML	2/3 2/4	Clayey sandy silt 35% fine sand Light grey mottled with yellowish brown	74.4 61.9	
SM				
ML-CL	7/10 /15	Clayey silt seams	65.7	

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

VERTICAL SCALE 1" = 5.0'

WELL 129 DATE DRILLED 7/10/82
STUDY AREA Active Burning Grounds

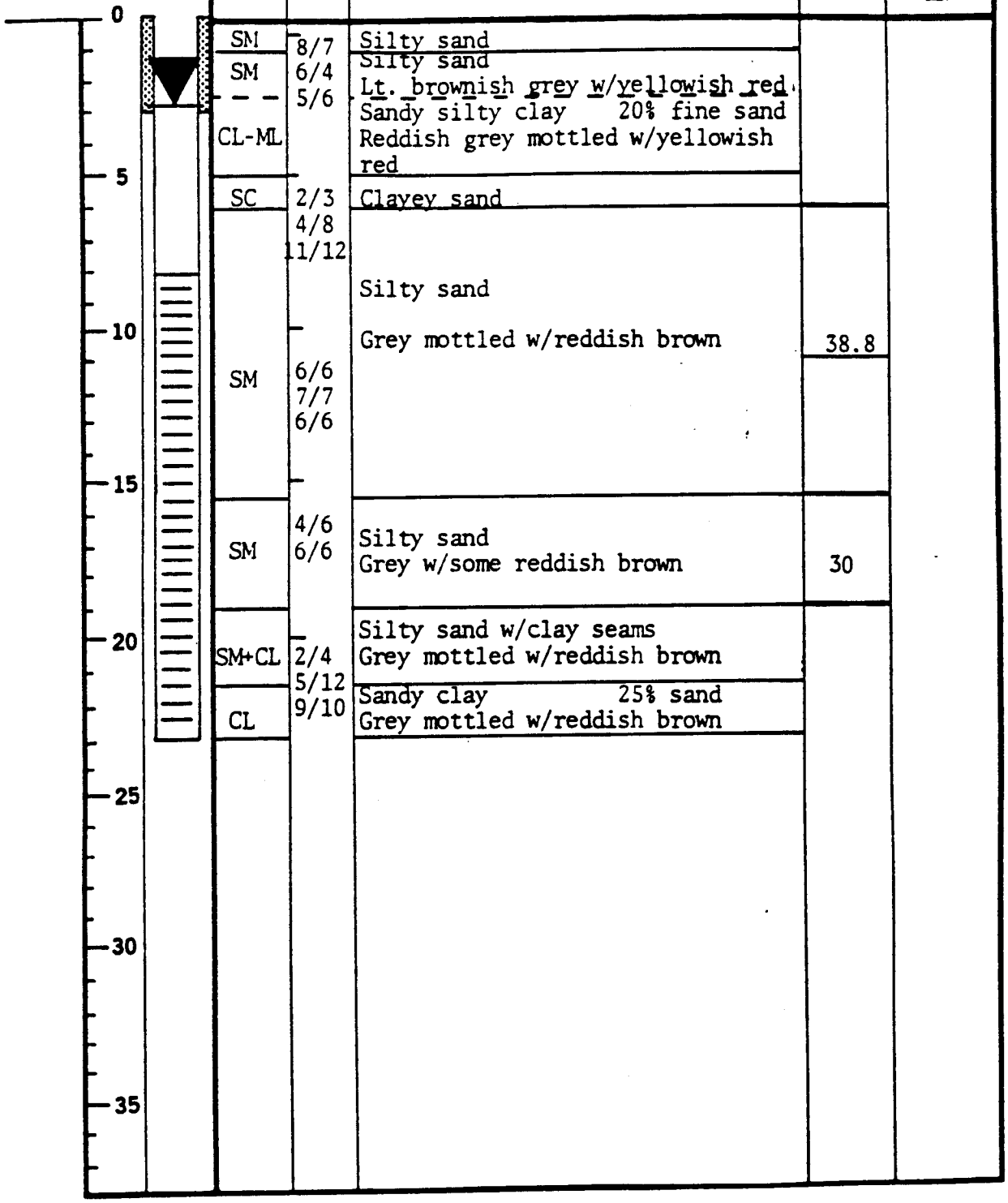
ELEVATION TOP OF STEEL CASING = 196.93
ELEVATION TOP OF PVC RISER = 196.58
ELEVATION OF GROUND SURFACE = 194.06

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

006209



VISUAL U/S	BLOW COUNT*	MATERIAL CLASSIFICATION	% FINES	AQUIFER PERMEABILITY
SM	8/7	Silty sand		
SM	6/4	Silty sand		
— —	5/6	Lt. brownish grey w/yellowish red		
CL-ML		Sandy silty clay 20% fine sand Reddish grey mottled w/yellowish red		
SC	2/3	Clayey sand		
SM	4/8 11/12	Silty sand Grey mottled w/reddish brown	38.8	
	6/6 7/7 6/6			
SM	4/6 6/6	Silty sand Grey w/some reddish brown	30	
SM+CL	2/4 5/12	Silty sand w/clay seams Grey mottled w/reddish brown		
CL	9/10	Sandy clay 25% sand Grey mottled w/reddish brown		

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

VERTICAL SCALE 1" = 5.0'

WELL 130 DATE DRILLED 6/7/82

STUDY AREA Flashing Area

ELEVATION TOP OF STEEL CASING = 177.36 ft

ELEVATION TOP OF PVC RISER = 176.71 ft

ELEVATION OF GROUND SURFACE = 174.44 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

LOGS OF WELL BORINGS AND WELL CONSTUCTION DETAILS
C-1 THRU C-10

Monitor Well Installation

006211

Client: Camp, Dresser & McKee, Inc. Job No.: 84-894 Date Drilled: 7/17-19/84 Well No.: C-1

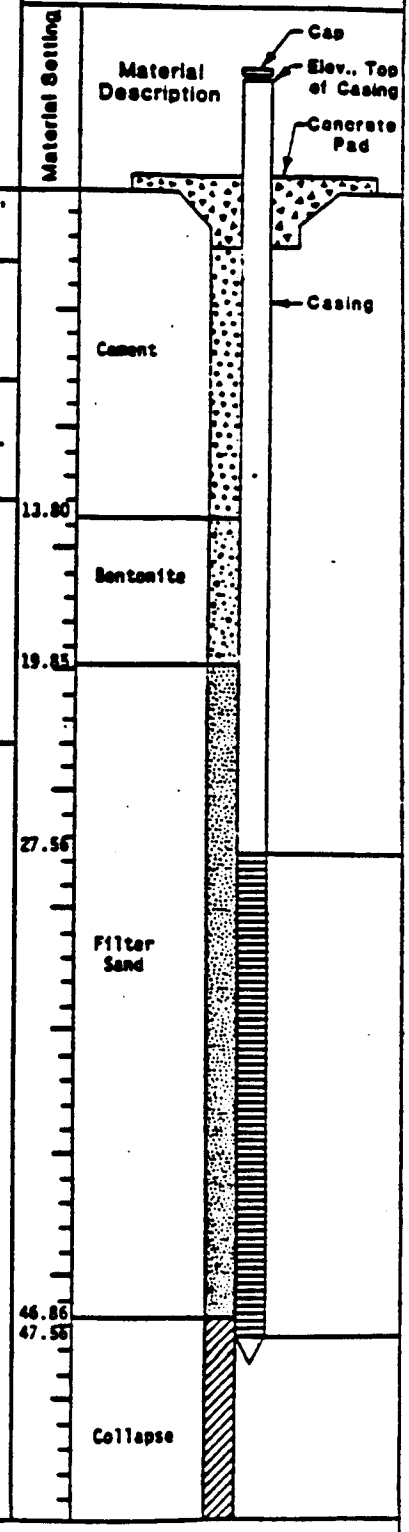
Site: I.A.P., Karnack, Texas Elevation: Pad _____ Top of PVC Casing _____

Total Depth: 56.5 feet Casing Size & Type: 4"ID Sch. 80 PVC, Flush Joint* Screen Size: 4"ID, .010" slots

Comments: *Additional 10' of screenadded by use of coupling joint secured with pop rivits.

Depth	Symbol	Stratigraphy	Sample Description
0	SM		SILTY SAND, poorly graded, 90% fine sand (red), 10% silt (gray), damp, loose, red and gray.
5	MH		SANDY SILT, highly plastic, 20% very fine sand, soft, damp, red and gray.
10	SP		SAND, uniform fine sand, < 8% silt, compact, moist, red and gray.
15	MH		SILT, highly plastic, stiff, damp, red and gray.
20	MH		SILT, similar to above except all gray.
25	SP		SAND, uniform fine, loose, saturated, red.
30	SP		SAND, similar to above.
35	SP		SAND, similar to above.
40	SP		SAND, similar to above. N=15
45	SP		SAND, similar to above. N=27
50	SP		SAND, similar to above. N=24

Completion Data



Underground Resource Management, Inc.
Austin, Texas

URM-A3e

006212

Monitor Well Installation

Client: Camp, Dresser & McKee, Inc. Job No.: 84-894 Date Drilled: 7/17-19/84 Well No.: C-1

Site: L.A.P., Karnack, Texas Elevation: Pad _____ Top of PVC Casing _____

Total Depth: 56.5 feet Casing Size & Type: 4"ID Sch. 80 PVC, Flush Joint Screen Size: 4"ID, .010" slots

Comments: _____

Depth	Symbol	Stratigraphy	Sample Description	Completion Data: Material Setting	Completion Data: Material Description
55	SP		SAND, similar to above. N=47		Collapse
				56.5	
60					
65					
70					
75					
80					
85					
90					
95					
100					

Underground Resource Management, Inc.
Austin, Texas

Monitor Well Installation

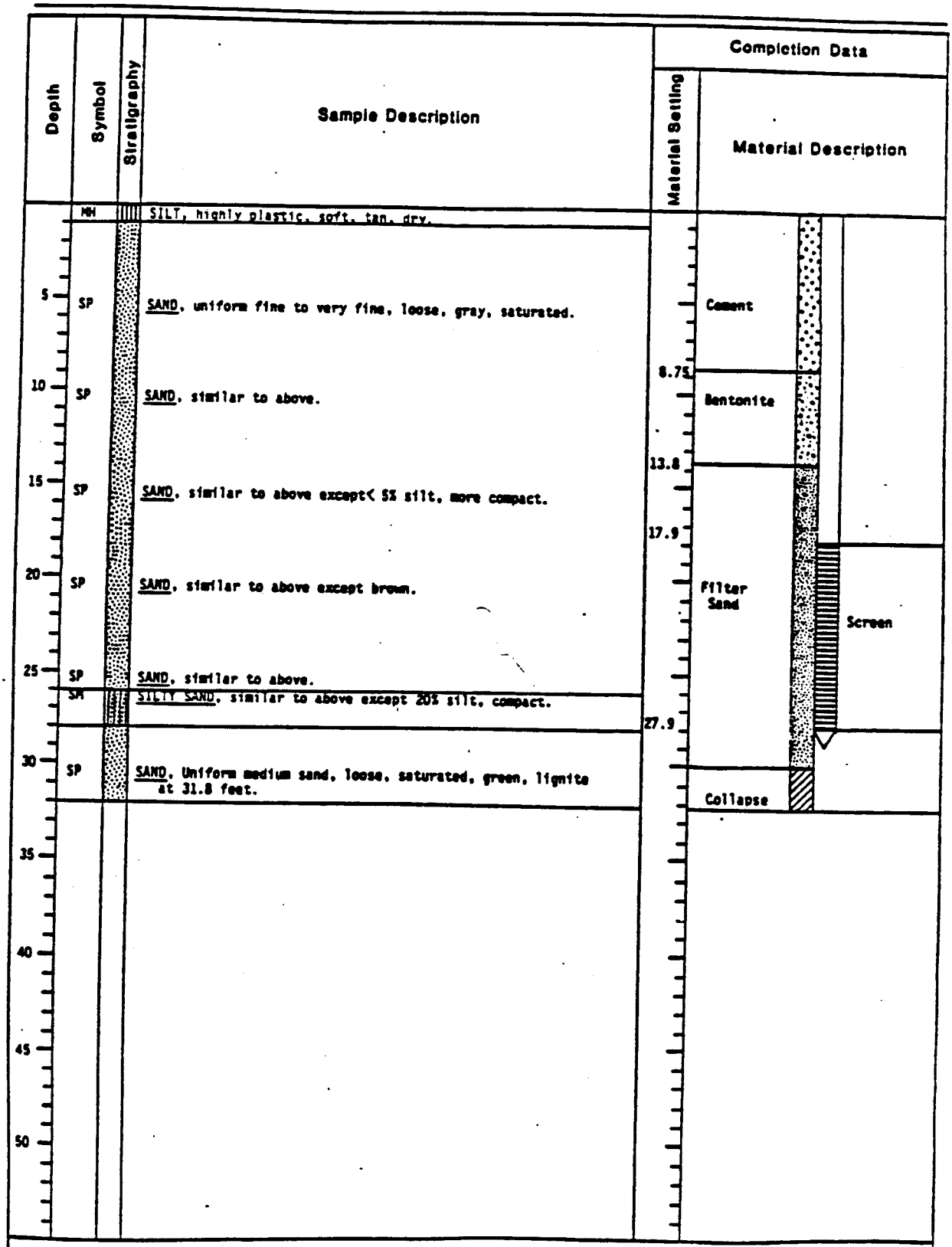
006213

Client: Camp, Dresser & McKee, Inc. Job No.: 84-894 Date Drilled: 7/29-30/84 Well No.: C-2

Site: L.A.P., Karnack, Texas . Elevation: Pad _____ Top of PVC Casing _____

Total Depth: 32 feet Casing Size & Type: 4"ID Sch. 80 PVC, Flush Joint Screen Size: 4"ID, .010" slots

Comments: _____



Underground Resource Management, Inc.
Austin, Texas

JRM-Acc

Monitor Well Installation

006214

Client: Camp, Dresser & McKee, Inc. Job No.: 84-894 Date Drilled: 7/21-22/84 Well No.: C-3

Site: I.A.P. Karnack, Texas Elevation: Pad _____ Top of PVC Casing _____

Total Depth: 63.7' Casing Size & Type: 4"ID Sch. 80 PVC, Flush Joint Screen Size: 4"ID, .010" slots

Comments: _____

Depth	Symbol	Stratigraphy	Sample Description
	MH		CLAYEY SILT, highly plastic, < 5% very fine sand, 10% carbonaceous clay in nodules, dry, brown silt - white clay.
5	CH		CLAY, highly plastic, hard 4.0 TSF, brown, scattered black organic spots, damp.
	SM		SILTY SAND, uniform fine sand, 20% silt, dense, orange, damp, grades downward to a SAND (SP) with <5% silt.
10	CH		CLAY, highly plastic, < 5% fine sand, hard, brown, damp.
	SP		SAND, uniform fine, compact, damp, orange.
15	SP		SAND, similar to above except loose and moist.
20	SP-ML		SAND, similar to above except saturated, alternating with partings of: SILT, low plastic, 5% very fine sand, stiff, gray. N=12
25	SP-ML		SAND and SILT, similar to above. N=11
30	SM		SILTY SAND, poorly graded, 70% very fine sand, 30% silt (low plasticity), dense, saturated, orange and gray. N=22
35	SM		SILTY SAND, similar to above. N=19
40	CH		CLAY, highly plastic, stiff, < 5% very fine sand, gray, saturated.
45	CL		SANDY CLAY, similar to above except 15% very fine sand, moderately plastic.
50	SP-CL		SAND, uniform medium, loose, saturated, gray, alternating with beds of: SANDY CLAY, low plasticity, 20% very fine sand, soft, gray, saturated.

Completion Data

Material Setting: Cement; 40.9 Bentonite; 47.8 Filter Sand

Material Description: Cap; Elev., Top of Casing; Concrete Pad; Casing

Underground Resource Management, Inc.
Austin, Texas

URM-R3a

006215

Monitor Well Installation

Client: Camp, Dresser & McKee, Inc. Job No.: 84-834 Date Drilled: 7/21-22/84 Well No.: C-3

Site: L.A.P., Karnack, Texas Elevation: Pad _____ Top of PVC Casing _____

Total Depth: 63.7' Casing Size & Type: 4"ID Sch. 80 PVC, Flush Joint Screen Size: 4"ID, .010" slots

Comments: _____

Depth	Symbol	Stratigraphy	Sample Description
55	SP-CL		
	SP		SAND, uniform medium sand, loose, saturated, gray.
60	CH		CLAY, highly plastic, hard, saturated, dark green.
65			
70			
75			
80			
85			
90			
100			
110			

Completion Data

Material Setting	Material Description
51	
	Filter Sand
	Screen
61	
62	Collapse

Underground Resource Management, Inc.
Austin, Texas

Monitor Well Installation

006216

Client: Camp, Dresser & McKee, Inc. Job No.: 84-894 Date Drilled: 7/25-26/84 Well No.: C-4

Site: L.A.P., Karnack, Texas Elevation: Pad _____ Top of PVC Casing _____

Total Depth: 55.5 feet Casing Size & Type: 4"ID, Sch. 80 PVC, Flush Joint Screen Size: 4"ID, .010" slots

Comments: _____

Depth	Symbol	Stratigraphy	Sample Description
	MH		SILT, highly plastic, soft, dry, buff color, roots.
5	CL		SANDY CLAY, moderately plastic, 20% very fine sand, hard 4.5 TSF, damp, tan and red, sand is scattered in matrix.
10	CL		SANDY CLAY, similar to above except sand is in defined partings.
15	CH		SILTY CLAY, highly plastic, 30% silt, very stiff, dry to damp.
20	SP		SAND, uniform fine, compact, saturated, red.
25	CH		CLAY, highly plastic, < 5% very fine sand, stiff, damp, blue and red.
30	SP		SAND, uniform very fine, compact, saturated, tan.
35	SP		SAND, similar to above except tan (35.0 feet - 36.2 feet) and dark brown (36.2 feet - 37.0 feet), minor (<5%) silt.
40	SP		SAND, similar to above except loose.
	CH		CLAY, highly plastic, stiff, saturated, brown.
45	CH		CLAY, similar to above except green.
	SP		SAND, uniform medium sand, loose, saturated, green.
50	SP		SAND, similar to above.

Completion Data

Material Setting: Cement; 33.7; Bentonite; 43.65; Filter Sand; 48.75; Collapse; 53.65

Material Description: Cap; Elev., Top of Casing; Concrete Pad; Casing; Screen

Underground Resource Management, Inc.
Austin, Texas

URM-R3e

Monitor Well Installation

006217

Client: Camp, Dresser & McKee, Inc. Job No.: 84-894 Date Drilled: 7/25-26/84 Well No.: CW-17

Site: L.A.P., Karnack, Texas Elevation: Pad _____ Top of PVC Casing _____

Total Depth: 55.5 feet Casing Size & Type: 4"ID Sch. 80 PVC, Flush Joint Screen Size: 4"ID, .010" slots

Comments: _____

Depth	Symbol	Stratigraphy	Sample Description	Completion Data: Material Setting	Completion Data: Material Description
55	SP		SAND, similar to above.		Collapse
	SP		SAND, similar to above except coarse and sub-angular (55.3 - 55.4 Lignite).		
	CH		CLAY, highly plastic, soft, saturated, blue.		

60 65 70 75 80 85 90 95 100

Underground Resource Management, Inc.
Austin, Texas

URM-RC3

006218

Monitor Well Installation

Client: Camp, Dresser & McKee, Inc. Job No.: 84-894 Date Drilled: 7/27-28/84 Well No.: C-5

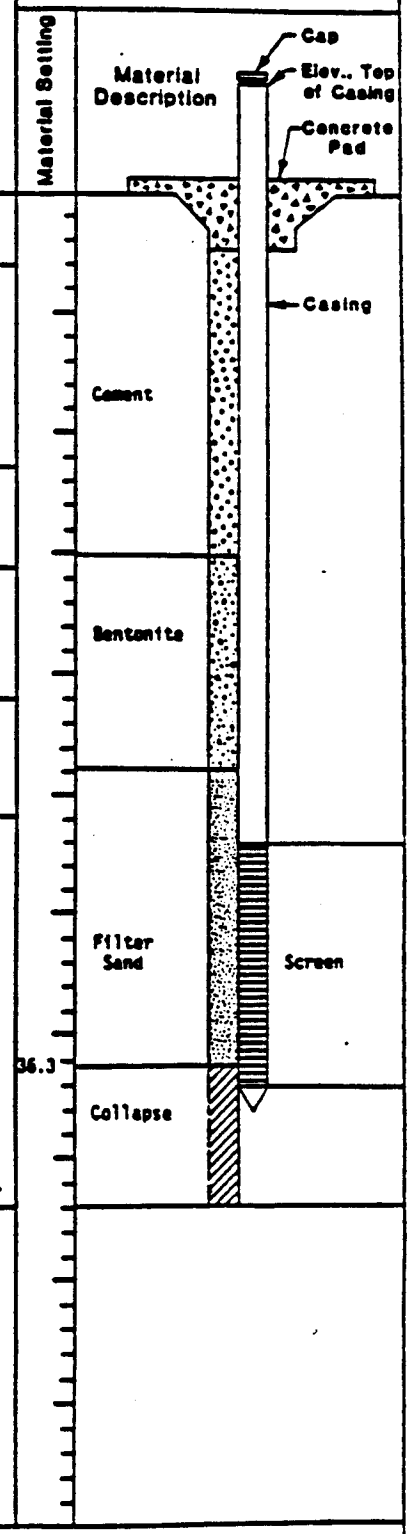
Site: L.A.P., Karnack, Texas Elevation: Pad _____ Top of PVC Casing _____

Total Depth: 42' Casing Size & Type: 4"ID Sch. 80 PVC, Flush Joint Screen Size: 4"ID, .010" slots

Comments: _____

Depth	Symbol	Stratigraphy	Sample Description
	SP		SAND, uniform very fine, loose, damp, red.
5	SM		SILTY SAND, poor grading, 80% very fine sand, 20% silt, hard, damp, red.
10	SM		SILTY SAND, similar to above.
	SP		SAND, uniform medium, loose, saturated, gray.
15	SP		SAND, similar to above.
	MH		SILT, highly plastic, stiff, moist, gray.
20	MH		SILT, similar to above.
	ML		SANDY SILT, moderately plastic, 20% very fine sand, soft, saturated, gray.
25	ML		SANDY SILT, similar to above except very stiff.
	SP		SAND, uniform very fine, < 5% silt, compact, saturated, gray.
30	SP		SAND, uniform medium sand, loose, saturated, green.
35	SP		SAND, similar to above except medium to coarse sand.
40	SP		SAND, similar to above except coarse lignite in lower 3 inches.
45			
50			

Completion Data



Underground Resource Management, Inc.
Austin, Texas

URM-A3a

Monitor Well Installation

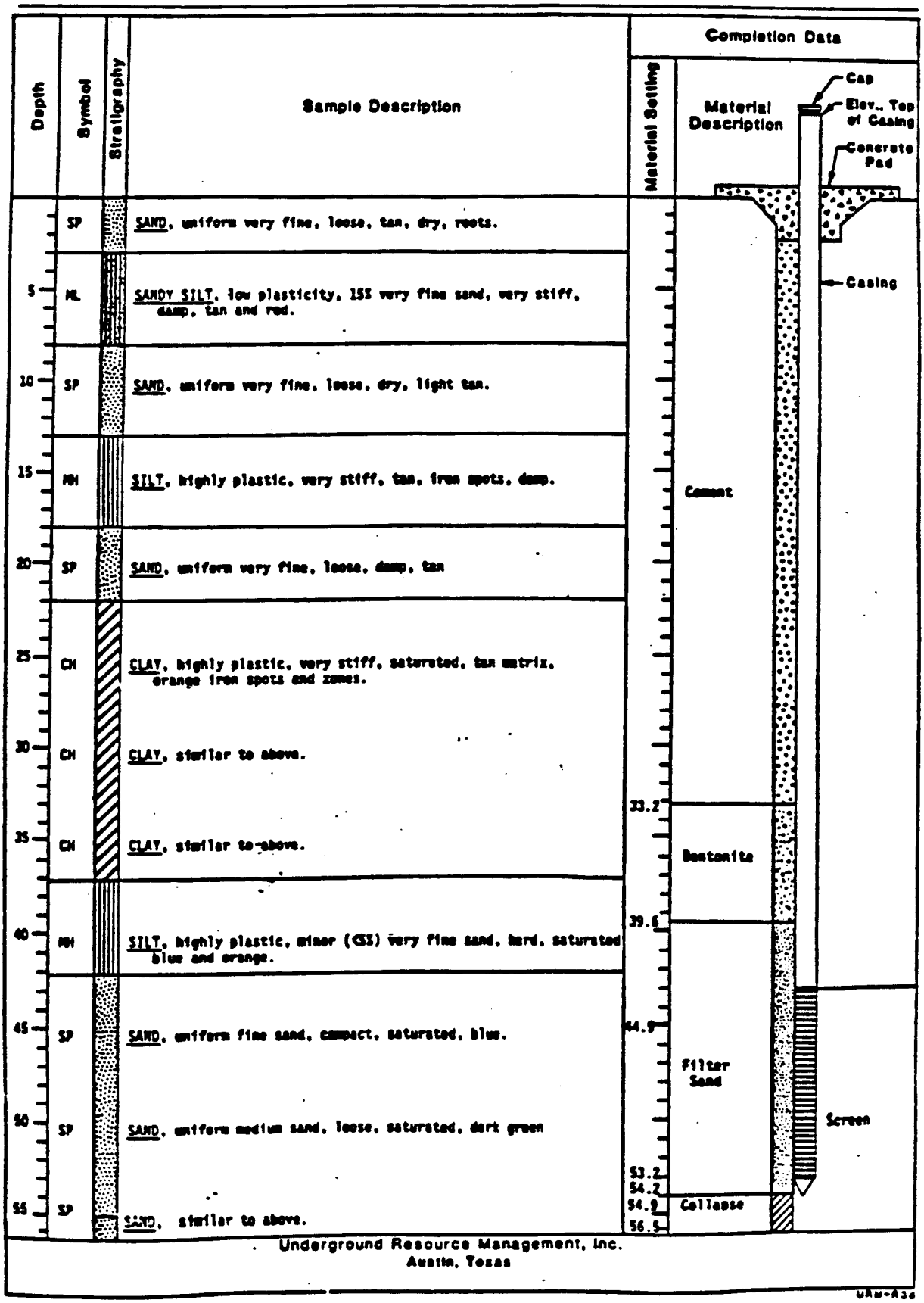
006219

Client: Camp, Dresser & McKee, Inc. Job No.: 84-094 Date Drilled: 7/19-20/84 Well No.

Site: I.A.P., Karnack, Texas Elevation: Pad Top of PVC Casing

Total Depth: 56.5 feet Casing Size & Type: 4"ID Sch. 80 PVC, Flush Joint Screen Size: 4"ID, .010" slots

Comments:



Underground Resource Management, Inc.
Austin, Texas

URM-A3c

Monitor Well Installation

006220

Client: Camp Dresser & McKee Job No.: J85-874 Date Drilled: 2/1/86 Well No.: C-7

Site: LHAAP Elevation: GL _____ Top of PVC Casing _____

Total Depth: 36 feet Casing Size & Type: 4-inch Schedule 40 Flush-joint Threaded PVC Screen Size: .010 PMS

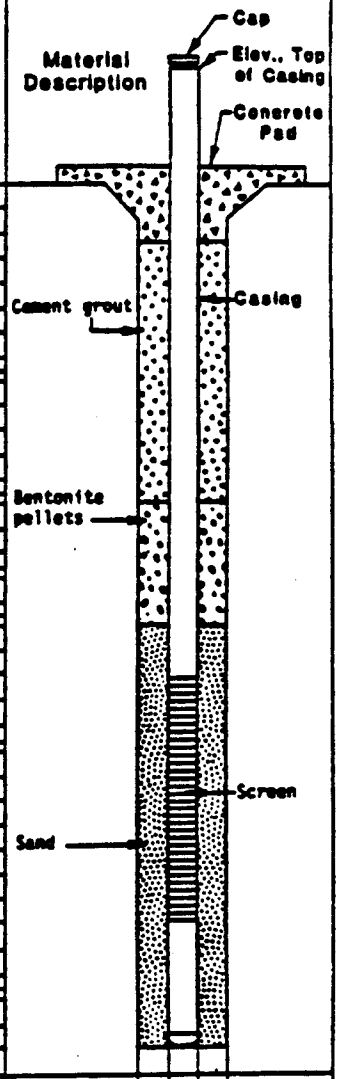
Comments: _____

Depth	Symbol	Stratigraphy	Sample Description
0	CH		SANDY CLAY, 10-20% very fine sand, stiff, moist, tan and red mottled, roots, iron nodules.
10	SP/SM		SAND, uniform fine, compact, wet, iron stains, 3-5% silt.
15	MH		SILT, highly plastic, stiff, wet, gray, mottled with iron stains.
	SM		SILTY SAND, 70-80% fine to medium sand, wet, dark red, some 1/4" mud clasts (rounded).
20	MH		CLAYEY SILT, highly plastic, stiff, moist, gray, slight iron mottling.
25	SM		SILTY SAND, 20-30% silt, very fine, saturated, tan and red.
30	SM		SILTY SAND, 60-70% fine sand, compact, wet, red and gray laminated.
35	ML		SILT, moderate plasticity, stiff, moist, tan and red mottled, 10-20% very fine sand.
40			
45			
50			

Completion Data

Material Setting

Material Description



Underground Resource Management, Inc.
Austin, Texas

006221

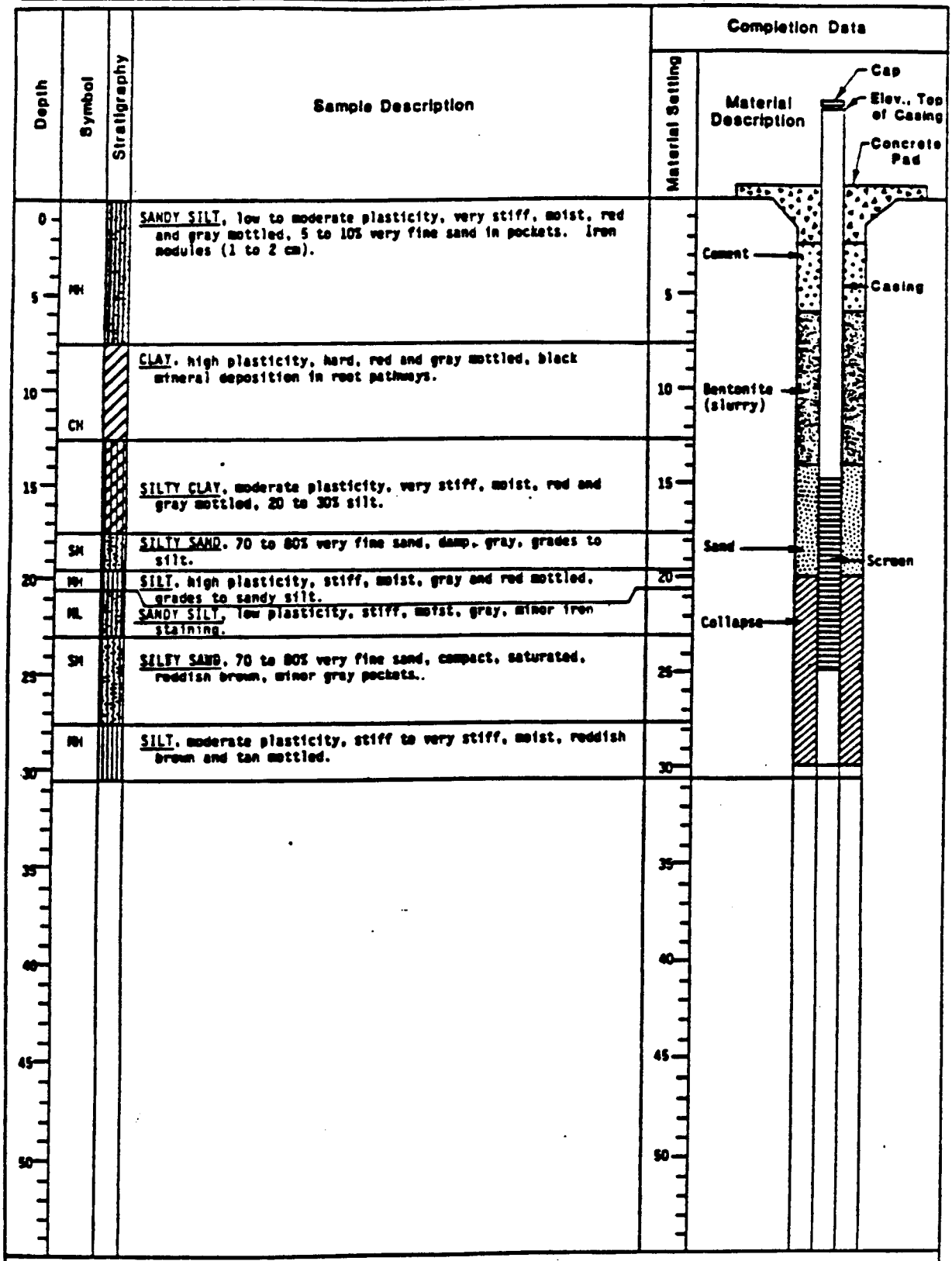
Monitor Well Installation

Client: Camp, Dresser & McKee Job No.: 385-874 Date Drilled: 2/26/86 Well No.: C-8

Site: Karnack, Texas Elevation: GL _____ Top of PVC Casing _____

Total Depth: 30 feet Casing Size & Type: 4-inch Flush-Joint Threaded PVC Screen Size: .010

Comments: _____



Underground Resource Management, Inc.
Austin, Texas

Monitor Well Installation

006222

Client: Camp, Dresser & McKee Job No.: 385-874 Date Drilled: 1/31/86 Well No.: C-9

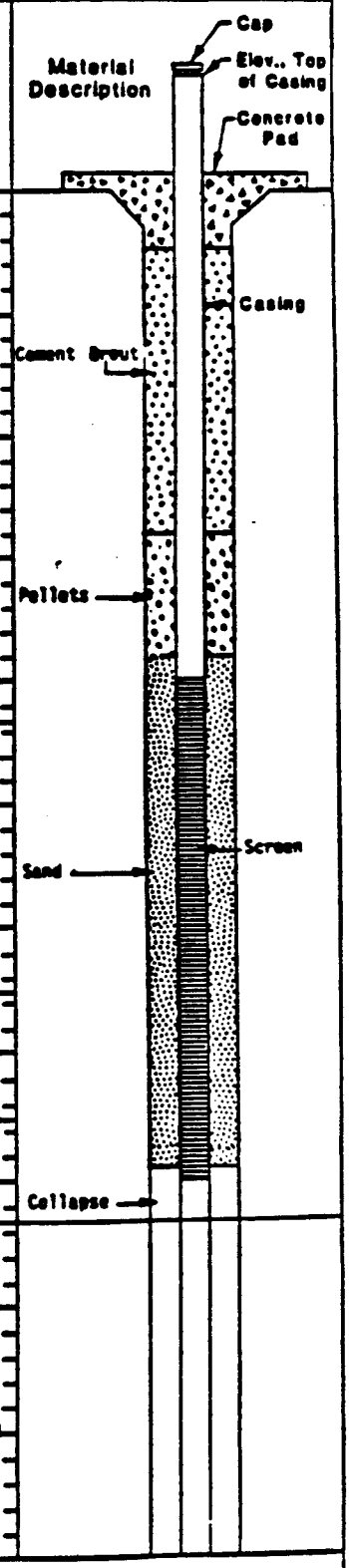
Site: Farnack, Texas Elevation: GL _____ Top of PVC Casing _____

Total Depth: 41.5 feet Casing Size & Type: 4-inch Flush-joint Threaded PVC Screen Size: .010 Millslot

Comments: _____

Depth	Symbol	Stratigraphy	Sample Description
0	ML		SANDY SILT, low plasticity, hard, dry, orange and tan mottled, sand in pockets and partings, roots, black mineral deposition in root pathways.
10	ML		SANDY SILT, similar to above.
15	ML		SANDY SILT, similar to above, minor very fine sand.
20	ML		SANDY SILT, similar to above.
25	SM		SILTY SAND, 70 to 80% fine to very fine sand, slightly moist, white, some iron stains, some black mineral dendrites.
			SILTY SAND, similar to above, moist/wet, less iron staining than above, silt disseminated and in partings.
30			SILTY SAND, similar to above, sand is very fine to silt, (low permeability).
35	ML		CLAYEY SILT, low plasticity, hard, slightly moist, gray with red laminations and partings.
40			SILTY CLAY, low plasticity, stiff, dry, red, silt in clean gray partings.
45			
50			

Completion Data



Underground Resource Management, Inc.
Austin, Texas

Monitor Well Installation

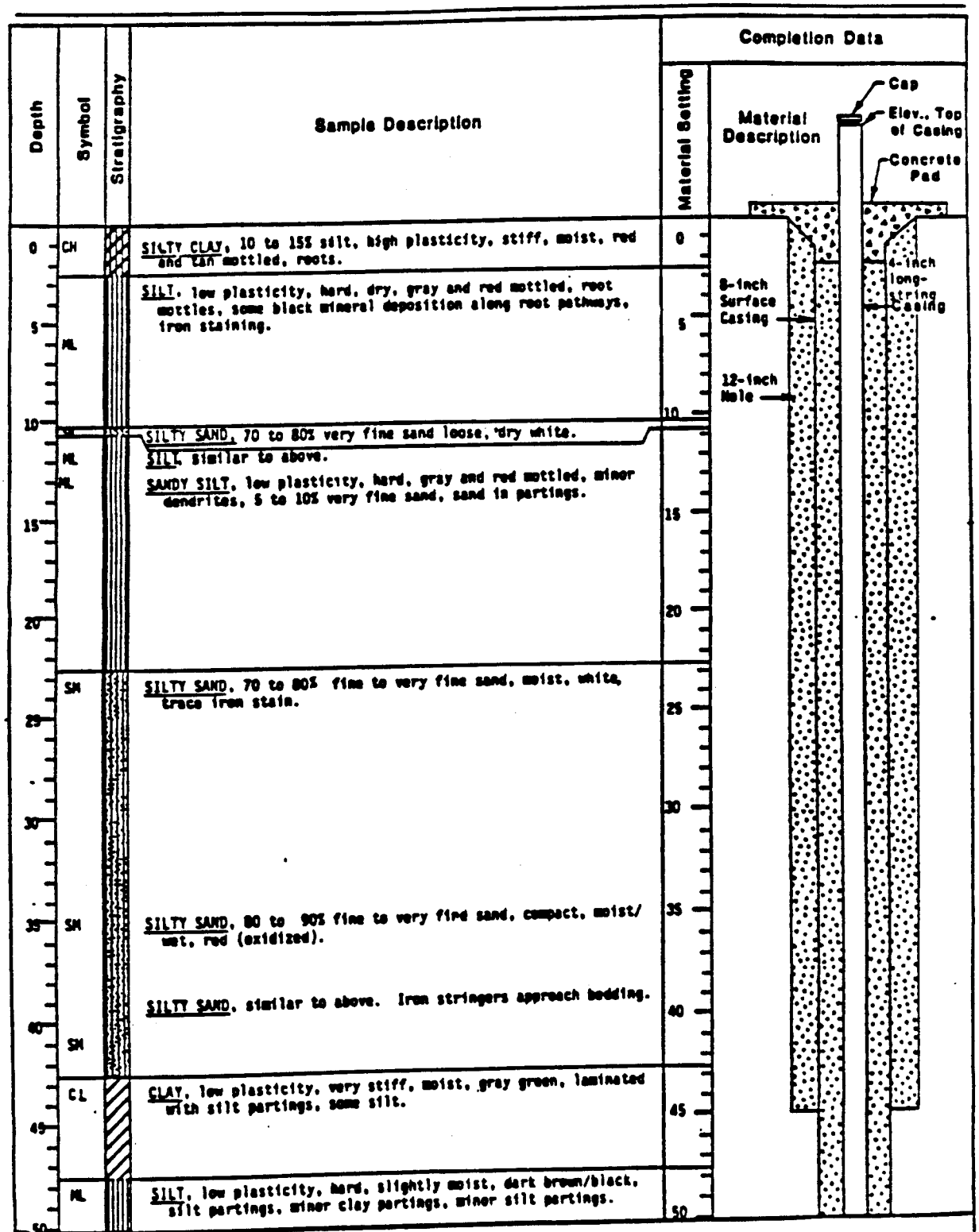
Client: Camp, Dresser & McKee Job No.: J85-874 Date Drilled: 2/28-2/29/86 Well No.: C-108

Site: LHAAP Elevation: GL _____ Top of PVC Casing _____

Total Depth: 81 feet Casing Size & Type: 8-inch Schedule 40 BE Surface Casing, 4-inch Flush-joint Threaded Schedule 40 PVC Long-string Screen Size: .010 Millslot

Comments: _____

Depth	Symbol	Stratigraphy	Sample Description
0	CH		SILTY CLAY, 10 to 15% silt, high plasticity, stiff, moist, red and tan mottled, roots.
5	ML		SILT, low plasticity, hard, dry, gray and red mottled, root mottles, some black mineral deposition along root pathways, iron staining.
10	SM		SILTY SAND, 70 to 80% very fine sand loose, dry white.
	ML		SILT, similar to above.
	ML		SANDY SILT, low plasticity, hard, gray and red mottled, minor dendrites, 5 to 10% very fine sand, sand in partings.
15			
20			
25	SM		SILTY SAND, 70 to 80% fine to very fine sand, moist, white, trace iron stain.
30			
35	SM		SILTY SAND, 80 to 90% fine to very fine sand, compact, moist/wet, red (oxidized).
40	SM		SILTY SAND, similar to above. Iron stringers approach bedding.
45	CL		CLAY, low plasticity, very stiff, moist, gray green, laminated with silt partings, some silt.
50	ML		SILT, low plasticity, hard, slightly moist, dark brown/black, silt partings, minor clay partings, minor silt partings.



Underground Resource Management, Inc.
Austin, Texas

URM-R3b

Monitor Well Installation

096224

Client: Camp, Dresser & McKee Job No.: JBS-874 Date Drilled: 2/28-2/29/86 Well No.: C-108

Site: LHAAP Elevation: GL Top of PVC Casing

Total Depth: 81 feet Casing Size & Type: 8-inch Schedule 40 PE Surface Casing, 4-inch Flush-joint Threaded Schedule 40 PVC Long-string Screen Size: .010 Millslot

Comments:

Depth	Symbol	Stratigraphy	Sample Description	Material Setting	Completion Data: Material Description
			SILT, same as above.		
55	SM		SILTY SAND, 70 to 80% fine sand, dark brown to black, slightly moist, lignite, silt and sand partings, clay lenses.	55	Cement Grout; Casing
60	ML		SILT, low plasticity, moist, brown to black, lenses of clay, pockets of fine sand (erosional bases), lignite.	60	Bentonite Pellets
65	SM		SILTY SAND, 70 to 80% fine to very fine sand, moist, gray, clay stringers.	65	
70	SM		SILTY SAND, similar to above.	70	Sand
75	SM		SILTY SAND, similar to above.	75	Screen
80	SM		SILTY SAND, similar to above.	80	

Underground Resource Management, Inc.
Austin, Texas

LOGS OF WELL BORINGS AND WELL CONSTRUCTION DETAILS
MW-1 THRU MW-23

Hole No. MW-1

006226

DRILLING LOG	DIVISION: SWD	INSTALLATION: FWD	SHEET 1 OF 1 SHEETS
1. PROJECT: GROUND-WATER MONITORING WELLS		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): LONGHORN AAP		11. DATUM FOR ELEVATION SHOWN (MSL or USC&GS):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-1		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 17; UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 2 SEPT. 87; COMPLETED 3 SEPT. 87	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 199.73	
9. TOTAL DEPTH OF HOLE: 38.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie L. Stokes	

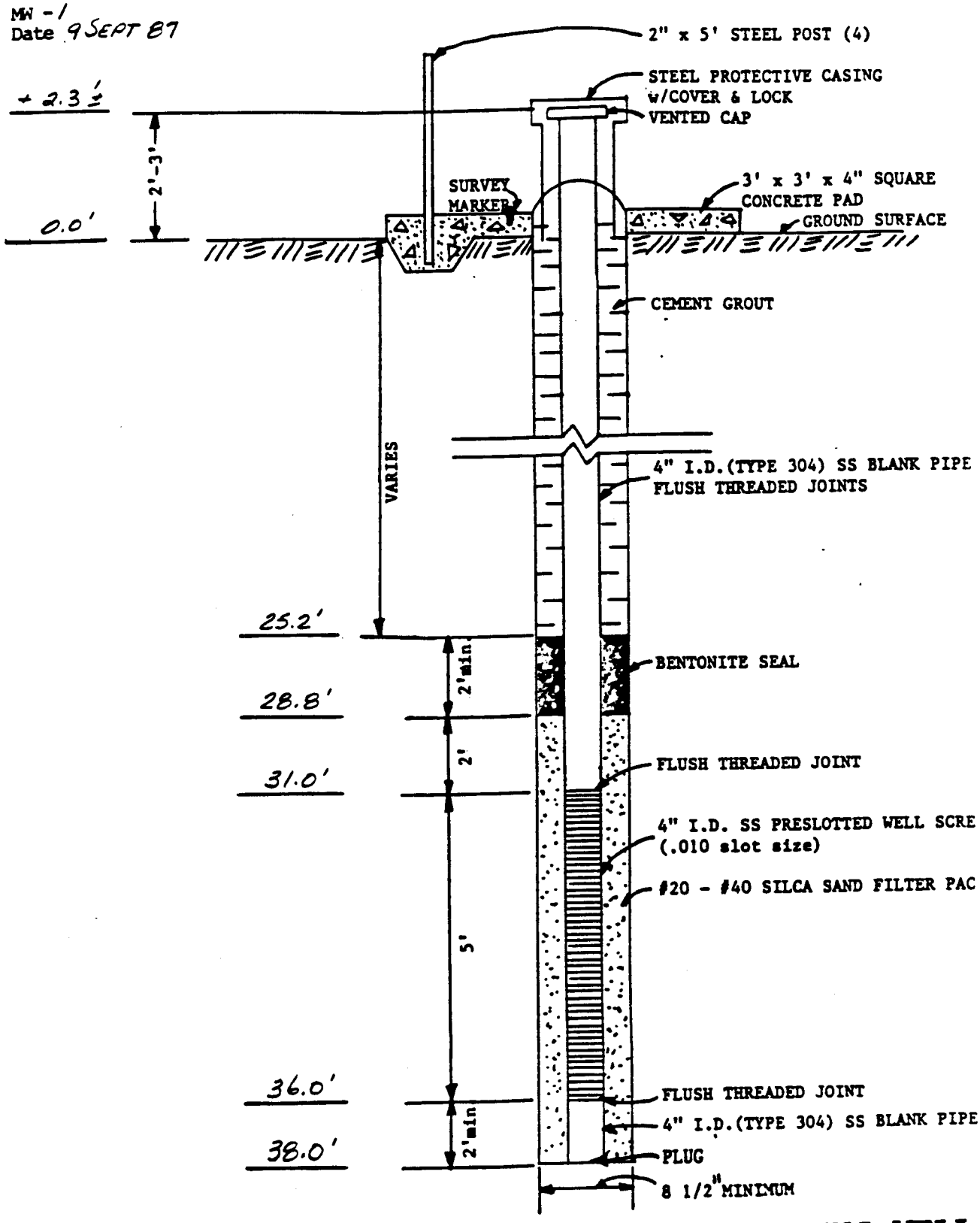
ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
	0.0		0.0' To 3.0' SAND: FINE GRAINED; REDDISH BROWN; MEDIUM DRY; SILTY; CLAYEY FROM 2.0'-3.0' 3.0' To 8.0' CLAY: 3.0'-6.0': MEDIUM-HIGH PLASTICITY; RED & LIGHT GRAY TO RED FROM 4.0'± VERY STIFF-HARD; DAMP; TRACE OF SILTY SAND TO 4.0'± 6.0'-8.0': LOW-MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF; DAMP; VERY SILTY; SANDY 8.0' To 24.2' SILT: 8.0'-20.0': LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM MOIST; SANDY; VERY CLAYEY WITH THIN SILTY CLAY LAMINATIONS 20.0'-24.2': LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; VERY MOIST-WET; SANDY		A B C D E F G H I	1. WATER LEVEL: NOTE: FREE WATER BEGAN ENTERING BORING AT 22.0'±; LEVEL WAS AT 23.0' AFTER 24 HRS 2. JAR SAMPLES: A: 0.0' - 2.0' B: 2.0' - 3.0' C: 3.0' - 4.0' D: 4.0' - 6.0' E: 6.0' - 8.0' F: 8.0' - 10.0' G: 10.0' - 15.0' H: 15.0' - 20.0' I: 20.0' - 24.2' J: 24.2' - 26.5' K: 26.5' - 31.5' L: 31.5' - 34.4' M: 34.4' - 38.0' 3. JAR SAMPLES: (CHEMICAL TESTS) CH-1 & 1A: 2.0' CH-2 & 2A: 10.0'
	20					4. DRILLING: 10" FLIGHT AUGER: 0.0' - 37.0' NOTE: BORING BEGAN SQUEEZING IN FROM 21.0'±
11/87 ▼ 8/88			24.2' To 26.5' SAND: FINE GRAINED; YELLOWISH BROWN; SATURATED; VERY SILTY 26.5' To 34.4' CLAY: MEDIUM-HIGH PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP; WITH SCATTERED SILTY SAND LAMINATIONS		J K	NOTE: SET 8" STEEL CASING TO 37.0' 8" FLIGHT AUGER: 37.0' - 38.0' 5. NOTE: MONITORING WELL WAS COMPLETED & DEVELOPED 10 SEPT. 87; REFER TO CONSTRUCTION DETAIL SHEET.
	38.0		34.4' To 38.0' T.D. SILT: LOW-MEDIUM PLASTICITY; YELLOWISH BROWN; SATURATED; SANDY; MODERATELY CLAYEY T.D. 38.0'		L M	6. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT; NO MEASURABLE AMOUNTS WERE PRESENT.
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: LONGHORN AAP. HOLE NO. MW-1

006227

LONGHORN AAP
MW -1
Date 9 SEPT 87



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-2

006228

DRILLING LOG	DIVISION: SWD	INSTALLATION: FWD	SHEET 1 OF 2 SHEETS
1. PROJECT: GROUND-WATER MONITORING WELLS		10. SIZE AND TYPE OF BIT: 8" AUGER	
2. LOCATION (Coordinates or Station): LONGHORN AAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-2		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 18 / UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 27 AUG. 87 / COMPLETED 28 AUG. 87	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 195.18	
9. TOTAL DEPTH OF HOLE: 40.4'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: James R. Stokes	

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
	0.0		0.0' TO 2.0' SAND: FINE GRAINED; REDDISH BROWN; MEDIUM; DRY; VERY SILTY 2.0' TO 19.2' CLAY: 2.0'-6.0': MEDIUM-HIGH PLASTICITY; RED WITH LIGHT GRAY TO REDDISH BROWN FROM 4.0'±; VERY STIFF-HARD DOWN TO VERY STIFF FROM 4.0'±; DAMP; TRACE OF SILTY SAND TO NO SAND FROM 4.0'± 6.0'-14.2': MEDIUM PLASTICITY; REDDISH BROWN, YELLOWISH BROWN & LIGHT GRAY; STIFF; MOIST; VERY SILTY; SLIGHTLY SANDY 14.2'-19.2': LOW-MEDIUM PLASTICITY; REDDISH BROWN WITH LIGHT GRAY; MEDIUM; VERY MOIST; VERY SANDY WITH LAMINATIONS OF FINE SAND		A B C D E F G	1. WATER LEVEL: NOTE: FREE WATER BEGAN ENTERING BORING AT 20.8'±; LEVEL WAS AT 20.7' AFTER 24 HRS. 2. JAR SAMPLES: A: 0.0'-2.0' B: 2.0'-4.0' C: 4.0'-6.0' D: 6.0'-8.0' E: 8.0'-10.0' F: 10.0'-14.2' G: 14.2'-19.2' H: 19.2'-20.4' I: 20.4'-26.0' J: 26.0'-27.0' K: 27.0'-34.0' L: 34.0'-38.0' M: 38.0'-39.9' N: 39.9'-40.4'
11/92	20		19.2' TO 27.0' SILT: LOW PLASTICITY; YELLOWISH BROWN; MEDIUM; WET TO SATURATED FROM 20.4' TO VERY MOIST FROM 26.0'; SANDY TO VERY SANDY		H I	3. JAR SAMPLES (CHEMICAL TESTS): CH-1 & 1A: 2.0' CH-2 & 2A: 10.0' 4. DRILLING: 10" FLIGHT AUGER: 0.0'-40.0' NOTE: BORING BEGAN SQUEEZING IN FROM 20.0'± NOTE: SET 8" STEEL CASING TO 40.0' 8" FLIGHT AUGER: 40.0'-40.4'
8/80			27.0' TO 34.0' CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN & LIGHT GRAY; STIFF; MOIST; SLIGHTLY SILTY		J K	5. NOTE: MONITORING WELL WAS COMPLETED & DEVELOPED ON 1 SEPT. 87; REFER TO CONSTUCTION DETAIL SHEET.
	40		34.0' TO 39.9' SILT: LOW TO MEDIUM PLASTICITY FROM 38.0'; YELLOWISH BROWN WITH LIGHT GRAY TO YELLOWISH BROWN & REDDISH BROWN FROM 38.0'; MEDIUM; VERY MOIST; VERY SANDY; CLAYEY FROM 38.0'; WITH ABUNDANT		L M	6. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0'

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PROJECT: LONGHORN AAP

HOLE NO. MW-2

Hole No. MW-2

006229

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 2 SHEETS
1. PROJECT: GROUND-WATER MONITORING WELLS		10. SIZE AND TYPE OF BIT	
2. LOCATION (Coordinates or Station): LONGHORN AAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number): MW-2		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED	
5. NAME OF DRILLER		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 27 AUG. '87 / COMPLETED 28 AUG. '87	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE		18. TOTAL CORE RECOVERY FOR BORING %	
		19. SIGNATURE OF INSPECTOR: James R. Stokes	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	40.4		FERRUGINOUS STAINING FROM 38.0' 39.9' TO 40.4' T.D. CLAY: HIGH PLASTICITY; GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP 40.4' T.D.		N	OF BOREHOLE ADVANCEMENT; NO MEASURABLE AMOUNTS WERE PRESENT.
	60					
	80					

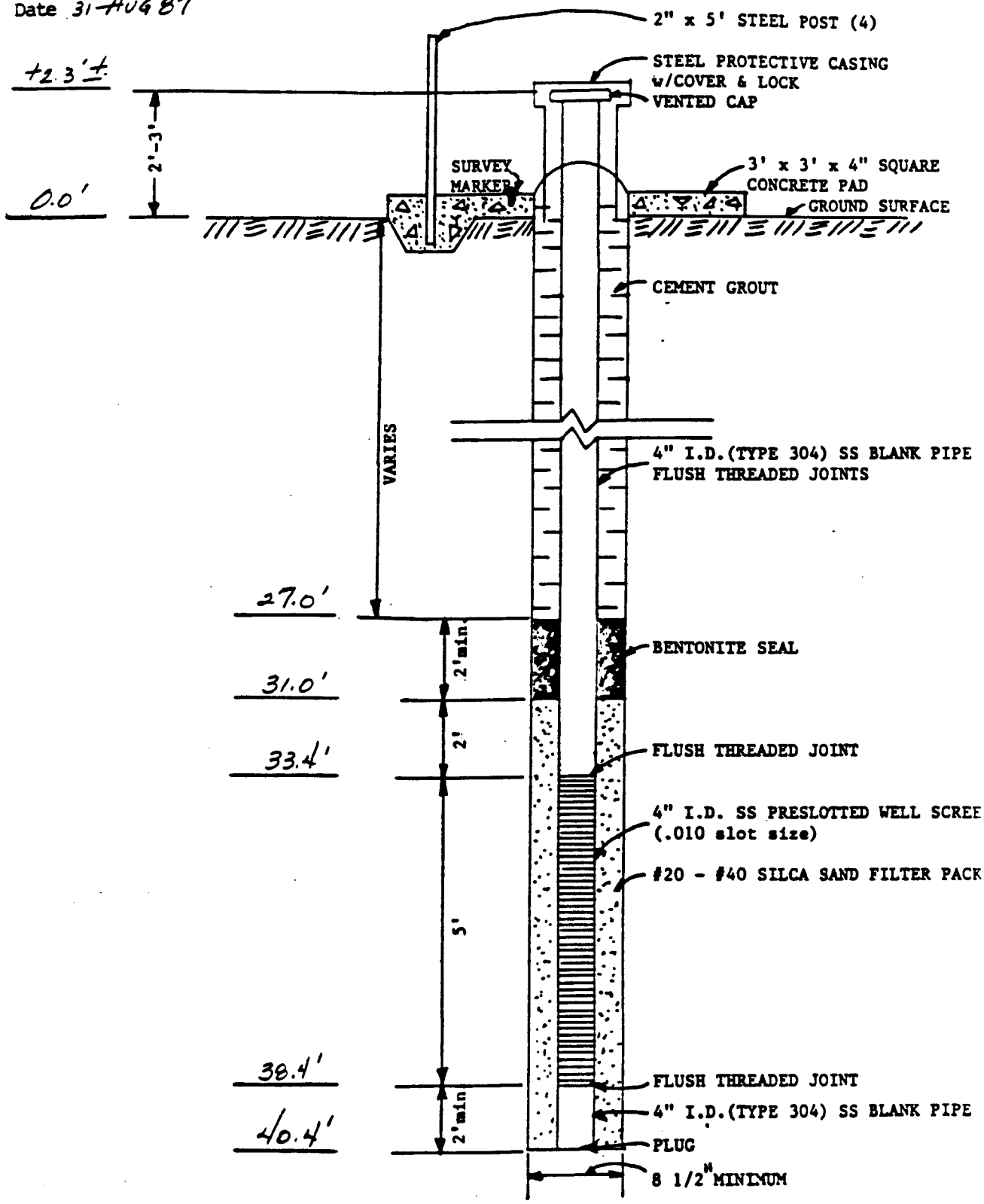
ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: I-[illegible] AAP

HOLE NO. AA-[illegible]

006230

LONGHORN AAP
MW -2
Date 31-AUG 87



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-3

006231

DRILLING LOG	DIVISION: SWD	INSTALLATION: FWD	SHEET 1 OF 2 SHEETS
1. PROJECT: GROUND-WATER MONITORING WELLS		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): LONGHORN AAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-3		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 15 / UNDISTURBED 0	
5. NAME OF DRILLER: T. SILTS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 11 SEPT. 87 / COMPLETED 12 SEPT. 87	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 194.02	
9. TOTAL DEPTH OF HOLE: 46.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A	
		19. SIGNATURE OF INSPECTOR: Jackie R. Stokes	

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIAL (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
	0.0		0.0' To 2.0' SAND: FINE GRAINED; LIGHT BROWN; MEDIUM; DRY; VERY SILTY		A	1. WATER LEVEL: NOTE: MATERIAL BECAME VERY MOIST TO WET FROM 16.0'± DURING DRILLING; LEVEL WAS 22.1' 24 HRS. AFTER WELL DEVELOPMENT.
			2.0' To 8.2' SILT: MEDIUM PLASTICITY TO LOW PLASTICITY FROM 4.0'; YELLOWISH BROWN WITH LIGHT GRAY WITH RED FROM 4.0'; STIFF; DAMP; SLIGHTLY SANDY TO SANDY FROM 4.0'		B C D	
			8.2' To 15.0' SAND: FINE GRAINED; YELLOWISH BROWN; MEDIUM; DAMP; SILTY		E F	2. JAR SAMPLES: A: 0.0' - 2.0' B: 2.0' - 4.0' C: 4.0' - 6.0' D: 6.0' - 8.2' E: 8.2' - 10.0' F: 10.0' - 15.0' G: 15.0' - 17.5' H: 17.5' - 20.5' I: 20.5' - 25.5' J: 25.5' - 29.0' K: 29.0' - 34.0' L: 34.0' - 37.8' M: 37.8' - 39.4' N: 39.4' - 43.5' O: 43.5' - 46.0'
			15.0' To 20.5' SILT: LOW PLASTICITY; YELLOWISH BROWN; VERY MOIST TO WET FROM 17.5'±; MEDIUM; VERY SANDY; WITH OCCASIONAL CLAY LAMINATION		G H	
11/92	20		20.5' To 29.0' SAND: FINE GRAINED; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM; VERY MOIST-WET; VERY SILTY; (BORDERS A SANDY SILT)		I	3. JAR SAMPLES: (CHEMICAL TESTS) CH-1 & 1A : 2.0' CH-2 & 2A : 10.0' CH-3 & 3A : 15.0'
8/88					J	4. DRILLING: 10" FLIGHT AUGER: 0.0' - 45.5' NOTE: SET 8" STEEL CASING TO 45.5 8" FLIGHT AUGER: 45.5' - 46.0' NOTE: BORING BEGAN SQUEEZING IN FROM 16.0'±
			29.0' To 37.8' SILT: MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; VERY MOIST; CLAYEY; SLIGHTLY SANDY		K L	
			37.8' To 39.4' CLAY: MEDIUM PLASTICITY; REDDISH BROWN; MEDIUM; VERY MOIST; VERY SILTY;		M	
	40					

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PROJECT: [illegible]/000.1/000

HOLE NO. AAH-MW-3

Hole No. MW-3

006232

DRILLING LOG | DIVISION | INSTALLATION | SHEET 2 OF 2 SHEETS

1. PROJECT: GROUND-WATER MONITORING WELLS
2. LOCATION (Coordinates or Station): LONGHORN AAP.
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number)
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 11 SEPT. 87 | COMPLETED 12 SEPT. 87
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Jackie R. Bolen

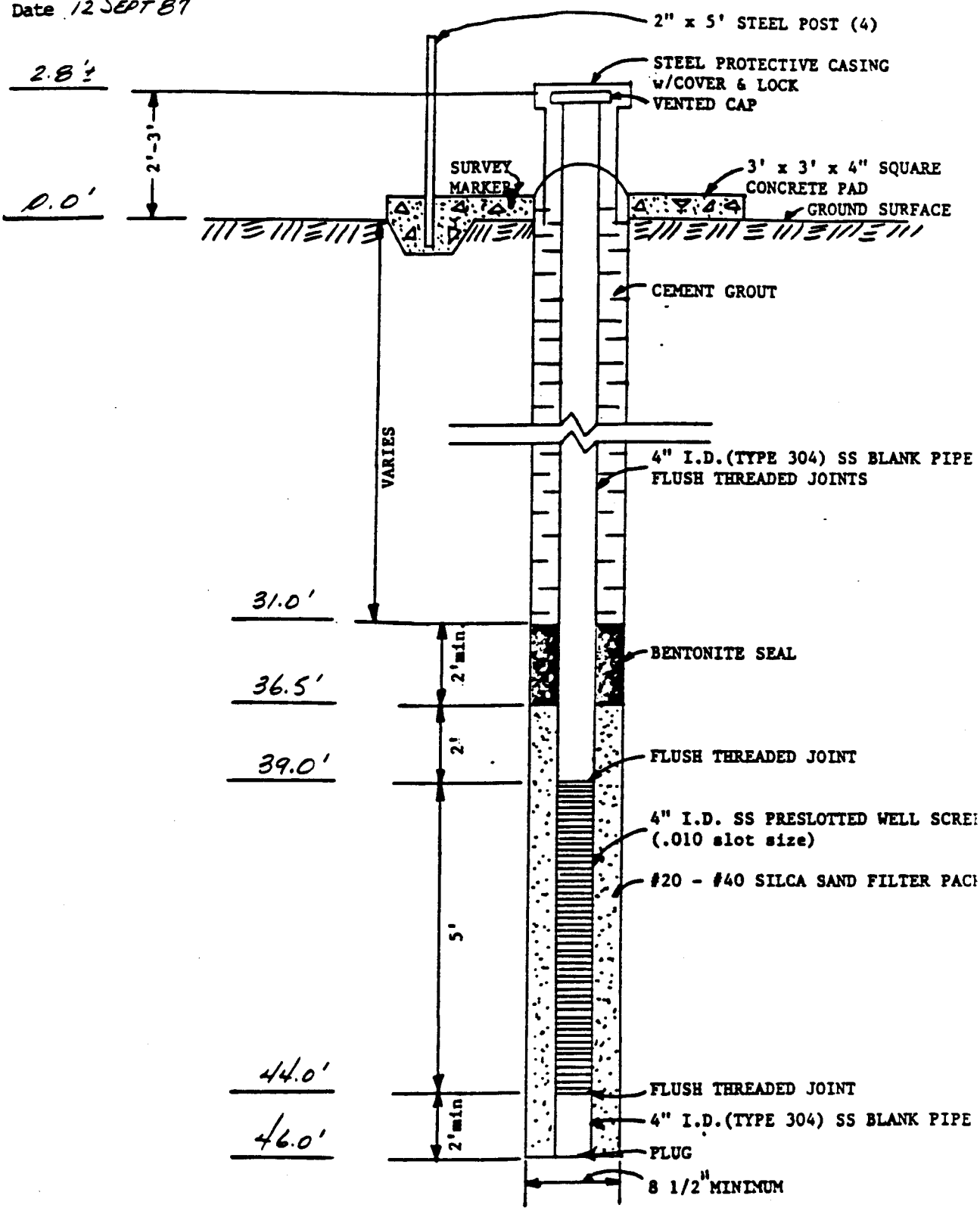
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			SLIGHTLY SANDY 39.4' TO 43.5' SILT: LOW-MEDIUM PLASTICITY; YELLOWISH BROWN; MEDIUM; WET; CLAYEY; SANDY		N	5. NOTE: MONITORING WELL WAS COMPLETED & DEVELOPED ON 14 SEPT.; REFER TO CONSTRUCTION DETAIL SHEET.
			43.5' TO 46.0' T.D. SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; WET; VERY SILTY; (BORDERS A SANDY SILT)		0	6. NOTE: GAS DETECTOR TUBES WERE USED IN WORK AREA TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT; NO MEASURABLE AMOUNTS WERE PRESENT.
	46.0		T.D. 46.0'			
	60					
	80					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT LONGHORN AAP. HOLE NO. MW-3

006233

LONGHORN AAP
MW - 3
Date 12 SEPT 87



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-4

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	SWD	FWD	1 of 2 SHEETS

1. PROJECT: GROUND-WATER MONITORING WELLS
2. LOCATION (Coordinates or Station): LONGHORN AAP.
3. DRILLING AGENCY: USCE
4. HOLE NO. (As shown on drawing title and file number): MW-4
5. NAME OF DRILLER: T. SWITS
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 43.6'
10. SIZE AND TYPE OF BIT: 10" AUGER
11. DATUM FOR ELEVATION SHOWN (MSL or Assumed): 006234
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 24; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: SEE REMARKS COLUMN
16. DATE HOLE: STARTED 15 SEPT. 87; COMPLETED 16 SEPT. 87
17. ELEVATION TOP OF HOLE: 195.77
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: Jackie R Stokes

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
	0.0		0.0' TO 2.0' ±		A	1. WATER LEVEL: NOTE: FREE WATER ENTERING FROM 15.0' ± WITH BORING SQUEEZING IN; LEVEL IN WELL AFTER COMPLETION - 24 HRS. WAS 23.0'
			SAND FILL: FINE GRAINED; LIGHT REDDISH BROWN; MEDIUM-DENSE; DRY; VERY SILTY; WITH SCATTERED GRAVEL, SANDSTONE & ASPHALT FRAGMENTS		B	
			2.0' ± TO 8.0' ±		C	
			SILT FILL:		D	2. JAR SAMPLES:
			2.0' ± - 4.0': LOW PLASTICITY; GRAY; MEDIUM-STIFF; DAMP; VERY SANDY		E	A: 0.0' - 2.0'
			4.0' - 8.0' ±: MEDIUM PLASTICITY; YELLOWISH BROWN & LIGHT GRAY TO LIGHT GRAY WITH YELLOWISH BROWN FROM 6.0'; MEDIUM; VERY MOIST - WET; CLAYEY; WITH TRACE OF SAND		F	B: 2.0' - 4.0' C: 4.0' - 6.0' D: 6.0' - 8.0' E: 8.0' - 10.0' F: 10.0' - 15.0' G: 15.0' - 17.1' H: 17.1' - 19.9' I: 19.9' - 21.9' J: 21.9' - 26.9' K: 26.9' - 29.0' L: 29.0' - 32.3' M: 32.3' - 38.1' N: 38.1' - 42.0' O: 42.0' - 43.0' P: 43.0' - 43.6'
			8.0' ± TO 17.1'		G	
			SILT: LOW PLASTICITY; YELLOWISH BROWN; MEDIUM-STIFF; VERY MOIST TO WET FROM 15.0'; VERY SANDY		H	
	20		17.1' TO 19.9'		I	3. JAR SAMPLES: (CHEMICAL TESTS): CH-1 & 1A : 2.0' CH-2, 2A, 2C & 2D: 10.0 CH-3 & 3A : 15.0'
			SAND: FINE GRAINED; ORANGE & LIGHT GRAY; MEDIUM; WET; VERY SILTY (BORDERS A SANDY SILT)		J	4. DRILLING: 10" FLIGHT AUGER: 0.0' - 43.6' NOTE: SET 8" STEEL CASING TO 43.0' & CLEANED OUT WITH 8" AUGER
			19.9' TO 21.9'		K	
			CLAY: MEDIUM-HIGH PLASTICITY; RED, YELLOWISH BROWN & LIGHT GRAY; STIFF; MOIST; WITH OCCASIONAL SANDY SILT LAMINATION		L	5. NOTE: MONITORING WELL WAS COMPLETED & DEVELOPED ON 18 SEPT. 87; REFER TO CONSTRUCTION DETAIL SHEET.
			21.9' TO 29.0'		M	
			SILT: LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; WET; SANDY; VERY CLAYEY FROM 26.9'		N	
			29.0' TO 32.3'			
			CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN & LIGHT GRAY; STIFF - VERY STIFF; DAMP			
			32.3' TO 38.1'			
			SILT: LOW-MEDIUM PLASTICITY; YELLOWISH BROWN & LIGHT GRAY; MEDIUM-STIFF; MOIST; CLAYEY; SANDY			
	40					

Hole No. MW-4

006235

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 2 SHEETS

1. PROJECT
2. LOCATION (Coordinates or Station): LONGHORN AAP
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): MW-4
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED; UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 15 SEPT. 87; COMPLETED 16 SEPT. 87
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Jackie R. Stokes

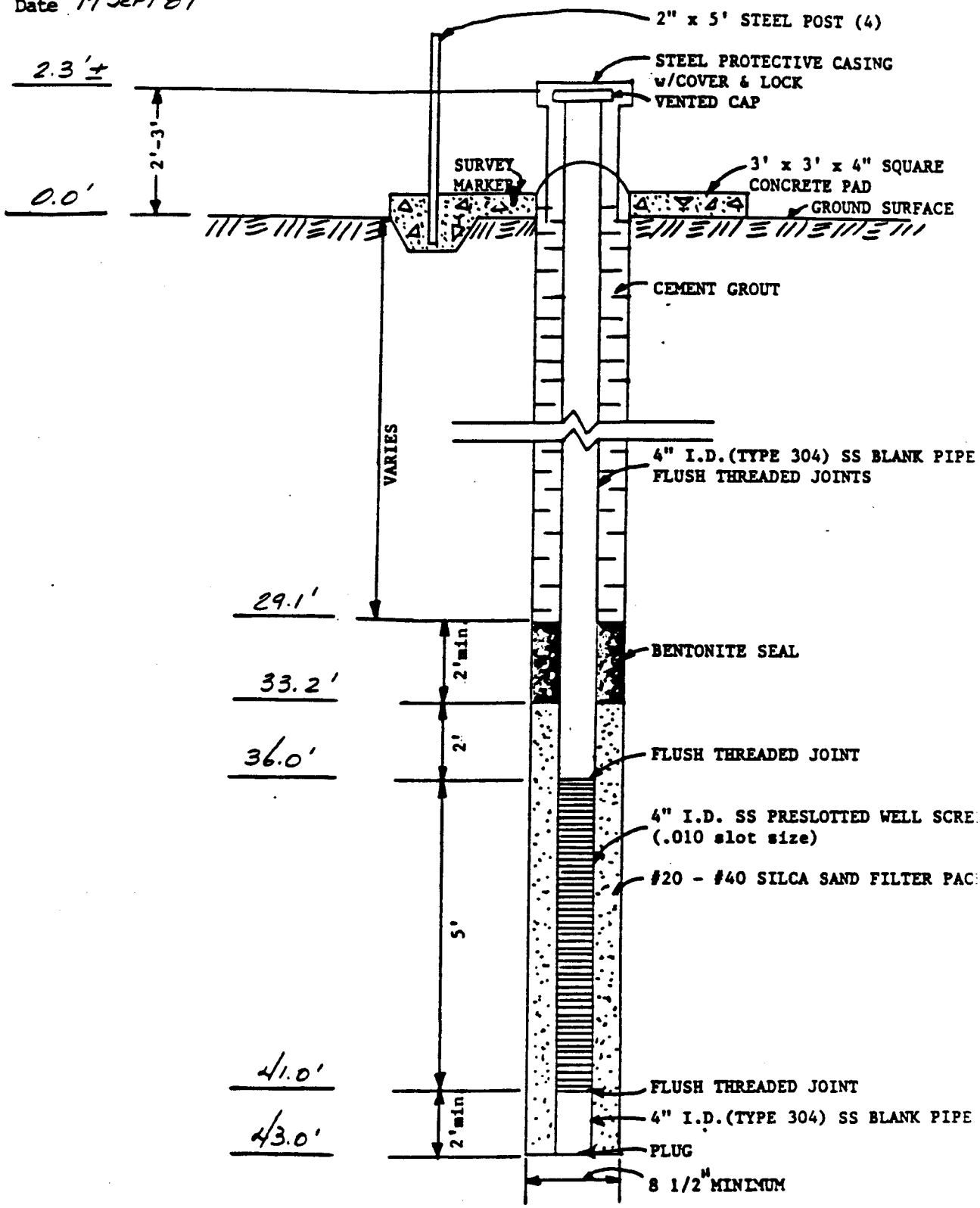
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			38.1' To 43.0'			6. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT; NO MEASURABLE AMOUNTS WERE PRESENT IN THE WORK AREA.
			SAND:			
			38.1'-42.0': FINE GRAINED, YELLOWISH BROWN; MEDIUM; SATURATED; SILTY		O	
	43.6		42.0'-43.0': FINE GRAINED; ORANGE WITH BLACK CARBONACEOUS STAINS; MEDIUM; VERY MOIST; CLAYEY		P	
			43.0' To 43.6' T.D.			
			CLAY: MEDIUM-HIGH PLASTICITY; ORANGE, YELLOWISH BROWN & LIGHT GRAY; STIFF; DAMP; WITH TRACE of SANDY SILT			
			T.D. 43.6'			
	60					
	80					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: LONGHORN AAP. HOLE NO.: MW-4

006236

LONGHORN AAP
MW - 4
Date 17 SEPT 87



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

006237

Hole No. C-4A

DRILLING LOG	DIVISION SWD	INSTALLATION SWF	SHEET 1 OF 4 SHEETS
1. PROJECT: LONGHORN AAP (RI - PHASE II - MONITOR WELLS)		10. SIZE AND TYPE OF BIT: 10" AUGER; 7 7/8" ROCKBIT	
2. LOCATION (Coordinates or Station): SEE REMARKS COLUMN		11. DATUM FOR ELEVATION SHOWN (MSL or MLL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): C-4A		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 33; UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 11 SEPT. 89; COMPLETED 14 SEPT. 89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE: 130.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Bass	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0		0.0' TO 0.7': SAND: FINE GRAINED: LIGHT BROWN; MEDIUM; DRY; VERY SILTY		A	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING FROM 19.0' DURING AUGERING.
			0.7' TO 13.3': CLAY: 0.7'-2.2': LOW-MEDIUM PLASTICITY; YELLOWISH BROWN WITH REDDISH BROWN; HARD; DRY-DAMP; VERY SILTY; SANDY		B	
			2.2'-7.2': MEDIUM-HIGH PLASTICITY; LIGHT GRAY WITH RED; HARD; DAMP; WITH SCATTERED SANDY SILT LAMINATIONS		C	
			7.2'-8.3': MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; HARD; DAMP; MODERATELY SILTY & SANDY		D	
			8.3'-13.3': LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; HARD; DAMP; VERY SILTY & SANDY		E	2. JAR SAMPLES: A: 0.0' - 0.7'; B: 0.7' - 2.2'; C: 2.2' - 7.2'; D: 7.2' - 8.3'; E: 8.3' - 13.3'; F: 13.3' - 14.0'; G: 14.0' - 15.1'; H: 15.1' - 19.0'; I: 19.0' - 24.5'; J: 24.5' - 27.0'; K: 27.0' - 29.1'; L: 29.1' - 31.0'; M: 31.0' - 36.0'; N: 36.0' - 36.8'; O: 36.8' - 41.8'; P: 41.8' - 44.0'; Q: 49.0' - 51.0'; R: 54.0' - 56.0'; S: 59.0' - 61.0'; T: 64.0' - 66.0'; U: 69.0' - 70.0'; V: 74.0' - 75.0'; W: 79.0' - 80.0'; X: 84.0' - 85.0'; Y: 89.0' - 90.0'; Z: 94.0' - 95.0'; AA: 99.0' - 100.0'; BB: 104.0' - 105.0'; CC: 109.0' - 110.0'; DD: 114.0' - 115.0'; EE: 119.0' - 120.0'; FF: 124.0' - 125.0'; GG: 129.0' - 130.0'
					F	
					G	
					H	
	20		13.3' TO 14.0': SILT: LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF; MOIST; VERY SANDY		I	
			14.0' TO 15.1': CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; VERY STIFF; DAMP; MODERATELY SILTY; WITH TRACE OF SAND		J	
			15.1' TO 24.5': SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; DAMP TO SATURATED FROM 19.0'; SLIGHTLY SILTY		K	
			24.5' TO 27.0': CLAY: MEDIUM-HIGH PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; HARD; DAMP		L	
			27.0' TO 29.1': SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; WET; VERY SILTY		M	3. DRILLING: 10" FLIGHT AUGER: 0.0' - 40.0'; NOTE: SET 8" STEEL CASING TO 40.0'; 8" FLIGHT AUGER: 40.0' - 44.0'; 7 7/8" ROCKBIT: W/ LIQUID DRILL MUD: 44.0' - 130.0'
			29.1' TO 31.0': CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; HARD; DAMP		N	
	40				O	

Hole No. C-4A

006238

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 4 SHEETS
1. PROJECT: Longhorn/AAP (RFI-PHASE II-Monitor Wells)		10. SIZE AND TYPE OF BIT	
2. LOCATION (Coordinates or Station)		11. DATUM FOR ELEVATION SHOWN (MSL or MSL)	
3. DRILLING AGENCY		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number): C-4A		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED	
5. NAME OF DRILLER		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 11 SEPT. '89 / COMPLETED 14 SEPT. '89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE		18. TOTAL CORE RECOVERY FOR BORING %	
		19. SIGNATURE OF INSPECTOR: Joachim R. Hoffman	

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
			31.0' To 36.8'			NOTE: 3" SHELBY TUBE SAMPLES TAKEN AT:
			SAND: FINE GRAINED; YELLOWISH BROWN; MEDIUM; SATURATED; SILTY		P	49.0' - 51.0'
			36.8' To 44.0' ±			54.0' - 56.0'
			CLAY:			59.0' - 61.0'
			36.8'-41.8': MEDIUM-HIGH PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP-MOIST		← ROCKBIT →	64.0' - 66.0'
						69.0' - 70.0'
						74.0' - 75.0'
						79.0' - 80.0'
						84.0' - 85.0'
						89.0' - 90.0'
						94.0' - 95.0'
			41.8'-44.0' ±: MEDIUM PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; STIFF; MOIST; SILTY; SLIGHTLY SANDY		Q	NOTE: SPLIT SPOON SAMPLES TAKEN AT:
			44.0' ± To 56.0' ±		← ROCK-BIT →	99.0' - 100.0'
			SAND: FINE-MEDIUM GRAINED; LOOSE-MEDIUM; GRAY WITH GREEN TINT; SATURATED; WITH TRACE OF FINES TO VERY SILTY FROM 52.5' ±; WITH ABUNDANT CARBON MATTER (LIGNITE)			104.0' - 105.0'
						109.0' - 110.0'
						114.0' - 115.0'
					R	119.0' - 120.0'
						124.0' - 125.0'
						129.0' - 130.0'
			56.0' ± To 66.0' ±		← ROCK-BIT →	4. NOTE: GAMMA LOG & RESISTIVITY LOG WERE RUN IN BORING ON 14 SEPT. '89
			CLAY: MEDIUM-HIGH PLASTICITY; GRAY; HARD; DRY-DAMP; WITH OCCASIONAL SILTY SAND LAMINATION		S	5. NOTE: MONITOR WELL WAS PLACED IN BORING & BORING HAD CLOSED IN AT 103.0'; WELL PIPE WAS REMOVED & BORING WAS REAMED OUT WITH ROCKBIT & DRILL MUD & WELL WAS PLACED TO 116.3' WITH BOTTOM OF SCREEN AT 113.3'; SAND FILTER WAS PLACED, BENTONITE SEAL WAS PLACED & BORING WAS GROUTED AS CASING WAS REMOVED.
	60				← ROCK-BIT →	
			66.0' ± To 79.0' ±		T	
			SAND/SILT: LOW PLASTICITY; LIGHT GRAY-GRAY; DENSE; DAMP; LAMINATED; WITH CARBON MATTER		← ROCK-BIT →	
					U	
					← ROCK-BIT →	
					V	6. NOTE: C-4A WAS DRILLED 10° S87°E of C-4.
					← ROCK-BIT →	
			79.0' ± To 81.0' ±		W	7. NOTE: WELL WAS DEVELOPED ON 18 SEPT. '89
	80		CLAY: MEDIUM-HIGH PLAS-			

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE PROJECT HOLE NO.

Hole No. C-4A

006239

DRILLING LOG	DIVISION	INSTALLATION	SHEET 3 OF 4 SHEETS
1. PROJECT: LONGHORN AAP (REI-PHASE II-MONITOR WELLS)		10. SIZE AND TYPE OF BIT	
2. LOCATION (Coordinates or Station)		11. DATUM FOR ELEVATION SHOWN (USE or MSL)	
3. DRILLING AGENCY		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number): C-4A		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED	
5. NAME OF DRILLER		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 11 SEPT. '89 / COMPLETED 14 SEPT. '89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE		18. TOTAL CORE RECOVERY FOR BORING %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Stokes	

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
			TICITY: DARK GRAY; HARD; DAMP; WITH SANDY SILT LAMINATIONS		Rockbit	8. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE DURING DRILLING. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODOR WAS DETECTED DURING DRILLING.
			81.0'± To 85.0'±			
			SAND/SILT: LOW PLASTICITY; LIGHT GRAY-GRAY; DENSE; DAMP; LAMINATED; WITH CARBON MATTER		X Rockbit	
			85.0'± To 88.0'±			
			CLAY: MEDIUM-HIGH PLASTICITY; DARK GRAY; HARD; DAMP; WITH SANDY SILT LAMINATIONS		Rockbit	
			88.0'± To 94.0'±		Y	
			SAND/SILT: LOW PLASTICITY; LIGHT GRAY-GRAY; DENSE; DAMP; LAMINATED; WITH OCCASIONAL THIN CLAY SEAM		Rockbit	
			94.0'± To 97.0'±			
			CLAY: MEDIUM-HIGH PLASTICITY; DARK GRAY; HARD; DAMP; WITH SILTY SAND LAMINATIONS		N Rockbit	
			97.0'± To 99.0'±			
			SILT: LOW-MEDIUM PLASTICITY; DARK GRAY; HARD; DAMP; WITH SAND LAMINATIONS		Rockbit	
	100		99.0'± To 102.5'±		AA	
			CLAY: MEDIUM-HIGH PLASTICITY; GRAY; HARD; DAMP; WITH LIGHT GRAY SILTY SAND LAMINATIONS		Rockbit	
			102.5'± To 114.0'±		BB	
			SAND/CLAY: LOW PLASTICITY; FINE GRAINED; LIGHT GRAY-GREENISH GRAY; MEDIUM; VERY MOIST-WET; LAMINATED		Rockbit	
					CC Rockbit	
			114.0'± To 130.0' T.D.		DD	
			CLAY SHALE: MEDIUM-HIGH PLASTICITY; DARK GRAY; HARD; DAMP; WITH AN OCCASIONAL SANDY SILT LAMINATIONS		Rockbit	
	120				EE	

ENG. FORM 1836 PROJECT HOLE NO

Hole No. C-4A

DRILLING LOG

DIVISION

INSTALLATION

SHEET 1 OF 4 SHEETS

006240

1. PROJECT: Longhorn AAP (RFI-Phase II - Monitor Wells)
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): C-4A
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (USM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN — DISTURBED — UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE — STARTED 11 Sept. '89 — COMPLETED 14 Sept. '89
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Jackie R. Stokes

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
					← Rockrit →	
					FF	
					← Rockrit →	
	130.0		130.0' T.D.		GG	
	140					
	160					

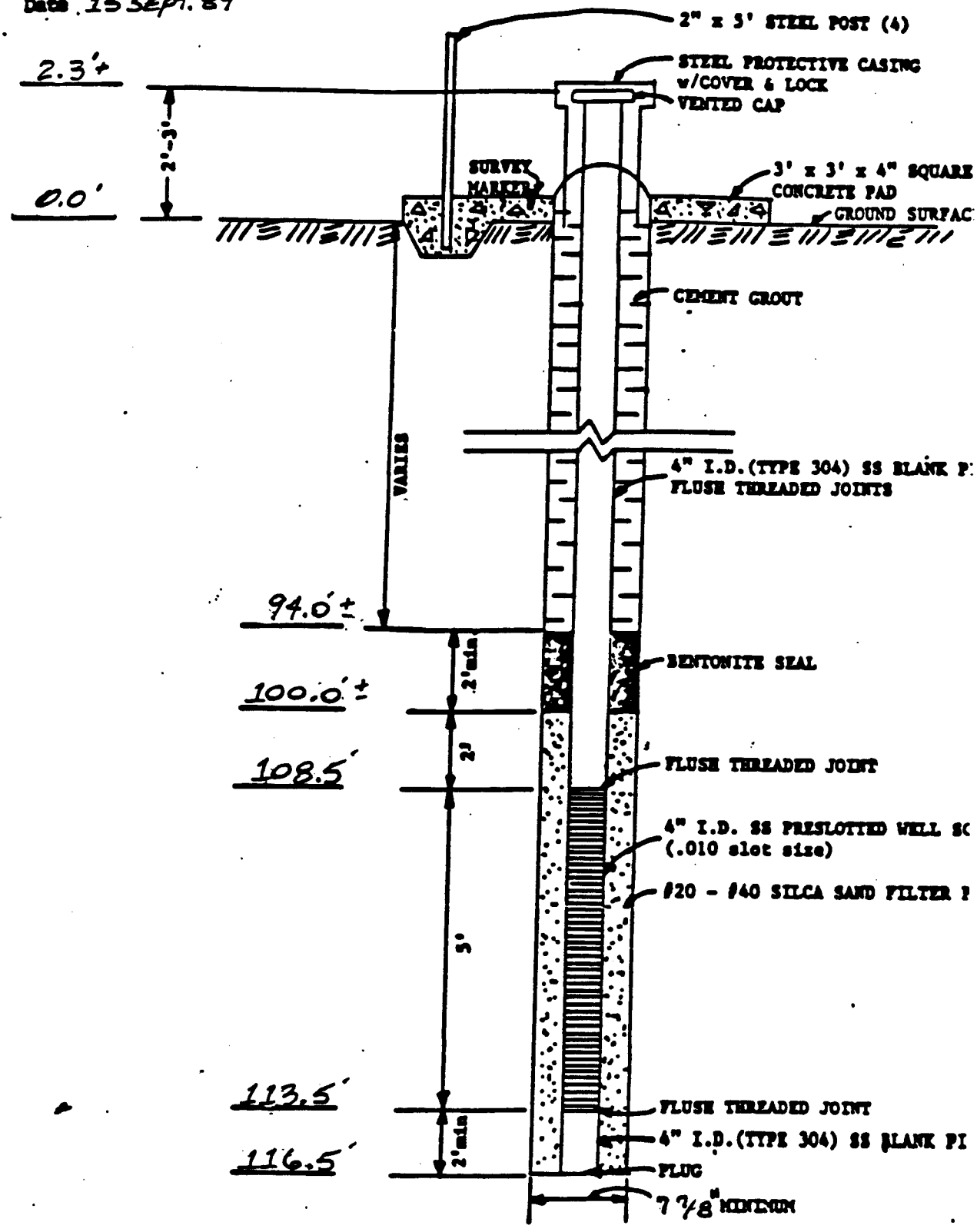
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PROJECT

HOLE NO.

006241

LONGHORN AAP
MW - C4A
Date 15 SEPT. 89



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WEL

Hole No. MW-5

006242

DRILLING LOG	DIVISION: SWD	INSTALLATION: FWD	SHEET 1 OF 2 SHEETS
1. PROJECT: GROUND-WATER MONITORING WELLS		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): LONGHORN AAP.		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and title number): MW-5		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 21; UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 21 SEPT. 87; COMPLETED 21 SEPT. 87	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 193.34	
9. TOTAL DEPTH OF HOLE: 40.8		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Stokes	

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
	0.0		0.0' To 2.0' SAND: FINE GRAINED; REDDISH BROWN; DENSE; DRY; VERY SILTY (BORDERS A SANDY SILT) 2.0' To 3.6' SILT: LOW PLASTICITY; REDDISH BROWN; HARD; DAMP; VERY SANDY 3.6' To 5.4' SAND: FINE GRAINED; LIGHT BROWN; MEDIUM; DAMP; SILTY 5.4' To 7.0' CLAY: MEDIUM PLASTICITY; LIGHT GRAY WITH RED; STIFF-VERY STIFF; DAMP; SILTY & SANDY 7.0' To 9.0' SAND: FINE GRAINED; BROWN-YELLOWISH BROWN; MEDIUM; DAMP; SILTY 9.0' To 11.2' SILT: LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM-STIFF; MOIST; SANDY 11.2' To 28.0' SAND: FINE GRAINED; LIGHT BROWN; MEDIUM; DAMP TO VERY MOIST FROM 16.2' TO WET FROM 19.5' ±; SLIGHTLY SILTY TO SILTY FROM 16.2'. 28.0' To 29.8' CLAY: MEDIUM-HIGH PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP 29.8' To 31.5' SAND: FINE GRAINED; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM; WET; SILTY 31.5' To 34.5' CLAY: MEDIUM-HIGH PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP 34.5' To 36.4' SILT: MEDIUM PLASTICITY;		A B C D E F G H I J K L M N O	1. WATER LEVEL: NOTE: FREE WATER BEGAN ENTERING BORING AT 19.0' ± WITH BORING SQUEEZING IN AT 19.0' ±; LEVEL IN WELL 24 HRS. AFTER COMPLETION WAS 21.3' 2. JAR SAMPLES: A: 0.0' - 2.0' B: 2.0' - 3.6' C: 3.6' - 5.4' D: 5.4' - 7.0' E: 7.0' - 9.0' F: 9.0' - 11.2' G: 11.2' - 16.2' H: 16.2' - 19.5' I: 19.5' - 24.5' J: 24.5' - 28.0' K: 28.0' - 29.8' L: 29.8' - 31.5' M: 31.5' - 34.5' N: 34.5' - 36.4' O: 36.4' - 40.8' 3. JAR SAMPLES: (CHEMICAL TESTS) CH-1 & 1A: 2.0' CH-2 & 2A: 10.0' CH-3 & 3A: 17.0' 4. DRILLING: 10" FLIGHT AUGER: 0.0' - 40.0' NOTE: SET 8" STEEL CASING TO 40.0' 8" FLIGHT AUGER: 40.0' - 40.8' 5. NOTE: MONITORING WELL WAS COMPLETED & DEVELOPED ON 22 SEPT. 87; REFER TO CONSTRUCTION DETAIL SHEET.
4/88 ▲	20					
8/88 ▼						
	40					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: [illegible] AAP

HOLE NO. MW-5

Hole No. MW-5

006243

DRILLING LOG | DIVISION | INSTALLATION | SHEET 2 of 2 SHEETS

1. PROJECT: GROUND-WATER MONITORING WELLS
2. LOCATION (Coordinates or Station): LONGHORN AAP
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): MW-5
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE | STARTED 21 SEPT. 87 | COMPLETED 21 SEPT. 87
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Jackie R. Stokes

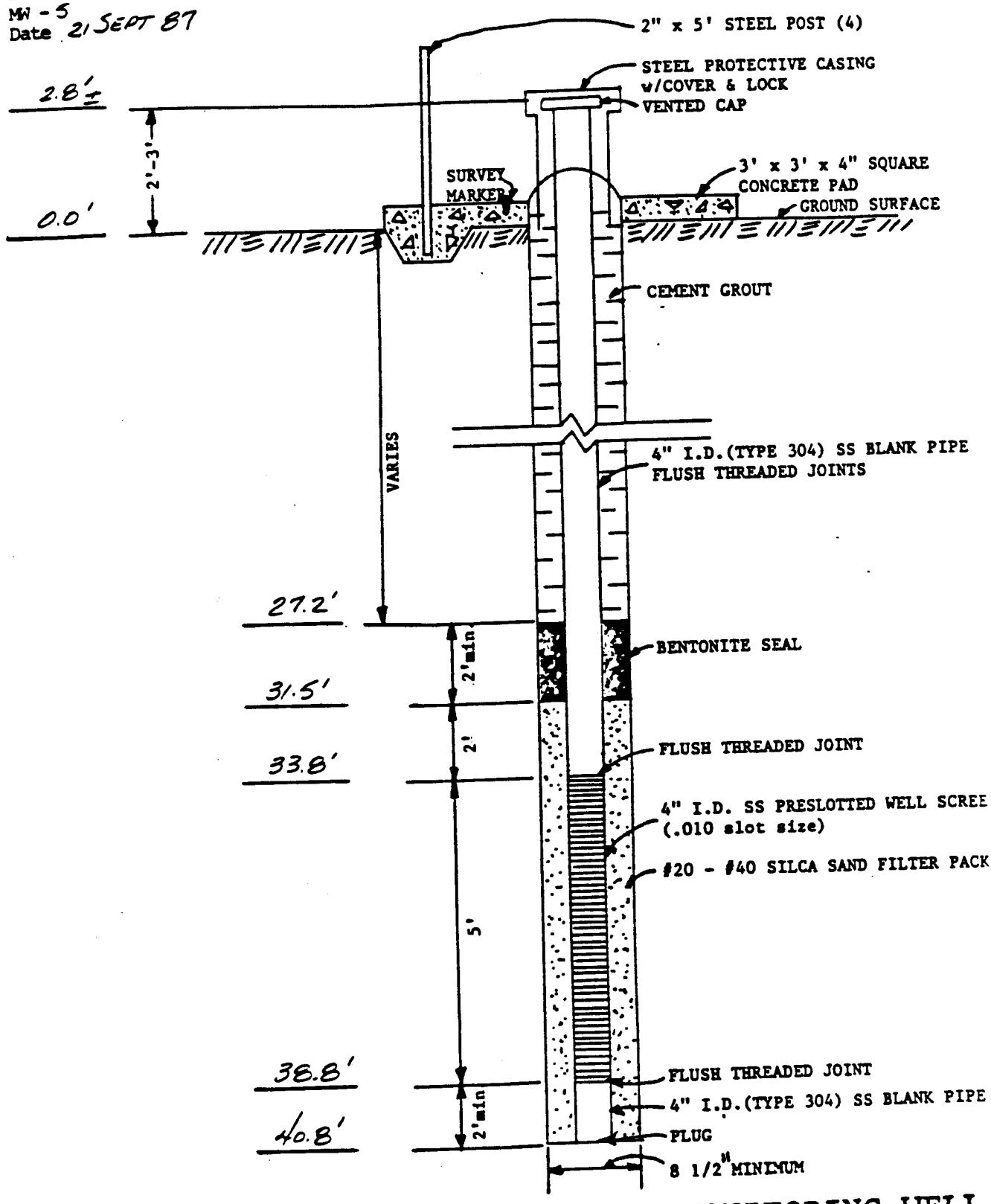
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	40.8		LIGHT GRAY & YELLOWISH BROWN WITH BLACK CARBONACEOUS STAINING; MEDIUM; VERY MOIST; CLAYEY: SLIGHTLY SANDY 36.4' TO 40.8' T.D. SILT; LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; WET; VERY SANDY T.D. 40.8'			6. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR WORK AREA FOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT; NO MEASURABLE AMOUNTS WERE PRESENT.
	60					
	80					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT Longhorn AAP | HOLE NO. MW-5

006244

LONGHORN AAP
MW - 5
Date 21 SEPT 87



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-6

006245

DRILLING LOG	DIVISION: SWD	INSTALLATION: FWD	SHEET 1 OF 2 SHEETS
1. PROJECT: GROUND-WATER MONITORING WELLS		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): LONGHORN AAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-6		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 20 / UNDISTURBED 0	
5. NAME OF DRILLER: T. SILTS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 23 SEPT. 87 / COMPLETED 23 SEPT. 87	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 190.26	
9. TOTAL DEPTH OF HOLE: 45.8'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Stokes	

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
	0.0		0.0' To 1.7' SAND: FINE GRAINED; REDDISH BROWN; DENSE; DRY; VERY SILTY		A	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING FROM 18.0' ± DURING DRILLING WITH BORING SQUEEZING IN FROM 12.0' ±; LEVEL 24 HRS. AFTER COMPLETION WAS AT 18.8'
			1.7' To 5.0' CLAY: MEDIUM PLASTICITY; LIGHT GRAY & RED; HARD; DRY-DAMP; SILTY		B	
			5.0' To 9.1' SILT: LOW PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN TO YELLOWISH BROWN FROM 7.1'; VERY STIFF TO STIFF FROM 7.1'; DAMP TO MOIST FROM 7.1'; SANDY TO VERY SANDY FROM 7.1'		C	
					D	
					E	2. JAR SAMPLES: A: 0.0' - 1.7' B: 1.7' - 3.7' C: 3.7' - 5.0' D: 5.0' - 7.1' E: 7.1' - 9.1' F: 9.1' - 13.9' G: 13.9' - 18.0' H: 18.0' - 19.5' I: 19.5' - 22.0' J: 22.0' - 27.0' K: 27.0' - 32.0' L: 32.0' - 37.0' M: 37.0' - 42.2' N: 42.2' - 45.8'
			9.1' To 13.9' SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; MOIST; SILTY		F	
			13.9' To 18.0' SILT: MEDIUM PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; STIFF; MOIST; CLAYEY; SLIGHTLY SANDY		G	
	20		18.0' To 19.5' SAND: FINE-MEDIUM GRAINED; LIGHT GRAY & YELLOWISH BROWN; MEDIUM; SATURATED; SLIGHTLY SILTY		H	
			19.5' To 22.0' SILT: MEDIUM PLASTICITY; LIGHT GRAY & YELLOWISH BROWN; MEDIUM-STIFF; MOIST-VERY MOIST; CLAYEY; WITH TRACE OF FINE SAND		I	3. JAR SAMPLES: (CHEMICAL TESTS): CH-1 & 1A: 2.0' CH-2 & 2A: 10.0' CH-3 & 3A: 18.0'
			22.0' To 37.0' CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF-VERY STIFF; DAMP		J	4. DRILLING: 10" FLIGHT AUGER: 0.0' - 45.0' NOTE: SET 8" STEEL CASING TO 45.0' 8" FLIGHT AUGER: 45.0' - 45.8
			37.0' To 42.2' SILT: MEDIUM PLASTICITY; LIGHT BLUE GRAY; WITH YELLOWISH BROWN; MEDIUM-STIFF; VERY MOIST; CLAYEY; WITH TRACE OF FINE SAND		K	
	40				L	5. NOTE: MONITORING WELL WAS COMPLETED & DEVELOPED on 24 SEPT. '87; REFER TO CONSTRUCTION DETAIL SHEET.
					M	

PROJECT: [illegible] AAP | HOLE NO. [illegible]

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE

Hole No. MW-6

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 2 SHEETS
1. PROJECT: GROUND-WATER MONITORING WELLS		10. SIZE AND TYPE OF BIT	
2. LOCATION (Coordinates or Station): LONGHORN AAP		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number): MW-6		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED	
5. NAME OF DRILLER		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 23 SEPT. 87 / COMPLETED 23 SEPT. 87	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE		18. TOTAL CORE RECOVERY FOR BORING	%
		19. SIGNATURE OF INSPECTOR: Jackie B. Stokes	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			42.2' To 45.8' T.D.			6. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR WORK AREA FOR METHYLENE CHLORIDE & TRICHLORDETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT; NO MEASURABLE AMOUNTS WERE PRESENT.
			SAND: FINE GRAINED: GRAY; MEDIUM; SATURATED; SILTY		N	
	45.8		T.D. 45.8'			
	60					
	80					

006246

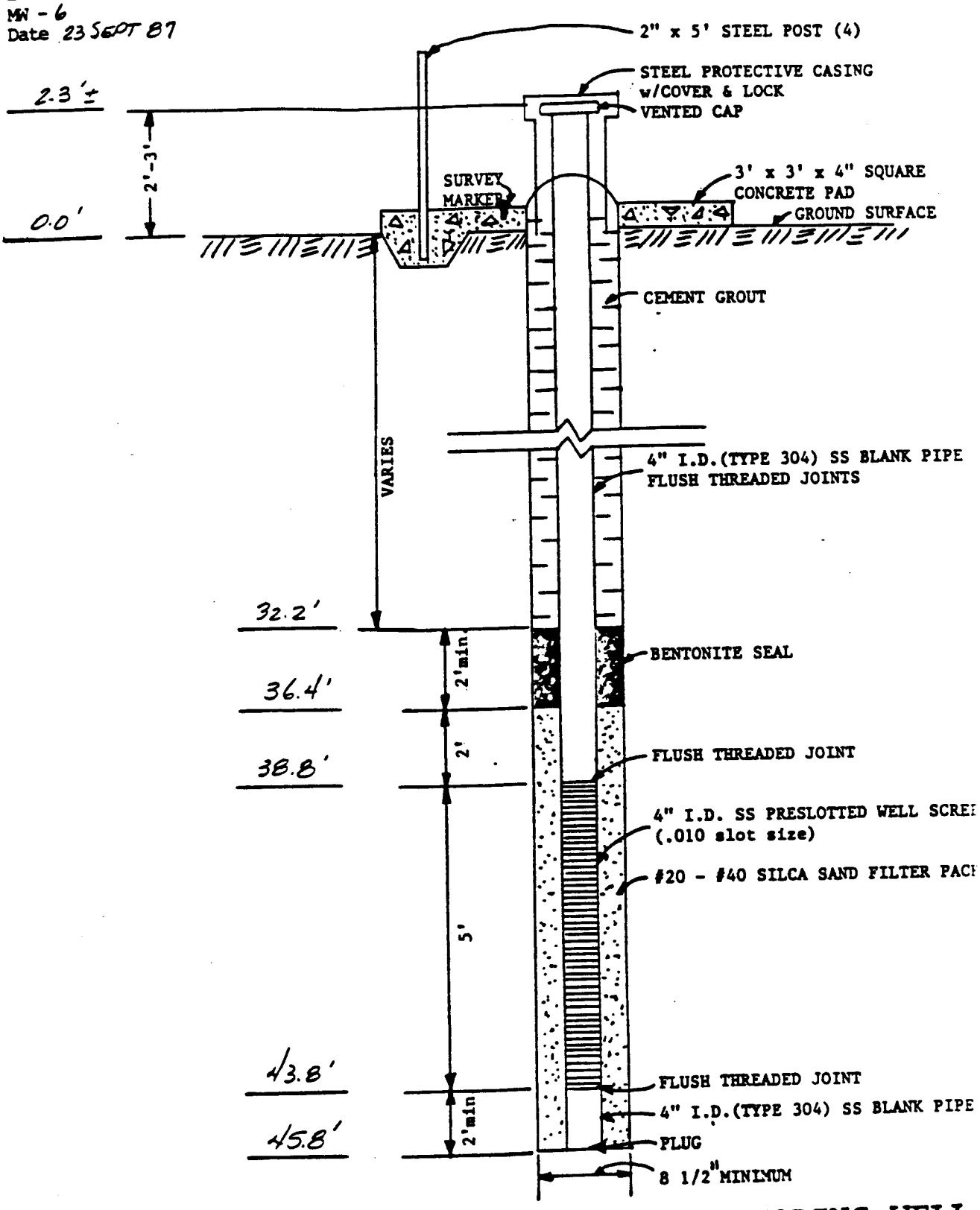
ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: [illegible] AAP

HOLE NO. AA[illegible]

006247

LONGHORN AAP
MW - 6
Date 23 SEPT 87



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-7

006248

DRILLING LOG	Division: SWD	Installation: FWD	Sheet 1 of 1 sheets
1. Project: LONGHORN AAP		10. Size and type of bit: 10" AUGER	
2. Location (Coordinates or Station): GROUND WATER QUALITY ASSESSMENT		11. Datum for elevation shown (MSL or USGS):	
3. Drilling agency: USCE		12. Manufacturer's designation of drill: FAILING 1500	
4. Hole No. (As shown on drawing title and file number): MW-7		13. Total no. of overburden samples taken: Disturbed 13; Undisturbed 0	
5. Name of driller: T. SUITS		14. Total number core boxes: N/A	
6. Direction of hole: ☒ Vertical ☐ Inclined ____ deg. from vert.		15. Elevation ground water: SEE REMARKS COLUMN	
7. Thickness of overburden		16. Date hole: Started 29 JUNE '88; Completed 29 JUNE '88	
8. Depth drilled into rock		17. Elevation top of hole: 186.62	
9. Total depth of hole: 36.0'		18. Total core recovery for boring: N/A %	
		19. Signature of inspector: Jackie R. Lacy	

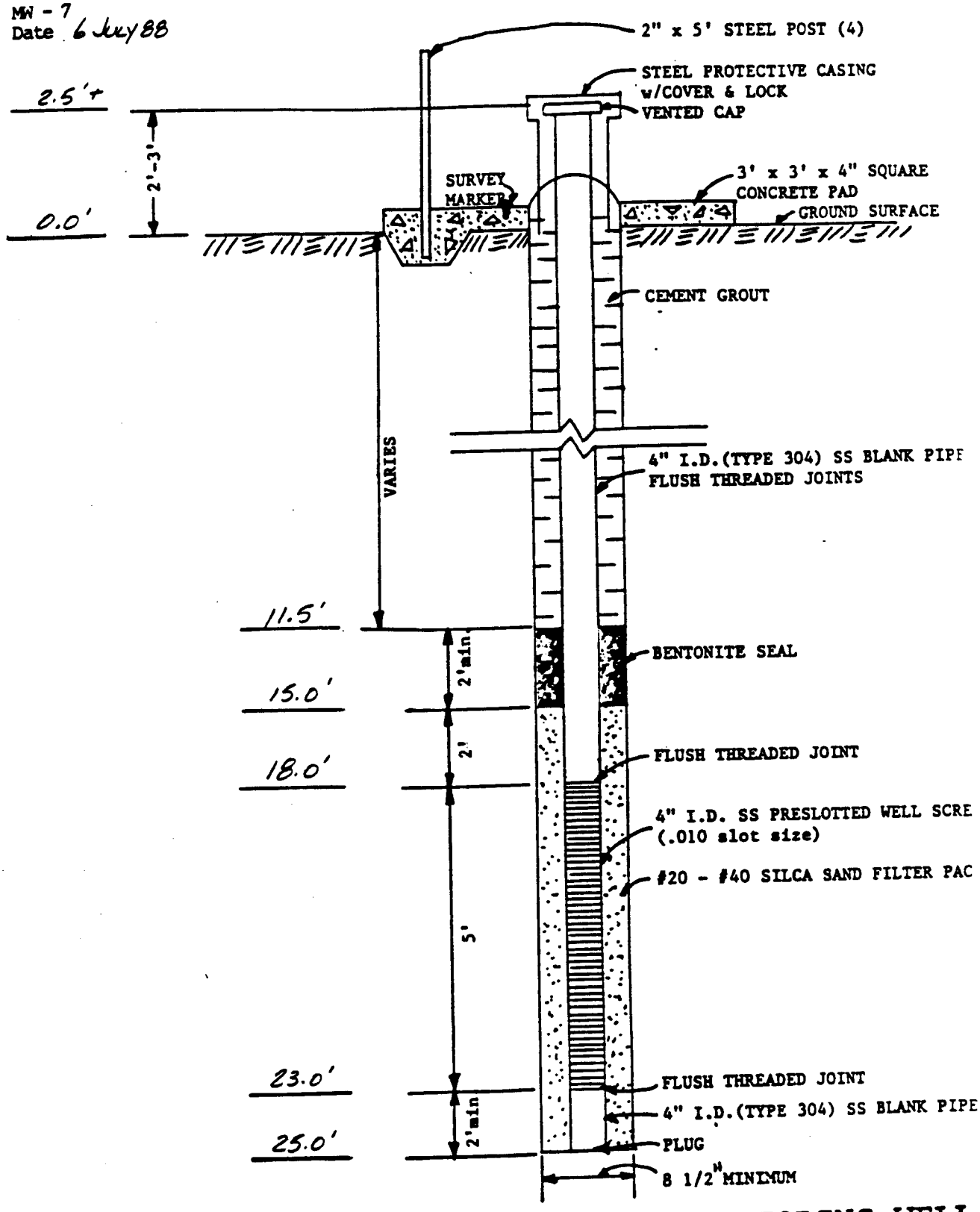
Elevation (a)	Depth (b)	Legend (c)	Classification of Materials (Descriptions) (d)	% Core Recovery (e)	Box or Sample No. (f)	Remarks (Drilling time, water loss, depth of weathering, etc., if significant) (g)
	0.0		0.0' TO 2.0' SILT: 0.0'-1.0': LOOSE; DRY; CLAYEY; WITH SOME SAND; REDDISH BROWN 1.0'-2.0': LOOSE; SLIGHTLY MOIST; WITH VERY FINE SAND; REDDISH BROWN		A	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 15.0'±; LEVEL IN MONITORING WELL AFTER 24 HRS. WAS 12.7'
			2.0' TO 10.0' CLAY: 2.0'-4.5': VERY STIFF; HIGH PLASTICITY; SLIGHTLY SILTY; REDDISH BROWN TO TAN 4.5'-6.5': STIFF; MEDIUM-HIGH PLASTICITY; SILTY; SLIGHTLY MOIST; YELLOWISH BROWN TO LIGHT GRAY 6.5'-8.0': STIFF; MEDIUM-HIGH PLASTICITY; SILTY; SLIGHTLY MOIST; LIGHT GRAY TO YELLOWISH BROWN 8.0'-10.0': MEDIUM-STIFF; MEDIUM PLASTICITY; SLIGHTLY MOIST; SANDY; YELLOWISH BROWN TO LIGHT GRAY		B C D E F G	2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.0' - 1.0' B: 1.0' - 2.0' C: 2.0' - 4.5' D: 4.5' - 6.5' E: 6.5' - 8.0' F: 8.0' - 10.0' G: 10.0' - 15.0' H: 15.0' - 17.0' I: 17.0' - 19.0' J: 19.0' - 21.0' K: 21.0' - 27.0' L: 27.0' - 32.0' M: 32.0' - 36.0'
	20		10.0' TO 17.0' SAND: 10.0'-15.0': FINE; DENSE; MOIST; CLAYEY; YELLOWISH BROWN 15.0'-17.0': DENSE; WET; WITH SOME CLAY & SILT; YELLOWISH BROWN 17.0' TO 19.0' CLAY: MEDIUM-STIFF; MEDIUM PLASTICITY; MOIST; SILTY TO SANDY; GRAY TO YELLOWISH BROWN 19.0' TO 21.0' SAND: DENSE; WET; SILTY; CLAYEY; YELLOWISH BROWN 21.0' TO 36.0' T.D. CLAY: 21.0'-27.0': MEDIUM-HIGH PLASTICITY; MOIST; STIFF; SILTY TO SANDY IN ZONES TO 24.0'; BLUE GRAY, RED & YELLOWISH BROWN 27.0'-36.0': HIGH PLASTICITY; STIFF; MOIST; SILTY; BLUE GRAY WITH YELLOWISH BROWN TO BLUE GRAY FROM 32.0' T.D. 36.0'		H I J K L M	CHEMICAL TESTS: C-1 & 1A: 2.0' C-2 & 2A: 10.0' 3: DRILLING: 10" FLIGHT AUGER: 0.0' - 36.0' 4. NOTE: MONITORING WELL IS TO BE SET IN OFFSET BORING. 5. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODOR WAS DETECTED DURING DRILLING. 6. NOTE: MATERIAL WAS CLASSIFIED BY GEOL. LACY.
	36.0					
	40					

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Project: LONGHORN AAP — Hole No.: MW-7

006249

LONGHORN AAP
MW - 7
Date 6 July 88



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-8

006250

DRILLING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP.		10. SIZE AND TYPE OF BIT 10" AUGER	
2. LOCATION (Coordinates or Station) GROUND-WATER MONITORING WELLS		11. DATUM FOR ELEVATION SHOWN (MSL or USC&GS)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-8		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 18 / UNDISTURBED 0	
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 13 JULY 88 / COMPLETED 13 JULY 88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 185.47'	
9. TOTAL DEPTH OF HOLE 32.0'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
		19. SIGNATURE OF INSPECTOR Jackie R. Stokes	

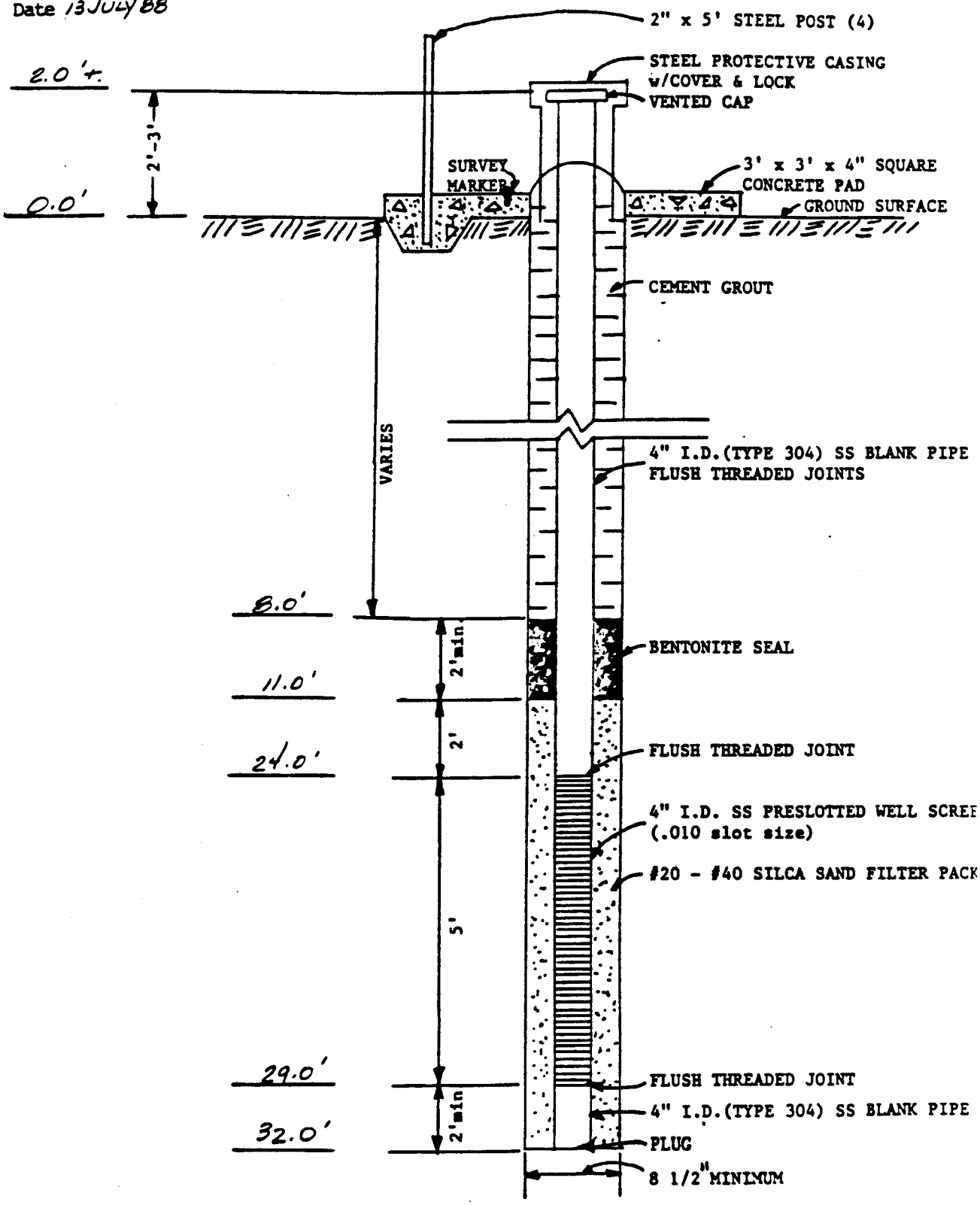
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Descriptions) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0		0.0' TO 0.1'		A	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 9.5'± LEVEL IN WELL AFTER 24 HRS. WAS 11.5'.
			SILT: LOW PLASTICITY; DARK BROWN; LOOSE; DRY; SANDY			
			0.1' TO 5.6'		B	
			CLAY:			
			0.1' - 1.8': MEDIUM PLASTICITY; RED; HARD; DRY-DAMP; SLIGHTLY SANDY		C	
			1.8' - 5.6': LOW-MEDIUM PLASTICITY; YELLOWISH BROWN & LIGHT GRAY WITH RED; HARD; DRY-DAMP; SANDY		D	2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.1' - 1.8' B: 1.8' - 3.8' C: 3.8' - 5.6' D: 5.6' - 7.6' E: 7.6' - 9.5' F: 9.5' - 11.5' G: 11.5' - 13.8' H: 13.8' - 14.4' I: 14.4' - 17.5' J: 17.5' - 18.4' K: 18.4' - 23.4' L: 23.4' - 28.0' M: 28.0' - 30.0' N: 30.0' - 32.0'
			5.6' TO 9.5'		E	
			SILT: LOW PLASTICITY; YELLOWISH BROWN & LIGHT GRAY; STIFF; DAMP-MOIST TO MOIST FROM 7.6'; SANDY; CLAYEY		F	
			9.5' TO 13.8'		G	
			SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; WET TO SATURATED FROM 11.5'; SILTY		H	
			13.8' TO 14.4'		I	
			CLAY: LOW-MEDIUM PLASTICITY; LIGHT BLUE & YELLOWISH BROWN; STIFF; MOIST; VERY SILTY; MODERATELY SANDY		J	3. DRILLING: 10" FLIGHT AUGER: 0.0' - 32.0' NOTE: SET 8" STEEL CASING TO 32.0' & CLEANED OUT. SET MONITORING WELL & PLACED SAND FILTER & BENTONITE SEAL AS CASING WAS REMOVED. GROUTED TO SURFACE NOTE: REFER TO CONSTRUCTION DETAIL SHEET.
	20		14.4' TO 17.5'		K	
			SILT: LOW PLASTICITY; YELLOWISH BROWN & LIGHT GRAY; MEDIUM; WET; SANDY			
			17.5' TO 18.4'		L	
			CLAY: MEDIUM-HIGH PLASTICITY; LIGHT BLUE GRAY & YELLOWISH BROWN; VERY STIFF; DAMP			
			18.4' TO 28.0'		M	4. JAR SAMPLES: (CHEMICAL TESTS) C-1 & 1A: 2.0' C-2 & 2A: 10.0'
			SILT: LOW PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM; VERY MOIST-WET; SANDY			
			28.0' TO 32.0' T.D.		N	5. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0 OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODOR WAS DETECTED.
	32.0		CLAY: MEDIUM-HIGH PLASTICITY; LIGHT BLUE GRAY & YELLOWISH BROWN; STIFF-VERY STIFF TO VERY STIFF FROM 30.0; MOIST TO DAMP FROM 30.0'; WITH TRACE OF SILT & FINE SAND TO 30.0'			
			T.D. 32.0'			6. SURVEYED CO-ORDINATES: X: 3,040,110.04 Y: 380,189.97
	40					

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PROJECT LONGHORN AAP. HOLE NO. MW-8

006251

LONGHORN AAP
MW - B
Date 13JULY88



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-9

'00625

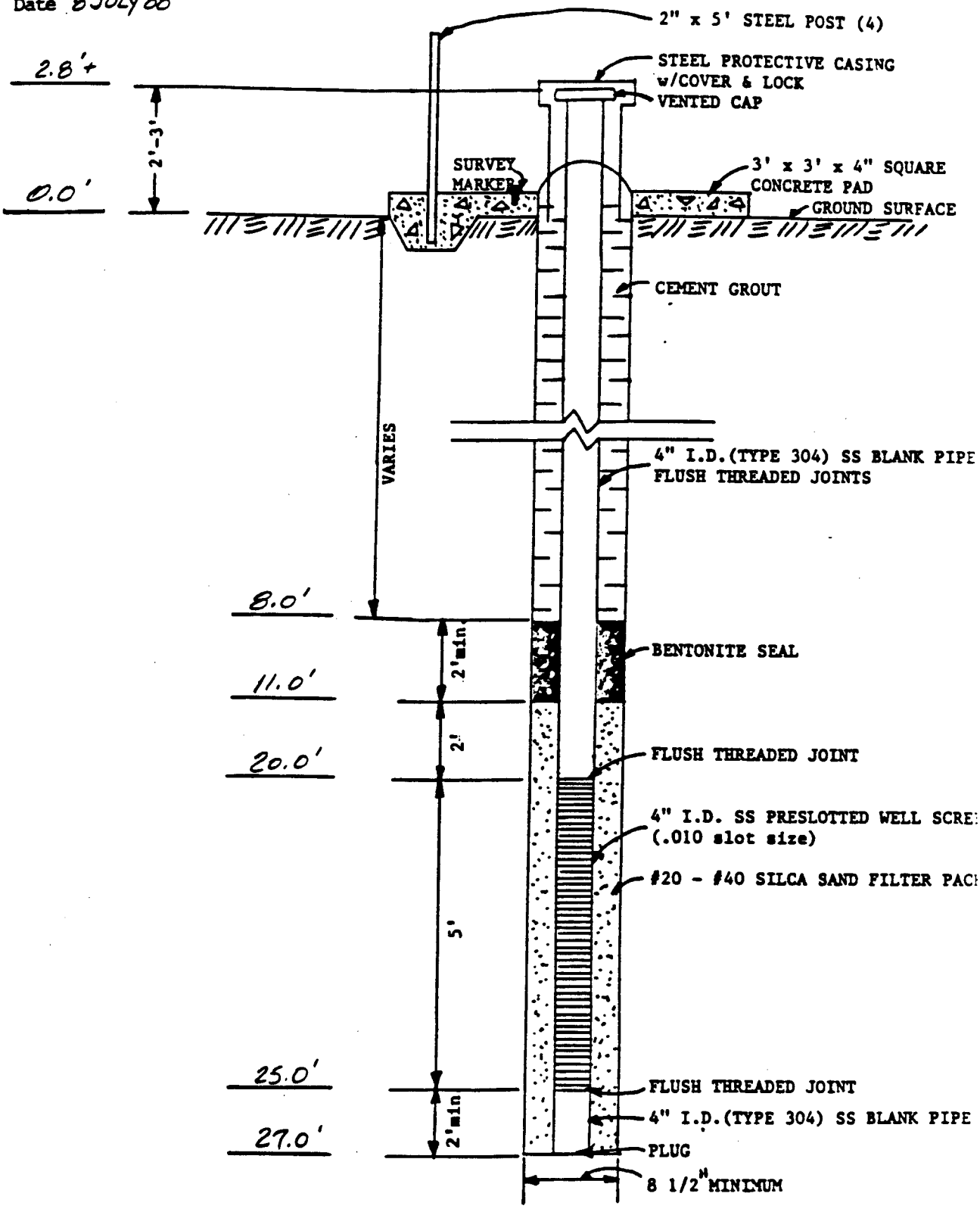
DRILLING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT: LONGHORN AAP		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): GROUND-WATER MONITORING WELLS		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-9		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 18; UNDISTURBED 0	
5. NAME OF DRILLER: T. SILITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 7 JULY 88; COMPLETED 8 JULY 88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 182.58'	
9. TOTAL DEPTH OF HOLE: 27.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: James R. Hall	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc.; if applicable) g
	0.0		0.0' TO 0.5' SILT: LOW PLASTICITY; REDDISH BROWN; STIFF; DAMP; VERY SANDY (BORDERS A SILTY SAND) 0.5' TO 7.3' CLAY: 0.5'-2.5': MEDIUM-HIGH PLASTICITY; RED WITH YELLOW; VERY STIFF-HARD; DAMP; TRACE of SAND 2.5'-4.0': MEDIUM PLASTICITY; RED & LIGHT GRAY; HARD; DRY; SLIGHTLY SANDY 4.0'-6.0': MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; HARD; DRY-DAMP; SILTY; WITH TRACE of FINE SAND. 6.0'-7.3': LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF; MOIST; VERY SANDY 7.3' TO 12.5' SAND: FINE-MEDIUM GRAINED; YELLOWISH BROWN; MEDIUM; VERY MOIST TO SATURATED FROM 9.0'; VERY SILTY TO SLIGHTLY SILTY FROM 9.0' 12.5' TO 13.1' CLAY: HIGH PLASTICITY; LIGHT BLUE GRAY & YELLOWISH BROWN; STIFF; MOIST; WITH A WEAK ODOR 13.1' TO 16.0' SAND: FINE-MEDIUM GRAINED; YELLOWISH BROWN; MEDIUM; SATURATED; SILTY; WITH A WEAK ODOR 16.0' TO 27.0' T.D. CLAY: (WITH A WEAK ODOR) 16.0'-19.0': HIGH PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP 19.0'-26.0': LOW-MEDIUM PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; STIFF TO MEDIUM FROM 24.0'; MOIST TO VERY MOIST FROM 24.0'; VERY SILTY; SANDY 26.0'-27.0': HIGH PLASTICITY; LIGHT BLUE & YELLOWISH BROWN; HARD; DAMP. T.D. 27.0'		A B C D E F G H I J K L M N	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 9.0'±; LEVEL IN WELL AFTER 24 HRS. WAS 8.8' 2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.0' - 0.5' B: 0.5' - 2.5' C: 2.5' - 4.0' D: 4.0' - 6.0' E: 6.0' - 7.3' F: 7.3' - 9.0' G: 9.0' - 11.0' H: 11.0' - 12.5' I: 12.5' - 13.1' J: 13.1' - 16.0' K: 16.0' - 19.0' L: 19.0' - 24.0' M: 24.0' - 26.0' N: 26.0' - 27.0' (CHEMICAL TESTS) C-1 & 1A: 2.0' C-2 & 2A: 10.0' 3. DRILLING: 10" FLIGHT AUGER: 0.0' - 27.0' NOTE: SET 8" STEEL CASING TO 27.0' & CLEANED OUT. SET MONITORING WELL & PLACED SAND FILTER & BENTONITE SEAL AS CASING WAS REMOVED; GROUTED TO SURFACE. NOTE: REFER TO CONSTRUCTION DETAIL SHEET. 4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' of BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NOTE: A WEAK ODOR WAS DETECTED IN JAR SAMPLES FROM 12.5'-27.0' 5. SURVEYED COORDINATES: X: 3,040,119.45' Y: 380,467.99'
	20					
	27.0					
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT LONGHORN AAP. HOLE NO MW-9

LONGHORN AAP
MW -9
Date 8 JULY 88



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-10

006254

DRILLING LOG	DIVISION: SWD	INSTALLATION: FWD	SHEET 1 OF 1 SHEETS
1. PROJECT: LONGHORN AAP.		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): GROUND-WATER MONITORING WELLS		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-10		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 17; UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 18 JULY '88; COMPLETED 18 JULY '88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 176.23'	
9. TOTAL DEPTH OF HOLE: 34.5'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Hobbs	

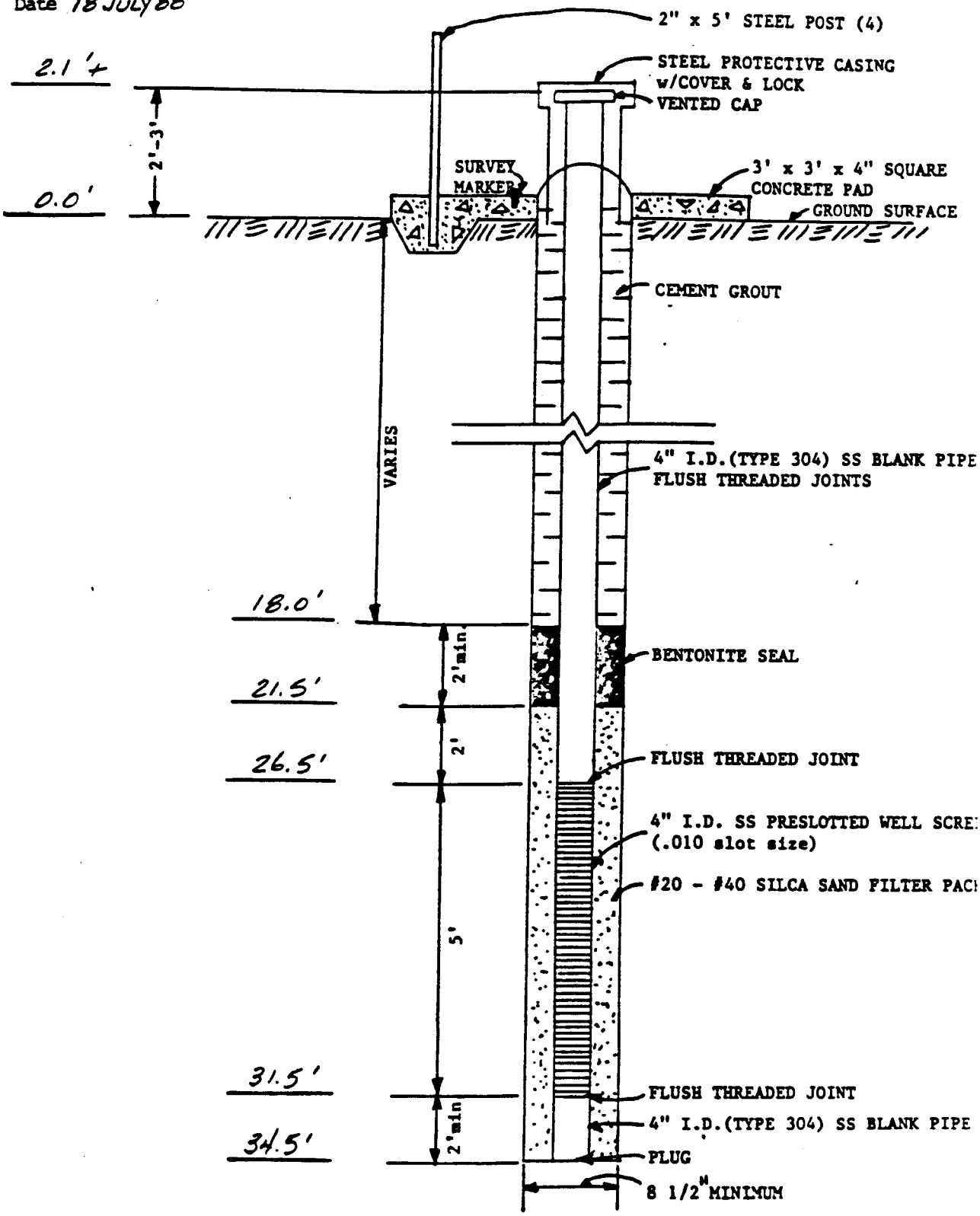
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0		0.0' TO 1.0' SILT: LOW PLASTICITY; LIGHT BROWN; HARD; DRY; VERY SANDY 1.0' TO 7.2' CLAY: 1.0'-3.0': MEDIUM PLASTICITY; LIGHT GRAY WITH RED & YELLOWISH BROWN; HARD; DRY-DAMP; SLIGHTLY SANDY 3.0'-7.2': MEDIUM PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; STIFF-VERY STIFF; MOIST; VERY SILTY; SLIGHTLY SANDY 7.2' TO 32.0' SAND: 7.2'-13.0': FINE GRAINED; LIGHT GRAY & YELLOWISH BROWN; MEDIUM; SATURATED; VERY SILTY TO SILTY FROM 9.2' 13.0'-19.5': FINE GRAINED; LIGHT GRAY & YELLOWISH BROWN; MEDIUM; MOIST; VERY SILTY (BORDERS A SANDY SILT) 19.5'-23.5': FINE GRAINED; YELLOWISH BROWN; MEDIUM; SATURATED; SLIGHTLY SILTY 23.5'-32.0': FINE GRAINED; GRAY; MEDIUM; VERY MOIST-WET; VERY SILTY 32.0' TO 34.5' T.D. SILT: LOW PLASTICITY; GRAY; MEDIUM-STIFF; MOIST-VERY MOIST; VERY SANDY; WITH THIN SANDY CLAY SEAMS T.D. 34.5'		A B C D E F G H I J K L	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 7.2' TO LEVEL IN WELL AFTER 24 HRS. WAS 5.5' 2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.0' - 1.0' B: 1.0' - 3.0' C: 3.0' - 5.1' D: 5.1' - 7.2' E: 7.2' - 9.2' F: 9.2' - 11.2' G: 11.2' - 13.0' H: 13.0' - 18.0' I: 18.0' - 19.5' J: 19.5' - 23.5' K: 23.5' - 28.5' L: 28.5' - 32.0' M: 32.0' - 34.5' (CHEMICAL TESTS) C-1 & 1A: 2.0' C-2 & 2A: 10.0' 3. DRILLING: 10" FLIGHT AUGER: 0.0' - 34.5' NOTE: SET 8" STEEL CASING TO 34.5' & CLEANED OUT. SET MONITORING WELL & PLACED SAND FILTER & BENTONITE SEAL AS CASING WAS REMOVED. GROUTED TO SURFACE. NOTE: REFER TO CONSTRUCTION DETAIL SHEET. 4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODOR WAS DETECTED. 5. SURVEYED CO-ORDINATES: X: 3,039,841.24 Y: 380,650.29
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ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: LONGHORN AAP. HOLE NO. MW-10

LONGHORN AAP
MW - 10
Date 18 JULY 88

006255



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-11

006256

DRILLING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 10" AUGER	
2. LOCATION (Coordinates or Grid) GROUND-WATER MONITORING WELLS		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-11		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 12 / UNDISTURBED 0	
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 21 JULY 88 / COMPLETED 21 JULY 88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 176.52	
9. TOTAL DEPTH OF HOLE 11.6'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
		19. SIGNATURE OF INSPECTOR Jackie R. Hall	

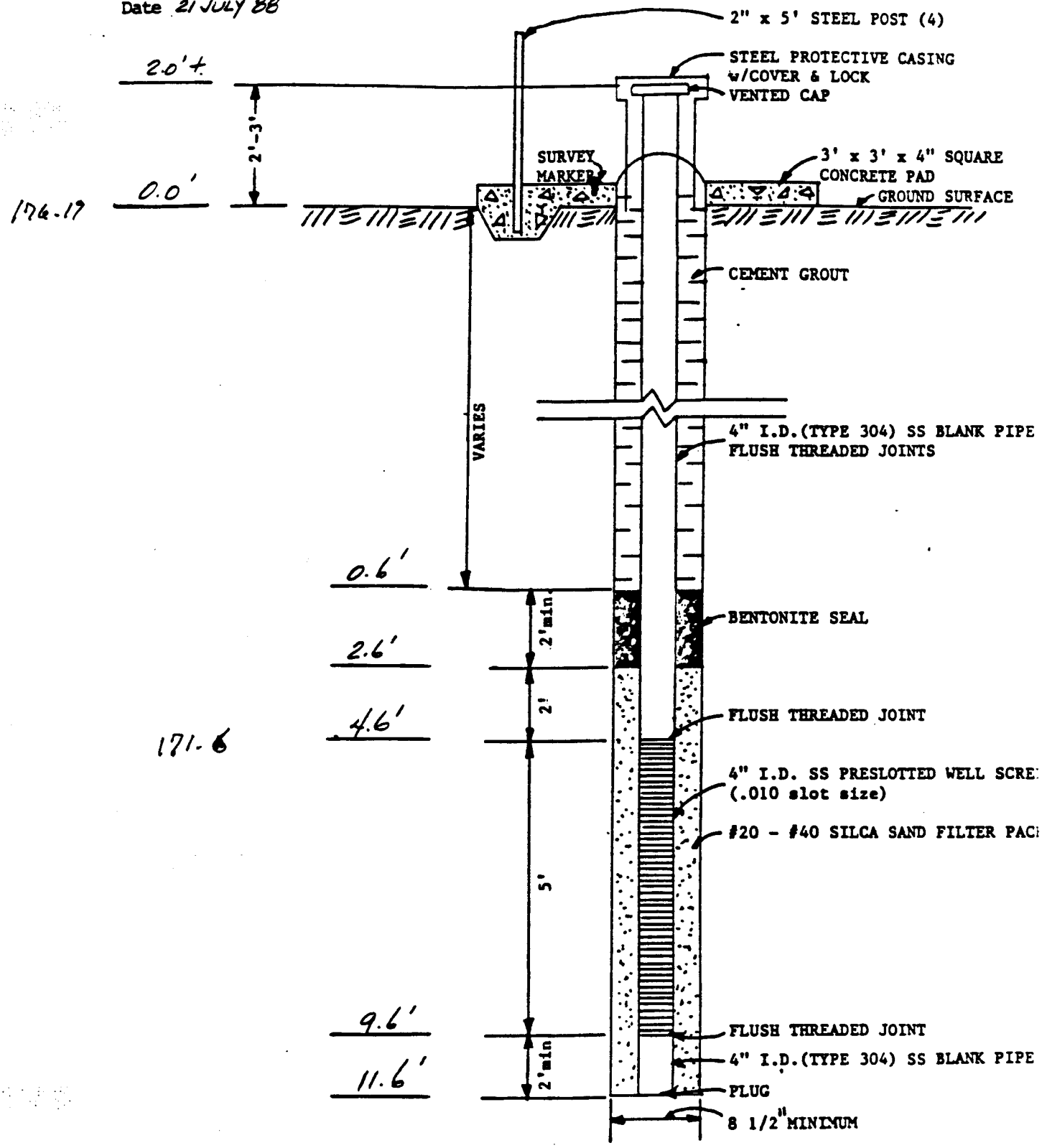
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Descriptions) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0		0.0' TO 0.4' SAND: FINE GRAINED; LIGHT BROWN; DENSE; DRY; VERY SILTY 0.4' TO 1.9' SILT: LOW PLASTICITY; LIGHT BROWN & YELLOWISH BROWN; HARD; DRY; VERY SANDY 1.9' TO 5.0' CLAY: MEDIUM PLASTICITY TO LOW PLASTICITY FROM 3.9'; LIGHT GRAY, RED, ORANGE & YELLOWISH BROWN; VERY STIFF TO HARD; DAMP; SLIGHTLY SANDY & SILTY TO SANDY & SILTY FROM 3.9' 5.0' TO 11.6' T.D. SAND: FINE GRAINED; LIGHT GRAY & YELLOWISH BROWN; MEDIUM; VERY MOIST TO WET FROM 6.0' TO SATURATED FROM 8.0'; SILTY T.D. 11.6'		A B C D E F G H	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 6.0'±; LEVEL IN WELL AFTER 24 HR WAS AT 6.0' 2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.0' - 0.4' B: 0.4' - 1.9' C: 1.9' - 3.9' D: 3.9' - 5.0' E: 5.0' - 6.0' F: 6.0' - 8.0' G: 8.0' - 10.0' H: 10.0' - 11.6' (CHEMICAL SAMPLES) C-1 & 1A: 2.0' C-2 & 2A: 10.0' 3. DRILLING: 10" FLIGHT AUGER: 0.0' - 11.6' NOTE: SET 8" STEEL CASING TO 11.6' & CLEANED OUT. SET MONITORING WELL & PLACED SAND FILTER & BENTONITE SEAL AS CASING WAS REMOVED. GROUTED TO SURFACE. NOTE: REFER TO CONSTRUCTION DETAIL SHEET. 4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0 OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODOR WAS DETECTED. 5. SURVEYED COORDINATES: X: 3,040,098.51 Y: 380,914.88
	11.6					
	20					
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ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT LONGHORN AAP. HOLE NO. MW-11

006257

LONGHORN AAP
MW - 11
Date 21 JULY 88



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-12

006258

DRILLING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT LONGHORN AAP.		10. SIZE AND TYPE OF BIT 10" AUGER	
2. LOCATION (Coordinates or Station) GROUND-WATER MONITORING WELLS		11. DATUM FOR ELEVATION SHOWN (MSL or USGS)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-12		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 16; UNDISTURBED 0	
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 26 July '88 COMPLETED 26 July '88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 176.77	
9. TOTAL DEPTH OF HOLE 28.8'		18. TOTAL CORE RECOVERY FOR BORING N/A %	
		19. SIGNATURE OF INSPECTOR Jack R. Stokes	

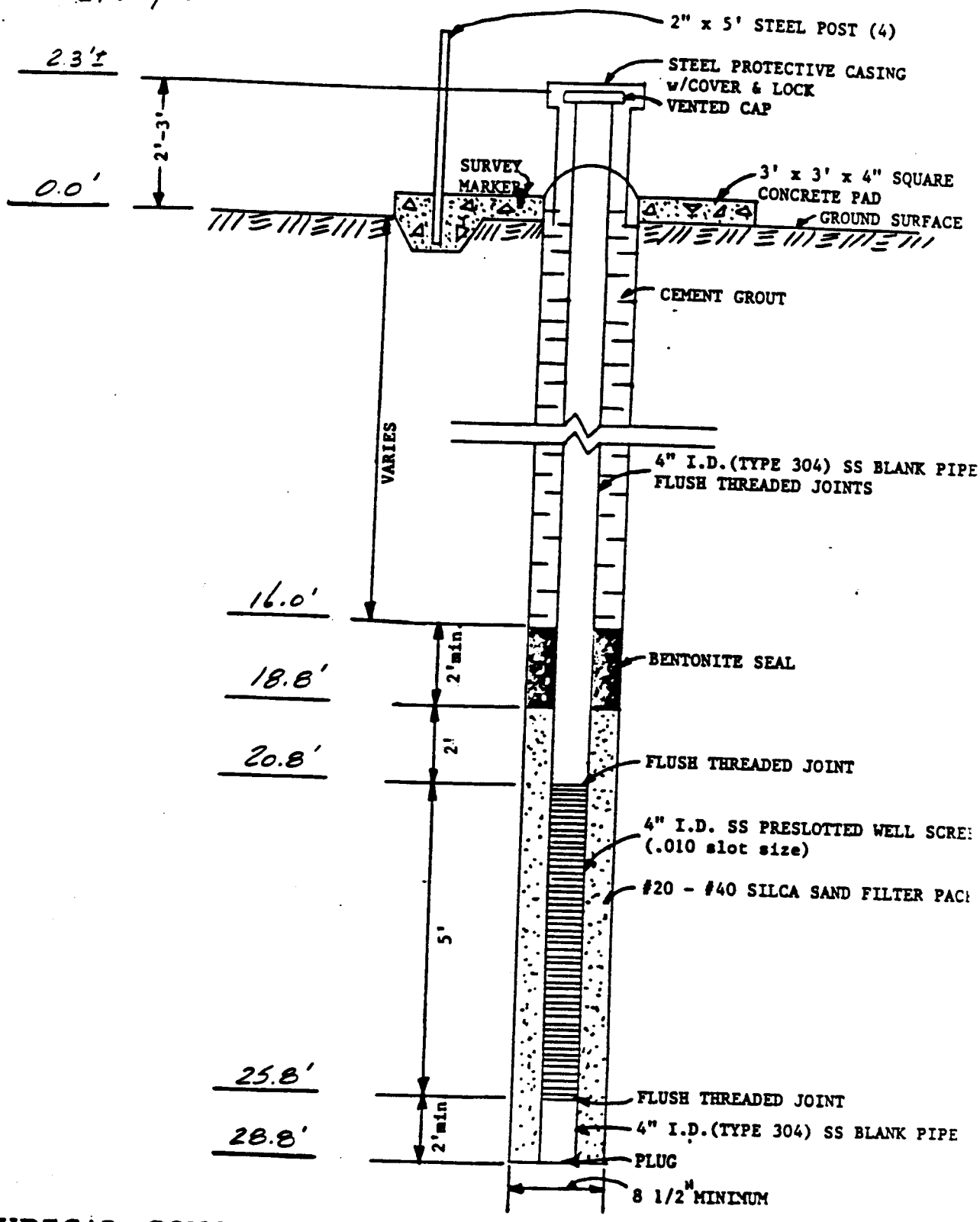
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0		0.0' TO 0.7' SILT: LOW PLASTICITY; LIGHT BROWN; HARD; DRY; VERY SANDY		A	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 7.0'±; LEVEL IN WELL AFTER 24 HRS. WAS AT 6.0'
			0.7' TO 6.0' CLAY: 0.7'-4.0': MEDIUM PLASTICITY; LIGHT GRAY WITH LIGHT BROWN & YELLOWISH BROWN; VERY STIFF-HARD; DAMP; SILTY; SLIGHTLY SANDY		B C D	
			4.0'-6.0': MEDIUM PLASTICITY; GRAYISH BROWN WITH YELLOWISH BROWN; STIFF-VERY STIFF; MOIST; SILTY; SLIGHTLY SANDY		E F G H	2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.0' - 0.7' B: 0.7' - 2.7' C: 2.7' - 4.0' D: 4.0' - 6.0' E: 6.0' - 7.0' F: 7.0' - 8.0' G: 8.0' - 10.0' H: 10.0' - 12.0'
			6.0' TO 8.0' SILT: 6.0'-7.0': LOW-MEDIUM PLASTICITY; LIGHT GRAY, BROWN & YELLOWISH BROWN; STIFF; MOIST-VERY MOIST; INTERBEDDED SANDY SILT & SILTY CLAY		I	I: 12.0' - 17.0' J: 17.0' - 22.0' K: 22.0' - 27.0' L: 27.0' - 28.8' (CHEMICAL SAMPLES) C-1 & 1A: 2.0' C-2 & 2A: 10.0'
	20		7.0'-8.0': LOW PLASTICITY; LIGHT GRAY & LIGHT BROWN WITH YELLOWISH BROWN; MEDIUM; WET; VERY SANDY; INTERBEDDED SANDY SILT & CLAYEY SILT; WITH A WEAK ODOR		J	3. DRILLING: 10" FLIGHT AUGER: 0.0' - 28.8' NOTE: SET 8" STEEL CASING TO 28.8' & CLEANED OUT. SET MONITORING WELL & PLACED SAND FILTER & BENTONITE SEAL AS CASING WAS REMOVED. GROUTED TO SURFACE. NOTE: REFER TO CONSTRUCTION DETAIL SHEET.
			8.0' TO 10.0' SAND: FINE GRAINED; LIGHT BROWN & YELLOWISH BROWN; MEDIUM; SATURATED; SILTY; WITH A WEAK ODOR.		K	
			10.0' TO 12.0' SILT: LOW PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; MEDIUM; WET; VERY SANDY; WITH A WEAK ODOR.		L	
	28.8		12.0' TO 27.0' SAND: FINE GRAINED; LIGHT BROWN TO LIGHT BLUE GRAY & YELLOWISH BROWN FROM 17.0'; MEDIUM; WET; SILTY TO VERY SILTY FROM 17.0'; WITH A WEAK ODOR			4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NOTE: A WEAK ODOR WAS DETECTED IN SOIL SAMPLES & A WEAK TO MEDIUM-STRONG ODOR IN BAILING & DEVELOPING WELL.
			27.0' TO 28.8' T.D. SILT: LOW PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM; VERY SANDY; SATURATED; WITH A WEAK ODOR. T.D. 28.8'			
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PROJECT LONGHORN AAP. HOLE NO. MW-12

LONGHORN AAP
MW - 12
Date 27 JULY 88

006259



TYPICAL CONSTRUCTION DETAIL FOR MONITORING WELL

Hole No. MW-13

006260

DRILLING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 2 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 10" AUGER; 9 7/8" ROCKBIT	
2. LOCATION (Coordinates or Station) GROUND-WATER QUALITY ASSESSMENT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-13		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 16; UNDISTURBED 0	
5. NAME OF DRILLER T. SLITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 13 SEPT. 88; COMPLETED 15 SEPT. 88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 174.64	
9. TOTAL DEPTH OF HOLE 46.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	
		19. SIGNATURE OF INSPECTOR Jackie R. Patton	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0		0.0' To 0.7' SILT: LOW PLASTICITY; LIGHT BROWN WITH YELLOWISH BROWN; STIFF; MOIST; VERY SANDY 0.7' To 5.5' CLAY: 0.7'-3.5': MEDIUM-HIGH PLASTICITY; LIGHT GRAY & RED; HARD; DAMP; SLIGHTLY SILTY 3.5'-5.5': LOW-MEDIUM PLASTICITY; LIGHT GRAY & YELLOWISH BROWN; VERY STIFF; DAMP; VERY SILTY; SANDY 5.5' To 26.0' SAND: 5.5'-6.5': FINE GRAINED; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM; WET; SILTY 6.5'-17.0': FINE GRAINED; LIGHT GRAY WITH YELLOWISH BROWN TO LIGHT BLUE GRAY FROM 8.5'; MEDIUM; SATURATED; SILTY 17.0'-26.0': FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY TO LIGHT BLUE GRAY FROM 22.0'; MEDIUM; WET; SLIGHTLY CLAYEY; VERY SILTY (BORDERS A SANDY SILT); SLIGHTLY CARBONACEOUS FROM 22.0' 26.0' To 28.0' SILT: LOW PLASTICITY; WITH THIN LAMINATIONS OF PLASTIC SILT; LIGHT BLUE GRAY & YELLOWISH BROWN; MEDIUM; WET; VERY SANDY 28.0' To 30.0'± CLAY: MEDIUM-HIGH PLASTICITY LAMINATIONS INTERBEDDED WITH SANDY SILT LAMINATIONS; LIGHT BLUE GRAY WITH YELLOWISH BROWN; MEDIUM; VERY MOIST; SILTY 30.0'± To 46.0' T.D. SAND: FINE GRAINED; LIGHT GRAY; SATURATED; WITH CARBON MATTER		A B C D E F G H I J K L 7 7/8" Rockbit	1. WATER LEVEL: NOTE: AUGERED INTO FREE WATER AT 5.5'±; LEVEL IN WELL AFTER 24 HRS. WAS 9.4' 2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.0' - 0.7' B: 0.7' - 2.7' C: 2.7' - 3.5' D: 3.5' - 5.5' E: 5.5' - 6.5' F: 6.5' - 8.5' G: 8.5' - 13.5' H: 13.5' - 17.0' I: 17.0' - 22.0' J: 22.0' - 26.0' K: 26.0' - 28.0' L: 28.0' - 29.0' (CHEMICAL SAMPLES) C-1 & 1A: 2.0' C-2 & 2A: 10.0' 3. DRILLING: 10" FLIGHT AUGER: 0.0' - 29.0' NOTE: SET 8" CASING TO 29.0' & CEMENTED IN PLACE. 9 7/8" ROCKBIT: 29.0' - 46.0' NOTE: USED BENTONITE MUD. NOTE: ALL DRILL MUD WAS FLUSHED FROM WELL & MONITORING WELL WAS PLACED & SAND FILTER & BENTONITE SEAL WAS PLACED & BORING WAS GROUTED TO SURFACE. NOTE: REFER TO CONSTRUCTION DETAIL SHEET. 4. NOTE: MW-13 WAS SET 10' SW OF C-2.
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ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT LONGHORN AAP

HOLE NO. MW-13

Hole No. MW-13

006261

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 2 SHEETS
1. PROJECT: LONGHORN AAP		10. SIZE AND TYPE OF BIT	
2. LOCATION (Coordinates or Station)		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number): MW-13		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED	
5. NAME OF DRILLER		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 13 SEPT. 88 / COMPLETED 15 SEPT. 88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE		18. TOTAL CORE RECOVERY FOR BORING	%
		19. SIGNATURE OF INSPECTOR: Joshua R. Hoke	

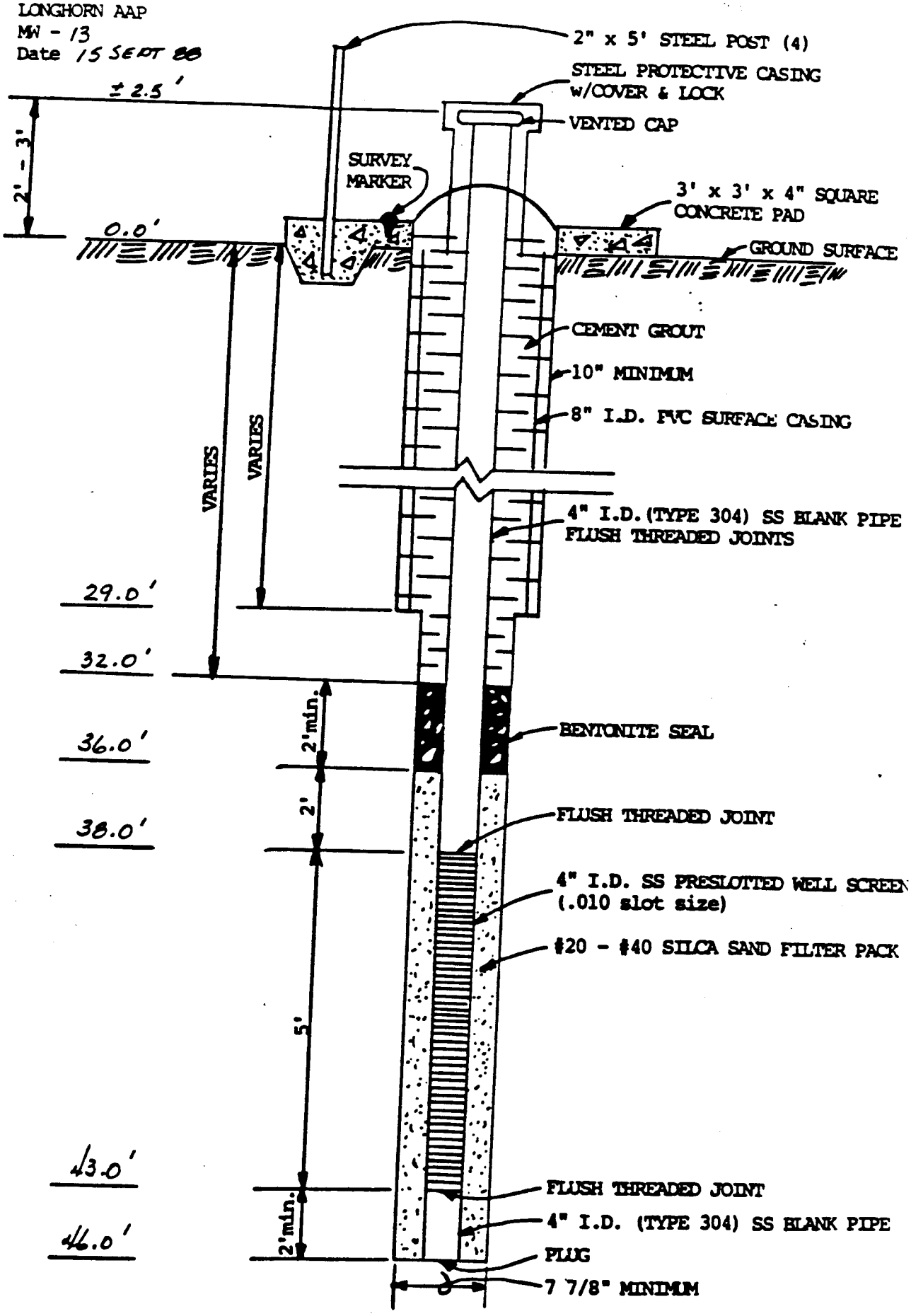
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	46.0		T.D. 46.0'			5. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NOTE: NO ODOR WAS DETECTED in SOIL SAMPLES.
	60					
	80					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: LONGHORN AAP. HOLE NO.: MW-13

006262

LONGHORN AAP
MW - 13
Date 15 SEPT 88



TYPICAL CONSTRUCTION DETAIL FOR DEEP MONITORING WELL

Hole No. MW-14

DRILLING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 2 SHEETS
1. PROJECT LONGHORN AAP		10. SIZE AND TYPE OF BIT 10" AUGER	
2. LOCATION (Coordinates or Station) GROUND-WATER MONITORING WELLS		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY USCE		12. MANUFACTURER'S DESIGNATION OF DRILL FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number) MW-14		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 21 / UNDISTURBED 0	
5. NAME OF DRILLER T. SUITS		14. TOTAL NUMBER CORE BOXES N/A	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE STARTED 2 AUG. 88 / COMPLETED 9 AUG. 88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE 180.93	
9. TOTAL DEPTH OF HOLE 51.0'		18. TOTAL CORE RECOVERY FOR BORING N/A	
		19. SIGNATURE OF INSPECTOR Jackie R. Hobbs	

006263

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
	0.0		0.0' To 1.9' SILT FILL: LOW PLASTICITY: LIGHT REDDISH BROWN: HARD: DRY: VERY SANDY: WITH FERRUGINOUS NODULES & CONCRETIONS		A	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 11.0': LEVEL IN WELL AFTER 24 HRS. WAS AT 10.0'
			1.9' To 7.0' SILT: 1.9'-5.0': LOW PLASTICITY: YELLOWISH BROWN WITH LIGHT GRAY: MEDIUM-STIFF: MOIST: VERY SANDY (BORDERS A SILTY SAND: CONTAINS A VERY WEAK ODOR.		B C D E	
			5.0'-7.0': LOW PLASTICITY: YELLOWISH BROWN & LIGHT GRAY: STIFF: DAMP: CLAYEY: SANDY: CONTAINS A VERY WEAK ODOR		F	
			7.0' To 20.0' SAND: 7.0'-11.0': FINE GRAINED: YELLOWISH BROWN WITH LIGHT GRAY: MEDIUM: VERY MOIST TO WET FROM 9.0'±: VERY SILTY TO SLIGHTLY SILTY FROM 9.0': CONTAINS A VERY WEAK ODOR		G H	2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.0' - 1.9' B: 1.9' - 3.9' C: 3.9' - 5.0' D: 5.0' - 7.0' E: 7.0' - 9.0' F: 9.0' - 11.0' G: 11.0' - 16.0' H: 16.0' - 20.0' I: 20.0' - 22.5' J: 22.5' - 23.8' K: 23.8' - 26.0' L: 26.0' - 27.8' M: 27.8' - 32.8' N: 32.8' - 37.8' O: 37.8' - 42.8' P: 42.8' - 47.8' Q: 47.8' - 51.0'
	20		11.0'-20.0': FINE GRAINED: YELLOW, YELLOWISH BROWN & LIGHT GRAY: MEDIUM: WET-SATURATED: VERY SILTY: CONTAINS A WEAK ODOR		I J	(CHEMICAL SAMPLES) C-1&1A: 2.0' C-2&2A: 10.0'
			20.0' To 23.8' SILT: 20.0'-22.5': LOW PLASTICITY: YELLOWISH BROWN & LIGHT GRAY: MEDIUM: WET: VERY SANDY (BORDERS A SILTY SAND): CONTAINS A VERY WEAK ODOR.		K L	3. DRILLING: 10" FLIGHT AUGER: 0.0' - 28.0' NOTE: SET 8" PVC CASING TO 28.0' & CEMENTED IN PLACE. NOTE: CEMENT PLUG WAS ROCKBITTED OUT.
			22.5'-23.8': LOW-MEDIUM PLASTICITY: LIGHT BLUE GRAY: MEDIUM-STIFF: VERY MOIST: CLAYEY: SANDY: CONTAINS A VERY WEAK ODOR		M	8" FLIGHT AUGER 28.0' - 50.0' NOTE: BENTONITE DRILL MUD WAS USED & BORING WAS "MUDDED OFF" & 7 7/8" ROCK-BIT WAS USED FROM 50.0' - 51.0'
			23.8' To 26.0' SAND: FINE GRAINED: YELLOWISH BROWN WITH LIGHT GRAY: MEDIUM: VERY MOIST - WET: VERY SILTY: CONTAINS A VERY WEAK ODOR		N	MONITOR WELL WAS SET & SAND FILTER WAS PLACED AFTER DRILL MUD WAS FLUSHED OUT. THE BENTONITE SEAL WAS PLACED & BORING WAS GROUTED TO SURFACE. NOTE: REFER TO CONSTRUCTION
			26.0' To 27.8' CLAY: LOW PLASTICITY:		O	
	40					

Hole No. MW-14

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 2 SHEETS
1. PROJECT: LONGHORN AAP.		10. SIZE AND TYPE OF BIT	
2. LOCATION (Coordinates or Station): GROUND-WATER MONITORING WELLS		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY		12. MANUFACTURER'S DESIGNATION OF DRILL	
4. HOLE NO. (As shown on drawing title and file number): MW-14		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED	
5. NAME OF DRILLER		14. TOTAL NUMBER CORE BOXES	
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 2 AUG. 88 / COMPLETED 9 AUG. 88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE		18. TOTAL CORE RECOVERY FOR BORING	%
		19. SIGNATURE OF INSPECTOR: Jackie R. Stokes	

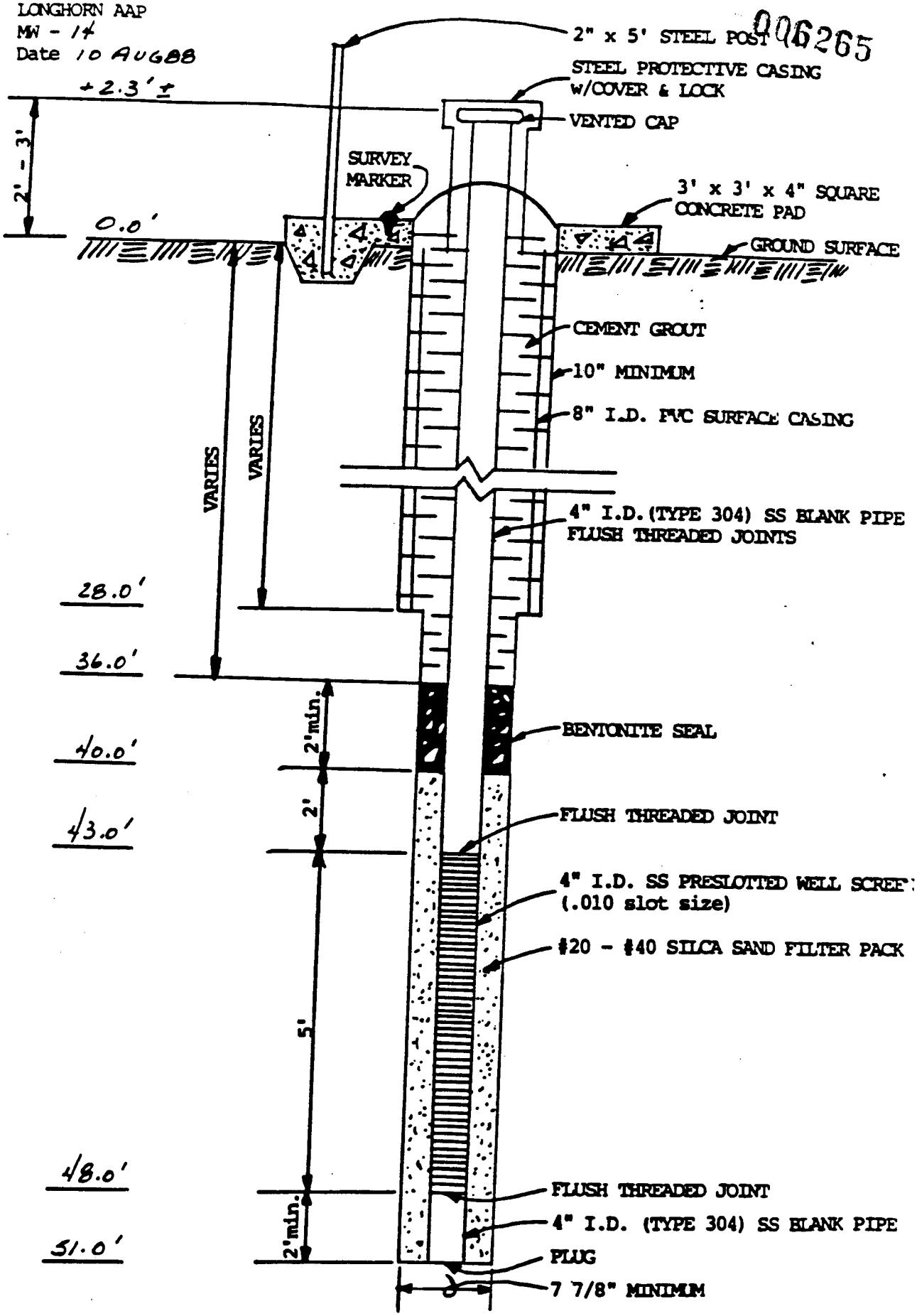
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			LIGHT BLUE GRAY & YELLOWISH BROWN; MEDIUM-STIFF; VERY MOIST; VERY SILTY; SANDY; CONTAINS A VERY WEAK ODOR.			DETAIL SHEET.
			27.8' TO 51.0' T.D.			4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT.
			SAND:			NOTE: A WEAK ODOR WAS DETECTED IN SOIL SAMPLES TO 32.8'
			27.8'-32.8': FINE GRAINED; LIGHT BLUE GRAY & YELLOWISH BROWN; MEDIUM; SATURATED; SILTY; CONTAINS A WEAK ODOR		P	
			32.8'-51.0': FINE-MEDIUM GRAINED; LIGHT BLUE GRAY & YELLOWISH BROWN TO LIGHT GRAY WITH CHOCOLATE BROWN FROM 47.8'; MEDIUM-DENSE; SATURATED; SLIGHTLY SILTY; WITH CARBON MATTER.		Q	
	51.0		T.D. 51.0'			
	60					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT LONGHORN AAP. HOLE NO. MW-14

LONGHORN AAP
MW - 14
Date 10 AUG 88

006265



TYPICAL CONSTRUCTION DETAIL FOR DEEP MONITORING WELL

Hole No. MW-15

006266

DRILLING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 2 SHEETS
1. PROJECT: LONGHORN AAP		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): GROUND-WATER QUALITY ASSESSMENT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and title number): MW-15		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 20 / UNDISTURBED 0	
5. NAME OF DRILLER: T. SILITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 29 AUG. 88 / COMPLETED 30 AUG. 88	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 195.70	
9. TOTAL DEPTH OF HOLE: 69.5'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie K. Baker	

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
	0.0		0.0' TO 0.7' SAND: FINE GRAINED; BROWN; MEDIUM; DRY-DAMP; VERY SILTY (BORDERS A SANDY SILT)		A	1. WATER LEVEL: NOTE: AUGERED INTO FREE WATER AT 20.0'±; LEVEL IN WELL AFTER 24 HRS. WAS 26.5'
			0.7' TO 17.0' CLAY: 0.7'-2.0': LOW PLASTICITY; YELLOWISH BROWN WITH RED; VERY STIFF; DAMP; VERY SILTY; SANDY; WITH SCATTERED CARBON STAINS 2.0'-5.8': MEDIUM-HIGH PLASTICITY; RED WITH LIGHT GRAY; HARD; DAMP; WITH TRACE OF SAND & SILT; WITH ABUNDANT CARBON STAINS FROM 4.0' 5.8'-12.0': MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF; MOIST; VERY SILTY; SLIGHTLY SANDY 12.0'-17.0': LOW-MEDIUM PLASTICITY; YELLOWISH BROWN, REDDISH BROWN & LIGHT GRAY; MEDIUM; VERY MOIST; SILTY; VERY SANDY		B	
					C	
					D	
					E	2. JAR SAMPLES: (SOIL CLASSIFICATION) A: 0.0' - 0.7' B: 0.7' - 2.0' C: 2.0' - 4.0' D: 4.0' - 5.8' E: 5.8' - 10.8' F: 10.8' - 12.0' G: 12.0' - 17.0' H: 17.0' - 20.0' I: 20.0' - 23.0' J: 23.0' - 25.5' K: 25.5' - 30.5' L: 30.5' - 31.5' M: 31.5' - 36.5' N: 36.5' - 40.0' O: 40.0' - 46.5' P: 46.5' - 47.0'
					F	
					G	
					H	(CHEMICAL SAMPLES) C-1 & 1A: 2.0' C-2 & 2A: 10.0'
	20		17.0' TO 25.5' SILT: LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; VERY MOIST-WET TO SATURATED AT 20.0'±; SANDY TO VERY SANDY FROM 23.0' (BORDERS A SAND FROM 23.0)		I	3. DRILLING: 10" FLIGHT AUGER: 0.0' - 41.0' NOTE: SET 8" CASINGS TO 42.0' & CEMENTED IN PLACE. 8" FLIGHT AUGER: 41.0' - 47.0' 7 7/8" ROCKBIT W/ BENTONITE MUD: 47.0' - 69.5' NOTE: MONITOR WELL WAS SET & SAND FILTER WAS PLACED AFTER ALL DRILL MUD WAS WASHED OUT. THE BENTONITE SEAL WAS PLACED & BORING WAS GROUTED TO SURFACE. NOTE: REFER TO CONSTRUCTION DETAIL SHEET.
					J	
			25.5' TO 31.5' CLAY: MEDIUM-HIGH PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; STIFF; MOIST; SLIGHTLY SILTY; CONTAINS A WEAK ODOR		K	
					L	
			31.5' TO 40.0' SILT: LOW PLASTICITY; YELLOWISH BROWN; WET-SATURATED; MEDIUM; VERY SANDY WITH SILTY SAND SEAMS (BORDERS A SAND); CONTAINS A WEAK ODOR.		M	
					N	4. NOTE: MW-15 WAS SET 10' WEST OF MW-2.
	40					

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: LONGHORN AAP. HOLE NO.: MW-15

Hole No. MW-15

DRILLING LOG	Division	Installation	Sheet 2 of 2 sheets

1. Project: LONGHORN AAP
2. Location (Coordinates or Station)
3. Drilling Agency
4. Hole No. (As shown on drawing title and file number): MW-15
5. Name of Driller
6. Direction of Hole: ☐ Vertical ☐ Inclined _____ Deg. From Vert.
7. Thickness of Overburden
8. Depth Drilled into Rock
9. Total Depth of Hole
10. Size and Type of Bit
11. Datum for Elevation Shown (TBM or MSL)
12. Manufacturer's Designation of Drill
13. Total No. of Overburden Samples Taken: Disturbed | Undisturbed
14. Total Number Core Boxes
15. Elevation Ground Water
16. Date Hole: Started 29 AUG. '88 | Completed 30 AUG '88
17. Elevation Top of Hole
18. Total Core Recovery for Boring %
19. Signature of Inspector: Jackie R. Stokes

006267

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
			40.0' To 46.5' CLAY: MEDIUM-HIGH PLASTICITY; LIGHT GRAY & BLUE GRAY WITH YELLOWISH BROWN; STIFF-VERY STIFF; DAMP-MOIST; SLIGHTLY SILTY; CONTAINS A VERY WEAK ODOR.		0	5. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. SOME ODOR WAS DETECTED IN SOIL SAMPLES FROM 25.5' TO 46.5'
			46.5' To 69.5' T.D. SAND: FINE GRAINED; LIGHT GRAY-LIGHT BLUE GRAY; MEDIUM; WET-SATURATED; VERY SILTY; WITH CARBON MATTER; WITH NO ODOR. (ROCKBITTED FROM 47.0')			
	60					
	69.5		T.D. 69.5'			
	80					

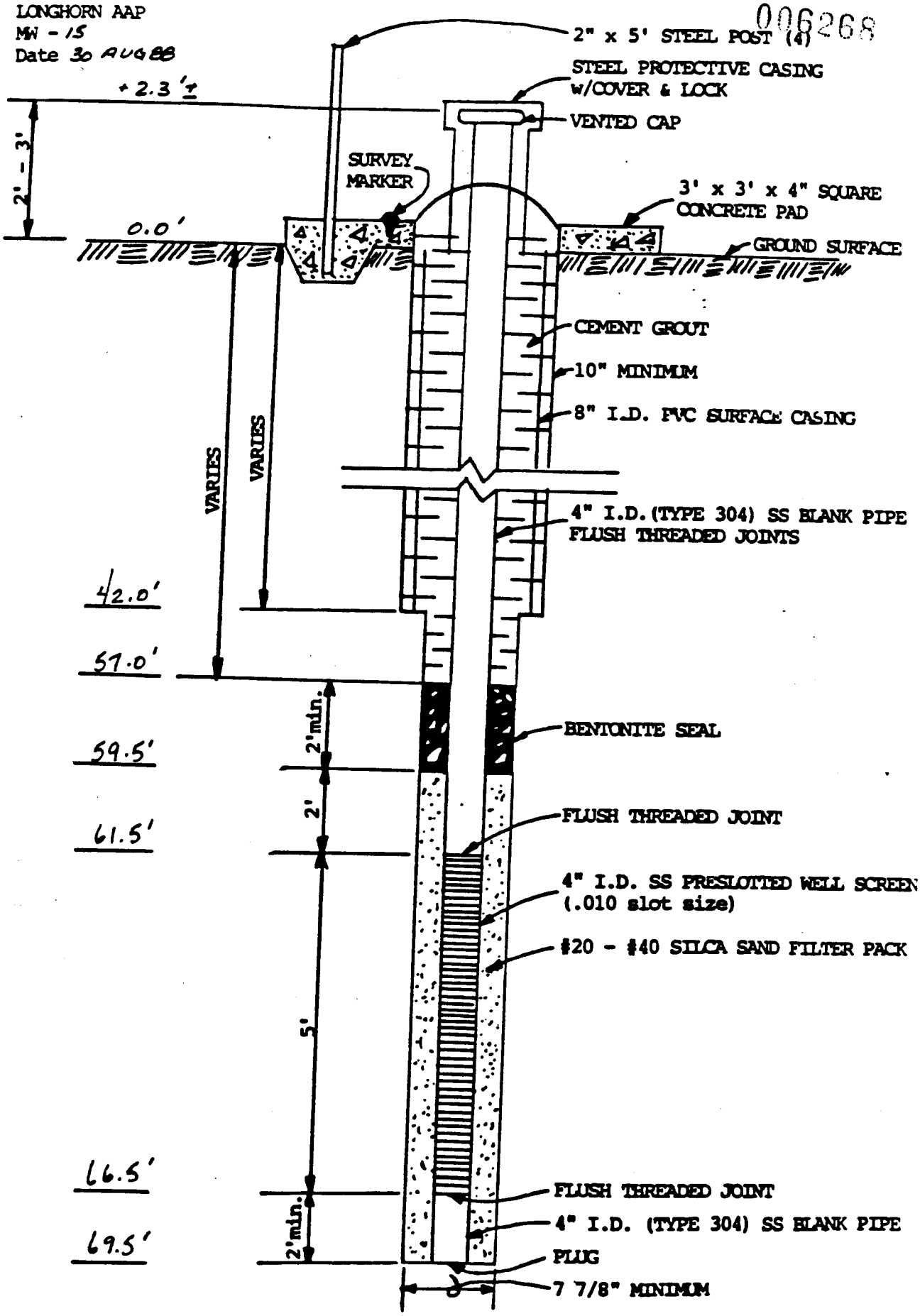
7 7/8" Rockbit

ENG FORM 1836 MAR 71 — PREVIOUS EDITIONS ARE OBSOLETE.

Project: LONGHORN AAP | Hole No. MW-15

LONGHORN AAP
MW - 15
Date 30 AUG 88

006268



TYPICAL CONSTRUCTION DETAIL FOR DEEP MONITORING WELL

Hole No. MW-16

006269

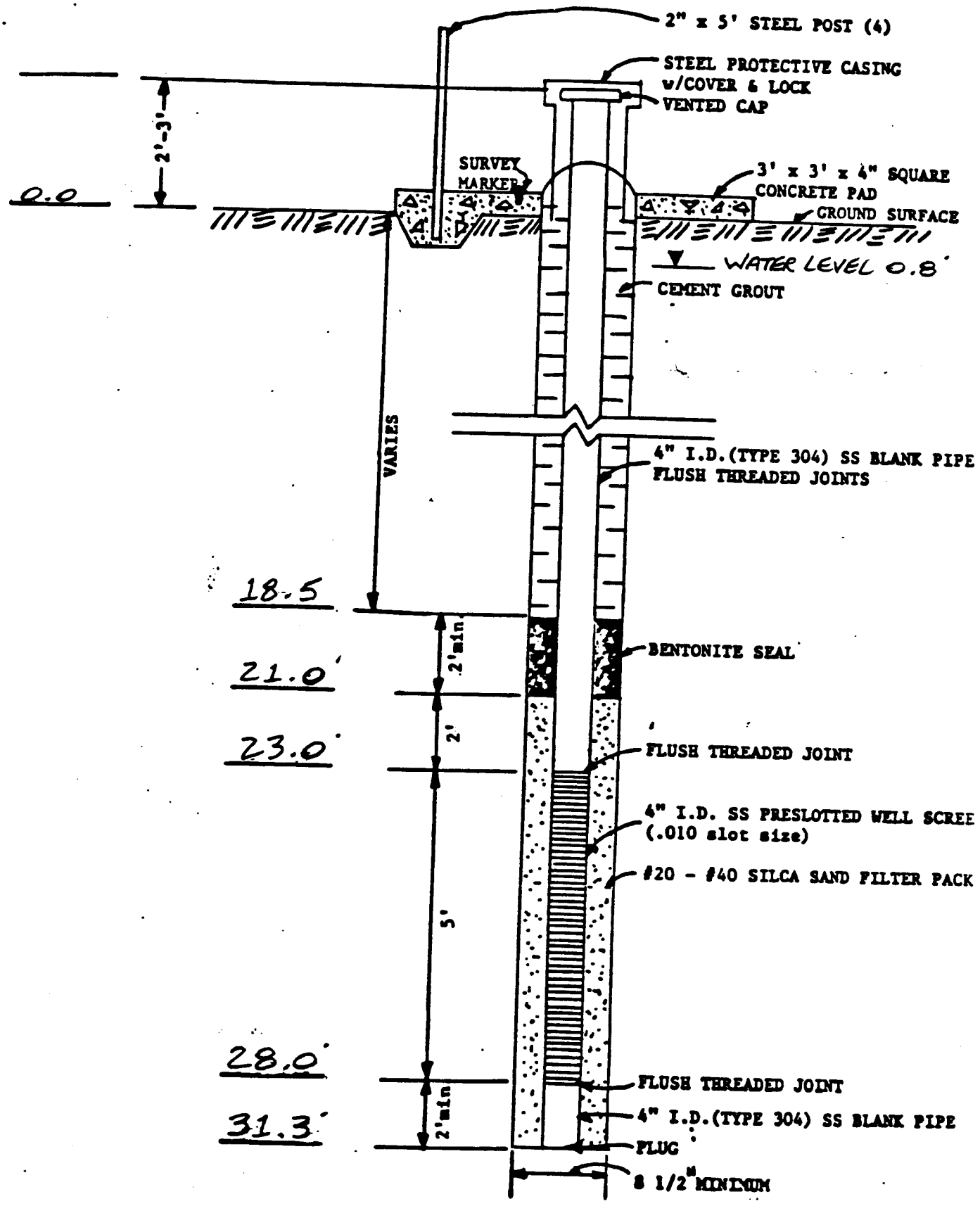
DRILLING LOG	DIVISION SWD	INSTALLATION SWF	SHEET 1 OF 1 SHEETS
1. PROJECT: LONGHORN AAP (RFI - PHASE II - MONITOR WELLS)		10. SIZE AND TYPE OF BIT: 10" AUGER, 8" AUGER	
2. LOCATION (Coordinates or Station): SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (MSL or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-16		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 9; UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 23 AUG. 89; COMPLETED 23 AUG. 89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 173.16	
9. TOTAL DEPTH OF HOLE: 31.3'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Stokes	

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
	0.0		0.0' TO 2.0' CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; HARD; DRY-DAMP; MODERATELY SILTY		A	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 8.5'; LEVEL WAS AT 0.8' AT 0720 HRS. ON 24 AUG. WELL WAS DEVELOPED BY BAILING ON 24 AUG. & BAIL LEVEL WAS 29.4' AT 1040 HRS. LEVEL WAS 14.0' AT 1048 HRS. & 9.3' AT 1054 HRS. & 0.8' AT 1338 HRS.
			2.0' TO 8.5' SILT: MEDIUM PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; STIFF; MOIST TO VERY MOIST FROM 5.0'		B	
					C	
			8.5' TO 31.3' T.D. SAND: FINE GRAINED; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM; WET; MODERATELY SILTY 13.0'-18.6': YELLOWISH BROWN WITH LIGHT GRAY; SATURATED; WITH A VERY WEAK ODOR 18.0'-19.5': SILTY; VERY MOIST 19.5'-31.3': SATURATED; GRAY; SLIGHTLY TO MODERATELY SILTY; WITH ABUNDANT CARBON MATTER		D	2. JAR SAMPLES: A: 0.0' - 2.0' B: 2.0' - 5.0' C: 5.0' - 8.5' D: 8.5' - 13.0' E: 13.0' - 18.0' F: 18.0' - 19.5' G: 19.5' - 24.5' H: 24.5' - 29.5' I: 29.5' - 31.3'
					E	
					F	3. DRILLING: 10" FLIGHT AUGER: 0.0' - 31.0' NOTE: SET 8" STEEL CASING TO 31.0' 8" FLIGHT AUGER: 31.0' - 31.3' NOTE: WELL SCREEN, FILTER & SEAL WERE PLACED AS CASING WAS REMOVED. WELL WAS GROUTED TO SURFACE
	20				G	
					H	4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. A VERY WEAK ODOR WAS DETECTED IN SOIL SAMPLE FROM 13.0'-18.0'
	31.3		T.D. 31.3'		I	5. NOTE: BORING WAS DRILLED AT SURVEY HUB.
	40					

ENG FORM 1836 — PROJECT — HOLE NO.

LONGHORN AAP
Well No. MW-16
Date 23AUG.89

006270



Construction Detail for Shallow Monitoring Well

Hole No. MW-17

006271

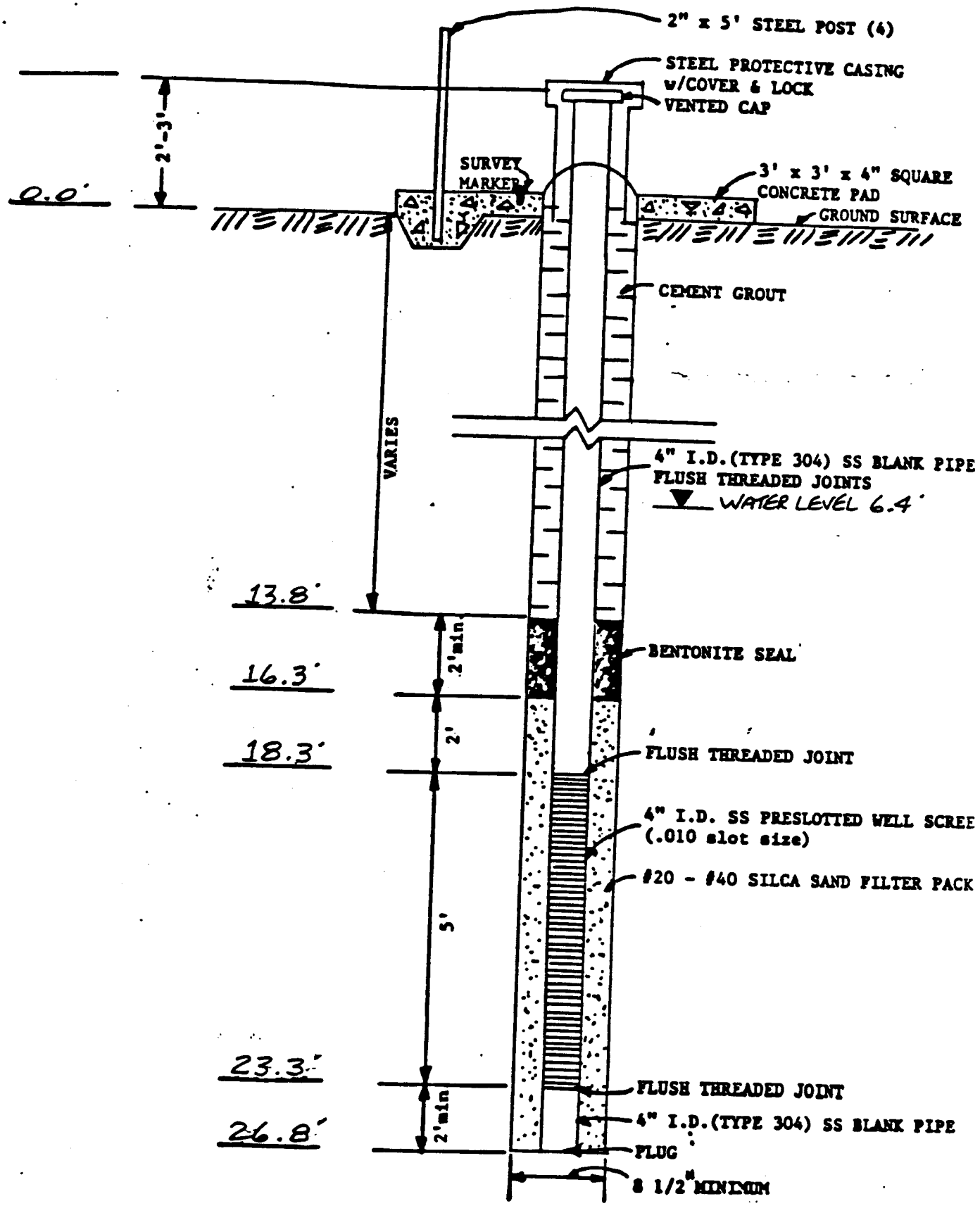
DRILLING LOG	DIVISION SWD	INSTALLATION FWD	SHEET 1 OF 1 SHEETS
1. PROJECT: LONGHORN AAP (RFI-PHASE II - MONITOR WELLS)		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (MSL or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-17		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 11; UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 14 AUG. 89; COMPLETED 14 AUG. 89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 177.09'	
9. TOTAL DEPTH OF HOLE: 26.8'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Stokes	

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
	0.0		0.0' TO 0.2' SAND: FINE GRAINED; LIGHT BROWN; DRY; SILTY 0.2' TO 4.5' CLAY: 0.2'-3.8': MEDIUM-HIGH PLASTICITY; RED WITH LIGHT GRAY; HARD; DAMP 3.8'-4.5': MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF; DAMP-MOIST; VERY SILTY 4.5' TO 6.2' SILT: MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; VERY MOIST; MEDIUM-STIFF; SANDY 6.2' TO 18.0' SAND: FINE GRAINED; LIGHT GRAY; MEDIUM; WET TO SATURATED FROM 9.0'; VERY SILTY 18.0' TO 19.5' CLAY: LOW PLASTICITY; LIGHT BLUE GRAY; MEDIUM-STIFF; VERY MOIST; VERY SANDY (BORDERS A CLAYEY SAND) 19.5' TO 24.8' SAND: FINE GRAINED; YELLOWISH BROWN; LOOSE-MEDIUM; SATURATED; SILTY; GRAY FROM 23.0'; WITH ABUNDANT FERRUGINOUS STAINS FROM 19.5'-23.0' 24.8' TO 26.8' T.D. CLAY: MEDIUM-HIGH PLASTICITY; GRAY-DARK GRAY; STIFF; MOIST; SLIGHTLY SANDY; VERY SILTY (BORDERS A SILT) T.D. 26.8'		B C D E F G H I J	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 6.2'± 24 HR. OBSERVATION: FREE WATER LEVEL WAS AT 6.4'; WELL WAS DEVELOPED ON 16 AUG. & LEVEL WAS 25.0' AT 144 SHRS. LEVEL WAS 6.4' ON 17 AUG. AT 0805 HRS. 2. JAR SAMPLES: A: 0.0' - 0.2' B: 0.2' - 3.8' C: 3.8' - 4.5' D: 4.5' - 6.2' E: 6.2' - 9.0' F: 9.0' - 14.0' G: 14.0' - 18.0' H: 18.0' - 19.5' I: 19.5' - 23.0' J: 23.0' - 24.8' K: 24.8' - 26.8' 3. DRILLING: 10" FLIGHT AUGER: 0.0' - 26.0' NOTE: SET 8" STEEL CASING TO 26.0' 8" FLIGHT AUGER: 26.0' - 26.8' NOTE: SET WELL PIPE, SCREEN, FILTER & SEAL AS CASING WAS REMOVED. 4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODORS WERE DETECTED IN SAMPLES OR DRILLING. 5. NOTE: BORING WAS OFFSET 12' S 76° W AT SAME ELEVATION.
	20					
	26.8					
	40					

ENG FORM 1836 — PREVIOUS EDITIONS ARE OBSOLETE — PROJECT — HOLE NO.

LONGHORN AAP
Well No. MW-17
Date 15AUG.89

006272



Construction Detail for Shallow Monitoring Well

Hole No. MW-18

006273

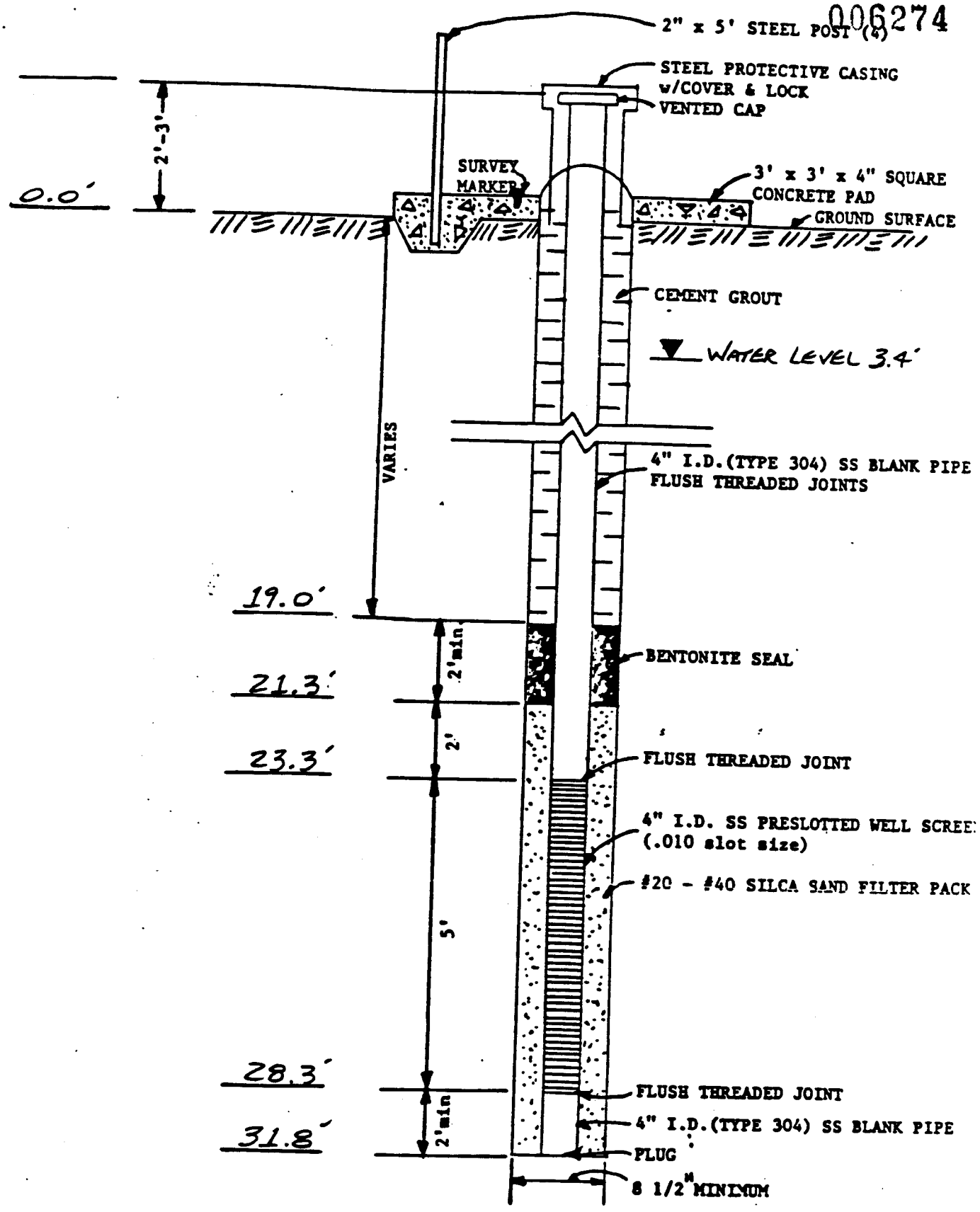
DRILLING LOG	DIVISION: SWD	INSTALLATION: SWF	SHEET 1 OF 1 SHEETS
1. PROJECT: LONGHORN/AAP (RFI-PHASE II-MONITOR WELLS)		10. SIZE AND TYPE OF BIT: 10" AUGER	
2. LOCATION (Coordinates or Station): SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (MSL or USL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-18		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 9 / UNDISTURBED 0	
5. NAME OF DRILLER: T. SILLS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 9 AUG 89 / COMPLETED 10 AUG 89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE: 177.09'	
9. TOTAL DEPTH OF HOLE: 31.8'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Bolen	

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
	0.0		0.0' TO 2.5' SILT: LOW PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; STIFF; DAMP; SANDY 2.5' TO 3.3' CLAY: MEDIUM PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; STIFF; DAMP-MOIST; VERY SILTY; SANDY 3.3' TO 9.0' SILT: LOW PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM; VERY MOIST TO WET FROM 5.0'; VERY SANDY (BORDERS A SILTY SAND FROM 5.0') 9.0' TO 31.8' T.D. SAND: FINE GRAINED; LIGHT BLUE GRAY WITH YELLOWISH BROWN; LOOSE-MEDIUM; WET TO SATURATED; MODERATELY SILTY TO VERY SILTY; WITH ABUNDANT BLACK CARBON MATTER FROM 24.0'-31.8' 14.0'-19.0': WET; VERY SILTY (BORDERS A SANDY SILT)		A B C D E F G H I	1. WATER LEVEL: NOTE: SOME FREE WATER ENTERED BORING DURING DRILLING FROM 3.3'±. 24 HR. OBSERVATION: FREE WATER LEVEL WAS AT 3.4'; AFTER DEVELOPING WELL ON 11 AUG. BORING WAS BAILED TO 33.0' ON 14 AUG. AT 0825 HRS. LEVEL WAS 26.8' AT 0850 HRS., 22.4' AT 0930 HRS., 17.5' AT 1037 HRS., 11.0' AT 1297 HRS., 9.0' AT 1408 HRS., 6.0' AT 1655 HRS. & 3.4' AT 0822 HRS. on 15 AUG. 2. JAR SAMPLES: A: 0.0' - 2.5' B: 2.5' - 3.3' C: 3.3' - 5.0' D: 5.0' - 9.0' E: 9.0' - 14.0' F: 14.0' - 19.0' G: 19.0' - 24.0' H: 24.0' - 29.0' I: 29.0' - 31.8' 3. DRILLING: 10" FLIGHT AUGER: 0.0' - 31.0' NOTE: SET 8" STEEL CASING TO 31.0' 8" FLIGHT AUGER: 31.0' - 31.8' NOTE: WELL PIPE, SCREEN, FILTER & SEAL WERE PLACED AS CASING WAS REMOVED. 4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODORS WERE DETECTED IN DRILLING. 5. NOTE: BORING WAS DRILLED AS STAKED.
	20					
	31.8		T.D. 31.8'			
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ENG FORM 1836 — PREVIOUS EDITIONS ARE OBSOLETE — PROJECT — HOLE NO.

LONGHORN AAP
Well No. MW-18
Date 10 AUG 89

006274



Construction Detail for Shallow Monitoring Well

Hole No. MW-19

DRILLING LOG	DIVISION	INSTALLATION	SHEET
	SWD	SWF	1 OF 1 SHEETS

006275

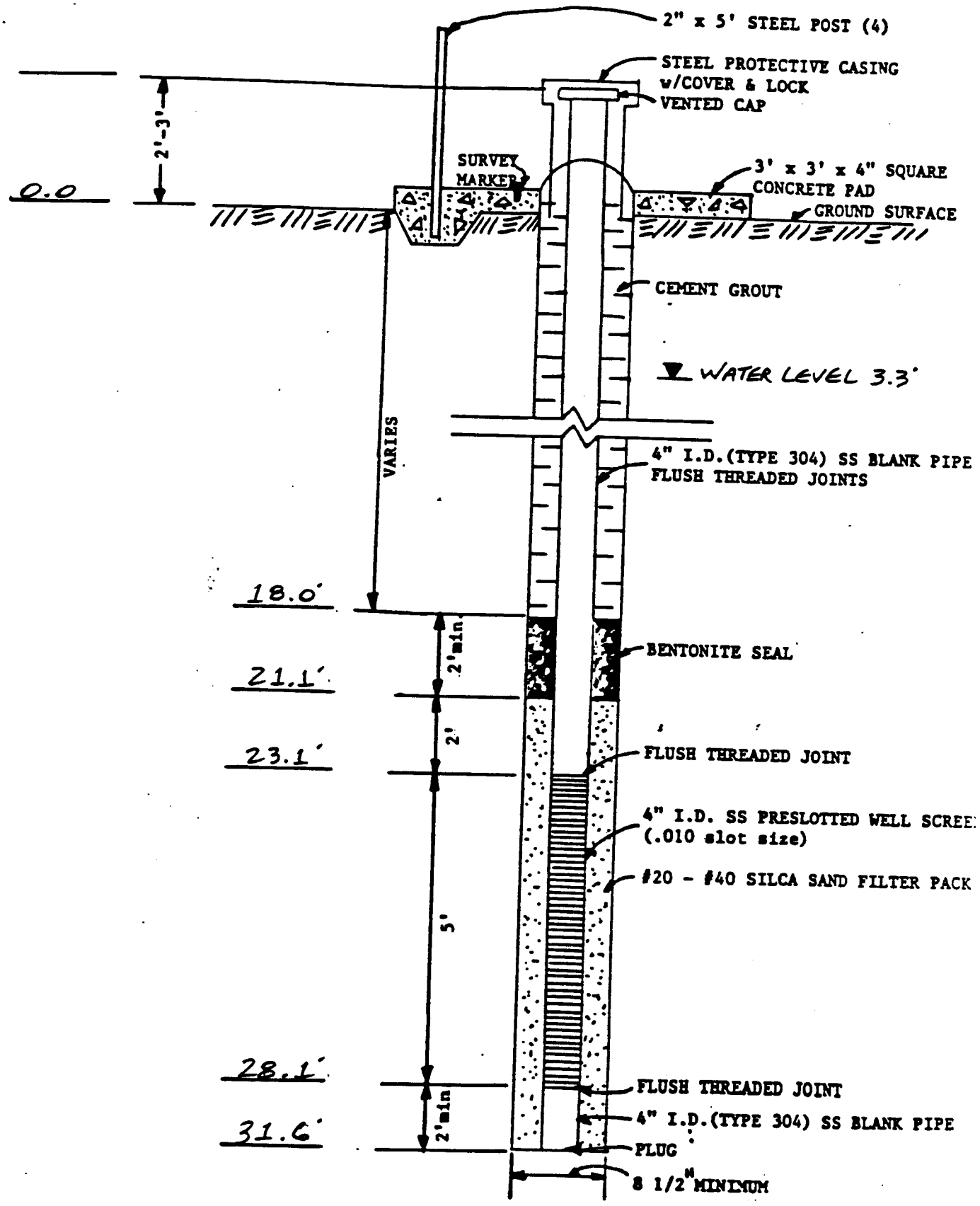
1. PROJECT: LONGHORN AAP (RFI-PHASE II-Monitor Wells)
2. LOCATION (Coordinates or Station): SEE REMARKS COLUMN
3. DRILLING AGENCY: USCE
4. HOLE NO. (As shown on drawing title and file number): MW-19
5. NAME OF DRILLER: T. SLITS
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 31.0'
10. SIZE AND TYPE OF BIT: 10" AUGER
11. DATUM FOR ELEVATION SHOWN (USE or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 13; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: SEE REMARKS COLUMN
16. DATE HOLE: STARTED 3 AUG. 89; COMPLETED 3 AUG. 89
17. ELEVATION TOP OF HOLE: 176.59'
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: Jackie R. Stokes

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
	0.0		0.0' TO 0.8' SILT: LOW PLASTICITY; GRAY BROWN; STIFF; DAMP; VERY SANDY		A	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 10.0'-10.9' & 15.0'-18.5' & 23.0'-31.6'.
			0.8' TO 4.0 CLAY: MEDIUM-HIGH PLASTICITY; GRAYISH BROWN; STIFF-VERY STIFF; DAMP-MOIST; MOD. SILTY		B	
			4.0' TO 7.0' SILT: MEDIUM PLASTICITY; YELLOWISH BROWN & LIGHT GRAY; MEDIUM-STIFF; MOIST-VERY MOIST; SLIGHTLY SANDY		C	24 HR. OBSERVATION: FREE WATER LEVEL IN WELL CASING WAS AT 3.3'; WELL WAS DEVELOPED ON 7 AUG. & LEVEL WAS 30.5' AFTER BAILING AT 1325 HRS. LEVEL AT 18.0' AT 1355 HRS. & 5.9' AT 1515 HRS. & 3.3' AT 0810 HRS. on 8 AUG.
			7.0' TO 7.8' CLAY: MEDIUM-HIGH PLASTICITY; GRAY BROWN-YELLOWISH BROWN; VERY STIFF-HARD; DAMP		D	
			7.8' TO 15.0' SILT: LOW-MEDIUM PLASTICITY; GRAY WITH YELLOWISH BROWN, WITH LIGHT BLUE GRAY. FROM 10.9'; MEDIUM-STIFF; MOIST-VERY MOIST & WET FROM 10.0'-10.9'; SANDY. TO VERY SANDY FROM 10.0'-10.9'		E	
					F	
					G	2. JAR SAMPLES: A: 0.0' - 0.8' B: 0.8' - 4.0' C: 4.0' - 7.0' D: 7.0' - 7.8' E: 7.8' - 10.0' F: 10.0' - 10.9' G: 10.9' - 15.0' H: 15.0' - 18.5' I: 18.5' - 20.5' J: 20.5' - 20.7' K: 20.7' - 23.0' L: 23.0' - 28.0' M: 28.0' - 31.6'
					H	
	20		15.0' TO 18.5' SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; SILTY; SATURATED		I	
			18.5' TO 20.5' SILT: LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; VERY MOIST; VERY SANDY		J	
			20.5' TO 20.7' CLAY: MEDIUM-HIGH PLASTICITY; GRAY & BROWN; MEDIUM; VERY MOIST; WITH TRACE of SILT & SAND		K	
			20.7' TO 23.0' SILT: LOW PLASTICITY; LIGHT BLUE GRAY & YELLOWISH BROWN; MEDIUM-STIFF; VERY MOIST-WET; VERY SANDY; WITH FERRUGINOUS STAINS		L	3. DRILLING: 10" FLIGHT AUGER: 0.0' - 31.0' NOTE: SET 8" STEEL CASING TO 31.0' 8" FLIGHT AUGER: 31.0' - 31.6' NOTE: WELL PIPE & SCREEN WITH FILTER & SEAL WERE SET AS CASING WAS REMOVED.
	31.6		23.0' TO 31.6' T.D. SAND: FINE GRAINED; LIGHT BLUE GRAY WITH YELLOWISH BROWN; MEDIUM; SATURATED; SILTY; WITH ABUNDANT CARBON MATTER T.D. 31.6'		M	4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODORS WERE DETECTED IN DRILLING. 5. NOTE: BORING OFFSET 15' 552°E OF HUB AT SAME ELEVATION.
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ENG FORM [illegible] PROJECT [illegible] HOLE NO.

LONGHORN AAP
Well No. MW-19
Date 4 AUG. 89

006276



Construction Detail for Shallow Monitoring Well
and Well C-4A

Hole No. MW-20

006277

DRILLING LOG | DIVISION: SWD | INSTALLATION: FWD | SHEET 1 OF 1 SHEETS

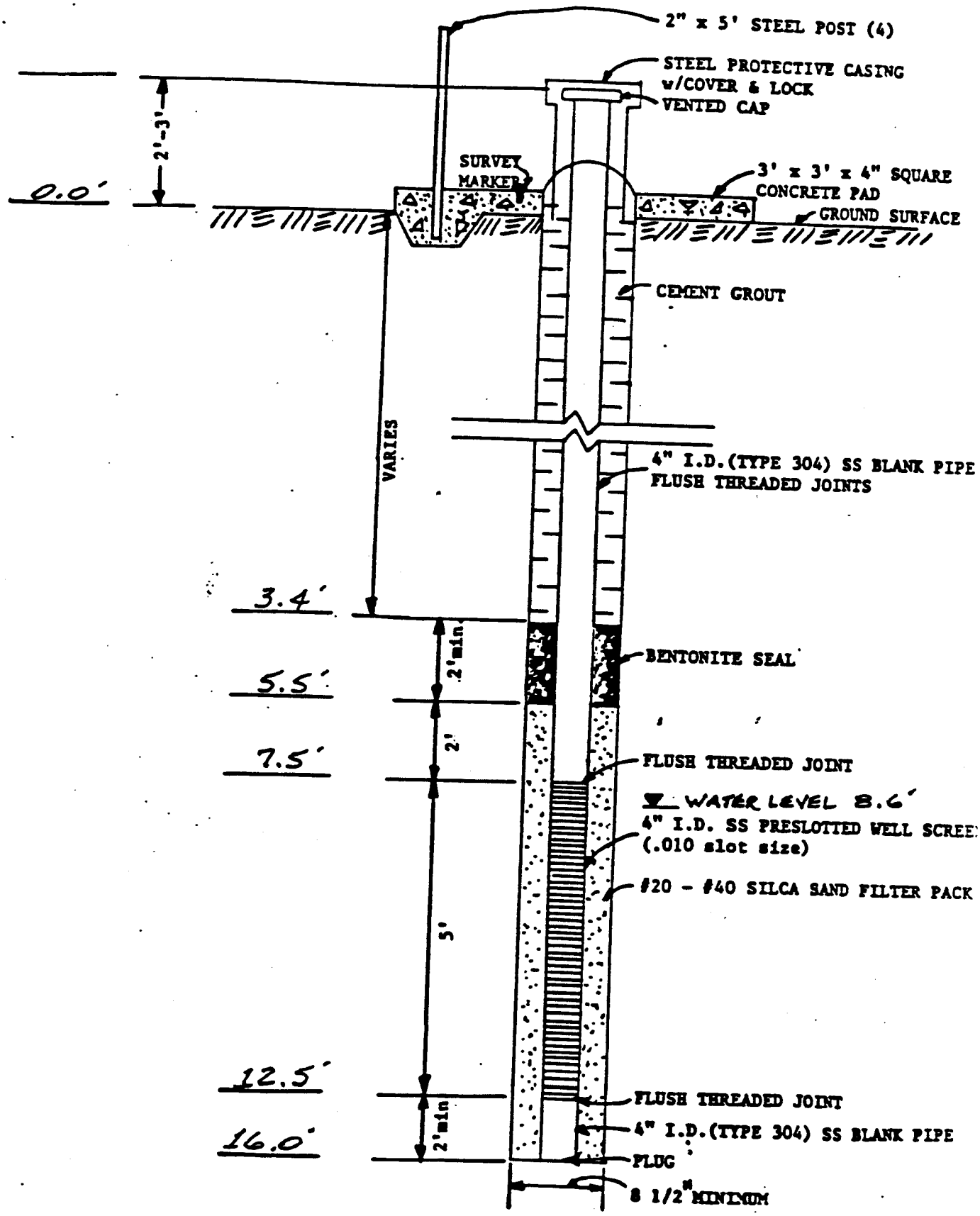
1. PROJECT: LONGHORN AAP IRFT-PHASE II-MONITOR WELLS
2. LOCATION (Coordinates or Station): SEE REMARKS COLUMN
3. DRILLING AGENCY: USCE
4. HOLE NO. (As shown on drawing title and file number): MW-20
5. NAME OF DRILLER: T. SUITS
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 16.0'
10. SIZE AND TYPE OF BIT: 10" AUGER
11. DATUM FOR ELEVATION SHOWN (MSL or MSL):
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: SEE REMARKS COLUMN
16. DATE HOLE: STARTED 8 AUG. 89; COMPLETED 8 AUG. 89
17. ELEVATION TOP OF HOLE: 184.28'
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: Jackie R. Hobbs

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
	0.0		0.0' To 0.2' SAND: FINE GRAINED; YELLOWISH BROWN; LOOSE; DAMP; MODERATELY SILTY		B	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 3.5'-6.0' & 9.6'-12.0'.
			0.2' To 0.8' CLAY: MEDIUM PLASTICITY; RED & YELLOWISH BROWN; MEDIUM; VERY MOIST; VERY SILTY; WITH TRACE OF SAND		C	
			0.8' To 2.6' SAND: FINE GRAINED; YELLOWISH BROWN; LOOSE-MEDIUM; VERY MOIST; VERY SILTY		D	
			2.6' To 9.6' SILT: 2.6'-3.5': LOW-MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; VERY MOIST; SANDY 3.5'-7.5': MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; WET; CLAYEY; MODERATELY SANDY 7.5'-9.6': LOW PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; HARD; DAMP; VERY SANDY		E	24 HR. OBSERVATION: FREE WATER LEVEL WAS AT 8.6'; WELL WAS DEVELOPED ON 9 AUG. & LEVEL WAS AT 14.7' AFTER BAILING AT 1105 HRS. LEVEL WAS AT 9.3' AT 1240 HRS.
					F	
					G	
					H	2. JAR SAMPLES: A: 0.0' - 0.2' B: 0.2' - 0.8' C: 0.8' - 2.6' D: 2.6' - 3.5' E: 3.5' - 6.0' F: 6.0' - 7.5' G: 7.5' - 9.6' H: 9.6' - 12.0' I: 12.0' - 13.0' J: 13.0' - 16.0'
					I	
					J	
	16.0		9.6' To 12.0' SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; LOOSE-MEDIUM; SATURATED; MODERATELY SILTY			3. DRILLING: 10" FLIGHT AUGER: 0.0' - 15.0' NOTE: SET 8" STEEL CASING TO 15.0' 8" FLIGHT AUGER: 15.0' - 16.0' NOTE: WELL PIPE & SCREEN WITH FILTER & SEAL WERE SET AS CASING WAS REMOVED.
	20		12.0' To 16.0' T.D. CLAY: 12.0'-13.0': MEDIUM PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP; MODERATELY SILTY & SANDY 13.0'-16.0': MEDIUM-HIGH PLASTICITY; LIGHT BLUE GRAY & YELLOWISH BROWN; HARD; DAMP; WITH "SLICKS" T.D. 16.0'			4. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODORS WERE DETECTED IN DRILLING. 5. NOTE: BORING OFFSET 15' S89°E OF HUB AT SAME ELEVATION.
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ENG FORM 1836 — PROJECT — HOLE NO.

LONGHORN AAP
Well No. MW-20
Date 8 AUG. 89

006278



Construction Detail for Shallow Monitoring Well

Hole No. MW-21

006279

DRILLING LOG	DIVISION: SWD	INSTALLATION: SWF	SHEET 1 OF 2 SHEETS
1. PROJECT: LONGHORN AAP (RFI-PHASE II-MONITOR WELLS)		10. SIZE AND TYPE OF BIT: 10" AUGER 3" SHELBY	
2. LOCATION (Coordinates or Station): SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-21		13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 27 / UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 6 SEP. '89 / COMPLETED 7 SEP. '89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE: 43.6'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Stokes	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIAL (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
	0.0		0.0' TO 2.4' SAND: 0.0'-0.8': FINE GRAINED; GRAYISH BROWN; MEDIUM; DAMP; SILTY 0.8'-2.4': FINE GRAINED; LIGHT GRAYISH BROWN; MEDIUM; DAMP; VERY SILTY 2.4' TO 14.9' CLAY: 2.4'-4.0': MEDIUM-HIGH PLASTICITY; LIGHT GRAY BROWN WITH YELLOWISH BROWN; STIFF; MOIST; SILTY 4.0'-6.2': MEDIUM-HIGH PLASTICITY; LIGHT GRAY & RED; HARD; DAMP 6.2'-9.9': MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; HARD DOWN TO STIFF FROM 8.5; DAMP DOWN TO MOIST FROM 8.5; SILTY; WITH TRACE of SAND 9.9'-14.9': MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; HARD; DAMP; WITH SMALL CARBON STAINS		AA BB CC DD EE FF GG HH II JJ KK LL MM NN OO PP QQ	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING FROM 22.0'±; 24 HR. OBSERVATION: FREE WATER LEVEL WAS AT 22.0' 2. SAMPLES: (CHEM.): A: TOT. METALS: (4.0'-6.0') B: EXPLOSIVES: (4.0'-6.0') C: VOC: (4.0'-6.0') D: QA-VOC: (4.0'-6.0') E: EQUIP. METALS: (4.0') F: TOT. METALS: (10.0'-12.0') G: EXPLOSIVES (10.0'-12.0') H: VOC (10.0'-12.0') I: QC-EXPL. (10.0'-12.0') 3. SAMPLES: (Soil): AA: 0.0' - 0.8' BB: 0.8' - 2.4' CC: 2.4' - 4.0' DD: 4.0' - 6.2' EE: 6.2' - 8.5' FF: 8.5' - 9.9' GG: 9.9' - 14.9' HH: 14.9' - 17.6' II: 17.6' - 20.5' JJ: 20.5' - 22.0' KK: 22.0' - 24.0' LL: 24.0' - 26.1' MM: 26.1' - 28.0' NN: 28.0' - 29.5' OO: 29.5' - 33.0' PP: 33.0' - 38.0' QQ: 38.0' - 41.6' RR: 41.6' - 43.6' 4. DRILLING: 10" FLIGHT AUGER: 0.0' - 4.0' 6.0' - 10.0' 12.0' - 42.0' 3" SHELBY TUBE: 4.0' - 6.0' 10.0' - 12.0' NOTE: SET 8" STEEL CASING TO 42.0' 8" FLIGHT AUGER: 42.0' - 43.6' NOTE: WELL SCREEN, FILTER, SEAL & GROUT CAP WERE PLACED AS CASING WAS REMOVED.
	20		14.9' TO 20.5' SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; DAMP; VERY SILTY DOWN TO SLIGHTLY SILTY FROM 17.6' 20.5' TO 22.0' SILT: LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; VERY MOIST; VERY SANDY 22.0' TO 24.0' SAND: FINE GRAINED; YELLOWISH BROWN; MEDIUM; SATURATED; SILTY 24.0' TO 28.0' CLAY: 24.0'-26.1': MEDIUM-HIGH PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP 26.1'-28.0': MEDIUM PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; MEDIUM; MOIST-VERY MOIST; SILTY; WITH TRACE of SAND			
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ENG FORM ____ PROJECT HOLE NO.

Hole No. MW-21

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 2 SHEETS

006280

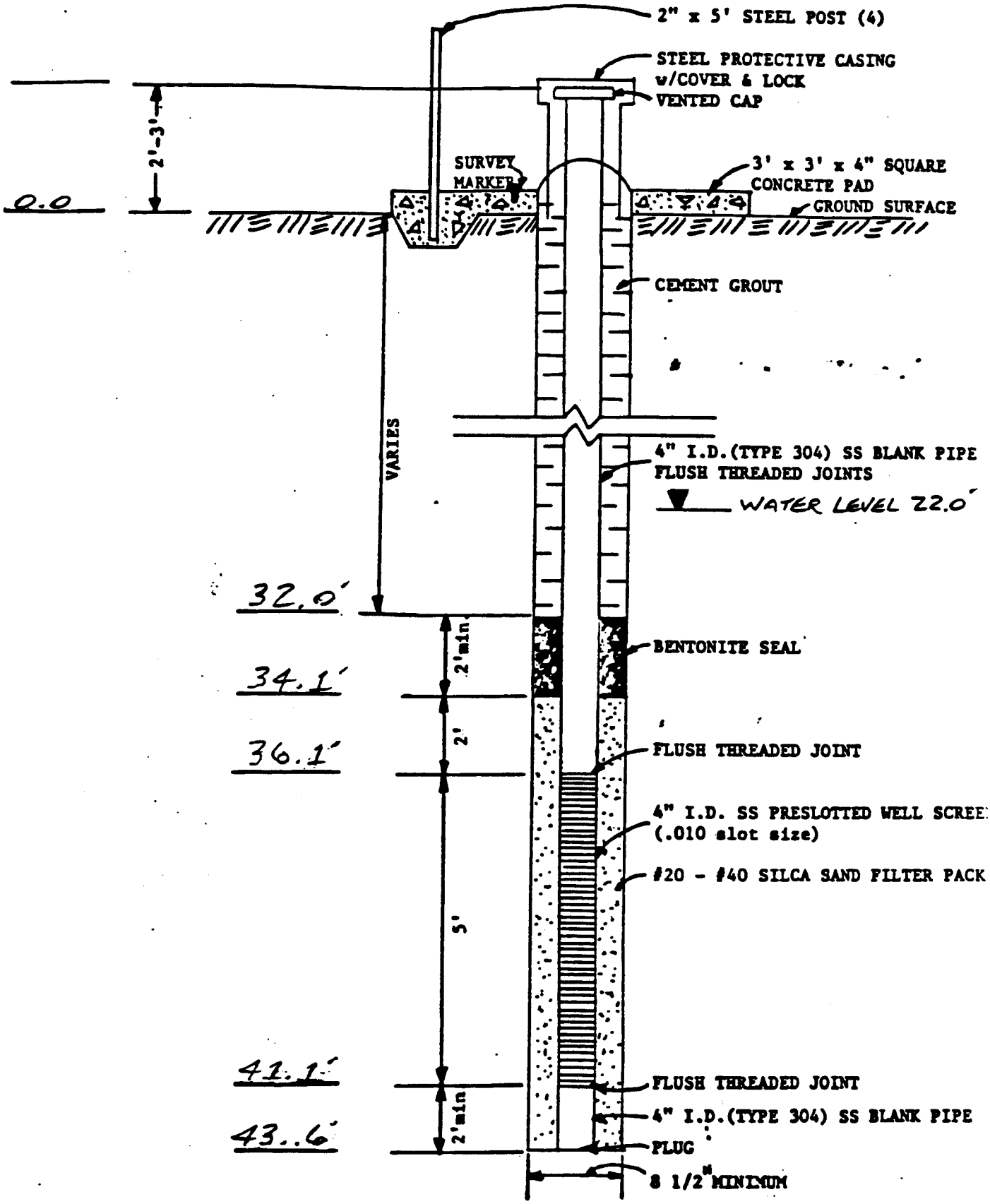
1. PROJECT: LONGHORN AAP (RFI-PHASE II-MONITOR WELLS)	10. SIZE AND TYPE OF BIT
2. LOCATION (Coordinates or Station)	11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
3. DRILLING AGENCY	12. MANUFACTURER'S DESIGNATION OF DRILL
4. HOLE NO. (As shown on drawing title and file number): MW-21	13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
5. NAME OF DRILLER	14. TOTAL NUMBER CORE BOXES
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.	15. ELEVATION GROUND WATER
7. THICKNESS OF OVERBURDEN	16. DATE HOLE: STARTED 6 SEP. 89 / COMPLETED 7 SEP. 89
8. DEPTH DRILLED INTO ROCK	17. ELEVATION TOP OF HOLE
9. TOTAL DEPTH OF HOLE	18. TOTAL CORE RECOVERY FOR BORING %
	19. SIGNATURE OF INSPECTOR: Jackie R Baker

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
			28.0' TO 29.5'			5. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODOR WAS DETECTED DURING DRILLING.
			SAND: FINE GRAINED; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; SATURATED; SILTY		RR	
	43.6		29.5' TO 33.0'			
			CLAY: MEDIUM-HIGH PLASTICITY; LIGHT BLUE GRAY; VERY STIFF; DAMP; WITH TRACE OF SILT & SAND			
			33.0' TO 41.6'			
			SILT: LOW-MEDIUM PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM; WET; SANDY TO VERY SANDY FROM 38.0'			
			41.6' TO 43.6' T.D.			
			CLAY: MEDIUM-HIGH PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; HARD; DAMP			
			T.D. 43.6'			
	60					
	80					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT [illegible] HOLE NO. MW-21

LONGHORN AAP
Well No. MW-21
Date 7 SEP-89

006281



Construction Detail for Shallow Monitoring Well

Hole No. MW-22

006282

DRILLING LOG	DIVISION SWD	INSTALLATION SWF	SHEET 1 OF 2 SHEETS
1. PROJECT: LONGHORN AAP (RFI-PHASE II-MONITOR WELLS)		10. SIZE AND TYPE OF BIT: 10" AUGER; 3" SHELBY	
2. LOCATION (Coordinates or Station): SEE LAYOUT		11. DATUM FOR ELEVATION SHOWN (TBM or MSL):	
3. DRILLING AGENCY: USCE		12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500	
4. HOLE NO. (As shown on drawing title and file number): MW-22		13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 25; UNDISTURBED 0	
5. NAME OF DRILLER: T. SUITS		14. TOTAL NUMBER CORE BOXES: N/A	
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: SEE REMARKS COLUMN	
7. THICKNESS OF OVERBURDEN		16. DATE HOLE: STARTED 30 AUG. 89; COMPLETED 31 AUG. 89	
8. DEPTH DRILLED INTO ROCK		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE: 41.0'		18. TOTAL CORE RECOVERY FOR BORING: N/A %	
		19. SIGNATURE OF INSPECTOR: Jackie R. Stubbs	

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
	0.0		0.0' TO 2.5' SILT: LOW PLASTICITY; GRAYISH BROWN; STIFF; DAMP; SANDY.		AA	1. WATER LEVEL: NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 20.5' ±; NOTE: LEVEL WAS AT 20.8' ON 6 SEP. AT 0741 HRS. WELL WAS DEVELOPED BY BAILING. BAIL LEVEL WAS 39.5' AT 0905 HRS. & 33.0' AT 1246 HRS. & 28.9' AT 1552 HRS. & 21.0' ON 7 SEP AT 0812 HRS.
			2.5' TO 10.0' CLAY: 2.5'-6.5': MEDIUM-HIGH PLASTICITY; RED & LIGHT GRAY; HARD; DAMP		BB	
			6.5'-9.0': LOW-MEDIUM PLASTICITY; LIGHT GRAY & YELLOWISH BROWN; STIFF; DAMP-MOIST; SILTY; SANDY		CC	
			9.0'-10.0': MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; HARD; DAMP; WITH CARBON STAINS		DD EE FF	2. SAMPLES (CHEM.): A: TOT. METALS (4.0'-5.0') B: EXPLOSIVES (4.0'-5.0') C: VOC (4.0'-5.0') D: QA-EXPL. (4.0'-5.0') E: TOT. METALS (10.0'-11.0') F: EXPLOSIVES (10.0'-11.0') G: VOC (10.0'-11.0') H: EQUIP. VOC (10.0') I: EQUIP. VOC (10.0') J: QA-METALS (10.0'-11.0')
			10.0' TO 12.0' SILT: LOW-MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF; DAMP; SANDY; CLAYEY		GG	
			12.0' TO 12.9' CLAY: MEDIUM PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; HARD; DAMP; SLIGHTLY SANDY; WITH CARBON STAINS		HH	3. SAMPLES (SOIL): AA: 0.0' - 2.5' BB: 2.5' - 6.5' CC: 6.5' - 9.0' DD: 9.0' - 10.0' EE: 10.0' - 12.0' FF: 12.0' - 12.9' GG: 12.9' - 17.9' HH: 17.9' - 20.5' II: 20.5' - 23.0' JJ: 23.0' - 25.0' KK: 25.0' - 30.0' LL: 30.0' - 32.8' MM: 32.8' - 35.0' NN: 35.0' - 39.0' OO: 39.0' - 41.0'
	20		12.9' TO 23.0' SAND: FINE GRAINED; YELLOWISH BROWN & LIGHT GRAY; MEDIUM; DAMP TO WET FROM 20.5'; VERY SILTY		II JJ	
			23.0' TO 25.0' CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM-STIFF; MOIST-VERY MOIST; SILTY		KK	
			25.0' TO 30.0' SAND: FINE GRAINED; YELLOWISH BROWN & LIGHT BLUE GRAY; MEDIUM; WET; SILTY		LL	4. DRILLING: 10" FLIGHT AUGER: 0.0' - 4.0' 6.0' - 10.0' 12.0' - 40.0' 3" SHELBY TUBE: 4.0' - 6.0' 10.0' - 12.0'
			30.0' TO 32.8' SILT: LOW PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; MEDIUM; VERY MOIST; VERY SANDY		MM NN	NOTE: 8" STEEL CASING WAS SET TO 40.0' 8" FLIGHT AUGER: 40.0' - 41.0' NOTE: WELL SCREEN.
	40		32.8' TO 35.0' CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN;		OO	

ENG FORM 1836 — PROJECT — HOLE NO.

Hole No. MW-22

006283

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 2 SHEETS

1. PROJECT: LONGHORN AAP. (RFI-PHASE II-MONITOR WELLS)
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): MW-22
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED / UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 30 AUG. 89 / COMPLETED 31 AUG. 89
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Jackie R. Stokes

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
	41.0		STIFF-VERY STIFF; DAMP 35.0' TO 39.0' SILT: LOW PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; MEDIUM; WET; VERY SANDY (BORDERS A SAND) 39.0' TO 41.0' T.D. CLAY: MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN WITH LIGHT BLUE GRAY; VERY STIFF; DAMP; SILTY; WITH TRACE OF FINE SAND T.D. 41.0'			FILTER, SEAL & GROUT CAP WERE PLACED AS CASING WAS REMOVED. 5. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODOR WAS DETECTED DURING DRILLING.
	60					
	80					

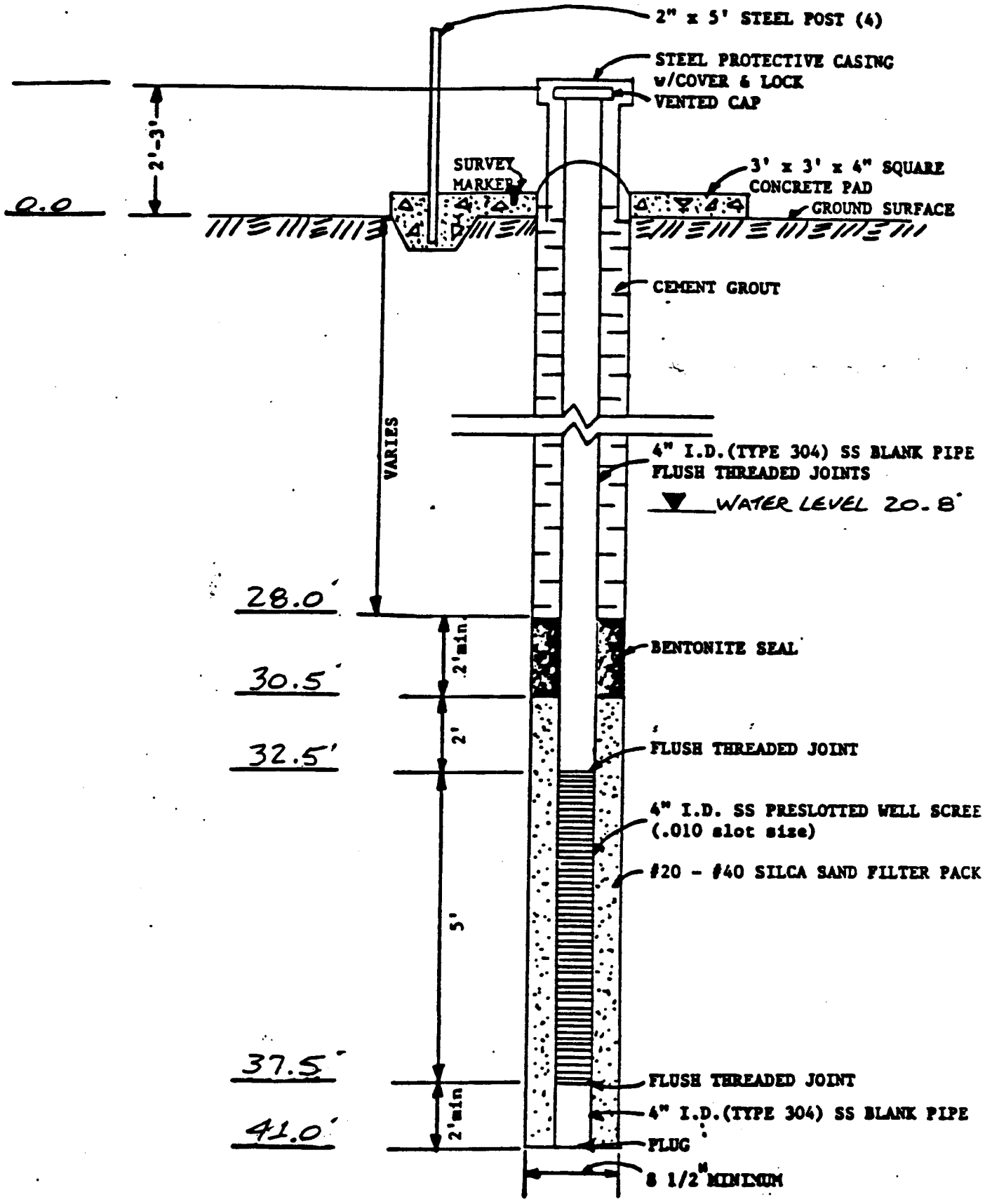
ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE

PROJECT

HOLE NO. MW-22

LONGHORN AAP
Well No. MW-22
Date 31AUG.89

006284



Construction Detail for Shallow Monitoring Well

Hole No. MW-23 006285

DRILLING LOG	DIVISION SWD	INSTALLATION SWF	SHEET 1 OF 2 SHEETS

1. PROJECT: LONGHORN AAP (RFI-PHASE II - MONITOR WELLS)
2. LOCATION (Coordinates or Station): SEE LAYOUT
3. DRILLING AGENCY: USCE
4. HOLE NO. (As shown on drawing title and file number): MW-23
5. NAME OF DRILLER: T. SUITS
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 44.0'
10. SIZE AND TYPE OF BIT: 10" AUGER, 8" AUGER
11. DATUM FOR ELEVATION SHOWN (MSL or USC&GS)
12. MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 24; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: N/A
15. ELEVATION GROUND WATER: SEE REMARKS COLUMN
16. DATE HOLE: STARTED 28 AUG. 89; COMPLETED 29 AUG. 89
17. ELEVATION TOP OF HOLE: 195.0' ±
18. TOTAL CORE RECOVERY FOR BORING: N/A %
19. SIGNATURE OF INSPECTOR: Jackie R. Roberson

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
	0.0		0.0' To 0.1'		AA	1. WATER LEVEL:
			SILT: LOW PLASTICITY; LIGHT BROWN; STIFF; DRY; SANDY (No SAMPLE)		BB	NOTE: FREE WATER ENTERED BORING DURING DRILLING FROM 20.0' ±; LEVEL WAS AT 20.8' ON 30 AUG. 89 AT 0835 HRS. WELL WAS DEVELOPED BY BAILING & BAIL LEVEL WAS 42.7' AT 1226 HRS. ON 30 AUG. LEVEL WAS 36.5' AT 1337 HRS. & 32.0' AT 1504 HRS. LEVEL WAS 20.8' ON 31 AUG. AT 0821 HRS.
			0.1' To 0.9'			
			CLAY: MEDIUM - HIGH PLASTICITY; RED WITH YELLOWISH BROWN & LIGHT GRAY; HARD; DAMP; WITH TRACE OF SILT & SAND		CC	
			0.9' To 3.0'			
			SILT: LOW PLASTICITY; LIGHT GRAY WITH YELLOWISH BROWN; MEDIUM - STIFF; MOIST - VERY MOIST; SANDY		DD	
			3.0' To 13.0'			
			CLAY:		EE	2. SAMPLES (CHEM.):
			3.0' - 6.2': MEDIUM - HIGH PLASTICITY; RED WITH LIGHT GRAY; STIFF - VERY STIFF; DAMP - MOIST			A: TOT. METALS (4.0'-5.0')
			6.2' - 13.0': LOW PLASTICITY; LIGHT GRAY & YELLOWISH BROWN; VERY STIFF; DAMP; SANDY; SILTY; WITH SMALL CARBON STAINS		FF	B: EXPLOSIVES (4.0'-5.0')
						C: VOC (4.0'-5.0')
						D: QC-VOC (4.0'-5.0')
						E: EQUIP. EXPL. (4.0')
						F: EQUIP. EXPL. (4.0')
						G: TOT. METALS (10.0'-11.0')
						H: EXPLOSIVES (10.0'-11.0')
						I: VOC (10.0'-11.0')
						J: QA-METALS (10.0'-11.0')
					GG	
	20		13.0' To 20.0'			3. JAR SAMPLES (SOIL):
			SILT: LOW PLASTICITY; SANDY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF; DAMP TO MOIST FROM 18.0'		HH	AA: 0.1' - 0.9'
			20.0' To 24.0'			BB: 0.9' - 3.0'
			SAND: FINE - MEDIUM GRAINED; YELLOWISH BROWN; MEDIUM; WET; SILTY			CC: 3.0' - 6.2'
			24.0' To 28.5'		II	DD: 6.2' - 11.2'
			CLAY: MEDIUM PLASTICITY; YELLOWISH BROWN WITH LIGHT GRAY; STIFF; MOIST; MODERATELY SILTY & SANDY			EE: 11.2' - 13.0'
						FF: 13.0' - 18.0'
						GG: 18.0' - 20.0'
						HH: 20.0' - 24.0'
						II: 24.0' - 28.5'
						JJ: 28.5' - 33.5'
						KK: 33.5' - 38.5'
						LL: 38.5' - 41.0'
						MM: 41.0' - 42.0'
						NN: 42.0' - 44.0'
			28.5' To 41.0'		JJ	4. DRILLING:
			SILT: LOW PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; MEDIUM; WET; VERY SANDY (BORDERS A SAND); SLIGHTLY SANDY FROM 33.5'			10" FLIGHT AUGER: 0.0' - 4.0', 6.0' - 10.0', 12.0' - 42.0'
						3" SHELBY TUBE: 4.0' - 6.0', 10.0' - 12.0'
					KK	NOTE: 8" STEEL CASING WAS SET TO 42.0'
						8" FLIGHT AUGER: 42.0' - 44.0'
	40					

PROJECT | HOLE NO.

Hole No. MW-23

DRILLING LOG	DIVISION	INSTALLATION	SHEET 2 OF 2 SHEETS

1. PROJECT: LONGHORN/AAP (RFI-PHASE II-MONITOR WELLS)
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY
4. HOLE NO. (As shown on drawing title and file number): MW-23
5. NAME OF DRILLER
6. DIRECTION OF HOLE: ☐ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE
10. SIZE AND TYPE OF BIT
11. DATUM FOR ELEVATION SHOWN (MSL or USC)
12. MANUFACTURER'S DESIGNATION OF DRILL
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE: STARTED 28 AUG. '89 | COMPLETED 29 AUG. '89
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING %
19. SIGNATURE OF INSPECTOR: Jackie R. Blaha

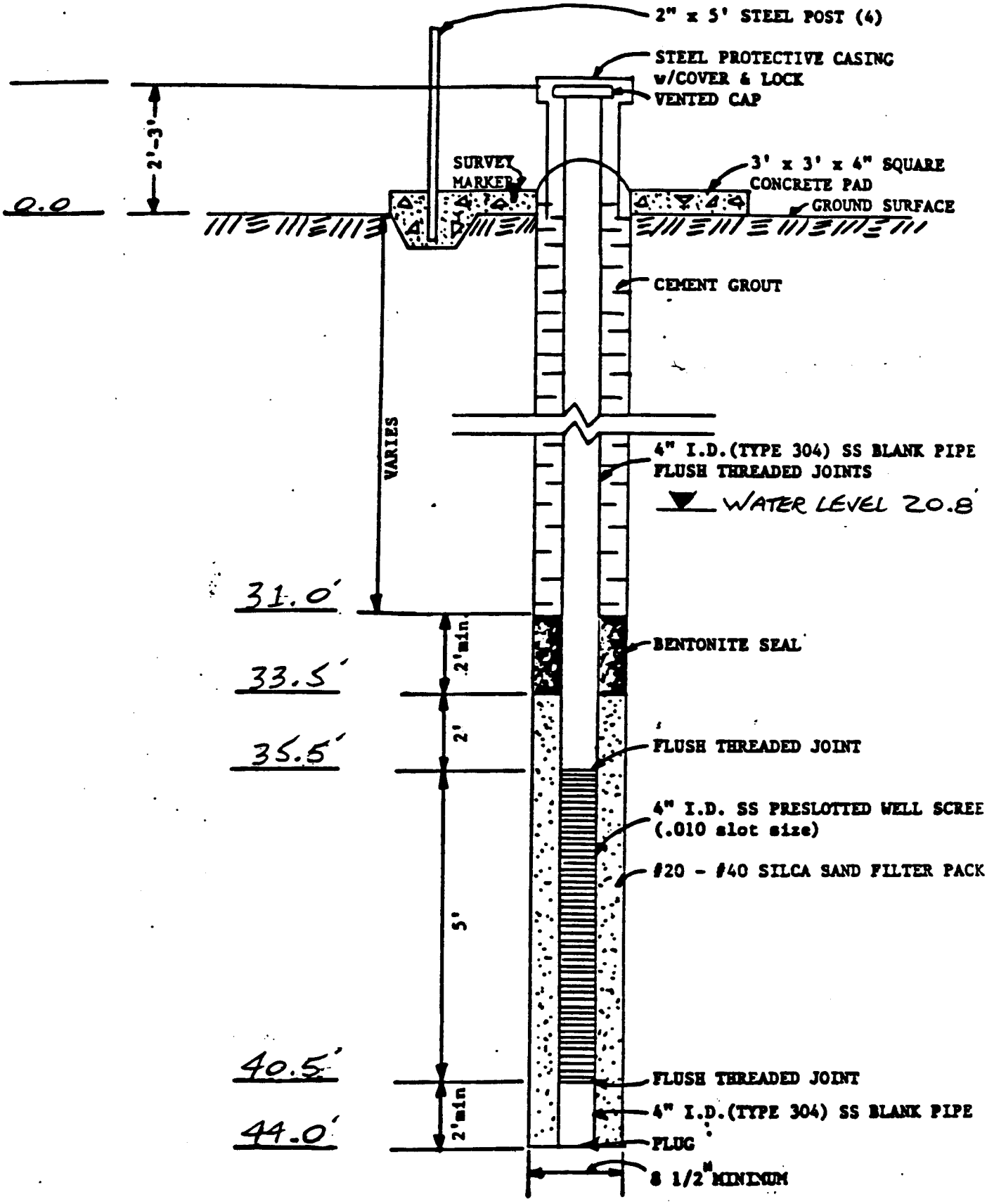
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
			41.0' To 44.0' T.D.		LL	NOTE: WELL SCREEN, FILTER & SEAL WERE PLACED & BORING WAS GROUTED AS STEEL CASING WAS REMOVED.
			CLAY:		MM	
			41.0'-42.0': MEDIUM-HIGH PLASTICITY; YELLOWISH BROWN; STIFF-VERY STIFF; DAMP-MOIST; SILTY; WITH TRACE OF SAND. WITH SMALL CARBON STAINS		NN	
	44.0		42.0'-44.0': MEDIUM-HIGH PLASTICITY; LIGHT BLUE GRAY WITH YELLOWISH BROWN; VERY STIFF; DAMP; SLIGHTLY SILTY			5. NOTE: GAS DETECTOR TUBES WERE USED TO MONITOR METHYLENE CHLORIDE & TRICHLOROETHYLENE EVERY 10.0' OF BOREHOLE ADVANCEMENT. NO MEASURABLE AMOUNTS WERE PRESENT. NO ODORS WERE DETECTED IN DRILLING.
			T.D. 44.0'			
	60					
	80					

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT HOLE NO.

00628

LONGHORN AAP
Well No. MW-23
Date 29AUG.89

006287

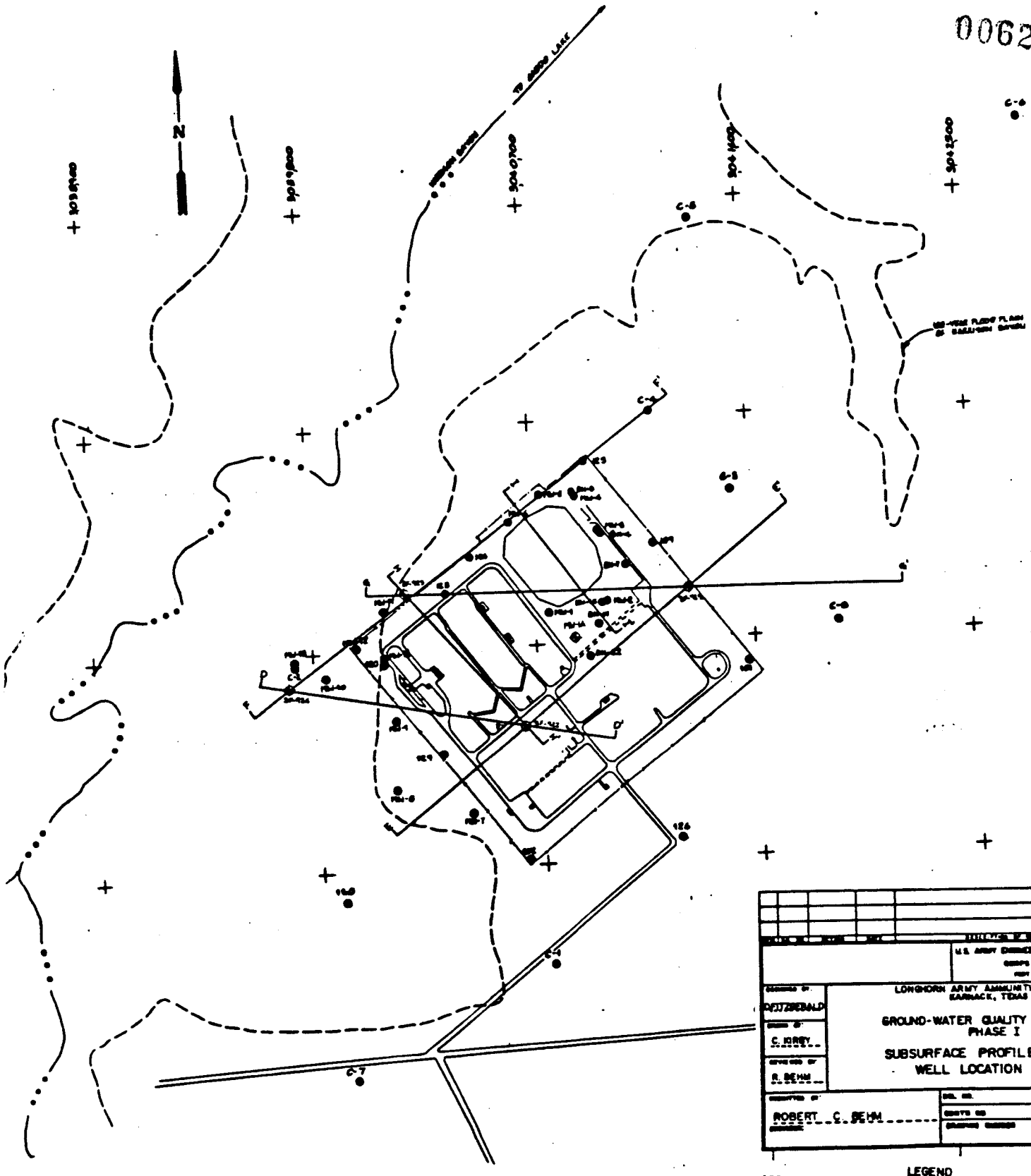


Construction Detail for Shallow Monitoring Well

006288

APPENDIX I
CROSS-SECTIONS

006289



LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

GROUND-WATER QUALITY ASSESSMENT
PHASE I

SUBSURFACE PROFILES AND
WELL LOCATION MAP

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

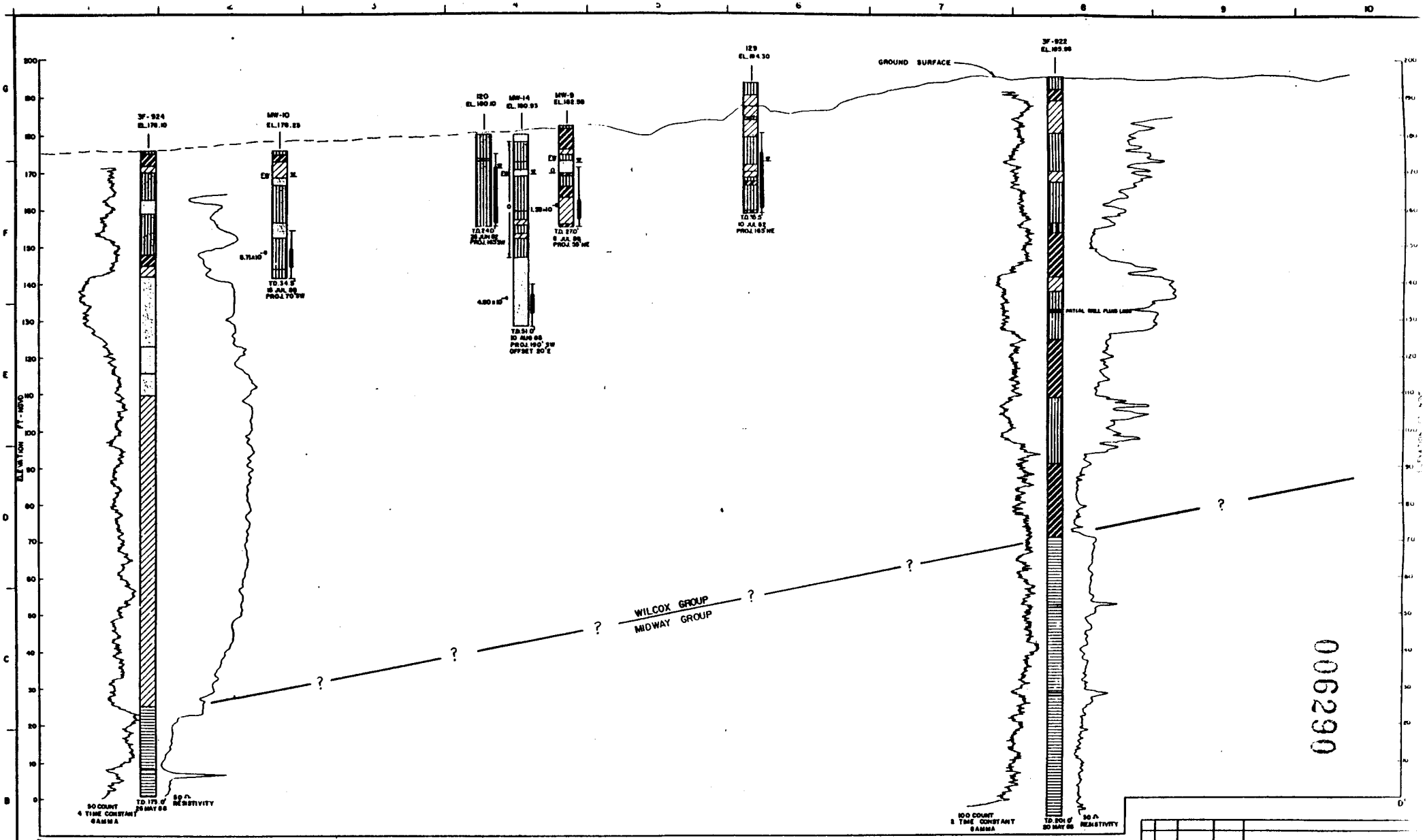
DESIGNED BY: DFJ/ZREMALP
DRAWN BY: C. ABBEY
APPROVED BY: R. BEHM
DESCRIPTION BY: ROBERT C. BEHM

SHEET NO. 21 OF 31
21

LEGEND

- MONITORING WELL
- STRATIGRAPHIC TEST BORING
- SOIL BORING

NOTE
1. FOR SUBSURFACE PROFILES, SEE SHEETS 23 THRU 27 AND SHEET 30.



NOTES

1. FOR LEGEND, STRATIGRAPHIC SYMBOLS, AND GENERAL NOTES, SEE SHEET 18.
2. FOR BORING LOCATIONS, SEE SHEET 21.

HORIZONTAL SCALE IN FEET
40 0 40 80

VERTICAL SCALE IN FEET
10 0 10 20

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

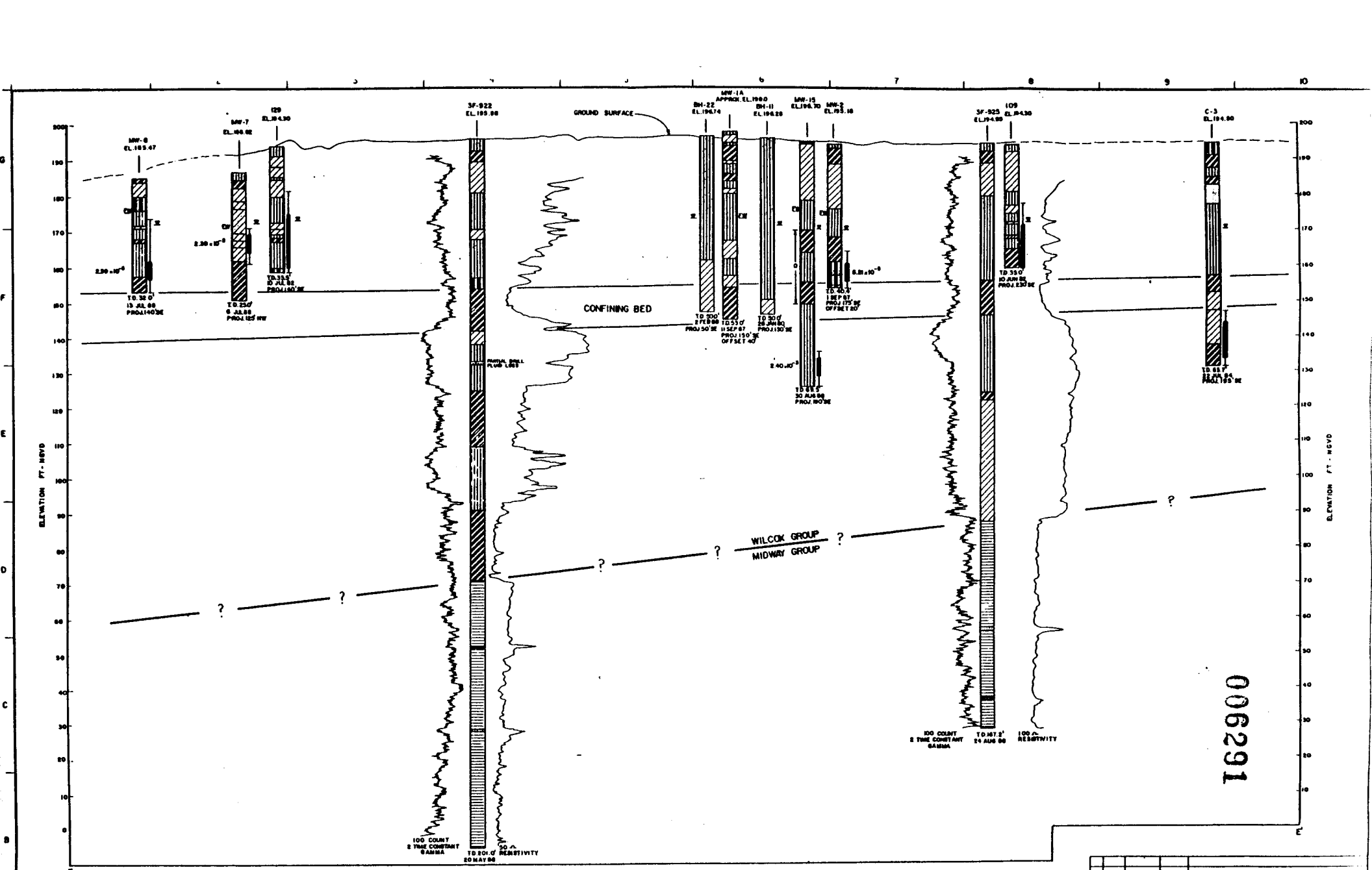
DESIGNED BY: PITTMAN/ALD
DRAWN BY: C. KIRBY
REVIEWED BY: R. BEHM
SUBMITTED BY: ROBERT C. BEHM

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

RCRA FACILITY INVESTIGATION
ABG AND UEP SITES
PHASE I
SUBSURFACE PROFILE D-D'

DSN. NO.
DATE:
CONTR. NO.
DRAWING NUMBER
SHEET NO.
SCALE: AS NOTED

062900



NOTES

1. LOG SHOWN FOR MW-7 WAS FROM ORIGINALLY DRILLED LOCATION APPROXIMATELY 10' SE OF LOCATION SHOWN. WELL WAS CONSTRUCTED IN NEW BORING WHERE T.D. WAS 25.0'.
2. FOR LEGEND, STRATIGRAPHIC SYMBOLS, AND GENERAL NOTES, SEE SHEET 18.
3. FOR BORING LOCATIONS, SEE SHEET 21.

HORIZONTAL SCALE IN FEET

VERTICAL SCALE IN FEET

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

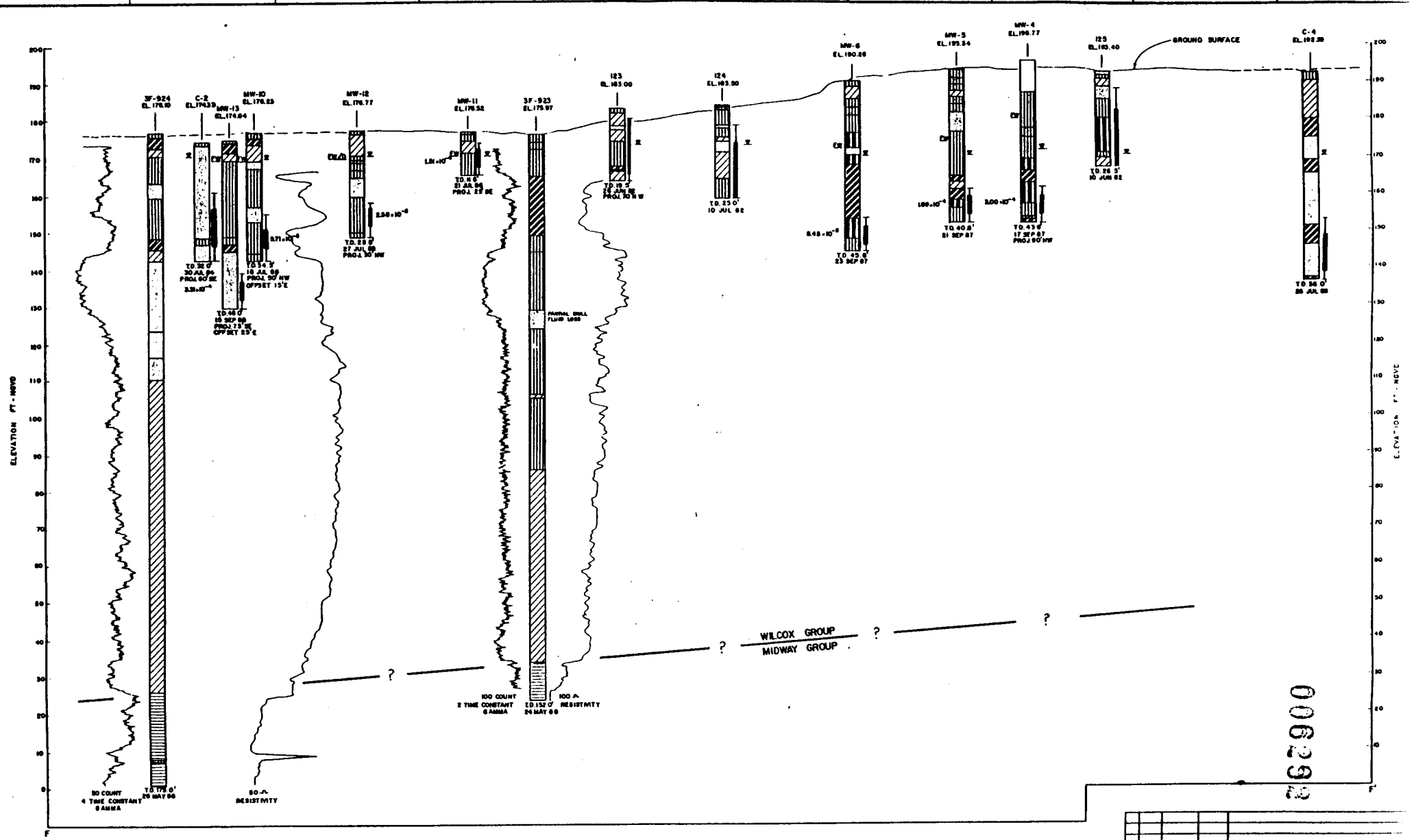
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

RCRA FACILITY INVESTIGATION
ABG AND UEP SITES
PHASE I

SUBSURFACE PROFILE E - E'

DESIGNED BY: D.FITZGERALD
DRAWN BY: C. KIRBY
REVIEWED BY: R. BEHM
SUBMITTED BY: ROBERT C. BEHM

006291



NOTES

1. FOR LEGEND, STRATIGRAPHIC SYMBOLS, AND GENERAL NOTES, SEE SHEET 10.
2. FOR BORING LOCATIONS, SEE SHEET 21.

HORIZONTAL SCALE IN FEET

VERTICAL SCALE IN FEET

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

RCRA FACILITY INVESTIGATION
ADG AND UEP SITES
PHASE I

SUBSURFACE PROFILE F - F'

DESIGNED BY: D.V. TERRAZAS
DRAWN BY: C. KIRBY
REVIEWED BY: R. BEHN
SUBMITTED BY: ROBERT C. BEHN
DRAWING NUMBER
SHEET NO. 25 of 31

CS6900

NOTES

1. FOR LEGEND, STRATIGRAPHIC SYMBOLS, AND GENERAL NOTES, SEE SHEET 18.
2. FOR BORING LOCATIONS, SEE SHEET 21.

HORIZONTAL SCALE IN FEET

VERTICAL SCALE IN FEET

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

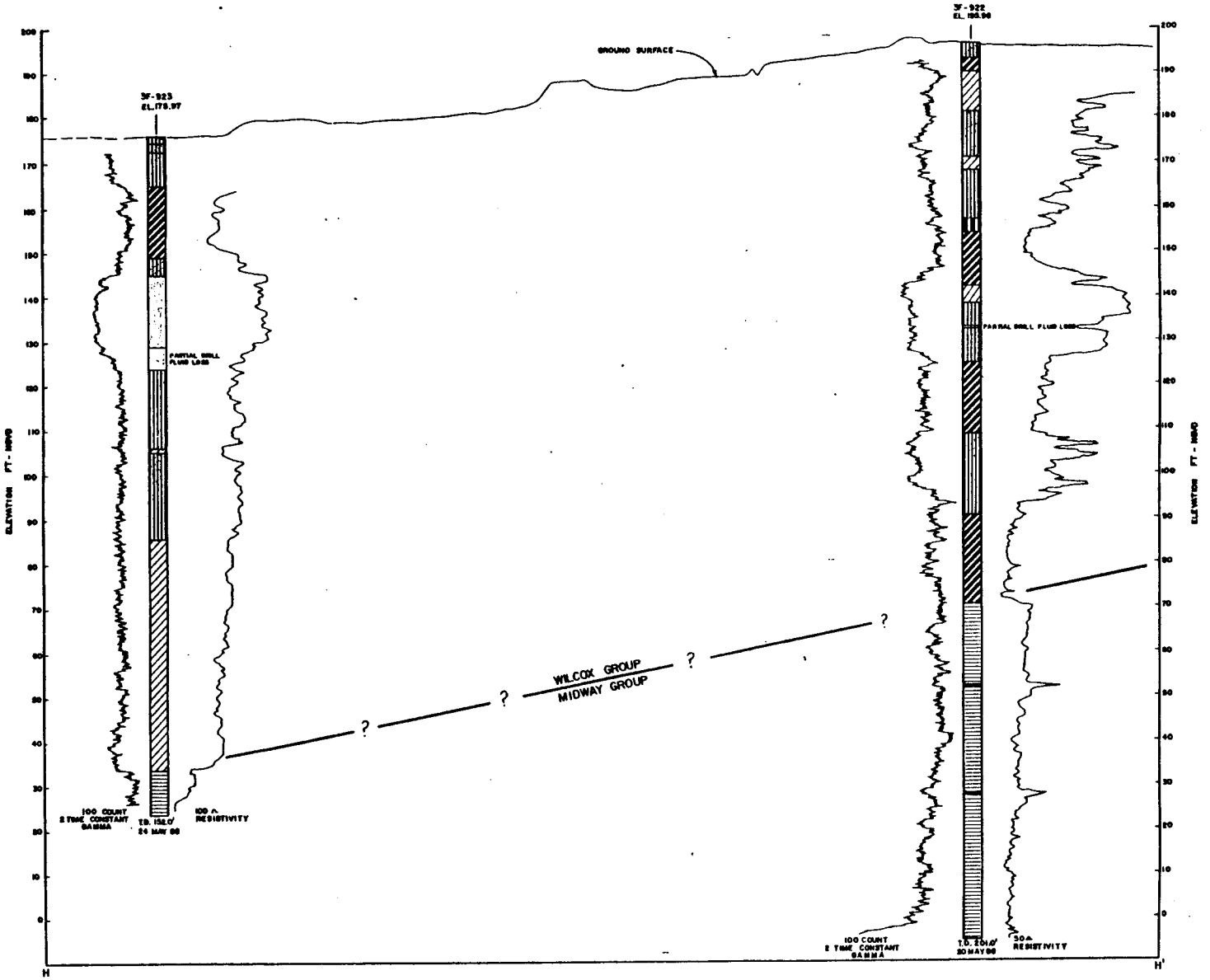
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

RCRA FACILITY INVESTIGATION
ABG AND UEP SITES
PHASE I

SUBSURFACE PROFILE G-G'

DESIGNED BY: D.F.LUNSFORD
DRAWN BY: C.JURRY
REVIEWED BY: R.BEHM
SUBMITTED BY: ROBERT C. BEHM (CONSULTANT)
DATE:
SHEET NO. 26 OF 31
DRAWING NO. 26

66900



NOTES

1. FOR LEGEND, STRATIGRAPHIC SYMBOLS, AND GENERAL NOTES, SEE SHEET 18.
2. FOR BORING LOCATIONS, SEE SHEET 21.

HORIZONTAL SCALE IN FEET

VERTICAL SCALE IN FEET

006294

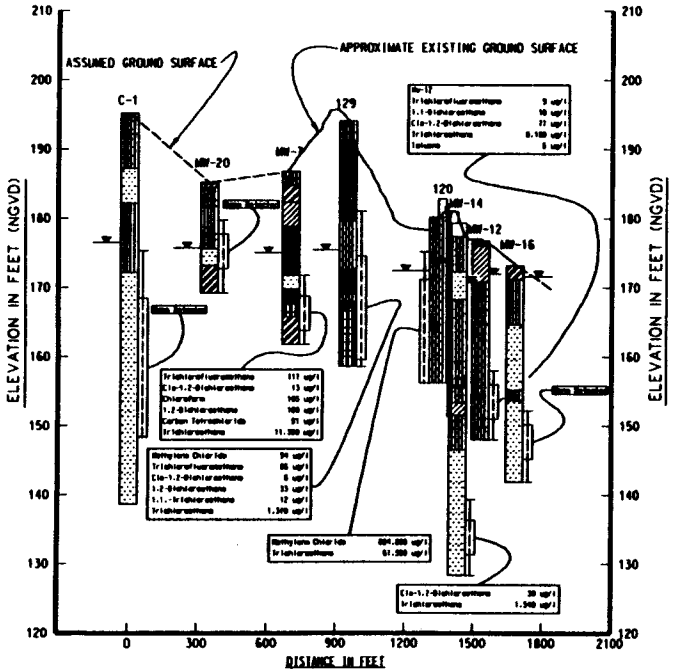
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: D.FITZGERALD
DRAWN BY: S.PERRY
REVIEWED BY: R.BEHM
SUBMITTED BY: ROBERT C. BEHM
CHIEF, ENGINEERING DIVISION

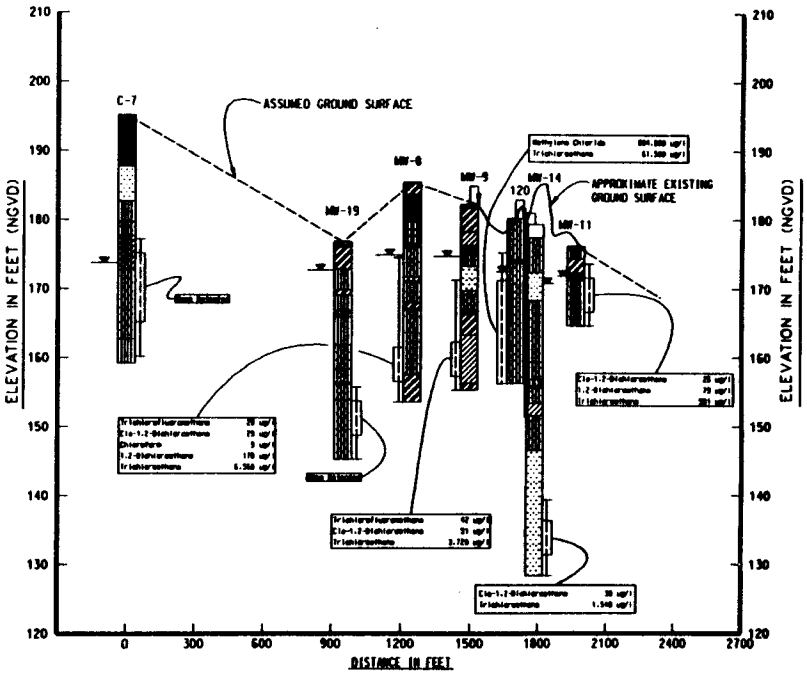
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

RCRA FACILITY INVESTIGATION
ABG AND UEP SITES
PHASE I
SUBSURFACE PROFILE H - H'

CONTR. NO.
DRAWING NUMBER
SHEET NO. 27 OF 31
DATE:
REVISION NO.
27



SECTION E - E



SECTION F - F

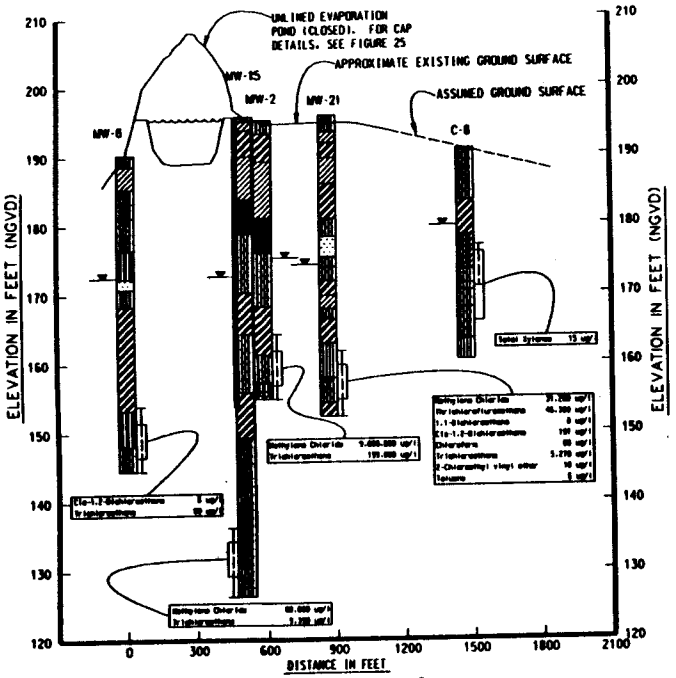
NOTE:
FOR NOTES AND LEGEND, SEE FIGURE 27

US ARMY CORPS OF ENGINEERS FORT WORTH DISTRICT

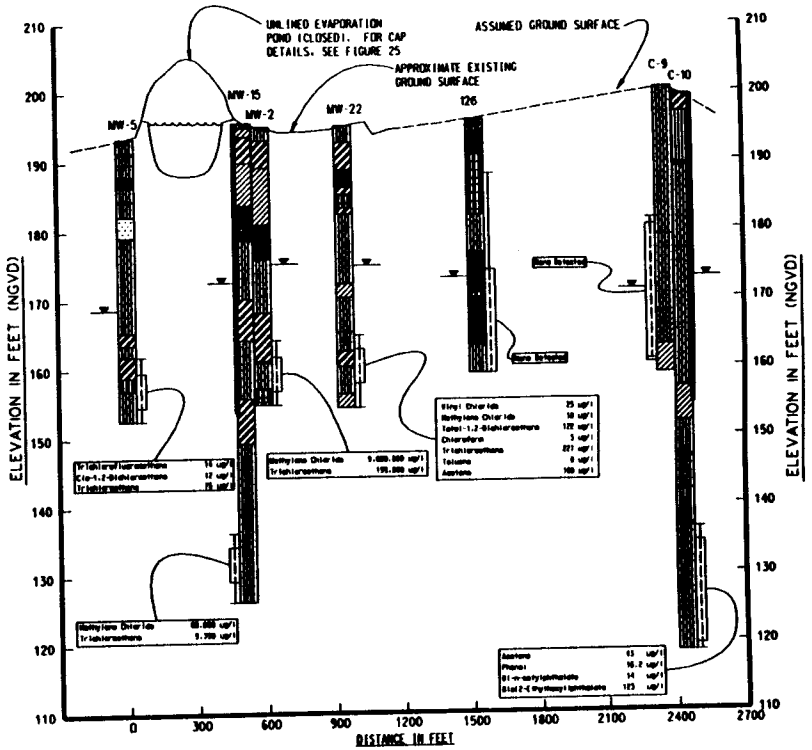
CORPS OF ENGINEERS
FORT WORTH DISTRICT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
INTERIM REMEDIAL ACTION
LHAAP - 18 AND 24
BURNING GROUND NO. 3 AND
UNLINED EVAPORATION POND
SECTIONS E -E AND F - F

DATE: FEBRUARY 1993 | FIGURE 30

062995



SECTION C - C



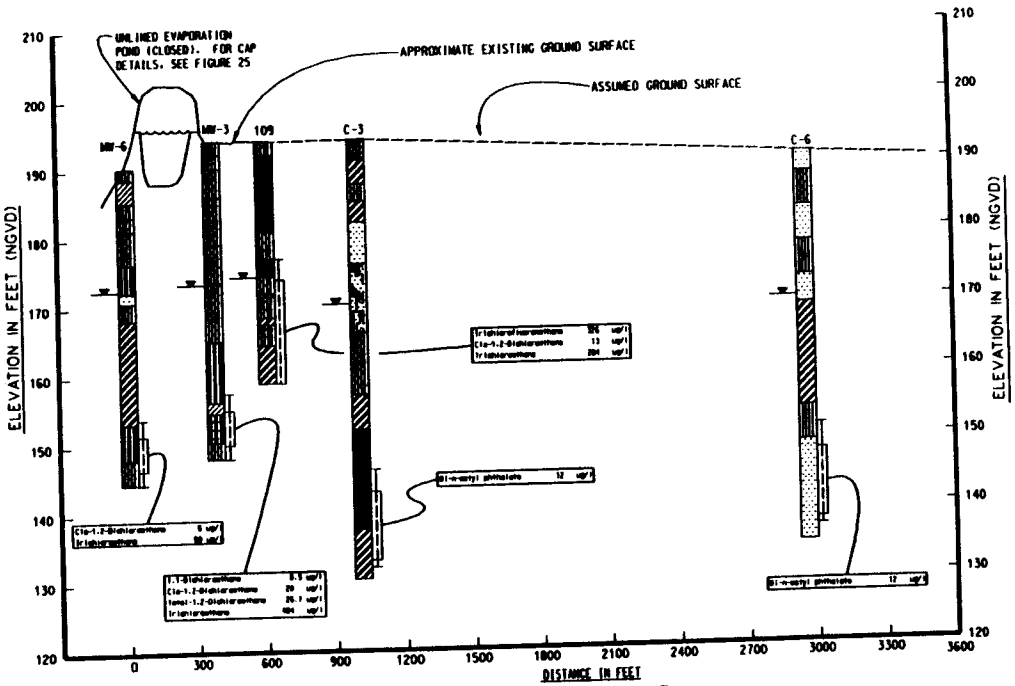
SECTION D - D

NOTE:
FOR NOTES AND LEGEND, SEE FIGURE 27

US ARMY CORPS OF ENGINEERS FORT WORTH DISTRICT

CORPS OF ENGINEERS
FORT WORTH DISTRICT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
INTERIM REMEDIAL ACTION
LHAAP - 18 AND 24
BURNING GROUND NO. 3 AND
UNLINED EVAPORATION POND
SECTIONS C - C AND D - D

DATE: FEBRUARY 1993 | FIGURE 29



SECTION B - B

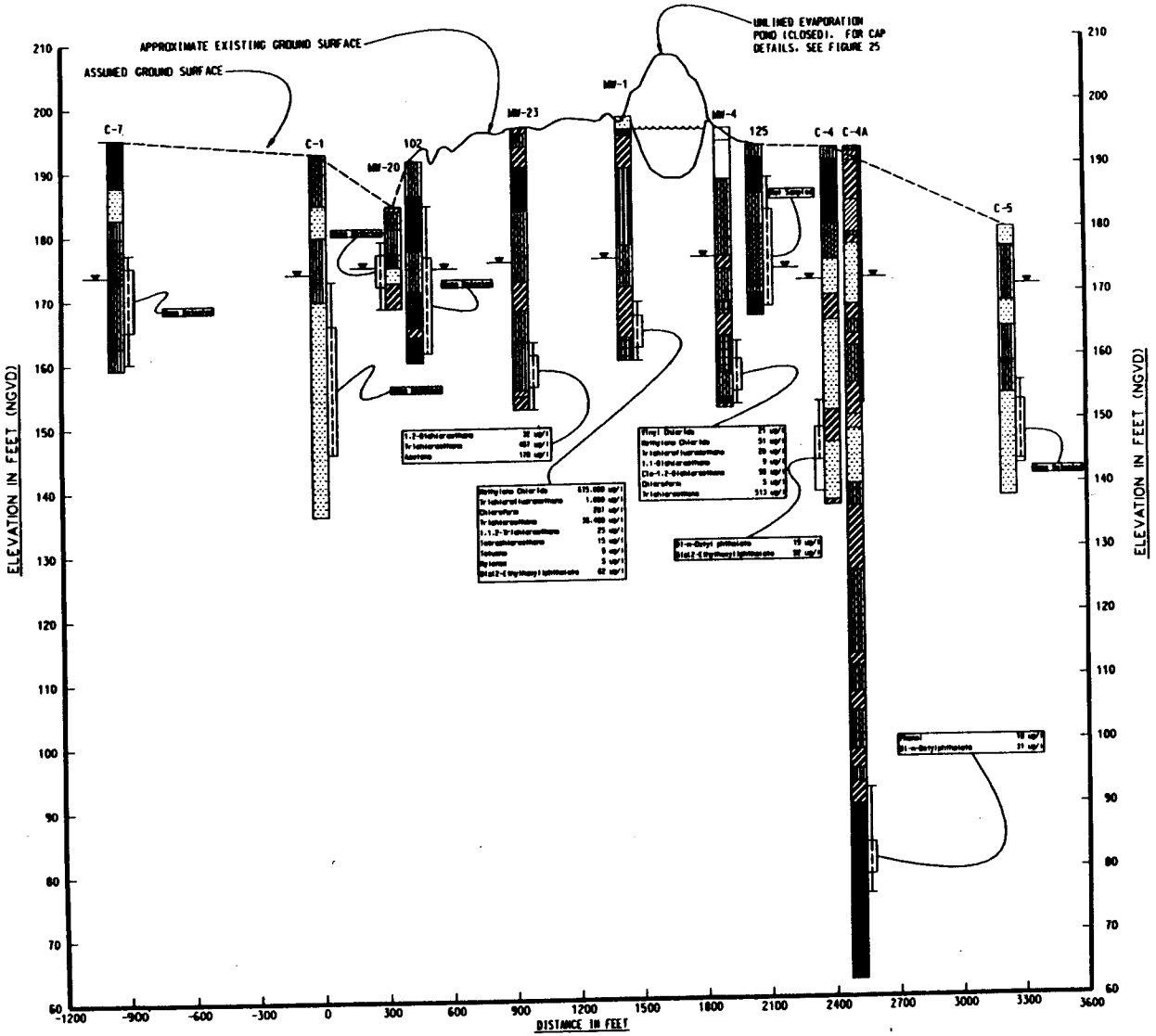
NOTE:
FOR NOTES AND LEGEND, SEE FIGURE 27

006297

US ARMY CORPS OF ENGINEERS FORT WORTH DISTRICT

CORPS OF ENGINEERS
FORT WORTH DISTRICT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
INTERIM REMEDIAL ACTION
LHAAP - 18 AND 24
BURNING GROUND NO. 3 AND
UNLINED EVAPORATION POND
SECTION B - B

DATE: FEBRUARY 1993 | FIGURE 28



SECTION A - A

LEGEND

- SAND
- SANDY CLAY AND CLAYEY SAND
- SILT
- SILTY CLAY AND CLAYEY SILT
- SANDY SILT AND SILTY SAND (LOW - MEDIUM PLASTICITY)
- SANDY SILT AND SILTY SAND (HIGH PLASTICITY)
- LOW - MEDIUM PLASTICITY CLAY (LEAN CLAY)
- HIGH PLASTICITY CLAY (FAT CLAY)
- SHALE
- WATER LEVEL MEASURED NOVEMBER 1992
- WELL SAND PACK INTERVAL
- WELL SCREEN INTERVAL
- PERMANENT CASING

NOTES:

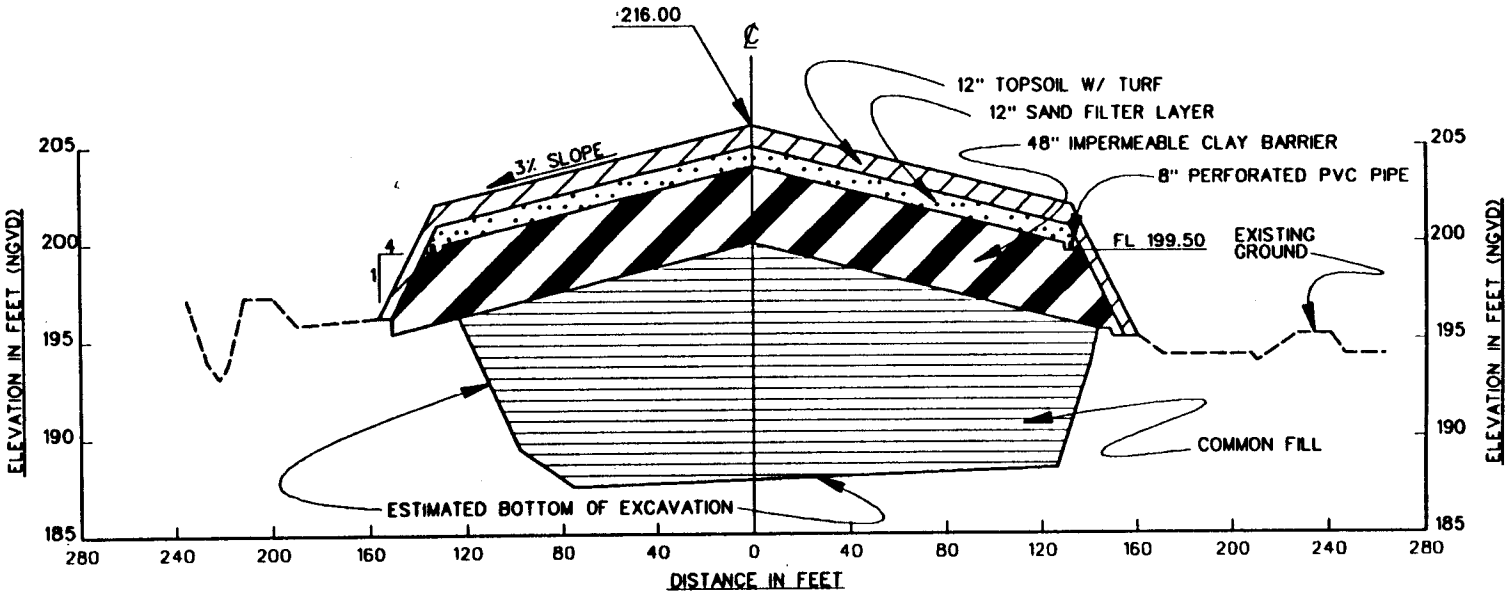
1. FOR BORING LOCATIONS, SEE FIGURE 26.
2. STRATIGRAPHIC SYMBOLS ARE IN ACCORDANCE WITH DESCRIPTION OF MATERIALS ON FIELD LOGS.
3. FOR BORING LOGS AND WELL CONSTRUCTION DETAILS, SEE APPENDIX A.
4. GROUNDWATER CONTAMINANT CONCENTRATIONS ARE SHOWN FOR DETECTED ORGANIC COMPOUNDS ONLY.

006298

US ARMY CORPS OF ENGINEERS FORT WORTH DISTRICT

CORPS OF ENGINEERS
FORT WORTH DISTRICT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
INTERIM REMEDIAL ACTION
LHAAP - 18 AND 24
BURNING GROUND NO. 3 AND
UNLINED EVAPORATION POND
SECTION A - A

DATE: FEBRUARY 1993 | FIGURE 27



STATION 2+25

LEGEND

- TOPSOIL
- IMPERMEABLE CLAY BARRIER
- COMMON FILL
- SAND FILTER

10 5 0 10 20
VERTICAL SCALE IN FEET

40 20 0 40 80
HORIZONTAL SCALE IN FEET

NOTE: SEE FIGURE 24 FOR LOCATION OF SECTION

CORPS OF ENGINEERS
FORT WORTH DISTRICT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
INTERIM REMEDIAL ACTION
LHAAP - 18 AND 24

BURNING GROUND NO. 3 AND
UNLINED EVAPORATION POND
TYPICAL CROSS-SECTION
UNLINED EVAPORATION POND BACKFILL

DATE: FEBRUARY 1993 | FIGURE 25

062900

f:/ed/drawing/longhorn/1824/uepsec Feb. 3, 1993 17:21:00

APPENDIX J
WATER ELEVATION AND SURVEY DATA

SUMMARY OF MONITORING WELL INSTALLATION DATA[a] FOR MW-1 THROUGH MW-15

Well No.	Survey Marker Elevation[b] (ft msl)	Total Boring Depth (ft)	Depth to Top of Screen (ft)	Depth to Top of Sand (ft)	Depth to Top of Bentonite (ft)	Top of Well Pipe Elevation (ft msl)
MW-1	197.73	38.0	31.0	28.8	25.2	199.24
MW-2	195.18	40.4	33.4	31.0	27.0	197.00
MW-3	194.02	46.0	39.0	36.5	31.0	196.51
MW-4	195.77	43.0	36.0	33.2	29.1	197.31
MW-5	193.34	40.8	33.8	31.5	27.2	195.21
MW-6	190.26	45.8	38.8	36.4	32.2	192.18
MW-7	186.62	25.0	18.0	15.0	11.5	188.56
MW-8	185.47	32.0	24.0	11.0	8.0	186.85
MW-9	182.58	27.0	20.0	11.0	8.0	184.78
MW-10	176.23	34.5	26.5	21.5	18.0	177.99
MW-11	176.52	11.6	4.6	2.6	0.6	177.65
MW-12	176.77	28.8	20.8	18.8	16.0	178.37
MW-13	174.64	46.0	38.0	36.0	32.0	176.72
MW-14	180.93	51.0	43.0	40.0	36.0	182.99
MW-15	195.70	69.5	61.5	59.5	57.0	197.32

a For well installation details, see Appendix .

b For survey data, see Appendix .

006301

006302

SURVEYED LOCATIONS OF MONITORING WELLS

Project: Ground Water Quality Assessment Location: Longhorn A.A.P.

Datum, Horizontal: North American 1927 Traverse: 3rd Order

Vertical: NGVD

Well Number	Y	X	Elevation		Remarks
			Top of Pipe	Ground	
C-1	379,446.469	3,040,702.924	193.797	191.88 SLAB	NOTCHED OUTER PIPE
C-2	380,733.329	3,039,721.027	176.029	174.33 SLAB	" GROUND 174.1
C-3	381,350.326	3,041,526.563	196.407	194.50 SLAB	" [illegible]
C-4	381,676.407	3,041,213.236	194.743	192.59	"
C-5	382,471.485	3,041,409.362	180.768	179.00	"
C-6	382,821.023	3,042,774.128	192.342	190.20	"
C-7	379,015.060	3,039,887.699	196.723	194.44 SLAB	" GROUND 19
C-8	380,801.871	3,041,949.525	192.564	189.90	"
C-9	379,167.866	3,041,567.895	202.665	199.07 SLAB	NOTCHED INNER PIPE
C-10	379,124.698	3,041637.181	202.035	197.96 SLAB	NOTCHED OUTER PIPE
BH-3	381,362.332	3,040,856.119	196.304	193.99	NOTCHED 2" PVC
BH-4	381,180.982	3,040,980.677	197.438	194.28 SLAB	"
BH-7	381,056.042	3,041,078.841	197.237	194.91 SLAB	"
BH-11	380,821.793	3,040,953.775	199.034	196.28 SLAB	"
BH-22	380,688.723	3,040,914.286	199.253	196.74 SLAB	"
101	380,654.794	3,041,559.772	197.509	193.90	NOTCHED OUTER PIPE
102	379,874.057	3,040,635.045	194.551	191.60	"
109	381,140.981	3,041,189.603	197.108	194.30	"
120	380,684.145	- 3,040,091.723	183.284	180.10	"
123	380,961.772	3,040,336.570	186.326	183.00	"
124	381,108.676	3,040,426.558	186.387	183.50	"
125	381,478.948	3,040,911.668	196.347	193.40	"
126	379,938.330	3,041,259.989	199.409	196.50	"
129	380,311.771	3,040,298.031	197.132	194.30	"
130	379,735.759	3,039,882.271	177.799	174.90	"

Page 1 of 2

Submitted by: [signature]

Date 5/3/88

006303

S VEYED LOCATIONS OF MONITORING ELLS

Project: Ground Water Quality Assessment Location: Longhorn A.A.P.

Datum, Horizontal: North American 1927 Traverse: 3rd Order

Vertical: NGVD

Well Number	Y	X	Elevation		Remarks
			Top of Pipe	Ground	
MW-1	380,869.265	3,040,746.763	199.242	197.73	NOTCHED INNER PIPE
MW-2	380,909.601	3,040,~~964.326~~ 991.46	196.996	195.175	"
MW-3	381,199.841	3,040,964.326	196.510	194.019	"
MW-4	381,321.942	3,040,886.566	197.313	195.772	"
MW-5	381,348.288	3,040,722.474	195.21	193.345	"
MW-6	381,243.920	3,040,590.386	192.179	190.258	"
MW-7	380,088.08	3,040,399.66		186.79	2×2 HUB/TACK @PROPOSED MW. WELL
MW-8	380,189.97	3,040,110.04		185.50	
MW-9	380,467.49	3,040,119.45		182.23	
MW-10	380,650.29	3,039,841.24		176.02	
MW-11	380,914.88	3,040,098.51		176.19	
MW-12	380,989.96	3,039,550.53		169.94	
MW-13	380,769.98	3,039,370.00		174.04	
MW-14	380,509.72	3,039,290.71		179.29	
3F-922	380,411.42	3,040,651.74		195.98	2×2 HUB/TACK @EXISTING FIRE HOLE
3F-923	380,975.05	3,040,179.87		175.97	
3F-924	380,601.88	3,039,702.32		176.10	
3F-925	380,930.04	3,041,339.93		194.93	2×2 HUB/TACK @PROPOSED CORE HOLE

Page	Submitted by:	Date
2 fo 2	Bruce Thompson	5/3/85

SURVEYED LOCATIONS OF MONITORING WELLS 006304

Project: MONITORING WELLS Location: LONGHORN AAP

Datum, Horizontal: NORTH AMERICAN 1927 Traverse: EDM

Vertical: NGVD 1929

Well Number	Y	X	Elevation		Remarks
			Top of Pipe	Brass Cap	
MW-7	380,075.85	3,040,415.84	188.56	186.62	NOTCHED INNER PIPE
MW-8	380,185.39	3,040,109.89	186.85	185.47	"
MW-9	380,468.69	3,040,120.51	184.78	182.58	"
MW-10	380,652.68	3,039,839.13	177.99	176.23	"
MW-11	380,912.57	3,040,099.54	177.65	176.52	"
MW-12	380,755.25	3,039,958.98	178.37	176.77	"
MW-13	380,720.71	3,039,724.67	176.72	174.64	"
MW-14	380,692.35	3,040,086.58	182.99	180.93	"
MW-15	380,907.74	3,040,979.58	197.32	195.70	"

Page 1 of 1 Submitted by: [signature] Date 9-28-88

TABLE 3. MONITORING WELL REFERENCE DATA*

WELL NO.	STATE PLANE COORDINATES		GROUND ELEV	STICK UP (ft)	REFERENCE ELEV	CONSTRUCTED BOW ELEV	SCREENED INTERVAL (ft)
	X	Y					
101(P)	3041557	380663	193.84	3.73	197.57	175.34	3.7-18.7
102	3040635	379882	191.34	2.96	194.30	161.34	15.2-30.2
109	3041185	381150	193.94	2.83	196.77	158.94	20.0-35.0
120	3040088	380689	180.15	2.80	182.95	156.15	9.2-24.2
123(P)	3040332	380969	183.55	3.21	186.76	166.05	2.8-17.8
124	3040421	381114	183.05	3.02	186.07	158.05	10.2-25.2
125	3040905	381486	193.01	2.94	195.95	168.01	10.0-25.0
126	3041260	379948	196.21	2.71	198.92	159.21	22.3-37.3
129	3040295	380317	194.06	2.88	196.94	159.56	19.6-34.6
130	3039884	379741	174.44	2.79	177.23	151.54	8.2-23.2
C-1	3040700	379444	192.48	1.88	194.36	144.92	27.6-47.6
C-2	3039721	380733	175.00	1.71	176.71	147.10	17.8-27.9
C-3	3041525	381349	194.06	1.60	195.66	133.06	51.0-61.2
C-4	3041212	381673	192.57	1.73	194.30	138.92	43.6-53.7
C-4A	NR	NR	NR	NR	NR	NR	108.5-113.5
C-5	3041408	382470	179.90	1.50	181.40	142.90	27.5-37.5
C-6	3042772	382817	191.01	1.92	192.93	137.81	43.0-53.2
C-7(BG)	3039884	379012	195.18	2.51	197.69	160.18	20.0-30.0
C-8	3041946	380798	190.89	2.21	193.10	160.89	15.0-25.0
C-9(BG)	3041566	379166	200.49	3.61	204.10	160.49	20.0-40.0
C-10(BG)	3041636	379123	199.44	3.81	203.25	119.44	65.0-80.0
MW-1	3040744	380865	197.73	1.54	199.27	159.73	31.0-36.0
MW-2	3040989	380905	195.18	1.84	197.02	154.78	33.4-38.4
MW-3	3040963	381196	194.02	2.52	196.54	148.02	39.0-44.0
MW-4	3040882	381318	195.77	1.60	197.37	152.77	36.0-41.0
MW-5	3040720	381347	193.35	1.90	195.25	152.55	33.8-38.8
MW-6	3040587	381239	190.26	2.00	192.26	144.46	38.8-43.8
MW-7	3040413	380073	186.79	2.00	188.79	161.79	18.0-23.0
MW-8	3040106	380184	185.50	1.48	186.98	153.50	24.0-29.0
MW-9	3040117	380467	182.23	2.25	184.48	155.23	20.0-25.0
MW-10	3039837	380649	176.02	1.79	177.81	141.52	26.5-31.5
MW-11	3040098	380910	176.19	1.17	177.36	164.59	4.6-9.6
MW-12	3039957	380753	176.77	1.56	178.33	147.97	20.8-25.8
MW-13	3039722	380716	174.04	2.1	176.14	128.04	38.0-43.0
MW-14	3040085	380689	179.29	2.04	181.33	128.29	43.0-48.0
MW-15	3040976	380905	195.70	1.65	197.35	126.20	61.5-66.5
MW-16	3039863	380871	173.40	1.73	175.13	142.10	23.0-28.0
MW-17	3039710	380508	177.37	1.67	179.04	150.57	18.3-23.3
MW-18	3039844	380174	177.09	1.31	178.40	145.29	23.3-28.3
MW-19	3040143	379883	176.83	1.67	178.50	145.23	23.1-28.1
MW-20	3040613	379761	185.21	2.00	187.21	169.21	7.5-12.5
MW-21	3041379	380887	195.85	2.96	198.81	152.25	36.1-41.1
MW-22	3041170	380502	195.33	2.19	197.52	154.33	32.5-37.5
MW-23	3040786	380358	196.31	2.46	198.77	152.31	35.5-40.5
BH-3(P)	3040851	381369	192.75	2.28	195.03	NR	NR
BH-4(P)	3040976	381190	193.29	3.06	196.35	NR	NR
BH-7(P)	3040174	381064	193.83	2.31	196.14	NR	NR
BH-11(P)	3040949	380831	195.58	2.25	197.83	NR	NR
BH-22(P)	3040912	380695	195.92	2.35	198.27	NR	NR

* SOURCE: USTHAMA 1990 DRAFT, RI/FS WORK PLAN 1992.
BG = BACKGROUND
P = TO BE PLUGGED
NR = NOT RECORDED