LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

ADMINISTRATIVE RECORD

VOLUME 1 of 1

1980

Bate Stamp Numbers
000078 - 000196

Prepared for:

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

1995

VOLUME 1 of 1

1980

A. **Title:** Final Report - AEHA Land Disposal Study
No. 38-26-0104-81-82
Group(s): 2 (Partial), 3 (Partial)
Site(s): LHAAP-12 Active Landfill
LHAAP-14 54 Burial Ground
LHAAP-16 Old Landfill
LHAAP-18 & LHAAP-24 Burning ground / Washout Pond & Evaporation Pond
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: U.S. Army Environmental Hygiene Agency, Aberdeen Proving Ground
Author(s): U.S. Army Environmental Hygiene Agency, Aberdeen Proving Ground
Recipient: Commander, USA Material Development and Readiness Command
Date: January 23 - February 8, 1980
Bate Stamp: 000078 - 000196

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UNITED STATES ARMY ENVIRONMENTAL HYGIENE AGENCY

ABERDEEN PROVING GROUND, MD 21010

LAND DISPOSAL STUDY NO. 38-26-0104-81
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
23 JANUARY - 8 FEBRUARY 1980

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CPT Corbitt/jg/AUTOVON 584-4211

DEPARTMENT OF THE ARMY
U S ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND MARYLAND 21010

REPLY TO ATTENTION OF
HSE-ES/WP

26 MAY 1980

SUBJECT: Land Disposal Study No. 38-26-0104-81, Longhorn Army Ammunition Plant, Marshall, TX, 23 January - 8 February 1980

Commander
US Army Materiel Development
and Readiness Command
ATTN: DRCSG
5001 Eisenhower Ave
Alexandria, VA 22333

1. This survey was orginally scheduled to obtain for Longhorn Army Ammunition Plant (LHAAP) the soils data for selected disposal facilities and to install monitoring wells around each. Subsequent phone conversations with installation personnel indicated a need to investigate an evaporation pond for possible leachate generation. Additionally, the Corps of Engineers, Fort Worth District, asked for soils data at these sites to augment two other studies conducted at LHAAP by independent architectural engineering firms. The operation of the sanitary landfill will have to be improved to prevent ground-water infiltration or the installation will have to use another disposal system. The evaporation pond is leaking and should be closed. The proper closure method will have to be discussed with State and Federal regulatory agencies.

2. Additional copies of this report are inclosed for mailing to HQDA (DAEN-MPO-U), HQDA (DAEN-ZCE) and Commandant, Academy of Health Sciences (HSA-IPM).

FOR THE COMMANDER:

ROBERT L. HANSON, P.E.
COL, MSC
Director, Environmental Quality

1 Incl
as (20 cy)

CF:
HQDA (DASG-PSP)
Cdr, ARRCOM (DRSAR-SG)
Cdr, HSC (HSPA-P)
Cdr, Longhorn (2 cy)
Cdr, MEDDAC, Ft Hood (PVNTMED Actv)(2 cy)
C, USAEHA-Rgn Div South

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010

000080

REPLY TO ATTENTION OF
HSE-ES/WP

LAND DISPOSAL STUDY NO. 38-26-0104-81
LONGHORN ARMY AMMUNITION PLANT
MARSHALL, TEXAS
23 JANUARY - 8 FEBRUARY 1980

1. AUTHORITY. Letter, HSE-AT/WP, this Agency, 27 July 1979, subject: Mission Services, FY 80.

2. REFERENCES. See Appendix A for listing of references.

3. PURPOSE. To obtain soils data for the installation on selected disposal sites and to determine if leachate is being generated from these facilities.

4. PERSONNEL CONTACTED. See Appendix B for listing of personnel contacted.

5. BACKGROUND.

a. Mission. Longhorn Army Ammunition Plant (LHAAP) is a Government-owned, contractor-operated (GOCO) industrial installation under the jurisdiction of ARRCOM with the primary mission of load, assembly, and packout (LAP) of pyrotechnic and illuminating/signal ammunition and solid propellant rocket motors. The Longhorn Division of Thiokol Chemical Corporation is the current operating contractor.

b. Geohydrology.

(1) Soil Types. Soils on LHAAP are generally fine grained (clays, silts, and fine sands) and are from two basic origins. Residual soils, being formed from decomposition of the underlying Wilcox Formation, consist of silty or sandy clay occassionally interbedded with sand strata. Soil borings on the installation show that these soils become intermixed with soft clay shales at depths greater than 10 to 15 feet. The second major category comprises alluvial soils. These soils are found predominately along bayou flood plains and along Caddo Lake. They are fine grained clays, silts, and fine sand in varying combinations. Agriculturally, soils on LHAAP are described as belonging to the Forested Coastal Plains Problem Area. These soils are acidic, of low fertility, and generally moderately drained. Erosion is usually not a factor on LHAAP except on the western or northwestern areas and along the Harrison Bayou flood plain where slopes are steeper. Permeability of various soils ranges qualitatively from moderate to very slow.

(2) Hydrology. The Wilcox Group is part of the Cypress Aquifer, which is the primary source of well water for domestic, industrial and agricultural uses in Harrison County. Rainfall percolating through the soil recharges the aquifer. The depth of the water table is 5 to 30 feet with reported fluctuations of 5 to 10 feet in response to rainfall. Due to the fluctuating water table conditions, landfill sites should be restricted to the higher elevations [over 200 feet above mean sea level (MSL) to maximize trench depth].

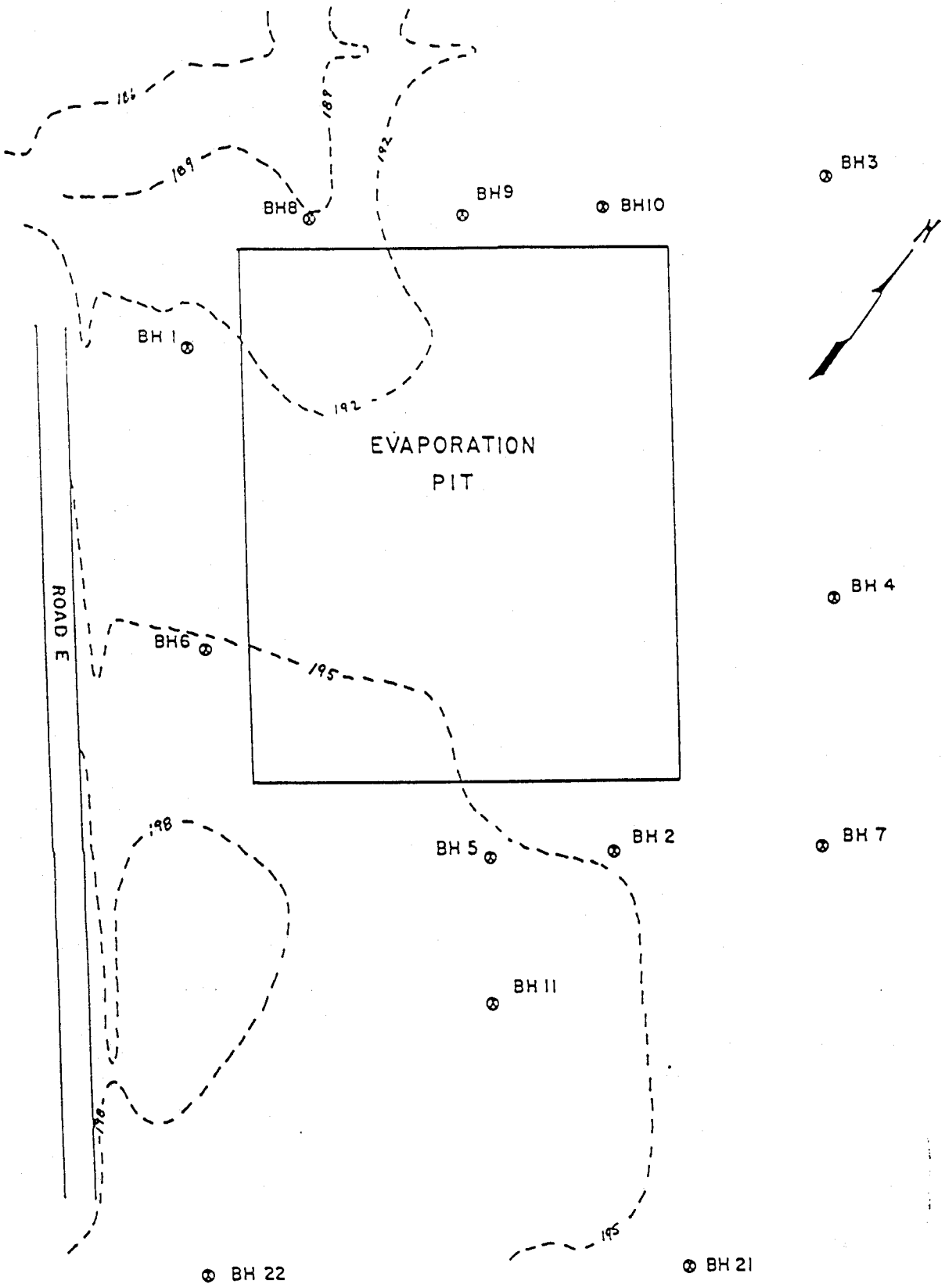

FIGURE 1 EVAPORATION PIT

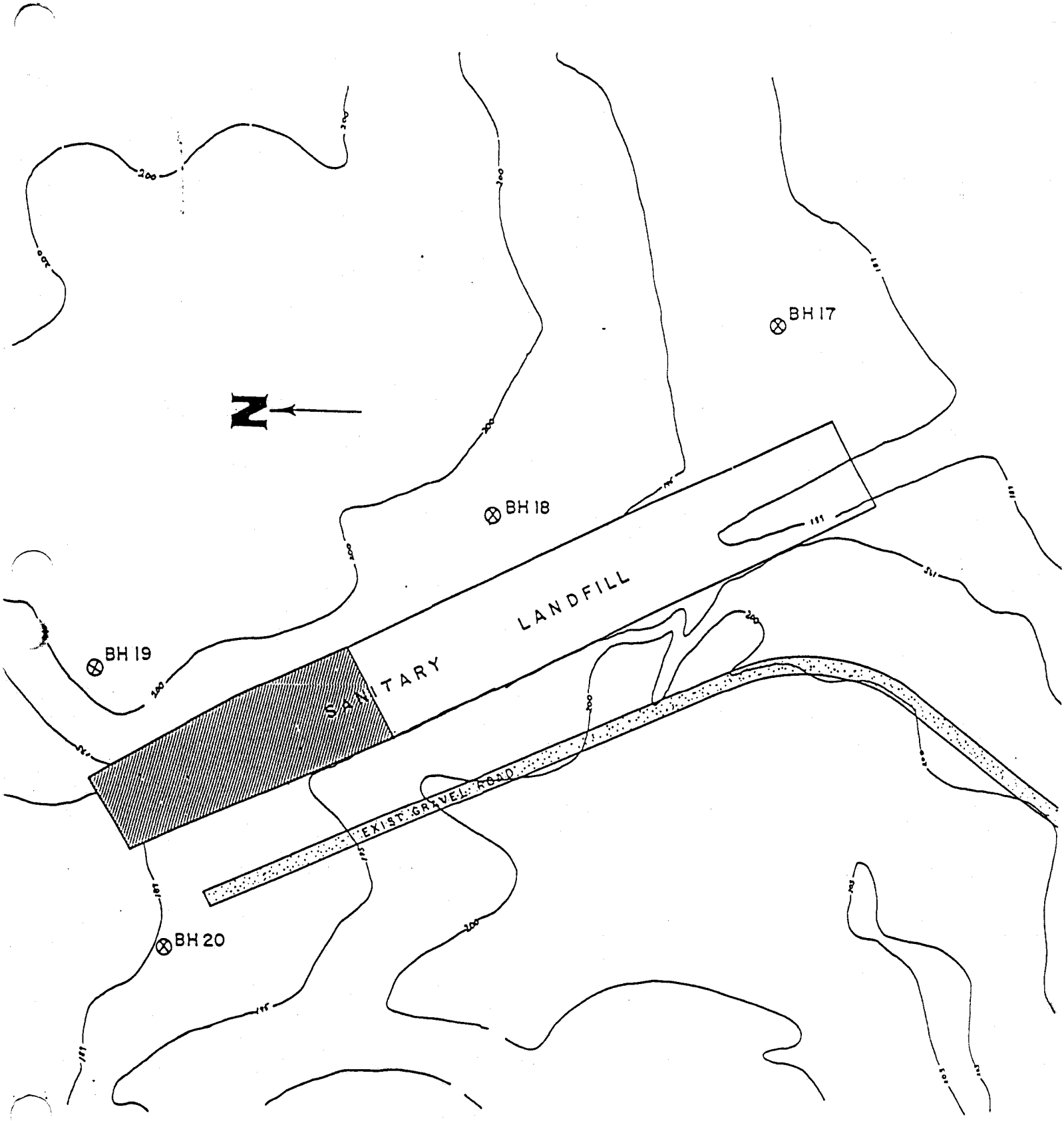

FIGURE 2

This combination of silty sands at 11 feet, the bottom of the pond at 12 feet, and this facility was not being lined artifically or with natural materials that have a low permeability (10-8 cm/sec or less), indicate that there is a great chance of leakage through the silty sand layer. During the drilling, a pungent odor was encountered in BH 5. Subsequently, holes 11, 21, and 22 were drilled to determine the extent, if any, of migration. The odor was detected in these holes also. Water samples were also taken from these wells. Chlorides again were a great deal higher in the wells around the lagoon as compared to well 13. Alkalinity, conductivity, TDS, TOC, and nitrates were all high. Calcium was high, but should pose no serious problem. Some cadmium was detected, but it was below the drinking water limit of .05 mg/L. Lead was high in one hole. No TNT or isomers of DNT were detected. The installation will have to close this lagoon. They can either try to get the State's permission to close it in place or drain the liquid, excavate the sludge that has accumulated through the years, and cover the lagoon. This sludge should be analyzed using US Environmental Protection Agency's (EPA) toxic extraction procedures to determine if it is hazardous. Monitoring should be continued on quarterly basis. Parameters to be sampled should be discussed with the State.

d. The Old Sanitary Landfill. Three borings and monitoring wells were established and water samples taken from the site (Figure 2). Chlorides and TDS were very high, again indicating leachate generation. The installation should regrade to a slope of 1 to 3 percent on this site, put 2 feet of compacted cover material of 10^{-6} cm/sec permeability or greater, and maintain properly to eliminate or minimize this leachate.

e. Area 54W. This area (Figure 2) was stipulated by the Corps of Engineers for further study. At one time, this area, approximately 10' x 20' in size, was designated for burial of wastes. Now, it has been asphalted over and used for a parking area. Two borings and wells were established with water samples being taken. Some chloride generation and the TDS in well 12 were higher than the background well. Calcium and magnesium were also higher than the background well. The installation should continue monitoring this site.

7. CONCLUSION. The soil borings were taken and monitoring wells established around four disposal sites. Analysis of water samples taken indicate the leachate is being produced from all four sites. If the installation is to continue using the present site for a sanitary landfill, then operational changes are required. Otherwise, a feasibility study should be done to consider other options. The installation should continue monitoring at all the sites. The evaporation point should be closed and a new one constructed to meet new regulatory requirements.

8. RECOMMENDATIONS.

a. Upgrade present landfilling procedures or evaluate the feasibility of other disposal options (paragraph 6b).

b. Continue monitoring all four sites for the parameters listed (paragraph 6b, c, d, and e).

c. Close the evaporation pond due to leaching (paragraph 6c).

Delwyn C Corbitt

DELWYN C. CORBITT
CPT, MSC
Chief, Solid Waste Branch
Waste Disposal Engineering Division

APPROVED:

David J. Warner

DAVID J. WARNER, P.E.
MAJ, MSC
Chief, Waste Disposal Engineering Division

APPENDIX A

REFERENCES

1. AR 40-5, Health and Environment, 25 September 1974.

2. AR 200-1, Environmental Protection and Enhancement, 20 January 1978.

3. Public Law 94-580, Resource Conservation and Recovery Act of 1976, 21 October 1976.

4. Title 40, Code of Federal Regulations (CFR), Part 265, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities, as cited from 45 Federal Register (FR) 33232, 19 May 1980.

5. Municipal Solid Waste Management Regulations, Texas Department of Health, April 1977.

6. Landfill Leachate Study, Option IX, Longhorn AAP (HND 4-454-W) Contract No. DACA 63-76-C-0149, Horacek, Smith, Painter, and Spitz.

7. Red Water Residue, Longhorn AAP (HND 1470-W), Contract No. DACA 63-76-C-0149, Horacek, Smith, Painter, and Spitz.

APPENDIX B

PERSONNEL CONTACTED

1. COL Robert P. Gall, Commander
2. CPT Joseph V. Webers, Executive Officer
3. Mr. Don Maley, Chief Engineer
4. Mr. Dave Rayner, Plant Engineerings
5. Mrs. Zmma Hall, Property and Mail
6. Mrs. Reba Williams, Maintenance
7. Mr. Tubby Cook, Maintenance
8. Mr. Horace Hess, Maintenance
9. Mr. Al Morgan, Burning Ground Operator
10. Mr. Curtis McCane, Chem Lab
11. Mr. Robert Heath, Stores
12. Mr. Hugh D. Hall, Army Property
13. Mr. C. C. Swafford, Maintenance
14. Mr. B. J. Hamilton, Purchasing
15. Mr. C. A. Tackett, Property Accounting
16. Mr. John Spencer, Property

APPENDIX C

BORE LOGS

000088

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
	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

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			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbett, Mr. Martin

DRILL RIG Acker II BORE HOLE

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
35		Medium brown silty sand with clay	
40	MB		
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

080090091

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

DRILLING LOG

PROJECT 38-26-0104 DATE 24 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Fortner

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		
	BS	Brick red fine silty sand with some clay	Fairly dry
10		Tan fine silty sand with some clay	Getting wet
15			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

000093

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

Page 2 of 4

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand with some clay	Getting wet
20			
			WT
25			
		Light tan silty sand with very little clay	Wet
30			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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
35		Light tan silty sand with very little clay	
40			
45			

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000095

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	

000096

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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		Tan fine silty sand with some clay.	
	BS		
			Wet
10	BS		
			Water running out of hole.
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

000097

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			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

000098

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			

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000099

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
45		Medium brown silty clay.	Hangs to auger
			WT
50		Bottom of hole	

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kratner
10 feet to east side of road

DRILL RIG Acker II BORE HOLE 4

DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown fine silty sand.	Damp
5	MB		
10	MB		
15	MB		Getting wetter

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 000101

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

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

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	
35	MB		
40			
45			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 000103

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	
		Medium brown silty clay.	Hangs to auger
50		Bottom of hole	
55			
60			

000104

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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 sand with clay.	

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 26 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Koster

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			

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000107

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

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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
		Medium brown silty sand.	Moist
		Brown silty sand	
5	BS		
10	BS	Brick red silty clay with fine sand	
		Light tan silty fine sand with some clay.	Moist
	BS		
15			

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000109

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	BS 29-31 ft		Water

000110

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 000111

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	

000112

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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	
			Moist
		Tan silty sand, fine	Moist
5	BS		
10			
	BS		
			Water
15			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 000113

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			

000114

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 27 Jan 86

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Foster

Edge of Road

DRILL RIG Acker II BORE HOLE 7

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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	

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000115

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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

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000116

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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
5	MB	Medium Brown silty sand; some clay	Moist
10	MB	Brown fine silty sand	
15		Tan fine silty sand w some clay	

US ARMY ENVIRONMENTAL HYGIENE AGENCY 060117

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			

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000118

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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
40			
45		Tan silty clay	
	MB		
50			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

000119

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	

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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

099121

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		
			Wet
20			
25			
			Water level
30			

000122

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 8[illegible]

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. [illegible]

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			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

000123

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

000124

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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
		Tan fine silty sand w some clay	Moist

US ARMY ENVIRONMENTAL HYG!ENE AGENCY

000125

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			

000126

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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
35			
40		Medium brown clay	
45			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 070127

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
	PB	Medium brown clay	
			Well depth
50			
55		BOTTOM OF HOLE	

US ARMY ENVIRONMENTAL HYGIENE AGENCY

000128

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			

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000129

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			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 28 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. [illegible]

DRILL RIG Acker II BORE HOLE 11

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
35		Tan firm silty sand	
40			
45			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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	

000132

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

About 100' south from edge of 59W (parking lot) along power line opening

DRILL RIG Acker II BORE HOLE 12

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Brown silty fine sand	
		Brick red silty sand w some clay	
5			
		Tan fine silty sand	
10			
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000133

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner
About 100' south from edge of 59W (parking lot) along power line opening

DRILL RIG Acker II BORE HOLE 12

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan fine silty sand	
20			
25			Water level
30			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT. Corbitt, Mr. Kestner
About 100' south from edge of 59W (parking lot) along power line opening

DRILL RIG Acker II BORE HOLE 12

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan fine silty sand	Getting wet
		Tan & gray fine silty sandy clay	Moist
35			
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

000135

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

About 100' south from edge of 59W (parking lot) along power line opening

DRILL RIG Acker II BORE HOLE 12

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		brick red silty clay	Dry
50		BOTTOM OF HOLE	Well depth

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000136

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS Mr. Kestner, LT Corbitt

Landfill side of road

DRILL RIG Acker II BORE HOLE 13

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Brown silty fine sand	Moist because of rain
		Brick red silty sand w some clay	Dry
5		Tan fine sandy silt	Dry
10		Brown fine sandy silt w clay	Moist
		Tan silty fine sand w some clay	Moist
15			

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000137

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS Mr. Kestner, LT Corbitt

Landfill side of road

DRILL RIG Acker II BORE HOLE 13

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan silty fine sand w some clay	Moist
20			
			Water level
25			
30			

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS Mr. Kestner, [illegible]

Landfill side of road

DRILL RIG Acker II BORE HOLE 13

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
35		Tan silty fine sand w some clay	Moist Water
40			
45			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

000139

DRILLING LOG

PROJECT 38-26-0104

DATE 29 Jan 80

LOCATION Longhorn AAP
Landfill side of road

DRILLERS Mr. Kestner, LT Corbitt

DRILL RIG Acker II

BORE HOLE 13

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan silty fine sand w some clay	Moist
			Well depth
50		BOTTOM OF HOLE	

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Near back of rubble fill

DRILL RIG Acker II BORE HOLE 14

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Brick red silty sand w some clay	
		Tan fine silty sand	
10		Tan fine silty sand w clay	Damp
15			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Near back of rubble fill

DRILL RIG Acker II BORE HOLE 14

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan fine silty sand w clay	Damp
20			
25			
30			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Near back of rubble fill

DRILL RIG Acker II BORE HOLE 14

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty clay	Moist
35			Water level
40			
45		Brown silty clay	Dry

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

000143

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

Near back of rubble fill

DRILL RIG Acker II BORE HOLE 14

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Brown silty clay	Dry
50		BOTTOM OF HOLE	Well depth

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 15

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty sand	Moist
		Brick red silty sand w some clay	Moist
5			
		Tan silty sand w some clay	Dry
10			
15			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 000145

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 15

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
		Tan silty sand w some clay	Dry
		Light tan silty sand	Dry
20		Tan silty sand w some clay	Moist
25			Water level
30			

[illegible]
000146

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. [illegible]

DRILL RIG Acker II BORE HOLE 15[illegible]

Page 3 of 4

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Tan silty sand w some clay	Moist
		Medium brown silty clay	Water Moist
35			
40			
			Well depth
45		Brown silty clay	Dry Clean auger

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000147

DRILLING LOG

PROJECT 38-26-0104 DATE 29 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 15

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Brown silty clay	Dry Clean auger
50		BOTTOM OF HOLE	

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 30 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 16

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty sand	Moist
		Brick red silty sand w clay	
5			
	BS	Tan silty sand w some clay	Dry
		Tan silty sand w some clay	Moist
10			
	BS		
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 060148

DRILLING LOG

PROJECT 38-26-0104 DATE 30 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 16

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
	BS	Tan silty sand w some clay	Moist
20		Light tan silty sand	Dry
		Dark tan silty sand w some clay	Moist
25			
30			

000150

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT: 38-26-0104

DATE: 30 Jan 80

LOCATION: Longhorn AAP

DRILLERS: LT Corbitt, Mr. Kestner

DRILL RIG: Acker II

BORE HOLE: 1[illegible]

Page [illegible] of [illegible]

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Dark tan silty sand w some clay	Moist
35			Water
		Medium brown silty clay	Moist
40			
45		Brown silty clay	Dry Auger came up clean

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

000151

DRILLING LOG

PROJECT 38-26-0104 DATE 30 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 16

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Brown silty clay	Dry Auger came up clean
50		BOTTOM OF HOLE	

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 17

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty sand	Wet
		Medium brown silty sand w some clay	Moist
5	MB		
		Golden silty sand	
		Tan intermixed w gold silty sand	
10		Light gray silty sand	Dry at first, then damp
			Water level
15			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000153

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 17

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
	MB	Tan silty sand w some clay	Moist
			Water
			Water level
20			
		Light tan silty sand w some clay	Wet
25	MB		
30			

000154

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 89

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Pierce

DRILL RIG Acker II BORE HOLE 17

Page 1 of 2

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN.	DESCRIPTION	REMARKS
35	BS	Chocolate brown stiff clay	Heavy & muck mixed
40			
45			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 10000155

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 17

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
			Auger came up clean
50		BOTTOM OF HOLE	Well depth

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 18

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Brick red silty sand & clay	
		Light brown	
5		Tan and gray intermixed silty sand and clay	
10		Tan silty sand w some clay	
	MB	Gold silty sand	
15		Tan silty sand	

US ARMY ENVIRONMENTAL HYGIENE AGENCY 000157

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 18

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
20	MB	Tan silty sand	
25			Water
30			

USAEHA Form 95, 12 Aug 74

000158

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 18

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
	MB	Tan silty sand	
35			
40		Brown silty clay	
45		Brown silty clay	Dry

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 18

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
50		Brown silty clay	Dry

000160

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 19

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Black organic soil	
		Light to medium brown silty sand	Moist
		Light brown silty sand	Drier
5	MB	Tan & gray intermixed silty sand w some clay	
10	MB		Water level
15			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 000161

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 19

FEET DEPTH	SAMPLE TYPE - BLOWS PER 6 IN	DESCRIPTION	REMARKS
	MB	Tan sandy silt	Moist
20			Water level
25		Light gray silty sand	Wet
30			

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000162

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corrit , Mr Keer

DRILL RIG Acker II BORE HOLE 19

Page 3 of -

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Light gray silty sand	Wet
30			
35			
		Medium brown silty clay	Hangs tight to auger
40			

USAEHA Form 95, 12 Aug 74

000163

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 31 Jan 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 19

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty clay	Hangs tight to auger
45		Reddish brown silty clay	Dry; auger came up clean
50		Bottom of hole	Well depth

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 1 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 20

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Brown silty sand w some clay	Moist
		Dark tan silty sand	
5			
			Wet
10			
15			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 1 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 20

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Dark tan silty sand	
20			Water level
25			
30			

USAEHA Form 95, 12 Aug 74

000166

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 1 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 20

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Dark tan silty sand	
35		Medium brown silty clay	Hand auger
40			
45			

USAEHA Form 95, 12 Aug 74

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 1 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbitt, Mr. Kestner

DRILL RIG Acker II BORE HOLE 20

FEET DEPTH	SAMPLE TYPE / BLOWS PER 6 IN	DESCRIPTION	REMARKS
		Medium brown silty clay	Slangs to auger
50		BOTTOM OF HOLE	

000168

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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
		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			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY

000169

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

000170

US ARMY ENVIRONMENTAL HYGIENE AGENCY

DRILLING LOG

PROJECT 38-26-0104 DATE 2 Feb 80

LOCATION Longhorn AAP DRILLERS LT Corbin, Mr. Foster

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			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 000171

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	

000172

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 000173

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	
20			
25			
30			Water

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000174

US ARMY ENVIRONMENTAL HYGIENE AGENCY

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			

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US ARMY ENVIRONMENTAL HYGIENE AGENCY 000175

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

APPENDIX D

LABORATORY ANALYSIS OF WATER SAMPLES

USAEHA

Environmental Chemistry Division — Water and Waste Chemistry Branch

Metal Analysis Report

To: CPT CORBITT

Project No.:

Date received:

Date reported:

Source of Samples : LHAAP, TEXAS

Sample Description :

Remarks : Concentrated at µg/mL

XO#: Reviewed by : Dr. Rosak

SAMPLE IDENTITY	ECD # Ms	Sr	Fe	B	Ba	Ca	Cd	Cu	Cr	Hg	K	Mg	Mn	Pb	Zn	Sb	
BH 1	1193	1.5	9.1	nd	2.7	96.7	.016	nd	nd	.0011	4.08	71.9	2.63	nd	.12	.51	
BH 2	1194	1.5	1.1	nd	3.4	99.1	.008	nd	nd	.0005	4.95	71.8	2.57	nd	.10	3.8	
3	1195	3.0	2.5	nd	5.4	89.4	.010	nd	nd	.0003	6.4	71.7	1.88	.56	.15	3.1	
4	1196	.99	.25	nd	2.1	68.0	.007	nd	nd	.0002	3.15	127.7	3.45	nd	.10	2.6	
5	1197	.98	.56	nd	2.2	45.7	nd	nd	nd	.0004	4.21	43.7	1.70	nd	.065	2.3	
6	1198	1.2	.22	nd	2.2	68.0	.006	nd	nd	.0002	6.1	60.7	2.02	nd	.057	1.5	
7	1199	.50	1.2	nd	1.1	24.8	nd	nd	nd	.0002	1.86	18.1	1.41	nd	.066	1.2	
8	1200	.71	3.1	nd	1.3	38.1	nd	nd	nd	.0007	2.87	32.4	1.27	nd	.11	1.1	
9	1201	1.3	12.8	nd	3.0	63.7	.005	nd	nd	.0003	6.6	69.1	3.63	nd	.17	1.4	
10	1202	1.2	.81	nd	2.0	59.2	.005	nd	nd	.0002	4.99	64.3	3.39	nd	.11	1.2	
11	1203	1.1	.41	nd	1.9	67.2	.005	nd	nd	.0002	3.99	53.8	.44	nd	.065	1.2	
12	1204	.12	1.00	nd	0.3	5.2	nd	nd	nd	.0005	.71	32.5	nd	nd	.10	1.0	
13	1205	.64	.22	nd	0.5	33.9	nd	nd	nd	.0004	1.28	63.0	.12	nd	.058	.9	
14	1206	1.1	nd	nd	nd	81.7	.006	nd	nd	.0003	1.21	118.3	.061	nd	.040	.9	
15	1207	2.3	nd	nd	0.6	100	.010	nd	nd	.0003	2.75	115.1	.13	nd	.049	1.0	
16	1208	2.1	nd	nd	0.6	135.4	.007	nd	nd	.0002	1.89	15.5	.053	nd	.068	.9	

USACHA

Environmental Chemistry Division — Water and Waste Chemistry Branch

Metal Analysis Report

To: CPT CORBITT

Project No.

Date received:

Date reported:

Source of Samples : LHAAP, TEXAS

Sample Description :

Remarks : Concentrated at ug/mL

XO# : Reviewed by : Dr. Rosak

SAMPLE IDENTITY	ECD # Ms	Sr	Fe	B	Ba	Ca	Cd	Cu	Cr	Hg	K	Mg	Mn	Pb	Zn	Sb	
BH 17	1209	.73	.63	nd	nd	32.5	nd	nd	nd	nd	2.26	15.5	.80	nd	.069	.50	
18	1210	1.4	.78	nd	nd	75.0	.006	nd	nd	.0003	2.60	51.4	.11	nd	.11	.60	
19	1211	1.00	1.8	nd	nd	41.1	.005	nd	nd	.0002	3.94	30.4	.28	nd	.14	.60	
20	1212	.33	.32	nd	nd	18.0	nd	nd	nd	.0002	2.81	60.3	.091	nd	.063	nd	
21	1213	1.1	.28	nd	nd	72.0	.006	nd	nd	.0004	3.45	8.3	.27	nd	.063	.50	
22	1214	1.3	.16	nd	2.2	83.4	.007	nd	nd	nd	4.01	68.9	.51	nd	.055	.60	
Pond A	1215	19.1	.44	nd	52.0	12.6	.003	nd	nd	.0002	28.0	96.9	.13	nd	.072	1.0	
Pond B	1216	19.0	.44	nd	52.0	12.5	nd	nd	nd	.0002	28.2	97.0	.16	nd	.077	.60	
Pond C	1217	18.8	.44	nd	55.0	12.5	nd	nd	nd	.0003	26.3	95.2	.14	nd	.077	.60	
Drainage Ditch	1218	.99	.10	32.3	0.91	12.9	.023	.025	nd	nd	135.0	146.0	.092	nd	.41	1.2	
Pond D	1219	19.2	.44	nd	52.0	12.9	.005	nd	nd	.0004	28.4	98.8	.14	nd	.10	.50	
ND <		.10	.10	10	.3	1.0	.005	.025	.025	.0002	0.5	0.5	.030	.20	.015	.10	

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LABORATORY REPORT — LHAAP, TEXAS

PROJECT NO. 38-28-0104-81

ANALYSES		SAMPLE IDENTIFICATION											
	ECD #	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204
	WDED #	BH 1	BH 2	BH 3	BH 4	BH 5	BH 6	BH 7	BH 8	BH 9	BH 10	BH 11	BH 12
pH	Units	6.3	6.2	5.3	5.5	6.2	6.3	3.3	5.8	5.2	5.5	6.5	6.0
Alkalinity	mg/L as $CaCO_3$	95	41	13	17	41	86	0	36	6	15	96	24
Acidity	mg/L as $CaCO_3$	45	22	58	38	16	23	36	65	88	45	29	29
COND	micro whc per cm	2800	2200	3140	1880	1930	2150	1290	1770	1870	1880	2480	82
TS	mg/L	1933	1683	3000	1588	1526	2005	3966	1245	1412	1508	4143	1914
TDS	mg/L	1873	1642	2952	1551	1482	1845	842	1135	1364	1444	1707	269
TSS	mg/L	60	41	48	37	44	160	3124	110	48	64	2436	1645
VSS	mg/L	8	5	7	4	5	25	220	12	5	10	137	156
COD	mg/L	86	269	74	71	932	291	93	128	121	67	97	102
TOC	mg/L	103	130	97	99	395	171	151	102	140	133	165	82
Phenols	mg/L	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01	<0.01	0.02	<0.01	<0.01
NH_3/N	mg/L	<0.10	2.0	<0.10	<0.10	2.5	<0.10	0.12	0.10	2.8	<0.10	<0.10	1.0
TKN	mg/L	<0.05	1.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.32	<0.05	0.07	0.53
NO_2NO_3/N	mg/L	0.10	3.1	27	3.2	41	37	0.27	5.8	5.4	11	6.0	13
TP	mg/L	0.03	<0.02	0.04	<0.02	0.02	0.11	<0.02	<0.02	<0.02	0.03	0.06	0.63
Cl^-	mg/L	765	625	572	362	435	665	322	562	480	430	602	22
F^-	mg/L	0.09	0.05	0.14	0.08	0.10	0.10	0.09	0.27	0.09	0.17	0.11	0.84
SO_4	mg/L	5	inter-ference	inter-ference	4	3	4	6	5	3	inter-ference	inter-ference	5
2,4,6 TNT	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
All isomers of DNT	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

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LABORATORY REPORT — LHAAP, TEXAS

PROJECT NO. 38-28-0104-81

ANALYSES		SAMPLE IDENTIFICATION											
	ECD # / WDED #	1205 / BH 13	1206 / BH 14	1207 / BH 15	1208 / BH 16	1209 / BH 17	1210 / BH 18	1211 / BH 19	1212 / BH 20	1213 / BH 21	1214 / BH 22	1215 / BH 23	1216 / BH 24
pH	Units	7.3	6.2	6.6	6.2	6.8	6.8	6.1	6.4	6.7	6.2	7.8	7.7
Alkalinity	mg/L as $CaCO_3$	546	197	156	169	225	233	79	88	150	150	265	285
Acidity	mg/L as $CaCO_3$	25	40	47	38	27	59	99	31	29	25	9	7
COND	micro who per cm	2170	2980	4200	4000	3410	2290	1860	1970	3770	2480	1650	1700
TS	mg/L	1419	2391	3549	4093	1884	63,760	67,573	703	1934	1693	1065	1118
TDS	mg/L	1186	1735	2958	2786	1655	1312	836	544	1864	1668	1037	1077
TSS	mg/L	233	656	591	1307	229	62,448	66,737	159	70	25	28	41
VSS	mg/L	23	66	53	98	134	2960	3494	41	9	15	23	27
COD	mg/L	183	106	921	253	272	152	226	233	98	106	113	113
TOC	mg/L	155	105	157	95	174	90	158	124	153	113	48	54
Phenols	mg/L	0.01	0.01	0.04	0.03	0.01	0.01	<0.01	<0.01	0.03	<0.01	0.05	0.10
NH_3/N	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	3.0	3.0
TKN	mg/L	<0.05	0.27	<0.05	<0.05	1.2	<0.05	<0.05	<0.05	<0.05	<0.05	8.0	8.1
NO_2NO_3/N	mg/L	0.27	0.43	12	11	11	0.42	14	<0.01	32	1.5	5.4	4.3
TP	mg/L	0.03	<0.02	0.04	0.02	0.03	0.06	0.08	0.02	0.02	<0.02	0.15	0.17
Cl^-	mg/L	337	757	1182	1107	82	427	477	165	65	652	412	417
F^-	mg/L	0.48	0.31	0.36	4.4	0.30	0.53	0.19	<0.22	0.23	0.15	0.18	0.13
SO_4	mg/L	17	44	21	22	25	400	190	110	6	4	7	7
2,4,6 TNT	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
All isomers of DNT	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

(One Time), 1 Apr 81

LABORATORY REPORT — LHAAP, TEXAS

PROJECT NO. 38-28-0104-81 — SAMPLE IDENTIFICATION

ANALYSES	ECD # / WDED #	1217 Pond C	1218 Drainage Ditch	1219 Pond D
pH	Units	7.8	9.8	7.9
Alkalinity	mg/L as $CaCO_3$	310	1776	280
Acidity	mg/L as $CaCO_3$	9	0	9
COND	micro mhos per cm	1700	10,580	1600
TS	mg/L	1120	7834	1678
TDS	mg/L	1094	7700	1634
TSS	mg/L	26	134	44
VSS	mg/L	26	134	41
COD	mg/L	121	>1000	106
TOC	mg/L	54	840	45
Phenols	mg/L	0.09	Inter-ference	0.05
NH_3/N	mg/L	3.2	1.4	3.0
TKN	mg/L	8.5	15	8.2
NO_2NL_3/N	mg/L	19	3.7	19
TP	mg/L	0.14	0.71	0.14
Cl^-	mg/L	392	42	392
F^-	mg/L	0.10	0.34	0.12
SO_4	mg/L	7	410	7
2,4,6 TNT	mg/L	<0.001	<0.001	<0.001
All isomers of DNT	mg/L	<0.001	<0.001	<0.001

D-6

AEHA Form 64, (One-Time), 1 Apr 81

Theodore W. Dolzine

THEODORE W. DOLZINE
CPT, MSC
Chief, Environmental Chemistry

APPENDIX E

LABORATORY ANALYSIS OF SOILS

LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION LHAAP

Bore Hole No.	1	1		
Depth of Sample	0 - 3	5 - [illegible]	[illegible]	[illegible]
Sample Type	MB	ST	MB	MB
Grain Size Analysis				
% passing No. 4 (GRAVEL)	99	-	[illegible]	-
% passing No. 10	98	99.9	97	-
% passing No. 20 (SAND)	97	99.[illegible]	[illegible]	99
% passing No. 40	93	96.9	94	[illegible]
% passing No. 100	79	81.0	85	[illegible]
% passing No. 200 (FINES Silt + clay)	68	60.7	79	[illegible]
Atterberg Limits				
Liquid Limit	22.3	29.8	35.9	NA
Plastic Limit	19.4	20.9	26.7	NP
Plastic Index	2.9	8.9	9.2	NP
Unified Soil Classification	ML	CL	ML	SM
Standard Proctor Density				
gm/cm^3	1.82		1.79	
lb/ft^3	113.4		111.5	
OMC	14.0		16.5	
Permeability Cm/sc 20°C	8.2×10^{-6}		3.3×10^{-8}	
"In Situ"		2.08×10^{-6}		
Proctor Density				
% Void				
Porosity	0.34	.35.1	0.46	
Void Ratio	0.51	0.541	0.85	
Dry Density g/cm^3	1.78	1.740	1.46	
% Saturation	118	94.21	73	
Moisture Content		2.679		
Specific Gravity				
Cation Exchange Capacity				
X-Ray Defraction				

AEHA Form 66 (One-Time), [illegible] 81

LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION LHAAP

Bore Hole No.	1			
Depth of Sample	40-43			
Sample Type	MB			
Grain Size Analysis				
% passing No. 4	98			
% passing No. 10	98			
% passing No. 20	96			
% passing No. 40	92			
% passing No. 100	80			
% passing No. 200	69			
Atterberg Limits				
Liquid Limit	32.8			
Plastic Limit	27.3			
Plastic Index	5.5			
Unified Soil Classification	ML			
Standard Proctor Density				
gm/cm^3				
lb/ft^3				
OMC				
Permeability Cm/sc 20°C	1.80×10^{-7}			
"In Situ"				
Proctor Density				
% Void				
Porosity				
Void Ratio	0.45			
Dry Density g/cm^3	0.83			
% Saturation	1.47			
Moisture Content	91			
Specific Gravity				
Cation Exchange Capacity				
X-Ray Defraction				

LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION LHAAP

Bore Hole No.	1	1	2	2
Depth of Sample	43 - 45	48 - 50	4 - 6	9 - 11
Sample Type	LOOSE	LOOSE	LOOSE	LOOSE
Grain Size Analysis				
% passing No. 4	100	100	98	100
% passing No. 10	100	100	98	99
% passing No. 20	97	99	97	99
% passing No. 40	75	95	95	97
% passing No. 100	43	85	86	86
% passing No. 200	37	78	79	78
Atterberg Limits				
Liquid Limit	29.2	38.5	26.8	40.8
Plastic Limit	24.6	28.8	22.5	33.1
Plastic Index	4.6	9.7	4.3	7.7
Unified Soil Classification	SM	ML	ML	ML
Standard Proctor Density				
gm/cm^3			1.84	1.75
lb/ft^3			115.0	109.4
OMC			12.7	16.2
Permeability Cm/sc 20°C	1.1×10^{-6}		3.4×10^{-7}	9.1×10^{-8}
"In Situ"				
Proctor Density				
3-Void				
Porosity n	0.41		0.40	0.59
Void Ratio e	0.69		0.66	1.46
Dry Density g/cm^3	1.60		1.62	1.10
% Saturation	101		110	117
Moisture Content				
Specific Gravity				
Cation Exchange Capacity				
X-Ray Defraction				

ACHA Form 66 (One-Time), 1 Apr 81

LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION LHAAP

Bore Hole No.	2	3	3	4
Depth of Sample	29 - 31	5 - 8	10 - 13	5 - 7
Sample Type	LOOSE	LOOSE	LOOSE	LOOSE
Grain Size Analysis				
% passing No. 4	96	99	100	99
% passing No. 10	93	98	100	98
% passing No. 20	87	96	97	98
% passing No. 40	71	88	88	95
% passing No. 100	46	63	59	82
% passing No. 200	37	49	44	71
Atterberg Limits				
Liquid Limit	NA	21.8	NA	32.0
Plastic Limit	NA	20.6	NA	25.0
Plastic Index	NA	1.2	NA	7.0
Unified Soil Classification	SM	SM	SM	ML
Standard Proctor Density				
gm/cm^3	1.86	1.90	1.81	
lb/ft^3	116.1	118.6	113.0	
OMC	12.5	14.0	12.5	
Permeability Cm/sc 20°C	4.2×10^{-7}	4.3×10^{-7}	9.3×10^{-7}	
"In Situ"				
Proctor Density				
% Void				
Porosity	0.44	0.40	0.39	
Void Ratio	0.79	0.68	0.64	
Dry Density g/cm^3	1.51	1.60	1.64	
% Saturation	101	102	102	
Moisture Content				
Specific Gravity				
Cation Exchange Capacity				
X-Ray Defraction				

AEHA Form 66 (One-Time), 1 Apr 81

000187
38L009

LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION LHAAP

Bore Hole No.	4	4	4	4
Depth of Sample	9 - 11	14 - 16	34 - 36	48 - 50
Sample Type	MB	Bag	MB	MB
Grain Size Analysis				
% passing No. 4	100	-	100	100
% passing No. 10	99	99.8	99	99
% passing No. 20	94	99.5	91	95
% passing No. 40	82	99.3	73	83
% passing No. 100	52	88.0	43	53
% passing No. 200	39	58.1	31	39
Atterberg Limits				
Liquid Limit	NA	21.5	NA	NA
Plastic Limit	NA	19.9	NA	NA
Plastic Index	NA	1.6	NA	NA
Unified Soil Classification	SM	ML	SM	SM
Standard Proctor Density				
gm/cm^3				
lb/ft^3				
OMC				
Permeability Cm/sc		2.75×10^{-7}		
"In Situ"				
Proctor Density				
3-Void				
Porosity		.29		
Void Ratio		29.1 .411		
Dry Density		.411 1.58		
% Saturation		1.88 148		
Moisture Content		140.95 21.8		
Specific Gravity		21.8 2.66		
Cation Exchange Capacity		2.660		
X-Ray Defraction				

AEHA Form 66 (One-Time), 1 Apr 81

000188

LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION Longhorn AAP

Bore Hole No.	5	5	5	5
Depth of Sample	4-6	6-8	9-11	14-16
Sample Type	MB	MB	MB	MB
Grain Size Analysis				
% passing No. 4	96	99	99.9	97
% passing No. 10	89	98	99.8	91
% passing No. 20	79	93	99.3	82
% passing No. 40	69	82	98.0	68
% passing No. 100	53	59	90.9	46
% passing No. 200	45	46	75.5	40
Atterberg Limits				
Liquid Limit	30.0	21.3	30.0	33.5
Plastic Limit	25.8	20.2	20.6	NA
Plastic Index	4.2	1.1	9.4	NA
Unified Soil Classification	SM-ML	SM	CL	SM-ML
Standard Proctor Density				
gm/cm^3				1.86
lb/ft^3				116.10
OMC				13.50
Permeability Cm/sc			$2.04x10^{-7}$	$2.1x10^{-7}$
"In Situ"				
Proctor Density				
% Void				
Porosity			37.6	44.0
Void Ratio			.603	0.78
Dry Density			1.64	1.51
% Saturation			113.62	99
Moisture Content			26.0	
Specific Gravity			2.636	
Cation Exchange Capacity				
X-Ray Defraction				

ALPHA Form 60 (One-Time), 1 Apr 81

LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION Longhorn AAP

Bore Hole No.	6	6	6	6
Depth of Sample	4-6	9-11	13-15	29-31
Sample Type	MB	MB	MB	MB
Grain Size Analysis				
% passing No. 4	99	100	100	100
% passing No. 10	97	99	100	99
% passing No. 20	89	92	100	83
% passing No. 40	76	79	99.9	54
% passing No. 100	50	54	95.8	22
% passing No. 200	38	46	74.0	15
Atterberg Limits				
Liquid Limit	20.0	46.6	35.7	NA
Plastic Limit	NA	32.5	22.2	NA
Plastic Index	NA	12.1	13.5	NA
Unified Soil Classification	SM-SC	ML-SM	CL	SM
Standard Proctor Density				
gm/cm^3			1.81	
lb/ft^3				
OMC %			15	
Permeability Cm/sc			2.85×10^{-8}	
"In Situ"				
Proctor Density				
3-Void				
Porosity			35.2	
Void Ratio			.544	
Dry Density			1.72	
% Saturation			107.90	
Moisture Content			22.1	
Specific Gravity			2.656	
Cation Exchange Capacity				
X-Ray Defraction				

AEHA Form 66 (One-Time), 1 Apr 81

LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26--0104-81 LOCATION Longhorn AAP

Bore Hole No.	7	7	7	8
Depth of Sample	3-6	8-10	13-15	5-9
Sample Type	MB	MB	MB	MB
Grain Size Analysis				
% passing No. 4	97	100	100	100
% passing No. 10	96	100	100	99.6
% passing No. 20	94	100	98	99.2
% passing No. 40	92	99	89	98.8
% passing No. 100	75	80	57	94.1
% passing No. 200	65	67	40	82.5
Atterberg Limits				
Liquid Limit	28.0	25.5	NA	31
Plastic Limit	19.9	NA	NA	19
Plastic Index	8.1	NA	NA	12
Unified Soil Classification	CL-ML	ML	SM	CL
Standard Proctor Density				
gm/cm^3	1.82			
lb/ft^3	113.3			
OMC	16.0			
Permeability Cm/sc	1.6×10^{-7}			7.37×1
"In Situ"				
Proctor Density				
3-Void				
Porosity	49.0			35.2
Void Ratio	0.97			.544
Dry Density	1.36			1.72
% Saturation	100			107.90
Moisture Content				22.1
Specific Gravity				2.656
Cation Exchange Capacity				
X-Ray Defraction				

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LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION [illegible]

Bore Hole No.	8			
Depth of Sample	11-15	15-20	20-25	5-
Sample Type	Bag	Bag	"	"
Grain Size Analysis				
% passing No. 4	98	100	100	99
% passing No. 10	97	99	99	99
% passing No. 20	97	98	95	98
% passing No. 40	95	89	87	96
% passing No. 100	85	72	73	8
% passing No. 200	78	60	65	7
Atterberg Limits				
Liquid Limit	20.5	29.8	25.8	18.8
Plastic Limit	17.7	26.0	23.1	18.8
Plastic Index	2.8	3.8	2.7	0.0
Unified Soil Classification	CL	ML	ML	CL
Standard Proctor Density				
gm/cm^3	1.86	1.82	1.87	1.86
lb/ft^3	116.1	113.9	116.7	116.0
OMC	13.5	14.2	13.8	13.0
Permeability Cm/sc	2.0×10^{-7}	3.6×10^{-7}	1.9×10^{-7}	5.9×10
"In Situ"				
Proctor Density				
3-Void				
Porosity	35.0	48.0	44.0	42.0
Void Ratio	0.53	0.91	0.77	0.73
Dry Density	1.76	1.41	1.52	1.57
% Saturation	107	97	98	99
Moisture Content				
Specific Gravity				
Cation Exchange Capacity				
X-Ray Defraction				

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LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION Longhorn AAP

Bore Hole No.	9	9	10	10
Depth of Sample	10-12	15-17	8-10	13-15
Sample Type	Bag	MB	Bag	MB
Grain Size Analysis				
% passing No. 4	100	100	99.8	100
% passing No. 10	99.9	100	99.5	99
% passing No. 20	99.7	99	99.2	99
% passing No. 40	99.6	94	99.0	95
% passing No. 100	95.9	63	91.4	74
% passing No. 200	77.3	44	62.1	59
Atterberg Limits				
Liquid Limit	29.5	NA	21.6	23.5
Plastic Limit	21.2	NA	18.4	18.4
Plastic Index	8.3	NA	3.2	5.1
Unified Soil Classification	CL	SM	ML	ML
Standard Proctor Density				
gm/cm^3				
lb/ft^3				
OMC				
Permeability Cm/sc	6.81×10^{-8}	2.2×10^{-6}	4.76×10^{-7}	
"In Situ"				
Proctor Density				
% Void				
Porosity	38.7	41.0	35.4	
Void Ratio	.632	0.71	.547	
Dry Density gm/cm³	1.63	1.57	1.71	
% Saturation	99.91	100	95.26	
Moisture Content	23.7		19.7	
Specific Gravity	2.663		2.647	
Cation Exchange Capacity				
X-Ray Defraction				

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LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-26-0104-81 LOCATION Longhorn AAP

Bore Hole No.	10	11	17
Depth of Sample	18-20	28-30	5-8
Sample Type	Bag	MB	Bag
Grain Size Analysis			
% passing No. 4	100	100	100
% passing No. 10	100	100	100
% passing No. 20	97	100	98
% passing No. 40	88	99.8	92
% passing No. 100	59	69.2	69
% passing No. 200	46	23.5	60
Atterberg Limits			
Liquid Limit	21.9	20.6	21.3
Plastic Limit	18.5	23.6	21.0
Plastic Index	3.4	0.0	0.3
Unified Soil Classification	SM-ML	SM	ML
Standard Proctor Density			
gm/cm^3		1.82	
lb/ft^3			
OMC		10.5	
Permeability Cm/sc	1.8×10^{-7}	2.69×10^{-6}	1.6×10^{-7}
"In Situ"			
Proctor Density			
3-Void			
Porosity	38.0	38.5	40.0
Void Ratio	0.60	.626	0.67
Dry Density	1.68	1.62	1.61
% Saturation	98	84.03	102
Moisture Content		20.0	
Specific Gravity		2.632	
Cation Exchange Capacity			
X-Ray Defraction			

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LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-28-0104-81 LOCATION Longhorn AAP

Bore Hole No.	17	17	17	18
Depth of Sample	10-14'	15-19'	30-40'	5-8'
Sample Type	Loose	Loose	Loose	Loose
Grain Size Analysis				
% passing No. 4	100	100	94	100
% passing No. 10	100	98	90	100
% passing No. 20	96	79	87	99
% passing No. 40	69	54	84	95
% passing No. 100	35	27	80	87
% passing No. 200	28	24	77	82
Atterberg Limits				
Liquid Limit	*NA	25.0	42.0	48.0
Plastic Limit	NA	25.0	34.0	27.1
Plastic Index	NA	0.0	8.0	20.9
Unified Soil Classification	SM	SM	OL	OLOH
Standard Proctor Density				
gm/cm^3	1.78	1.80	1.60	
lb/ft^3	110.8	112.6	99.9	
OMC	13.2	13.5	19.5	
Permeability Cm/sc 20°C	8.3×10^{-7}	1.2×10^{-6}	1.9×10^{-7}	
"In Situ"				
Proctor Density				
3-Void				
Porosity	0.41	0.39	0.53	
Void Ratio	0.71	0.65	1.12	
Dry Density g/cm^3	1.57	1.63	1.40	
% Saturation	87	95	89	
Moisture Content				
Specific Gravity				
Cation Exchange Capacity				
X-Ray Defraction				

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LABORATORY ANALYSIS OF SOIL

PROJECT NO. 38-28-0104-81 LOCATION Longhorn AAP

Bore Hole No.	18	18	19	19
Depth of Sample	15-17'	25-27'	10-12'	20-22'
Sample Type	Loose	Loose	Loose	Loose
Grain Size Analysis				
% passing No. 4	100	100	100	100
% passing No. 10	98	100	99	100
% passing No. 20	68	95	96	99
% passing No. 40	44	76	83	94
% passing No. 100	26	41	59	67
% passing No. 200	20	27	48	52
Atterberg Limits				
Liquid Limit	*NA	NA	22.8	22.2
Plastic Limit	NA	NA	20.9	NA
Plastic Index	NA	NA	1.9	NA
Unified Soil Classification	SM	SM	SM-ML	ML-SM
Standard Proctor Density				
gm/cm^3				
lb/ft^3				
OMC				
Permeability Cm/sc 20°C	2.0×10^{-7}		1.3×10^{-7}	
"In Situ"				
Proctor Density				
3-Void				
Porosity	0.36		0.45	
Void Ratio	0.56		0.82	
Dry Density g/cm^3	1.68		1.61	
% Saturation	103		94	
Moisture Content				
Specific Gravity				
Cation Exchange Capacity				
X-Ray Defraction				

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LABORATORY ANALYSIS OF SOIL

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PROJECT NO. 38-28-0164-81 LOCATION Longhorn AAP

Bore Hole No.	19	20	20	20
Depth of Sample	30-32'	5-7'	10-13'	15-18'
Sample Type	Loose	Loose	Loose	Loose
Grain Size Analysis				
% passing No. 4	100	100	100	100
% passing No. 10	100	99	99	98
% passing No. 20	99	82	79	77
% passing No. 40	94	63	59	58
% passing No. 100	75	44	35	39
% passing No. 200	60	37	28	34
Atterberg Limits				
Liquid Limit	*22.8	NA	*26.8	NA
Plastic Limit	**NA	NA	NA	NA
Plastic Index	NA	NA	NA	NA
Unified Soil Classification	ML (SM)	SM	SM	SM
Standard Proctor Density				
gm/cm^3				
lb/ft^3				
OMC				
Permeability Cm/sc 20°C		2.5x10-6		
"In Situ"				
Proctor Density				
3-Void				
Porosity		0.38		
Void Ratio		0.62		
Dry Density g/cm^3		1.59		
% Saturation		108		
Moisture Content				
Specific Gravity				
Cation Exchange Capacity				
X-Ray Defraction				

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for George C. Smith, CPT

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