

KAFB-0107 to KAFB-0121

DM-01 designated KAFB-0107 by USGS



SCIENCE APPLICATIONS, INC.
505 Marquette Avenue N.W.
Albuquerque, New Mexico 87102

BORING No. DM-01
DEPTH DRILLED 480 ft, BGS
SCREENED QTsf
FORMATION(S) _____

CLIENT Kirtland AFB
LOCATION Albuquerque, NM
PROJECT No. 1-220-06-351-33
SURVEY DATA (Coord.) 39989.91 ft E; 1470.29 ft N
TOP of PIPE ELEV. 5319.58 GROUND ELEV. 5318.42
(ft, MSL) (ft, MSL)

STATIC W.L. 420.7 ft, BGS;
10 Feb 84
DEVELOPMENT Bailed 75 hours
On 5 Jan 84 Pumped 8 hrs @
1gpm.

DRILLING
DRILLER Rodgers & Co RIG TYPE Gardner Denver 1000
START 22 December 1983 END 30 December 1983
BIT SCHEDULE 8 3/4" Retipped Soft Formation Tricone
0-480 ft, BGS
DRILLING FLUIDS Baroid "Quik Gel" Bentonite drilling
mud.

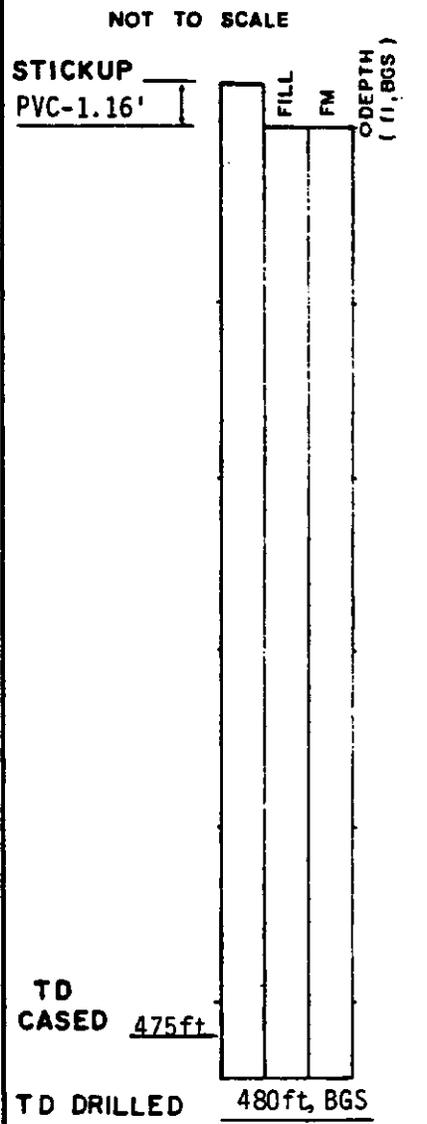
WATER ENCOUNTERED AT Approx. 430 ft. BGS

CONSTRUCTION
CASING SCHEDULE All casing flush threaded 5.5 inch OD
sch 40 PVC. 0-415 ft, solid; 415-465 ft, 0.020" slot
screen; 465-475 ft, solid; threaded end cap.

BACKFILL SCHEDULE 0-406 ft(?) natural material back-
fill; 406(?) -409 ft Bentonite pellet seal (20 lb), 409-
475 ft 10-20 Silica Sand (1700 lb), 475-480 ft caved.

GEOPHYSICAL LOGS _____
None

COMMENTS Locking steel cap set in concrete at well
head. See Lt. Col. Robinson (1606th ABW/SGPBF, KAFB)
ft, BGS=feet below ground surface



WELL CONSTRUCTION SUMMARY

E-3
AR 15

SAMPLE TYPE SYMBOL	DEPTH	DESCRIPTION	COMMENTS
P	0	CLAYEY SAND - light brown 5YR 5/5 with gravel (angular) tr. caliche	Drilling pad - disturbed and compacted.
P	2.5	SANDY CLAY - reddish light brown with gravel and lenses of clay with tr. organics	To 5 Ft. logged from mud pit excavation
C	10	SANDY SILT - reddish light brown poorly sorted with gravel, sand & clays gravel is granitic	
C	20	SANDY CLAY to CLAYEY SAND - moderate yellow brown 10YR 5/4, quartzose sand.	
C	30	SANDY CLAY/SILT - Light brown 5YR 4/5 sand is m-f grained, interbedded with arkosic(?) gravel to coarse sand.	
C	46	SANDY SILT - Moderate yellow brown 10YR 5/3, sand 15%, vf-f grained	
C	58	SANDY CLAY - Moderate brown 5YR 4/5 sand 5-10%, f. grained clays are plastic	65'-Loosing water-clays balling
CLIENT Kirtland AFB			SAI by <u>Culver</u>
LOCATION <u>Albuquerque, NM</u>			SHEET <u>1</u> of <u>5</u>
PROJECT No. <u>1-220-06-351-33</u>			BORING No. <u>DM-01</u>

CESA-DL-81

FIELD LOG

E-4

SAMPLE TYPE	SYMBOL	DEPTH	DESCRIPTION	COMMENTS
C		67	SILTY SAND - Moderate brown 5YR 4/4, sand f.-c. grained, with silty clay. Sand fraction granitic and cherty.	
C		80	Gradational change to coarse sand-fine gravel, fine sand and silt & clays to traces	
C		90	Gradational change to SILTY SAND sand averages m. grained, clay to v.f. sand fraction 30-40%.	
C		93	SANDY CLAY - Pale yellow brown 10YR 6/2. Plastic.	
C		96	CLAYEY SAND - Moderate yellow brown 10YR 6/4 with lenses of SANDY CLAY as at 93 ⁺ and coarse sand to gravel.	
C		123	SILTY SAND - Moderate yellow brown 10YR 5/4, gravelly, sand is well graded, coarse gr. fraction is granitic with chert and tr. micritic limestone.	
		130	Becomes interbedded with silty clays and average grain size to fine gravel-very coarse sand.	
		140	Gradational change to SANDY GRAVEL Quartz 30-40%, felds 10-20%, chert 30-40%, limestone 10%. Well graded to v.f. grained sand.	
CLIENT <u>Kirtland AFB</u>				SAI by <u>Culver</u>
LOCATION <u>Albuquerque, NM</u>				SHEET <u>2</u> of <u>5</u>
PROJECT No. <u>1-220-06-351-33</u>				BORING No. <u>DM-01</u>

CESA-DL-81

FIELD LOG

SAMPLE TYPE	SYMBOL	DEPTH	DESCRIPTION	COMMENTS
		143	SILTY SAND - average med-grained, m-w graded.	
				160' tr. pumice?
C		173	SANDY CLAY(?) - Yellow gray 5Y 7/2, sand 10%, fine grained.	
C		186	Gradational change to SILTY SAND - dark yellow brown 10YR 4/2, m-w graded, sand fraction is m-c grained, granitic and cherty	
C		200	Sand fraction decreases to m-f grained	
C		215	Sand fraction increases to m-c grained	
C		226	SILTY SAND - 5% c grained sand no color recorded. assume moderate yellow brown 10YR 5/2	partially indurated?
C		250	SILTY SAND - sand fraction is m-f grained with varying ammounts (10%) of coarse sand- gravel	reduce induration?
C		276	SANDY CLAY/SILT - moderate yellow brown 10YR 5/5, sand fraction averages f. grained and is cherty. Interbeds of m-c grained sand 2' thick @ 4' intervals.	
C		290	Gradational change to SILTY SAND pale yellow brown 1-YR 5-6/2. grain size averages m-f sand & ranges from clay to coarse gravel. W/ interbeds of SANDY CLAY/SILT as at (cont.)	
CLIENT Kirtland AFB				SAI by Culver
LOCATION Albuquerque, NM				SHEET 3 of 5
PROJECT No. 1-220-06-351-33				BORING No. DM-01

GES-A-DL-81

FIELD LOG

E-6

KAFB-0107 to KAFB-0121
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SAMPLE TYPE	SYMBOL	DEPTH	DESCRIPTION	COMMENTS
C		290	(cont.) 276 ft., 20% of 10' section	
C		310	Gradational change: Sandy Clay/Silt interbeds absent, grain size average to m-c grained, limestone 15-20% of sandy fraction.	
C		320	Grain size average to m-f grained.	
C		338	SANDY CLAY - pale yellow brown 1- YR 6/2, sand fraction f grained	
C		341	SILTY(?) SAND - dark yellow brown 10YR 5/4 with interbeds of silty sand (m-f grained) 6" thick @ 1.5 ft. intervals.	
C		370	Gradational change: sandy interbeds to 35-45% of section and grain size increases to m-c grained	increase induration
C		380	Gradational change=sandy interbeds to 25% of section	
C		386	SILTY(?) SAND - average grain size is m grained, well graded.	
C		389	SANDY SILT - moderate yellow brown 10YR 5/4	
C		391	SILTY SAND - average grain size is m grained well graded	
CLIENT <u>Kirtland AFB</u>				SAI by <u>Culver</u>
LOCATION <u>Albuquerque, NM</u>				SHEET <u>4</u> of <u>5</u>
PROJECT No. <u>1-220-06-351-33</u>				BORING No. <u>DM-01</u>

CESA-DL-81

FIELD LOG

E-7

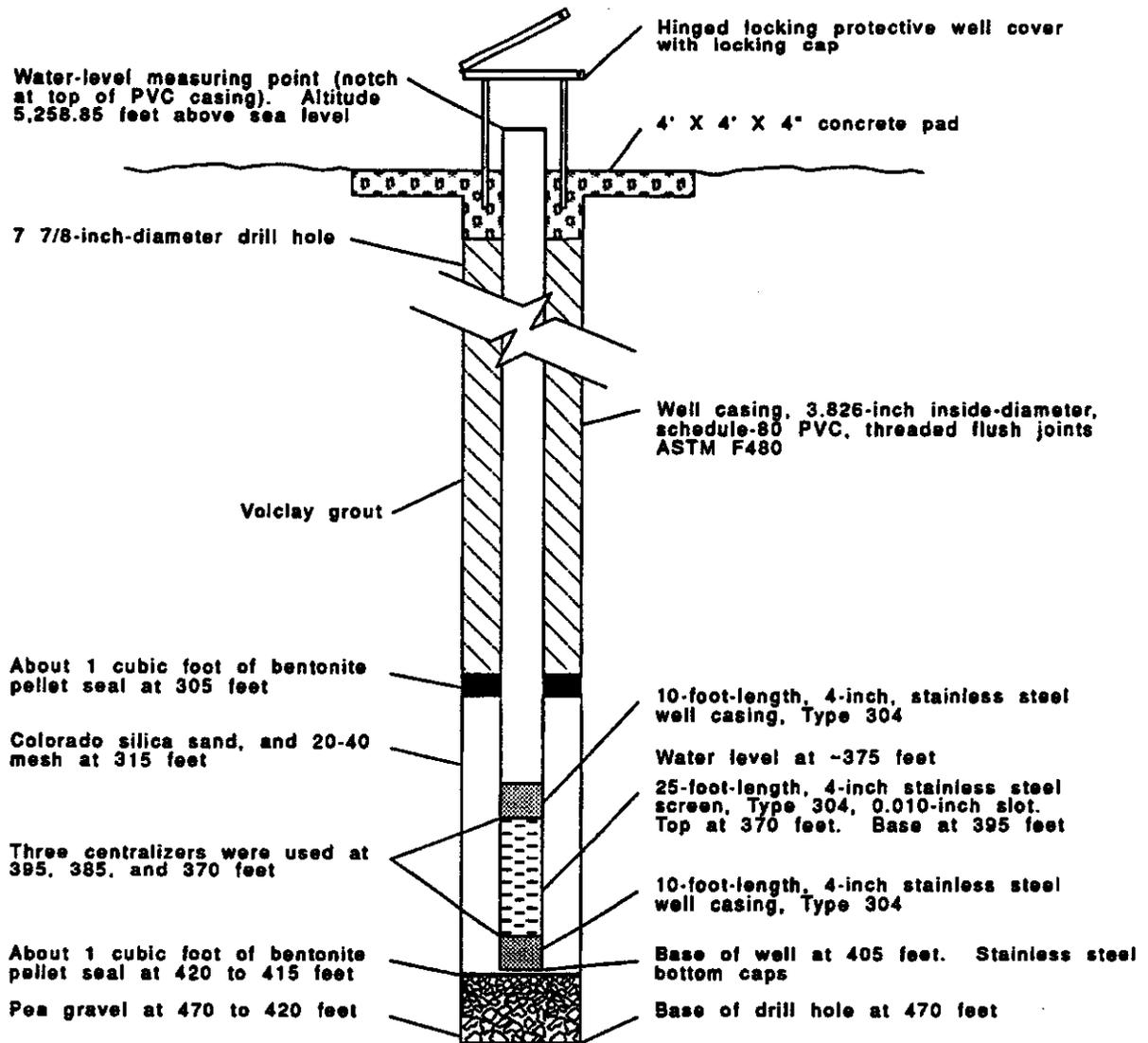
SAMPLE TYPE	SYMBOL	DEPTH	DESCRIPTION	COMMENTS
C		393	SANDY CLAY(?) - moderate yellow brown 10YR 5/4	increase induration
				400 ft - mud sample taken ^Q 13:51;12/27/83. Sample destroyed in storage by container failure. No analysis forthcoming.
C		410	SANDY SILT - pale yellow brown 10YR 6/2, sand fraction is c-f grained, quartzose, with 10% K-spar. Interbedded with traces of CLAY, pale red 1-YR 6/2	40 ft. decrease induration
C		420	Gradational Change of sand fraction to m-f grained.	
C		430	Gradational Change of coarse sand and gravel to 10-15%	435 drilling mud thinning
C		460	SANDY SILT with traces of gravel	
C		480	SANDY SILT pale yellow brown 10YR 6/2, sand fraction is c-m grained	TD: 480 ft. BGS Cuttings settled to 475 ft. BGS
CLIENT <u>Kirtland AFB</u>				SAI by <u>Culver</u>
LOCATION <u>Albuquerque, NM</u>				SHEET <u>5</u> of <u>5</u>
PROJECT No. <u>1-220-06-351-00</u>				BORING No. <u>DM-01</u>

CESA-DL-81

FIELD LOG

E-8

KAFB-0107 to KAFB-0121
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NOT TO SCALE

Well-completion diagram for monitoring well KAFB 0110. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 08-31-91, completed on 09-03-91. Well drilled using mud rotary method with Wyoming sodium bentonite drilling fluid. All depths are in feet below land surface.

KAFB-0110

AR 1710

1710

Borehole Log

Project name: Kirtland Air Force Base - Phase II, Stage 2A . Sheet 1 of 7
 Project number: 463536001 Site: 1
 Borehole number: KAFB0110 Location: Landfill 1, Kirtland AFB Elevation:
 Drilling Company: USGS Drilling crew: Art Clark, Dan Sweney, Jeff Eman, John Palmer
 Date started: 11 May 91 Date completed: 15 May 91 Total Depth: 100 ft.
 Drilling method: Hollow stem augering Drilling Fluid: N/A
 Borehole diameter: 7-7/8"
 Drilling equipment: Gardner-Denver 17W
 Logged by: Abeyta & Dam Sample type:

Date	Time	Depth (Feet)	Drilling Speed (Min./ft)	Lithology and Remarks
11 May 91	1045	0-2		(2 ft. recovered) Upper 12 inches fine sand; sub-rounded - sub-angular ~ 1% pebbles < 10 mm, 5YR 6/4 light brown. Middle 3 inches silty sand, 5YR 4/4 moderate brown slightly moist, w/ pebbles ~ 1% < 17 mm. Lower 12 inches, fine-medium sand 10YR 6/2 pale-yellowish brown, very slightly moist w/caliche prominent.
11 May 91	1223		Began drilling	- moved to new hole ~ 4 ft west of above hole.
11 May 91	1537	0-3		(3 ft. recovered) Upper 15 inches sand, vf-fg w/pebbles < 2 cm, < 1%, 5YR 6/4 light brown sub-rounded - sub-angular. Next 3 in. silty sand vfg-fg 5YR 5/6 light brown, very slight moist. Next 4 inches, sand vfg-fg w/pebbles < 2.0 cm ~ 1% light brown 5YR5/6 dry. Lower 15 in. silty sand vfg-fg, biotite, 5YR5/6, well sorted, slightly moist.
	1600	3-6	sampled @ 5 ft.	(2.5 ft recovered) sand/silty, vfg-fg w/pebbles < 1% gravel < 4 cm, 5YR5/6. Lower 8 in. 5YR6/4 light brown same as above but visible caliche, caliche modules. Roots & organics at about 5-5.5 ft. interval.
11 May 91	1650	6-9		(3.0 ft. recovered) sand, medium grained, well sorted, quartz, w/coarse sand & pebbles, < 3% pebbles < 10 mm, very slightly moist. Light brownish gray quartz sand.
	1725	9-12		(33 inches recovered) Upper 8 inches - sand, medium grained w/coarse sand and pebbles < 1% < 4 mm, well sorted, sub-rounded, quartz. Lower 23 inches, sand, medium grained, well sorted w/ < 1% pebbles. Light brownish gray quartz sand. Slightly moist. Lower 2 inches sand medium - vfg, sub-rounded - well rounded. Consolidated, caliche, thin organic lenses, coarse sand & pebbles < 7%, pebbles < 5 mm.

A-1

AR 1710

Borehole Log

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 2 of 7
 Project number: 463536001 Site: 1
 Borehole number: KAFB0110 Location: Landfill 1, Kirtland AFB Elevation:
 Drilling Company: USGS Drilling crew: Art Clark, Dan Sweney, Jeff Eman, John Palmer
 Date started: 11 May 91 Date completed: 15 May 91 Total Depth: 100 ft.
 Drilling method: Hollow stem augering Drilling Fluid: N/A
 Borehole diameter: 7-7/8"
 Drilling equipment: Gardner-Denver 17W
 Logged by: Abeyta & Dam Sample type:

Date	Time	Depth (Feet)	Drilling Speed (Min./ft)	Lithology and Remarks
	1755	12-15.25	sampled @ 14'	(3'3" recovered) Sand, medium grained, well sorted quartz sand w/pebbles & gravel throughout ~ 2%, sub-rounded to well rounded, ≤ 4 cm, included volcanic (tuff) gravel, at ~ 13' well consolidated lense of sand w/ vcg w/10YR 6/6. Dark yellowish orange distinct color (lense is about 1/2 inch thick ~ 2 inches above lense is a distinct lense ~ 1/4 in. thick of black, possible organic, material w/possibly precipitate material. Same type material found at 14 ft (lense ~ 3 in. thick) w/ large white nodule ~ 2.5 inch long - possible precipitate very light weight - barrel cut through nodule. This section was sampled. Slightly moist.
	1530	15.25-18		(35 inches recovered) Upper 6 inches, sandy clay vfg-fg w/ silt w/caliche nodules ≤ 2 in. R5/4 pale reddish brown. Lower 29 in. silty sand, vf-fg, well sorted, 5YR8/4 moderate orange pink, compacted, very slightly moist.
11 May 91	0800 0827	18-20		Began drilling (27 inches recovered) Upper 10 inches sand w/clay, vf-f grained, 10YR5/4 moderate yellowish brown, caliche; Lower 17 inches - sandy clay, sand is fg-vfg, clay is very compact & lower end is very hard, caliche 10YR 5/4 moderate yellowish brown, slightly moist except at bottom in shoe-very dry & hard.
	0933 0957			Added 4 gallons water to side of hole at surface. Added ~ 1 gallon water to side of hole at land surface.
12 May 91	1008	20-23		(38 inches recovered) Upper 2 inches same as above w/ roots, organics. Lower 3 ft sand w/clay, vfg-fg, more sand in lower 1 ft. 10YR 5/4, moderate yellowish brown, slightly moist except for top 2 inches.

A-2

Borehole Log

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 3 of 7
 Project number: 463536001 Site: 1
 Borehole number: KAFB0110 Location: Landfill 1, Kirtland AFB Elevation:
 Drilling Company: USGS Drilling crew: Art Clark, Dan Sweney, Jeff Eman, John Palmer
 Date started: 11 May 91 Date completed: 15 May 91 Total Depth: 100 ft.
 Drilling method: Hollow stem augering Drilling Fluid: N/A
 Borehole diameter: 7-7/8"
 Drilling equipment: Gardner-Denver 17W
 Logged by: Abeyta & Dam Sample type:

Date	Time	Depth (Feet)	Drilling Speed (Min./ft)	Lithology and Remarks
	1048	23-26.5	sample at 25 ft	(38 inches recovered) Upper 10 inches sand w/clay, vfg -cg, pebbles < 1% sub-angular 10YR5/4 moderate yellowish brown. Middle 10 inches sand f-cg w/ < 1% pebbles, well sorted quartz sand, brownish gray. Lower 18 inches sandy clay, vfg-fg, 5YR 4/4 moderate brown, slightly moist.
			Note	Added ~ 2 gallons water at side of hole at surface.
		1138	26.5-30	(44 inches recovered) Upper 15 inches sand, vfg-fg, well sorted, some clay, 10YR 7/4 grayish orange. Distinct color change w/ break showing ~ 45 degree angle (slope) w/~ 1/2 inch vf-mg sand well sorted. Middle 21 inches sand vf - med grained quartz sand well sorted 5Y 6/4 dusky yellow. Lower 8 inches fine -cg sand, well sorted, sub-angular to sub-rounded, quartz sand, also dusky yellow - mostly medium sandy, slightly moist.
	1220	30-34		(4 ft recovered) Sand, medium grained, some fine and coarse throughout. Pebbles < 8 mm < 1% 10YR 4/2 dark yellowish brown, moist, sub-rounded.
12 May 91	1300	34-38		(45 inches recovered) Upper 40 inches sand medium grained, well sorted lenses of very coarse sand at 12-15 inches from top of core & 32-35 in from top of core, sub-rounded to rounded. Lower 5 inches sandy clay, vfg-fg, 5YR 4/4 moderate brown. Very clean break at contact between upper & lower. Moist.
	1350	38-41		(30 inches recovered) Silty sand w/clay, very compact & tightly consolidated vfg-fg, root casts 10YR 5/4 moderate yellowish brown, very slightly moist. Caliche.

A-3

Borehole Log

Project name: Kirtland Air Force Base - Phase II, Stage 2A . Sheet 4 of 7
 Project number: 463536001 Site: 1
 Borehole number: KAFB0110 Location: Landfill 1, Kirtland AFB Elevation:
 Drilling Company: USGS Drilling crew: Art Clark, Dan Sweney, Jeff Eman, John Palmer
 Date started: 11 May 91 Date completed: 15 May 91 Total Depth: 100 ft.
 Drilling method: Hollow stem augering Drilling Fluid: N/A
 Borehole diameter: 7-7/8"
 Drilling equipment: Gardner-Denver 17W
 Logged by: Abeyta & Dam Sample type:

Date	Time	Depth (Feet)	Drilling Speed (Min./ft)	Lithology and Remarks
	1423	41-45		(50 inches recovered) Upper 14 inches silty sand w/ clay, & caliche, vfg-fg 10 YR5/4 moderate yellowish brown. Next 2 inches sand lense vfg-fg, well sorted 10YR 5/4. Middle 11 inches silty sand w/ clay, vfg-fg, 5YR4/4 moderate brown. Lower 23 inches sand, medium grained, well sorted, grayish brown quartz sand. Slightly moist.
	1510	45-48.5		(42 inches recovered) Sand, med. grained quartz sand, sub-angular - sub-rounded w/ vf-fg saved in upper 1 foot and < 1% pebbles & gravel. Gravel more prominent in lower 12 inches ≤ 4 cm. Moist.
12 May 91	1545	48.5-53	sampled @ ~ 50	(18 inches recovered) Sand, medium grained, well sorted w/ gravel especially in lower 1 ft. < 1% < 4 cm, Moist. Quartz, grayish brown. Drillers say sand did not fall out of shoe. It may have been pushed aside.
	1633	53-56		(3 ft recovered) Sand, medium grained, well sorted, sub-rounded - sub-angular, w < 1% pebbles. Gravel/pebble & coarse sand zone from 54-55', < 2%, gravel ≤ 4 cm & sub-rounded - sub-angular moist. Grayish brown quartz sand. Moist.
	1726	56-58.5		(32 inches recovered) same as 53-56.
	1818	58.5-63		(22 inches recovered) Sand, medium-coarse grained, well sorted, sub-rounded - sub-angular, w < 1% pebbles < 5 mm, quartz, grayish brown. Moist.
13 May 91	0818			Began drilling.
	0835			1 gallon water added to side of hole at land surface.
	0850			5 gallons water added to side of hole at land surface.

Borehole Log

Project name: Kirtland Air Force Base - Phase II, Stage 2A . Sheet 5 of 7
 Project number: 463536001 Site: 1
 Borehole number: KAFB0110 Location: Landfill 1, Kirtland AFB Elevation:
 Drilling Company: USGS Drilling crew: Art Clark, Dan Sweney, Jeff Eman, John Palmer
 Date started: 11 May 91 Date completed: 15 May 91 Total Depth: 100 ft.
 Drilling method: Hollow stem augering Drilling Fluid: N/A
 Borehole diameter: 7-7/8"
 Drilling equipment: Gardner-Denver 17W
 Logged by: Abeyta & Dam Sample type:

Date	Time	Depth (Feet)	Drilling Speed (Min./ft)	Lithology and Remarks
	0909	63-63.5		(16 inches recovered) About 10 inches slough. Upper 13 inches same as 63-63.5. Lower 3 inches sandy clay, f-vcg w <1% pebbles & gravel ≤ 5 cm, 5YR4/4 moderate brown, slightly moist.
	1005	63.5-67		(3.5 ft recovered) Sand, med-coarse grained, quartz sand, gravel in upper 2 ft. ≤ 1% < 3 cm, sub-angular -sub-rounded, moist, grayish brown color.
	1100	67-71		(49 in. recovered) Same as above w/ gravel < 3 cm < 1% throughout core, moist.
	1218	71-74.5		(41 in. recovered) Pinkish gray 5YR 8/1 to light brownish gray 5YR 6/1 to light brownish gray 5YR 6/1 sand, med-coarse grained quartz sand in upper 26 inches; grades to same sand with 10% gravel ≤ 2 cm sub-rounded, moist.
	1420	74.5-77.5		(3 ft. recovered) Sand, med-vcg, w/pebbles & gravel ~ 5% ≥ 6 cm. Gravel & pebbles more prominent in middle 1 ft. sub-rounded, moist, grayish brown.
	1530	77.5-82	sampled at 80.5 ft.	(53 in. recovered) Sand, med-vcg, w/pebbles & gravel < 3%, ≤ 6 cm, poorly sorted. Clay nodule 13 inches from top, 10YR 6/6 dark yellow orange w/sand vfg-fg.
13 May 91	1530	77.5-82	sampled at 80.5	Clay lense 37 inches from top, 10YR 5/4 moderate yellowish brown, very compact w/vfg-fg sand. Sand gets finer at bottom 1 ft. and more angular. Pebbles & gravel subangular to rounded. Pebble in second clay lense collected has green precipitate-yellow orange & white crystalline material also collected for analysis.

Borehole Log

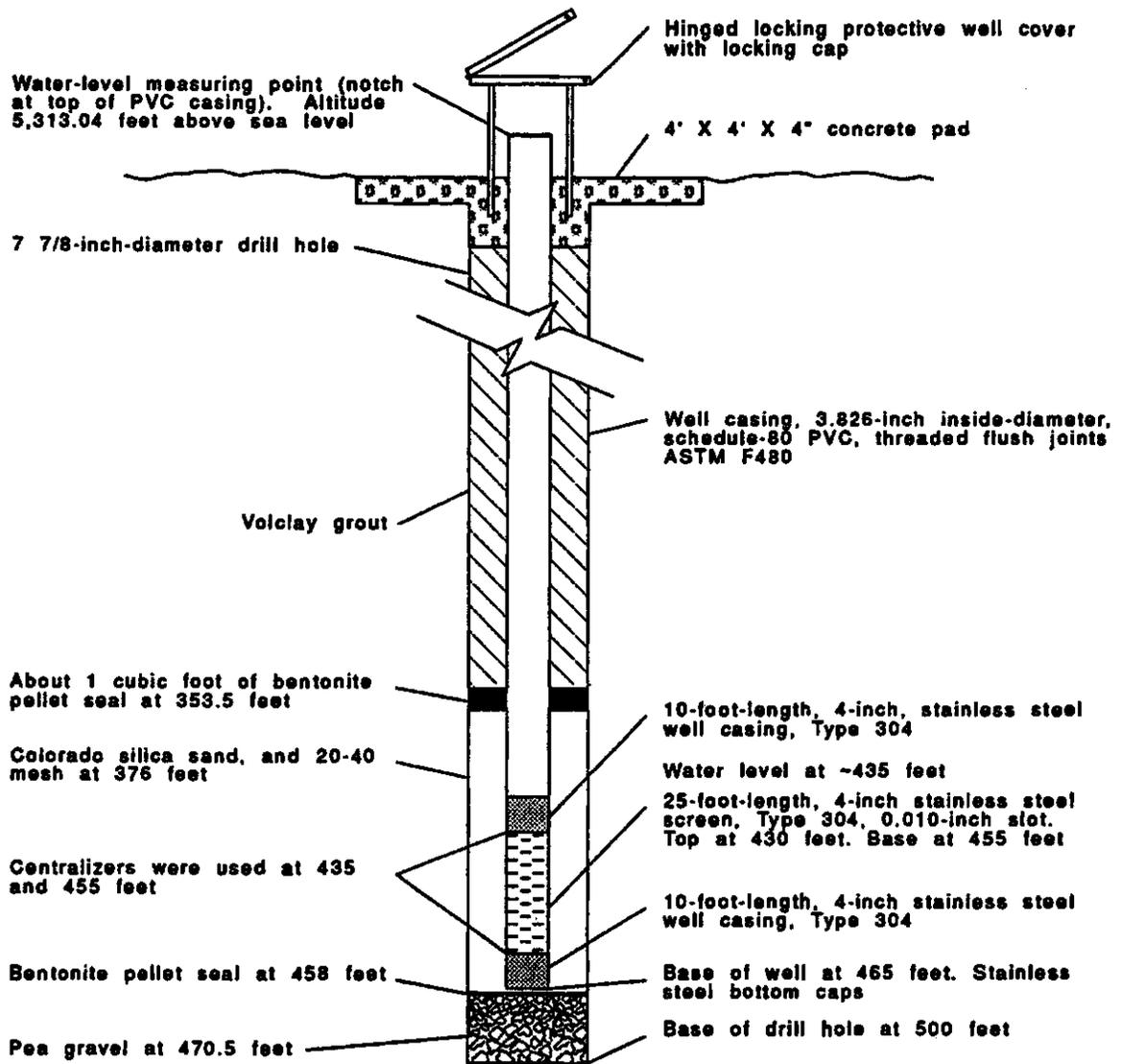
Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 6 of 7
 Project number: 463536001 Site: 1
 Borehole number: KAFB0110 Location: Landfill 1, Kirtland AFB Elevation:
 Drilling Company: USGS Drilling crew: Art Clark, Dan Sweney, Jeff Eman, John Palmer
 Date started: 11 May 91 Date completed: 15 May 91 Total Depth: 100 ft.
 Drilling method: Hollow stem augering Drilling Fluid: N/A
 Borehole diameter: 7-7/8"
 Drilling equipment: Gardner-Denver 17W
 Logged by: Abeyta & Dam Sample type:

Date	Time	Depth (Feet)	Drilling Speed (Min./ft)	Lithology and Remarks
	1700	82-86		(51 inches recovered) Medium grained sand, well sorted grades to med-coarses and at lower 1 ft. Clay nodules 2.5 ft. Veins of 10YR 6/6 dark yellowish orange through 83 - 84.5 ft - silty sand. Silty clay nodule/lense 5 YR 4/4 Moderate brown at 84 ft, core barrel cut through nodule/lense - not continuous through diameter of barrel. Pebbles throughout core < 1% ≤ 2 cm; sand & pebbles sub-angular to sub-rounded, Moist.
14 May 91	0955	86-87.5		Lost core barrel in hole.
15 May 91	1430	86-87.5		Retrieved core barrel. (25 inches recovered) Core barrel free fell from about 30 ft above bottom of hole and jammed into ground which probably accounts for the extra sample. Sand, m-vcg w/<1% pebbles ≤ 2.5 cm sub-angular to sub-rounded, 2 cm clay nodules in upper core, soft, poorly sorted, moist, grayish brown, quartz sand.
	1545	87-5-91.5		Began drilling.
	1610	87.5-90.5		(41 inches recovered) Extra sample may still be slough from reaming. Sand, m-vcg w/<3% pebbles & gravel < 4 cm, sub-angular to sub-rounded, poorly sorted, moist, grayish brown quartz sand.
	1657	90.5-93.5		(39 in. recovered) Sand med-vcg w/<1% pebbles ≤ 1 cm sub-rounded to sub-angular. Vcg sand increases 20-23 inches from top of core. Grades to medium -cg and then to medium sand at lower 6 inches, fairly well sorted, moist, grayish brown quartz sand.
	1715	93.5	Note	1 liter deionized water added inside auger.

Borehole Log

Project name: Kirtland Air Force Base - Phase II, Stage 2A . Sheet 7 of 7
Project number: 463536001 Site: 1
Borehole number: KAFB0110 **Location:** Landfill 1, Kirtland AFB **Elevation:**
Drilling Company: USGS **Drilling crew:** Art Clark, Dan Sweney, Jeff Eman, John Palmer
Date started: 11 May 91 **Date completed:** 15 May 91 **Total Depth:** 100 ft.
Drilling method: Hollow stem augering **Drilling Fluid:** N/A
Borehole diameter: 7-7/8"
Drilling equipment: Gardner-Denver 17W
Logged by: Abeyta & Dam **Sample type:**

Date	Time	Depth (Feet)	Drilling Speed (Min./ft)	Lithology and Remarks
	1747	93.5-97		(45 inches recovered) Upper 13 inches, sand, med-vcg, dominant vcg, w/<1% pebbles ≤ 2 mm, sub-rounded - angular, poorly sorted. Next 16 inches med-grained, well sorted, sub-angular - silty clay nodule 3 inches from top of med sand w/ numerous root casts (hollow) very hard, brittle, 10YR 5/4 moderate yellowish brown. Lower 16 inches - sand, m-vcg, poorly sorted, w/ <1% pebbles ≤ 3 mm, sub-angular. Moist, sands are quartz grayish brown.
	1630	97-100	Sample @ 99 ft.	(38 inches recovered) Sand m-vcg, well sorted, < 1% pebbles ≤ 2.5 mm, sub-rounded to sub-angular, grayish brown quartz sand, moist.



NOT TO SCALE

Well-completion diagram for monitoring well KAFB 0111. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 09-11-91, completed on 09-15-91. Well drilled using mud rotary method with Wyoming sodium bentonite drilling fluid. All depths are in feet below land surface.

KAFB-0111

AR 1710

Borehole Log
KAFB0111

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 1 of 7
Project number: 463536001	Site: Landfill I
Drilling Company: USGS	Location: Northeast Corner Surface Elevation:
Date Started drilling: 09 Sep 91	Drilling Crew: Dan Sweney, John Palmer
Drilling Method: Mud rotary	
Borehole diameter: 7 7/8	Date completed drilling: 15 Sep 91 Total Depth: 500 ft
Drilling equipment: Gardner-Denver17w	Drilling Fluid: Betonite mud
Logged by: Roybal, Gebhardt	Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
11-Sep-91	1450	100-105	Silt with some small pieces of clay, mg-cg sand, (variegated coloration) and some small gravel (pebbles up to 1 cm. in diameter).
11-Sep-91		105-110	Predominately vcg sand, (traces of silt, no clay), and angular-rounded pebbles. Several pieces about 1 cm. diameter.
11-Sep-91		110-115	Cg-vcg sand with pebbles, similar to above. Variegated coloration and minerals. Only slight trace of silt.
11-Sep-91		115-120	Same as above, only no silt observed. Seems to be higher percentage of quartz.
11-Sep-91		120-125	Same as above, except overall composition appears slightly coarser than previously (more vcg sand).
11-Sep-91		125-130	Predominately pebbles 2-10 mm diameter. Some vcg sand. Mineralogy still variegated as before. Overall composition is notably coarser than before (no silt or clay).
11-Sep-91	130-135		Vcg sand and pebbles, 2-15 mm diameter. Overall appearance similar to 120 ft-125 ft, (more c-vcg sand than previous interval) traces of silt. Rounded-subangular and fractured pieces predominate.
11-Sep-91	135-140		Same as above.
11-Sep-91	140-145		Same as above.
11-Sep-91	145-150		Very similar to previous interval, with slightly more silt.
11-Sep-91	150-155		Same as above, only slightly more silt than before. (Still predominately vcg sand and granules (occasional pebbles up to 10 mm diameter).
11-Sep-91	1550	155-160	Cg-vcg sand and pebbles up to 10 mm diameter. Some silt (almost to the consistency of clay).

AR 170

**Borehole Log
KAFB0111**

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 2 of 7
Project number: 463536001	Site: Landfill I
Drilling Company: USGS	Location: Northeast Corner
Date Started drilling: 09 Sep 91	Surface Elevation:
Drilling Method: Mud rotary	Drilling Crew: Dan Sweney, John Palmer
Borehole diameter: 7 7/8	Date completed drilling: 15 Sep 91
Drilling equipment: Gardner-Denver17w	Total Depth: 500 ft
Logged by: Roybal, Gebhardt	Drilling Fluid: Betonite mud
	Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
11-Sep-91		160-165	Lots of silt (almost clay-like feel). Variegated m-vcg sand. Traces of small pebbles.
11-Sep-91		165-170	Same as above (possibly less sand).
11-Sep-91		170-175	Mg-vcg sand. Some small pebbles. Still has a lot of silt, with some clay.
11-Sep-91		175-180	Vcg sand and an abundance of small pebbles (angular-subrounded) up to 10 mm diameter, less silt than previous interval. Traces of clay (particles have large amounts of andesite and pinkish feldspar)
11-Sep-91		180-185	Predominately silty clay (balls up readily), and small pebbles (2-5 mm diameter). Some sand.
11-Sep-91		185-190	Mg-vcg sand, a few small pebbles, some silt, a few small pieces of clay.
11-Sep-91		190-195	Sand, fg-cg. Some vcg sand, some small pebbles, a lot of silt with a few clay pieces (bottom of interval had more vcg sand, less silt and clay).
11-Sep-91		200-205	Cg-vcg sand, large amount of small pebbles (wellrounded-subangular, largely andesite), many pebbles 10-12 mm diameter. Traces of silt, no clay.
11-Sep-91		205-210	Cg-vcg sand, some small pebbles (fewer than previous interval), slightly higher quartz content. Some silt.
11-Sep-91		210-215	Same as above.
11-Sep-91	1700	215-220	Vcg sand, small pebbles (similar to previous interval). However, this interval has large numbers of clay and silt pieces.

Borehole Log
KAFB0111

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 3 of 7
Project number: 463536001	Site: Landfill I
Drilling Company: USGS	Location: Northeast Corner Surface Elevation:
Date Started drilling: 09 Sep 91	Drilling Crew: Dan Sweney, John Palmer
Drilling Method: Mud rotary	
Borehole diameter: 7 7/8	Date completed drilling: 15 Sep 91 Total Depth: 500 ft
Drilling equipment: Gardner-Denver17w	Drilling Fluid: Betonite mud
Logged by: Roybal, Gebhardt	Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
11-Sep-91	1715	220-225	Predominately vcg sand, a few small pebbles (generally less than 4 mm diameter). Subrounded-angular. Small amount of silt and clay.
11-Sep-91		225-230	Fg-cg sand, traces of small pebbles. Large amount of silt and clay.
11-Sep-91		230-235	Same as above.
11-Sep-91		235-240	Mg-vcg sand, trace of very small pebbles, some silt, no clay.
11-Sep-91		240-245	Mg-vcg sand, several small pebbles, a few larger pebbles, up to 10 mm diameter (mostly subrounded and fractured), large amounts of silt, several pieces of clay.
11-Sep-91		245-250	Similar to previous interval, only with slightly less silt.
11-Sep-91		250-255	Cg-vcg sand, large amounts of small pebbles (up to 4 mm diameter), several larger pebbles (6-8 mm diameter). Traces of silt, no clay.
11-Sep-91		255-260	Cg-vcg sand, many pebbles up to 10 mm (well rounded-angular and fractured) (generally much coarser consistency than previous few intervals). Slight trace of silt, no clay.
11-Sep-91		260-265	Similar to previous interval with slightly fewer of the larger pebbles. Several pieces of clay.
11-Sep-91		265-270	Similar to previous interval, only no clay.
11-Sep-91		270-275	Predominately "granules" (2-4 mm diameter), many larger pebbles (up to 10 mm diameter), lots of vcg sand, several small pieces of clay, trace of silt.
11-Sep-91	1848	275-280	Pebbles up to 12 mm diameter (8-10 mm very common), vcg sand, small traces of clay, no silt.
11-Sep-91		280-285	Similar to previous interval, only small traces of silt, no clay.

Borehole Log
KAFB0111

Sheet 4 of 7

Project name: Kirtland Air Force Base - Phase II, Stage 2A
 Project number: 463536001
 Drilling Company: USGS
 Date Started drilling: 09 Sep 91
 Drilling Method: Mud rotary
 Borehole diameter: 7 7/8
 Drilling equipment: Gardner-Denver17w
 Logged by: Roybal, Gebhardt

Site: Landfill I
 Location: Northeast Corner
 Surface Elevation:
 Drilling Crew: Dan Sweney, John Palmer

Date completed drilling: 15 Sep 91
 Total Depth: 500 ft
 Drilling Fluid: Betonite mud
 Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
11-Sep-91		285-290	Vcg sand and "granules" (2-4 mm diameter). Traces of pebbles up to 8 mm diameter. Many small "pieces" of silt, trace of clay.
11-Sep-91		290-295	Same as above.
11-Sep-91		295-300	Similar to previous interval, only many more pieces of a "silty clay".
12-Sep-91		300-305	Vcg sand and granules (2-4 mm diameter), trace of silt, a few larger pebbles (up to 10 mm diameter).
12-Sep-91		305-310	Primarily granules, small pebbles (4-7 mm diameter), still significant amounts of vcg sand. Trace of silt.
12-Sep-91	1145	310-315	Same as above.
12-Sep-91		315-320	Same as above.
12-Sep-91		320-325	Granules and small pebbles predominate. Pebbles typically range from 4-6 mm diameter, but several are up to 8 mm diameter, subrounded-angular. Variegated mineral and color composition (as have been all samples thus far, on this hole). Some silt also present.
12-Sep-91		325-330	Granules as above. Very similar to previous interval, only lower percentage of pebbles (overall finer composition). Some silt, some vcg sand.
12-Sep-91		330-335	Cg-vcg sand, some granules and small pebbles (4-8 mm diameter), subrounded-angular, some silt.
12-Sep-91		335-340	Cg-vcg sand. Lower percentage of granules and pebbles than previous interval. Trace of silt.
12-Sep-91		340-345	Predominately granules (2-4 mm diameter), vcg sand, a few small pebbles (4-8 mm diameter). Traces of a silty clay.

Borehole Log
KAFB0111

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 5 of 7
 Project number: 463536001 Site: Landfill I
 Drilling Company: USGS Location: Northeast Corner Surface Elevation:
 Date Started drilling: 09 Sep 91 Drilling Crew: Dan Sweney, John Palmer
 Drilling Method: Mud rotary
 Borehole diameter: 7 7/8 Date completed drilling: 15 Sep 91 Total Depth: 500 ft
 Drilling equipment: Gardner-Denver17w Drilling Fluid: Betonite mud
 Logged by: Roybal, Gebhardt Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
12-Sep-91		345-350	Vcg sand and granules, silt, traces of small pebbles.
12-Sep-91		350-355	Same as above.
12-Sep-91		355-360	Very similar to previous interval, only now has slightly more silt, and small amount of a silty clay.
12-Sep-91		360-365	Very similar to previous interval (predominately vcg sand and granules, a few small subrounded-angular and fractured pebbles, some silt, and a small amount of silty clay).
12-Sep-91		365-370	Similar to above, more mg-vcg sand than previously. Only very slight trace of clay (less silt than before).
12-Sep-91		370-375	Cg-vcg sand, granules (slightly lower percentage than previous interval), pebbles (typically 4-6 mm diameter), silt, very slight trace of clay.
12-Sep-91		375-380	Vcg sand and granules (2-4 mm diameter), large amount of clay, trace of silt, small pebbles (4-6 mm diameter).
12-Sep-91	1400	380-385	Same as above.
12-Sep-91		385-390	Very similar to previous interval with slightly more silt and slightly less clay.
12-Sep-91		390-395	Granule-sized particles (2-4 mm diameter) predominate. Also has a large amount of vcg sand and small pebbles (up to 10 mm diameter). Several pieces of reddish brown clay, small amount of silt.
12-Sep-91		395-400	Fg-vcg sand (good mix), granules, and pebbles. Small pebbles (4-8 mm diameter) seem to comprise bulk of sample. Small amount of silt, trace of clay.
12-Sep-91		400-405	Vcg sand, granules, and small pebbles. Sample now has a very large amount of silt.

**Borehole Log
KAFB0111**

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 6 of 7
Project number: 463536001	Site: Landfill 1
Drilling Company: USGS	Location: Northeast Corner
Date Started drilling: 09 Sep 91	Surface Elevation:
Drilling Method: Mud rotary	Drilling Crew: Dan Sweney, John Palmer
Borehole diameter: 7 7/8	Date completed drilling: 15 Sep 91
Drilling equipment: Gardner-Denver17w	Total Depth: 500 ft
Logged by: Roybal, Gebhardt	Drilling Fluid: Betonite mud
	Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
12-Sep-91		405-410	Majority of sample is a brownish silt. Small amount of vcg sand and granules. A few small pebbles, a few small pieces of a silty clay.
12-Sep-91		410-415	Predominately vcg sand and granules, some silt as in previous interval. A few small pebbles.
12-Sep-91		415-420	Large amount of silt and silty clay. Still quite a bit of vcg sand and granules. A few small pebbles.
12-Sep-91		420-425	Predominately silt and silty clay, some sand (a mixture of sizes) and some granules.
12-Sep-91		425-430	Vcg sand and granules. Still quite a bit of silt and silty, as in previous interval. A few small pebbles.
12-Sep-91		430-435	Same as above.
12-Sep-91		435-440	Same as above.
12-Sep-91		440-445	Vcg sand and granules, as in previous interval. However, now has a large amount of greenish brown clay. Some silt.
12-Sep-91		445-450	Predominately cg-vcg sand and silt. Trace amounts of granules and clay. Pebble-sized particles virtually non existent.
12-Sep-91		450-455	Cg-vcg sand. Large amounts of granules. Some silt, and trace amounts of clay and pebbles.
12-Sep-91		455-460	Same as above.
12-Sep-91		460-465	Same as above.
12-Sep-91		465-470	Same as above.

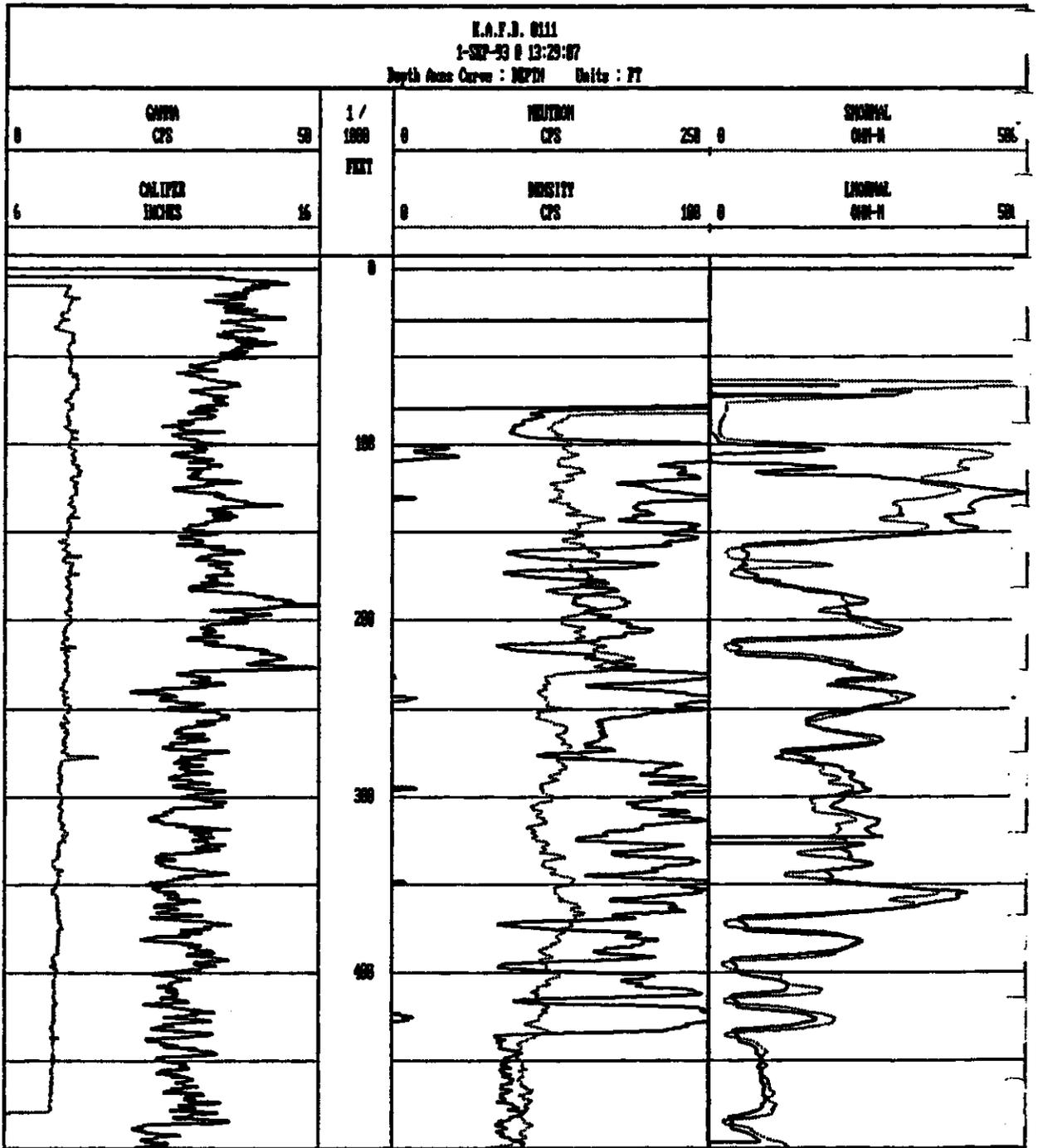
Borehole Log
KAFB0111

Sheet 7 of 7

Project name: Kirtland Air Force Base - Phase II, Stage 2A
 Project number: 463536001
 Drilling Company: USGS
 Date Started drilling: 09 Sep 91
 Drilling Method: Mud rotary
 Borehole diameter: 7 7/8
 Drilling equipment: Gardner-Denver17w
 Logged by: Roybal, Gebhardt

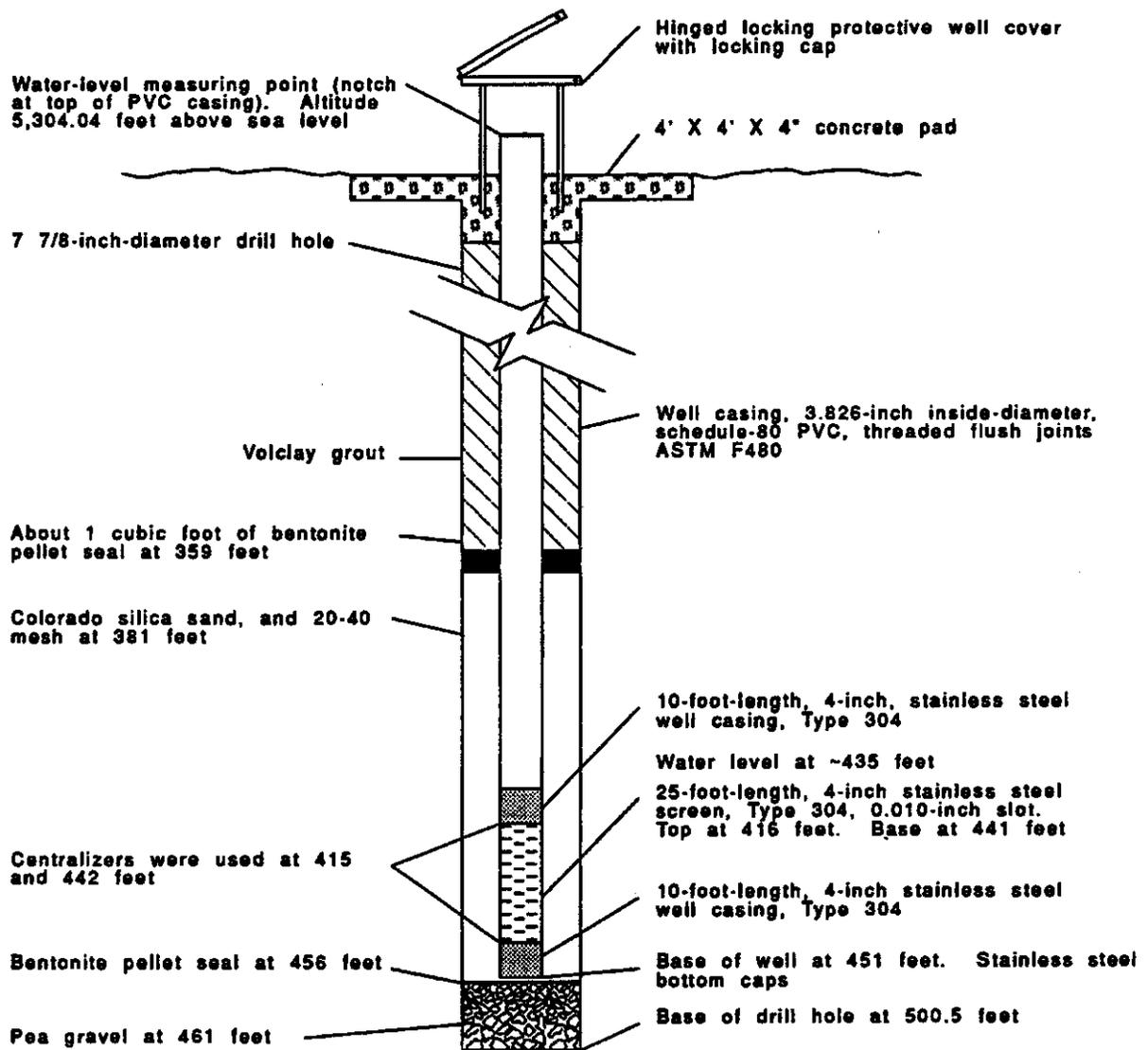
Site: Landfill I
 Location: Northeast Corner
 Drilling Crew: Dan Sweney, John Palmer
 Surface Elevation:
 Date completed drilling: 15 Sep 91
 Total Depth: 500 ft
 Drilling Fluid: Betonite mud
 Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
12-Sep-91		470-475	Very similar to previous intervals, slightly less cg sand, slightly more granules. Some silt, no clay.
12-Sep-91		475-480	Vcg sand and granules, as in previous interval. Trace of silt, a few small "pieces" of clay. Traces of very small pebbles.
12-Sep-91		480-485	Vcg sand and granules. No clay, some silt, some small pebbles (4-5 mm diameter).
12-Sep-91		485-490	Predominately granules (2-4 mm diameter). Some vcg sand, a few very small pebbles (4-6 mm diameter). Trace of silt.
12-Sep-91		490-495	Cg-vcg sand. Some granules. Large amount of silt, with several pieces of silty clay. Trace of pebbles.
12-Sep-91		495-500	Predominately silt, several pieces of silty clay. Lesser amounts of sand (mg-vcg). Small amounts of granules and small pebbles.



KAFB-0111

AR 1710



NOT TO SCALE

Well-completion diagram for monitoring well KAFB 0112. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 07-01-91, completed on 07-07-91. Well drilled using mud rotary method with Wyoming sodium bentonite drilling fluid. All depths are in feet below land surface.

KAFB-0112

AR 1710

**Borehole Log for 100' auger hole
KAFB0112**

Project name: Kirtland Air Force Base - Phase II, Stage 2A		Sheet 1 of 8
Project number: 463536001	Site: KAFB0112	
Drilling Company: USGS	Location: Kirtland AFB	Surface Elevation:
Date Started drilling: 26 May 91	Drilling Crew: Dan Sweney, John Palmer, Fred Gebhardt	
Drilling Method: Hollow stem auguring	Date completed drilling:	Total Depth:
Borehole diameter: 7 7/8	Drilling Fluid:	
Drilling equipment: Gardner-Denver17w		Sample type:
Logged by: Abeyta		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
25-May-91	1808	0-3		(Description from cuttings) Silty sand, vfg - fg with < 3 % vcg pebbles ≤1.5 cm 10 YR 5/4. Moderate yellowish brown, moist, root zone.
	1832	3-7		(17 inches recovered) Silty sand, with gravel ~ 3% ≤ 2.5 cm, angular - subrounded 10 YR 5/4. Moderate yellowish brown, poorly sorted upper 8 inches dry, lower 9 inches moist and 5 YR 5/6 light brown.
	1908	7-8		(14 inches recovered) Silty sand, caliche, < 1% coarse sand and pebbles < 3 mm compacted, hollow root casts, 5 YR 5/6. Light brown, slightly moist.
26-May-91	0830	0-3		(Description from cuttings) Silty sand, vfg - fg, with < 3% vcs and pebbles ≤1.5 cm, 10 YR 5/4. Moderate yellowish brown root zone, moist.
	0900	3-6	Sample	(36 inches recovered) Silty sand, vfg - fg, caliche in upper 6 inches, with coarse sand and pebbles <2% ≤1.5 cm, increasing towards, lower 1 ft with <4% coarse sand and pebbles 5 YR 4/4. Moderate brown, moist lower 25', dry upper 6 inches.

A 2 1710

**Borehole Log for 100' auger hole
KAFB0112**

Project name: Kirtland Air Force Base - Phase II, Stage 2A		Sheet 2 of 8
Project number: 463536001	Site: KAFB0112	
Drilling Company: USGS	Location: Kirtland AFB	Surface Elevation:
Date Started drilling: 26 May 91	Drilling Crew: Dan Sweney, John Palmer, Fred Gebhardt	
Drilling Method: Hollow stem auguring	Date completed drilling:	Total Depth:
Borehole diameter: 7 7/8	Drilling Fluid:	
Drilling equipment: Gardner-Denver17w		Sample type:
Logged by: Abeyta		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
26 May 91	0932	6-8		(23 inches recovered) Upper 8 inches - silty sand with pebbles and gravel - 8% ≤3 cm, 10 YR 5/4. Moderate yellowish brown subrounded - subangular. Next 6 inches - silty sand, well sorted, vfg - fg, 5 YR 5/6 light brown. Next 2 inches - sand fg - coarse grained with silt, < 1% pebbles ≤3 mm, subangular. Lower 7 inches - same as 6 inch interval above 2 inch interval. All sample moist.
	1003	8-12		(38 inches recovered) Silty sand, vfg - fg caliche 5 YR 5/6 light brown, <1% pebbles ≤1 cm in lower 14 inches, slightly moist, subangular.
	1110	Note		2.5 gallons deionized water added to side of auger.
	1115	12-14		(18 inches recovered) Same as 8-12 with increase in pebbles towards lower end - 3% pebbles ≤ 1.5 cm, angular to subrounded, slightly moist.
	1135	14-18		(24 inches recovered) Same as 12-14 lower core. Lower 7 inches - no coarse sand or pebbles, well sorted vfg - fg sand with silt. All sample slightly moist.

**Borehole Log for 100' auger hole
KAFB0112**

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 3 of 8	
Project number: 463536001	Site: KAFB0112	
Drilling Company: USGS	Location: Kirtland AFB	Surface Elevation:
Date Started drilling: 26 May 91	Drilling Crew: Dan Sweney, John Palmer, Fred Gebhardt	Total Depth:
Drilling Method: Hollow stem auguring	Date completed drilling:	
Borehole diameter: 7 7/8	Drilling Fluid:	
Drilling equipment: Gardner-Denver17w		Sample type:
Logged by: Abeyta		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1203	18-21		(25 inches recovered) Upper 12 inches same as lower 7 inches on 14 - 18. Middle 7 inches same with coarse sand and pebbles <2% ≤2 cm angular - subangular. Lower 6 inches - sandy clay, vfg - fg, 5 YR 4/4. All sample slightly moist.
	1210	Note		3 gallons deionized water pours down side of hole.
	1223	21-24		(36 inches recovered) Sandy silt, vfg - fg, well sorted 10 YR 5/4 moderate yellowish brown moist.
	1250	24-27	sampled @ 25'	(25 inches recovered) Same as 21-24, slightly moist.
	1312	27-39.5		(33 inches recovered) Note: picture will read to 30'. Same as 24 - 27. Clay lenses ~ 1 cm thick present in lower 10 inches - 5 YR 4/4. Moderate brown, slightly moist.
	1335	29.5-32.5		(38 inches recovered) Same as 24 - 27 with clay (sandy clay lenses at 16.'5' - 17", 19" - 20", 23.5 - 24.5 and 32 - 35, sand in clay, vfg fg, 5 YR 4/4 moderate brown slightly moist.

Borehole Log for 100' auger hole
KAFB0112

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 4 of 8	
Project number: 463536001	Site: KAFB0112	
Drilling Company: USGS	Location: Kirtland AFB	Surface Elevation:
Date Started drilling: 26 May 91	Drilling Crew: Dan Sweney, John Palmer, Fred Gebhardt	Total Depth:
Drilling Method: Hollow stem auguring	Date completed drilling:	
Borehole diameter: 7 7/8	Drilling Fluid:	
Drilling equipment: Gardner-Denver17w	Sample type:	
Logged by: Abeyta		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
		32.5 - 35.8		(39 inches recovered) Upper 17 inches silty sand vfg - fg, <.1% pebbles ≤3 mm, 10 YR 5/4. Moderate yellowish brown, subrounded - subangular. Next 2 inches - clay 5 YR 5/6 light brown. Next 6 inches sand med - vc grained with vf - fg and some silt, poorly sorted subangular 10 YR 5/4. Moderate yellowish brown, Next 6 inches - sandy silt. vfg - fg well sorted, 10 YR 5/4. Moderate yellowish brown. Lower 8 inches - clay with root casts - hollow 5 YR 4/4. Moderate brown, all sample slightly moist..
26-May-91	1450	35.8 - 38.8		(39 inches recovered) Upper 12 inches clay, 5 YR 4/4. Moderate brown. Middle 15 inches silty sand, vfg - fg with clay, 5 YR 5/6 light brown. Lower 12 inches - sandy silt vfg - fg with 1/4 inch volcanic ash deposits in lower 6 to 8 inches, 10 YR 5/4. Moderate yellowish brown. All sample slightly moist. (Note - picture is numbered 38.8 - 41.8 - should be 35.8 - 38.8.)
	1525	38.8 - 41.8		(28.5 inches recovered) Same as lower - 35.8 - 38.8.
	1552	41.8 - 44.8		(43.0 inches recovered) Upper 19.5 same as 38.8 - 41.8. More ash in lower 13 inches. 5 YR 8/4. Moderate orange pink. Lower 23.5 inches - silty sand, vfg - fg with <2% medium sand, 10 YR 5/4. Moderate yellowish brown, subangular, moist.

**Borehole Log for 100' auger hole
KAFB0112**

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 5 of 8
 Project number: 463536001 Site: KAFB0112
 Drilling Company: USGS Location: Kirtland AFB Surface Elevation:
 Date Started drilling: 26 May 91 Drilling Crew: Dan Sweney, John Palmer, Fred Gebhardt
 Drilling Method: Hollow stem auguring Date completed drilling: Total Depth:
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver17w Sample type:
 Logged by: Abeyta

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1612		Note	2.5 gallons deionized water added to side of auger.
	1617	44.8 - 48.8		(48 inches recovered) Upper 28 inches same as lower 23.5 inches on 41.8 - 44.8. Lower 20 inches, sand, med - coarse grained with some fine grained and pebbles. Pebbles <1% ≤3 mm, grayish brown quartz sand, angular to subrounded. All sample moist.
26-May-91	1707	48.8 - 51.8	Sampled at 50'	(39 inches recovered) Upper 13 inches - same as lower 20 inches of 44.8 - 48.8; clay nodule 2 1/2 in diameter found @ 7.5 inches from top on to of nodule is 1.5 in. diameter pumice nodule. Lower 26 inches, sand, fine to medium grained, well sorted, upper 6 inches has yellowish (moisture) color, 22 inches from top of core has some silt and considerable more moisture - about 2 in layer; quartz sand, grayish brown, moist.
	1720	Note		Approximately 20 gallons of water from water truck added to side of auger.
	1733	51.8 - 54.8		(39 inches recovered) Sand fine - medium grained, very well sorted, grayish brown quartz sand moist.
	1805	54.8 - 58.8		(48 inches recovered) Same as 51.8 - 54.8. Moist.

Borehole Log for 100' auger hole
KAFB0112

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 6 of 8
 Project number: 463536001 Site: KAFB0112
 Drilling Company: USGS Location: Kirtland AFB Surface Elevation:
 Date Started drilling: 26 May 91 Drilling Crew: Dan Sweney, John Palmer, Fred Gebhardt
 Drilling Method: Hollow stem auguring Date completed drilling: Total Depth:
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver17w Sample type:
 Logged by: Abeyta

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1833	58.8 - 63		(50 inches recovered) Same as 51.8 - 54.8. Moist.
27-May-91	0845			Began drilling.
	0853	63-66		(36 inches recovered) Same as 51.8 - 54.8. From 15 - 19 inches from top of core includes <10% pebbles ≤2 cm, moist.
	0920	66-69		(40 inches recovered) Same as 51.8 - 54.8.
	0950	69-72		(40 inches recovered) Same as 51.8 - 54.8. From 71 - 72 <1% gravel ≤2 cm, well rounded - subrounded, igneous - sample bag #2. Note - translucent rock.
	1017	72 - 74.5		(34 inches recovered) Upper 8.5 inches same as 51.8 - 54.8. Lower 22.5 inches coarse to very coarse sand, well sorted, grayish brown, moist.
	1045	74.5 - 77.5		(45 inches recovered) Upper 13 inches same as lower 22.5 inches on 72 - 74.5. Middle 16 inches sandy clay f - mg sand, poorly sorted, 1 inch basalt gravel on top of sandy-clay, 3 in diameter volcanic nodule - tuff (sample bag #3). Sandy clay 10YR 5/4. Moderate yellowish brown. Next 12 inches - clay - very light and smooth, 10 YR 4/2. Dark yellowish brown; lower 4 inches - same as middle 16 inches, all sample slightly moist.

**Borehole Log for 100' auger hole
KAFB0112**

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 7 of 8	
Project number: 463536001	Site: KAFB0112	
Drilling Company: USGS	Location: Kirtland AFB	Surface Elevation:
Date Started drilling: 26 May 91	Drilling Crew: Dan Sweney, John Palmer, Fred Gebhardt	
Drilling Method: Hollow stem auguring	Date completed drilling:	Total Depth:
Borehole diameter: 7 7/8	Drilling Fluid:	
Drilling equipment: Gardner-Denver17w	Sample type:	
Logged by: Abeyta		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1120	77.5 - 80.5		(39 inches recovered) Upper 16 inches sand clay, f - mg sand, poorly sorted, pink ash deposits 6 - 9.5 inches from top. Lower 23 inches - silty sand; vfg - fg well sorted. All sample 10 YR 5/4. Moderate yellowish brown, moist.
27-May-91	1203	80.5 - 84		(43 inches recovered) Sand, med. coarse grained with <1% pebbles ≤3 cm, well sorted, subround, grayish brown, quartz sand, moist.
	1235	84-87		(39 inches recovered) Upper 29 inches - medium sand, well sorted, 2 inches long tooth shaped sand, nodule at approximately 14 inches from top of cone. (Sample #4) grayish brown, quartz sand, ~ 2 more layers at interbedded black deposits at 26-27 inches from top at core. Lower 10 inches med. sand grade to coarse to very coarse sand, subrounded, reddish brown sand, poorly sorted. All sample moist.
	1300	87-89		(28 inches recovered) Upper 14 inches sand, medium grained, well sorted, grayish brown quartz sand. Lower 14 inches - sand, med - vcg, poorly sorted, with ~ 8 % gravel ≤3.5 cm. Well rounded to subrounded, grayish brown quartz sand. All sample moist.

**Borehole Log for 100' auger hole
KAFB0112**

Project name: Kirtland Air Force Base - Phase II, Stage 2A		Sheet 8 of 8
Project number: 463536001	Site: KAFB0112	
Drilling Company: USGS	Location: Kirtland AFB	Surface Elevation:
Date Started drilling: 26 May 91	Drilling Crew: Dan Sweney, John Palmer, Fred Gebhardt	
Drilling Method: Hollow stem auguring	Date completed drilling:	Total Depth:
Borehole diameter: 7 7/8	Drilling Fluid:	
Drilling equipment: Gardner-Denver17w		Sample type:
Logged by: Abeyta		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1334	89 - 92		(36 inches recovered) Same as lower 14 inches of 87 - 89.
27-May-91	1412	92-95		(36 inches recovered) Same as 89-92 with clayey silt lense 24 - 38 inches from top of core, 10 YR 4/2. Dark yellowish brown. Pebbles \leq 4 cm, well rounded, basalt and volcanic gravel/pebbles prominent. All sample moist,
	1442	95-98		(36 inches recovered) Sand, med - coarse grained with $<$ 2.2 pebbles and gravel \leq 1.5 cm, grayish brown sand, moist.
	1525	98-101		(38 inches recovered) Same as 95-98 with ~ 5% pebbles and gravel \leq 3.5 cm.

**Borehole Log
KAFB0112**

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 1 of 8
Project number: 463536001	Site: KAFB0112
Drilling Company: USGS	Location: Landfill 1
Date Started drilling: 01 Jul 91	Surface Elevation:
Drilling Method: Mud rotary	Drilling Crew: Dan Sweney, John Palmer, Art Clark, Keith Shoeman
Borehole diameter: 7 7/8	Date completed drilling: 3 Jul 91
Drilling equipment: Gardner-Denver17w	Total Depth: 500
Logged by: Abeyta	Drilling Fluid: Air 0-4 ft., Mud 4 - 4 ft.
	Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
01-Jul-91	1450	0-4	Began drilling using air and 13-inch drill bit to 4 ft. Set 8" ID surface casing with cement grout.
	1715	4-100	Began mud rotary drilling using 7 7/8' drill bit. See borehole log KAFB0112 for detailed description of cuttings.
	1825	4-25	Sample bag.
	1855	25-40	Stopped drilling. Sample bag.
02-Jul-91	0835	73'	Sample bag.
	0945	80'	-
	1000	80-95'	Sand, mg-vcg, gravel, quartz, feldspar, basalt. Gravel \leq 6 mm, subrounded-angular.
	1030	95-115	Same as 80-95. Sand is coarser and more gravelly.
		115-120	Same as 95-115'.
	1205	120-135	Sand, med-vcg, and gravel, limestone, basalt, feldspar and quartz, rounded to subangular \leq 1.2 cm, gravel size is consistent, abundant gravel.

Borehole Log
KAFB0112

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 2 of 8
Project number: 463536001	Site: KAFB0112
Drilling Company: USGS	Location: Landfill 1
Date Started drilling: 01 Jul 91	Drilling Crew: Dan Sweney, John Palmer
Drilling Method: Mud rotary	Date completed drilling: 3 Jul 91
Borehole diameter: 7 7/8	Total Depth: 500
Drilling equipment: Gardner-Denver17w	Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.
Logged by: Abeyta	Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
		135-145	Silty sand with clay, vfg, med-grained, some vcg and pebbles \leq 1 cm, subrounded-angular.
		145-160	Gravely sand, m-vcg with pebbles and gravel \leq 1.4 cm, rounded-subangular.
1345		160-170	Sandy gravel, med-vcg, gravel \leq 2 cm, 2 cm gravel abundant, rounded to subangular, quartz, granite, limestone.
1355		170-183.5	Same as 160-170 with gravel \leq 1.5 cm and more vc-med grained sand.
1310		183.5-187	Driller verified. Silty clay, with minor sand, vfg-fg, coarse-vc sand probably from cuttings above.
1420		187-195	Silty sand with minor clay, vfg-mg, and gravel \leq 1.5 cm, subrounded-angular.
1445		200-210	Same as 187-200 with pebbles \leq 9 mm rounded-subangular, limestone, quartz and feldspar.

Borehole Log
KAFB0112

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 3 of 8
Project number: 463536001	Site: KAFB0112
Drilling Company: USGS	Location: Landfill 1
Date Started drilling: 01 Jul 91	Drilling Crew: Dan Sweney, John Palmer
Drilling Method: Mud rotary	Date completed drilling: 3 Jul 91
Borehole diameter: 7 7/8	Total Depth: 500
Drilling equipment: Gardner-Denver17w	Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.
Logged by: Dam	Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
	1500	210-220	Sandy clay, vfg-fg, pebbles probably from cuttings above.
	1535	220-240	Gravelly sand, m-vcg, with gravel, abundant, ≤ 2 cm, rounded-angular, limestone, quartz, granite, gravel and sand.
	1540		Mixing mud.
03-Jul-91	0900	245	
	0920	260	
		240-260	Sandy gravel, m-vcg, gravel ≤ 1.3 cm, mostly rounded, some subangular-quartz, limestone, granite.
		260-280	Gravelly sand, m-vcg, gravel ≤ 11 cm, rounded to subangular, less and smaller gravel than 240'-260' interval; more vcg sand, especially towards bottom 10 ft.
	1035	280-300	
		280-285	Silty sand, silt with vfg-vcg sand w/gravel ≤ 1 cm rounded-subangular.
		285-300	Gravelly sand, m-vcg, gravel ≤ 1.8 cm and less abundant than 240-280' interval, sand is subrounded to angular, mostly angular, gravel is rounded to subrounded.

Borehole Log
KAFB0112

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 4 of 8
 Project number: 463536001 Site: KAFB0112
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 01 Jul 91 Drilling Crew: Dan Sweney, John Palmer
 Drilling Method: Mud rotary Date completed drilling: 3 Jul 91 Total Depth: 500
 Borehole diameter: 7 7/8 Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.
 Drilling equipment: Gardner-Denver17w Sample type:
 Logged by: Dam

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
03-Jul-91	1115	300-320 300-315 315-325	Same as 285'-300' interval. Silty sand, vfg-vcg sand, with pebbles \leq 1 cm, and less abundant than 285-315, minor clay.
		325'-330'	Sandy silt, vfg-mg, <1% vcg and pebbles \leq 1 cm, minor clay, subangular.
		330-335	Sand, coarse grained with subangular rock fragments-red, black, white and yellow w and uw samples.
		335-340	Same as above with subangular rock fragment 1.5 cm red and clear, possible feldspar and quartz.
		340-345	Same as above.
		345-350	Primarily rock fragments-yellow possible chert, black fragments possibly volcanic > 2 cm.
		350-355	Dan (driller) noted a 1-foot clay layer at 355', coarse grained sand with pebbles \leq 1 cm.

**Borehole Log
KAFB0112**

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 5 of 8
Project number: 463536001	Site: KAFB0112
Drilling Company: USGS	Location: Landfill 1 Surface Elevation:
Date Started drilling: 01 Jul 91	Drilling Crew: Dan Sweney, John Palmer
Drilling Method: Mud rotary	Date completed drilling: 3 Jul 91 Total Depth: 500
Borehole diameter: 7 7/8	Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.
Drilling equipment: Gardner-Denver17w	Sample type:
Logged by: Dam	

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
		355-360	Same as above coarse gr. s.s. with pebbles.
		360-365	Same as above with a clay ball in cuttings.
		365-370	Same coarse sand with pebbles-black, red, yellow with abundant clay - whitish tan.
	1405	370-375	Same as above.
		375-375.5	Clay-v. slow penetration from 1405 pm to 1430'. 377-379 sand.
	1535	375-380	Sand, minor rock fragments and clay.
		380-385	Same as above.
		385-390	Same as above.
	1600	390-395	Sand with pebbles; same limestone fragments.

Borehole Log
KAFB0112

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 6 of 8
Project number: 463536001	Site: KAFB0112
Drilling Company: USGS	Location: Landfill 1 Surface Elevation:
Date Started drilling: 01 Jul 91	Drilling Crew: Dan Sweney, John Palmer
Drilling Method: Mud rotary	Date completed drilling: 3 Jul 91 Total Depth: 500
Borehole diameter: 7 7/8	Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.
Drilling equipment: Gardner-Denver17w	Sample type:
Logged by: Dam	

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
	1615	395-400	Sand-coarse gr. with yellow rock fragments possibly silicate (chert); very small fragments.
	1630	400-405	Same as above with reddish black rock fragments, size of coarse sand.
	1640	405-410'	Same as above with some clay.
	1647	410-415	Penetration rate increased; driller says softer drilling; some lithology.
	1652	415-420	Slight increase in pebble size >0.5 cm; well rounded coarse grained quartz pebble with red, black yellow subangular fragments.
		420-425	Sand, medium-coarse grained brown-tan with rock fragments - small >.1 cm, uncemented, friable.
	1718	425-430	Sand, medium-coarsed grained, subrounded quartz sand, moderately well sorted, with minor rock fragments.
	1728	430-435	Silty sand with clay; abundant rock fragments, subangular-subrounded \geq 1 cm, red, yellow, violet, gray, black, green, etc.

Borehole Log
KAFB0112

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 7 of 8
 Project number: 463536001 Site: KAFB0112
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 01 Jul 91 Drilling Crew: Dan Sweney, John Palmer
 Drilling Method: Mud rotary Date completed drilling: 3 Jul 91 Total Depth: 500
 Borehole diameter: 7 7/8 Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.
 Drilling equipment: Gardner-Denver17w Sample type:
 Logged by: Dam

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
3-Jul-91	1735	435-440	Rock fragments as above ≥ 0.1 cm. Same colors as above.
	1753	440-445	Rock fragment angular ≥ 1 cm. Same colors as above. Medium grained sand.
	1805	445-450	Fine quartz sand subangular - subrounded ≥ 1 cm. Same colors as above.
	1815	450-455	Sand, silty-medium grained; poorly sorted, subangular, $> .1$ cm; as above increase in darker pebble sized rocks - black and green with minor red, clear, etc.
	1845	455-460	Sand, medium-coarsed grained, subrounded, with coarse-pebble sized rock fragments as above; 1 pebble was 2 cm smoothly rounded, spherical, elongated appears to be stream deposit, dark gray.
	1700	460-465	Sand, coarse-medium grained, clear quartz very minor rock fragments.
	1715	465-470	Same sand as above with increase in pebbles $> .1$ cm.

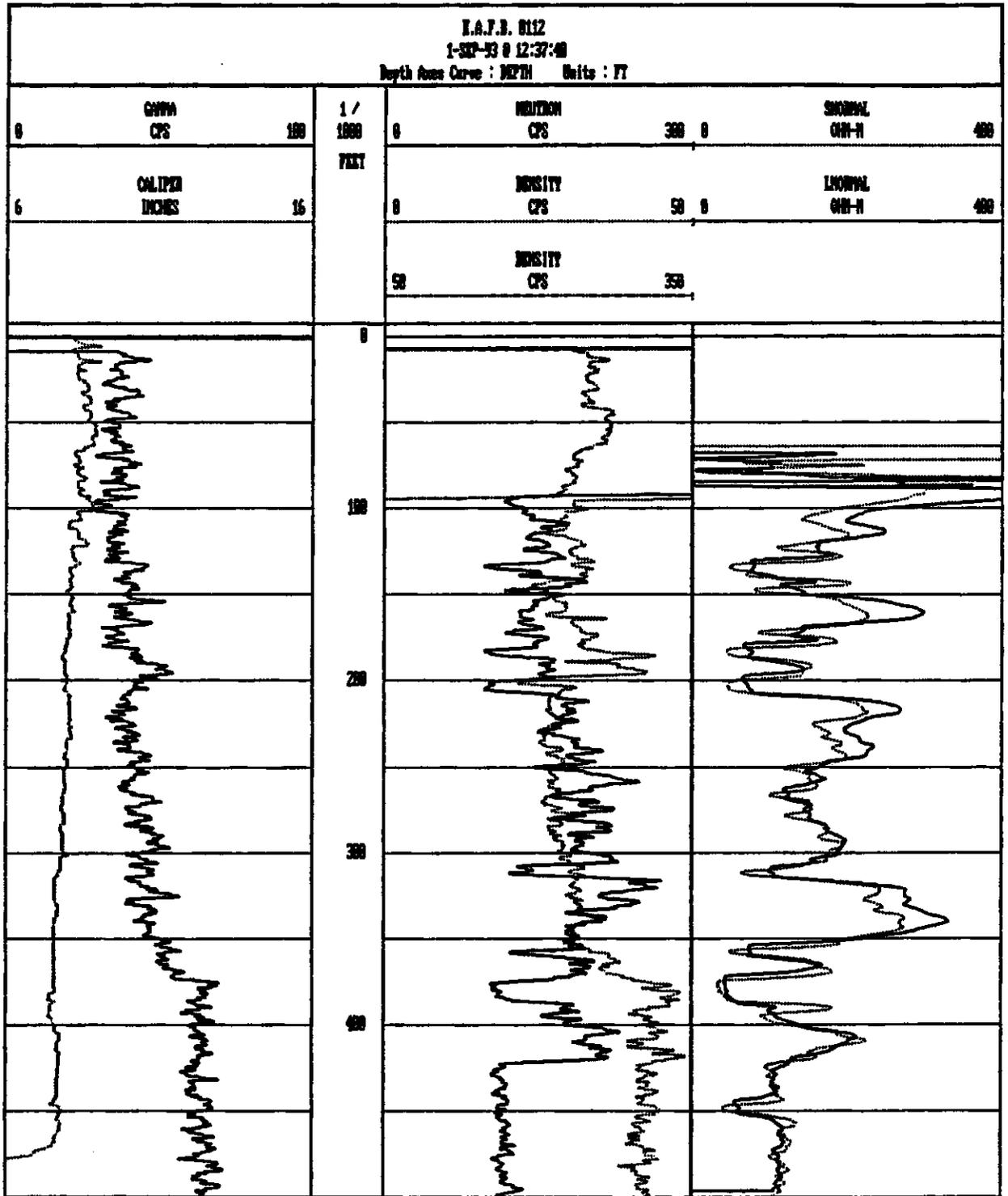
Borehole Log
KAFB0112

Project name: Kirtland Air Force Base - Phase II, Stage 2A
Project number: 463536001
Drilling Company: USGS
Date Started drilling: 01 Jul 91
Drilling Method: Mud rotary
Borehole diameter: 7 7/8
Drilling equipment: Gardner-Denver17w
Logged by: Dam

Site: KAFB0112
Location: Landfill 1
Drilling Crew: Dan Sweney, John Palmer
Date completed drilling: 3 Jul 91
Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.

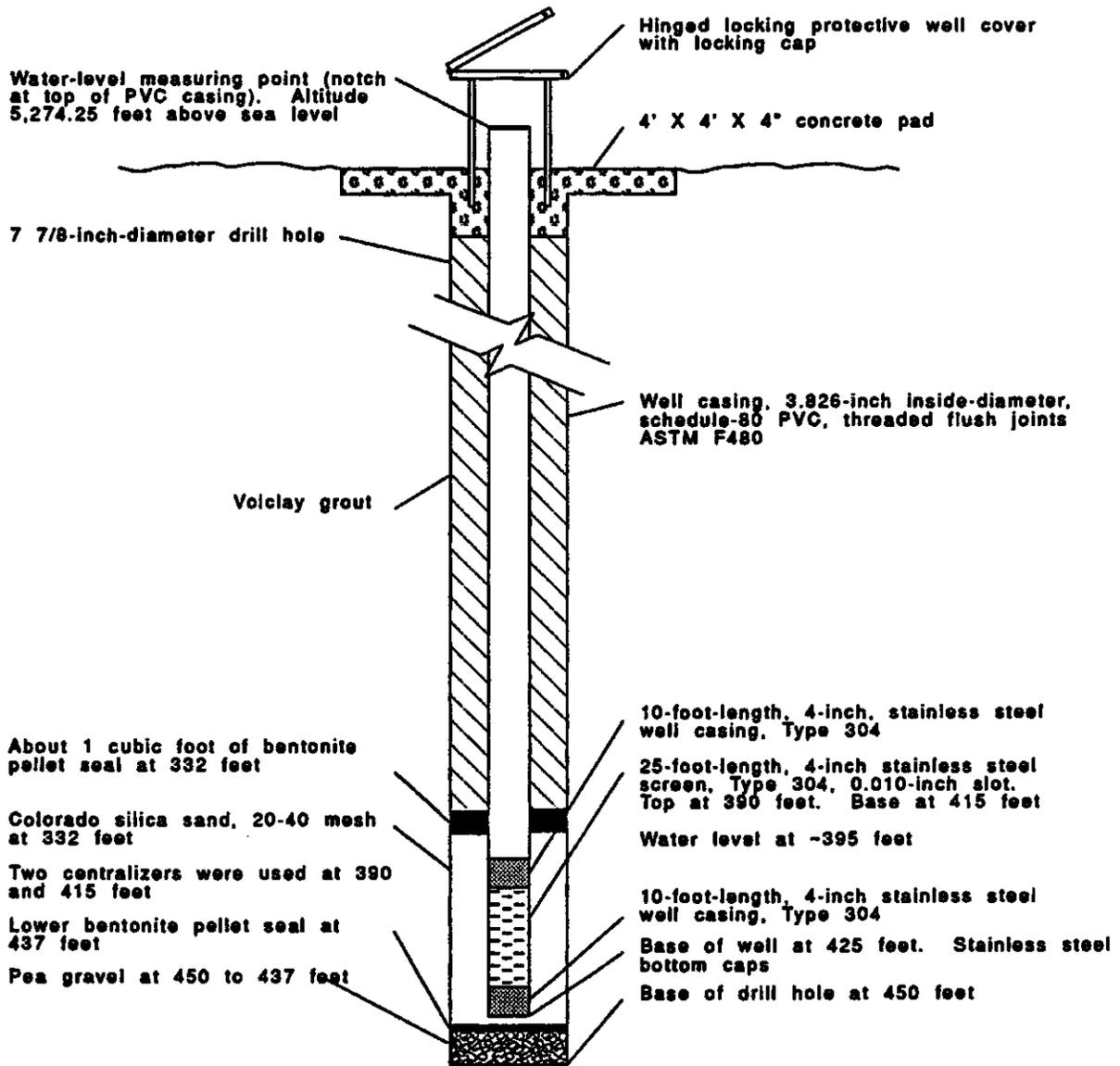
Sheet 8 of 8
Surface Elevation:
Total Depth: 500
Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
	1825	470-475	Same sand medium-coarsed grained, increase in sand percentage and red pebbles.
	1900	475-480	Sand, coarse, subrounded large % rock fragments/pebbles.
	1950	480-485	Same as above.
	2020	485-490	Same as above.
		490-495	Same as above.
	2030	495-500	Sand, coarse with black and red rock fragments/pebbles.



KAFB-0112

AR 1710



NOT TO SCALE

Well-completion diagram for monitoring well KAFB 0113. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 08-25-92, completed on 08-29-92. Well drilled using mud rotary method with Wyoming sodium bentonite drilling fluid. All depths are in feet below land surface.

KAFB-0113

AR 1710

Borehole Log
KAFB0113

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 1 of 9
 Project number: 463536001 Site: KAFB0113
 Drilling Company: USCS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 17 Oct 91 Drilling Crew: Dan Sweney, John Palmer, Gary Roybal,
Fred Gebhardt
 Drilling Method: Hollow stem auguring/mud rotary Date completed drilling: Total Depth: 100'
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver 17w Sample type:
 Logged by: Roybal, Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
17-Oct-91	0900	0-3	(No core taken)	(Description from cuttings) Silty-sands vfg - fg. with some vegetation and pebbles ≤1.0 cm 10 YR 5/4. Moderate yellowish brown, dry, rootzone.
	0935	3-7	44 "	(44 inches recovered) Top 3-5 inches are debris from surface. Remainder of core is a silty clay moderate yellowish brown 10 YR 5/4. Core was basically intact but crumbled with light pressure. Several bleached zones which appear to be caliche were in this interval. Small amount of v.fine - med. grained was noted distributed throughout sample.
	1010	7-10	34 "	Same as above.
	1039	10-11.8	26 "	Top 3" same as above. Remainder of sample is silt and v. fine-fine grained sand. Mostly grayish orange 10 YR 7/4. Sample mostly intact but will crumble to powder very easily.
	1055	11.8-14	31 "	Same as above.
		14-17	0	(No recovery.)
	1146	17-18	16 "	Sand. Very poorly sorted (v.fine - v. coarse grained). Sample wet because water had been added prior to auguring. Wet color is pale brown 5 YR 5/2. No silt, no clay, no caliche. Trace of granules and small pebbles.

AR 1710

Borehole Log
KAFB0113

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 2 of 9
 Project number: 463536001 Site: KAFB0113
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 17 Oct 91 Drilling Crew: Dan Sweney, John Palmer, Gary Roybal,
Fred Gebhardt
 Drilling Method: Hollow stem auguring/mud rotary Date completed drilling: Total Depth: 100'
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver 17w Sample type:
 Logged by: Roybal, Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1209	18-19	20 "	Poorly sorted sand as above. Small amount of granules and small pebbles interspersed throughout. No silt, no clay.
17-Oct-91	1232	19-21	0	(No recovery.)
	1245	21-22	21 "	Sand, very poorly sorted trace of granules and small pebbles. No silt, no clay (basically same as above).
	1315	22-23	8 "	Poorly-sorted sand (very similar to above). No silt, no clay. Slight increase in amount of granules and pebbles. Some small pieces of this sand tightly bonded by a white cement (calcite?).
	1341	23-26	40 "	Top 3 inches are same as above. Next 3 inches are similar but also contain about 40% granules and small pebbles up to 25 mm diam. Also found were several small pieces of calcite and several small chunks of tightly cemented sand and gravel. Trace of silt, no clay. The next 7 inches are very similar but only have small amounts of calcite and gravel. From 24 to 24 1/2 feet sample consists of silt and clay bonded together in a swirl pattern. Silt ranges from very pale orange 10 YR 8/2 to moderate orange pink 5 YR 8/4. Clay is a moderate brown 5 YR 4/4. A few pieces of gravel up to 30 mm diam. were found in this silt-clay mix. The bottom 18-20 inches is a poorly-sorted silty sand with a small amount of granules and small pebbles. Traces of calcite

**Borehole Log
KAFB0113**

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 3 of 9
 Project number: 463536001 Site: KAFB0113
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 17 Oct 91 Drilling Crew: Dan Sweney, John Palmer, Gary Roybal,
Fred Gebhardt
 Drilling Method: Hollow stem auguring/mud rotary Date completed drilling: Total Depth: 100'
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver 17w Sample type:
 Logged by: Roybal, Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
17-Oct-91	1415	26-28	25 "	Silty sand, very poorly sorted. Some granules, some pebbles (up to 30 mm diam.). Several pieces of pure white calcite found interspersed throughout sample. Bottom inch is cemented sand and gravel.
	1452	28-29	0	(No recovery.)
	1515	29-31	13 "	(Believe that the bottom 13 inches were all that was recovered on this interval). 90% sand, very poorly sorted. Small amount of granules interspersed throughout. No clay, no calcite, trace of silt in 2 inch thick later near top of sample.
	1540	31-31.5	13 "	Same as previous interval only no silt. (Also found one ±40 mm diam. piece of gravel in middle of sample.)
	1605	31.5-33	13 "	Same as previous interval.
	1625	33-34.5	11 "	Same as previous interval.
	1705	34.5-37.5	40 "	Sand, very poorly sorted (very similar to previous intervals). However, this sample has several small and poorly-defined zones where overall character of granulation is finer or coarser than that next to it. Some silt present in some of these zones. Various-sized pieces of gravel were found throughout the sample (up to about 40 mm diam.) Several small "pieces" of sand and gravel cemented (calcite) together were also found.

Borehole Log
KAFB0113

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 4 of 9
 Project number: 463536001 Site: KAFB0113
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 17 Oct 91 Drilling Crew: Dan Sweney, John Palmer, Gary Roybal,
Fred Gebhardt
 Drilling Method: Hollow stem auguring/mud rotary Date completed drilling: Total Depth: 100'
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver 17w Sample type:
 Logged by: Roybal, Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
17-Oct-91	1735	37.5-40.5	12 "	Sand, fairly well-sorted, 90% fine-coarse grained. Small amount of v. fine and v. coarse grains. Trace of granules. No pebbles, no silt, no clay, no calcite.
	1855	40-43	35 "	Upper 13 inches is clean sand (same as above). Next 7 inches is a light brown (5 YR 6/4 silt tightly packed (but will crumble with medium hand pressure) and mottled with a very pale orange (10 YR 8/2) color. The next 8 inches is still mostly light brown silt as before only no light coloration, and a slight amount of v. fine - fine sand mixed in. The bottom few inches is a mix of silt, sand, and pebbles (up to 30 mm diam.) and is very crumbly.
18-Oct-91	0848	43-45	14 "	Sand, poorly sorted, small amount of granules, trace of small pebbles. No silt, no clay, no calcite.
	0950	45-47	30 "	Upper 6 inches are same as above. Next 8 inches is poorly sorted mix of silt, sand, granules, and pebbles (up to 20 mm diam.). Next 5 inches is a clean silt (pale yellowish brown 10 YR 7/2) which is very powdery. The bottom several inches is a poorly sorted mix of silt, sand, granules, small pebbles, and powdered calcite with a few small calcite nodules.
		47-49	0	(No recovery.)

Borehole Log
KAFB

Project name: Kirtland Air Force Base - Phase II, Stage 2A		Sheet 5 of 9
Project number: 463536001	Site: KAFB0113	
Drilling Company: USGS	Location: Landfill 1	Surface Elevation:
Date Started drilling: 17 Oct 91	Drilling Crew: Dan Sweney, John Palmer, Gary Roybal, Fred Gebhardt	
Drilling Method: Hollow stem auguring/mud rotary	Date completed drilling:	Total Depth: 100'
Borehole diameter: 7 7/8	Drilling Fluid:	
Drilling equipment: Gardner-Denver17w	Sample type:	
Logged by: Roybal, Gebhardt		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
18-Oct-91	1045	49-52	43 "	Upper 20 inches are poorly sorted mix of silt sand and granules. Small pieces (or pulverized) of calcite were intermixed in sample. Several small pebbles were also seen. The next 7 inches was a clean well-sorted sand (fine-med. grained). The remainder was the same as this upper 20 inches.
	1117	52-55	36 "	Poorly sorted mix of silt, sand and granules as above. 3 small (2-3inch) zones with indistinct boundaries of high proportion (up to 50%) of calcite. One lens of packed light brown5Y6/4) silt at 54 foot depth.
	1242	56-59	38 "	(Hole had just been reamed, so upper few inches were from upper formations - mostly sand). Remainder (majority) of sample was sane as above (no light brown silt). (Including several indistinct bands containing a high percentage of calcite nodules (or powdered).)
	1338	59-62	36 "	Upper 2 1/2 feet same as above. Bottom 6 inches consisted of a grayish orange (10 YR 7/4) silty clay (hard to break apart) with several large pebbles (up to 60 mm diam.) and poorly-sorted sand and granules.

**Borehole Log
KAFB0113**

Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 6 of 9
Project number: 463536001	Site: KAFB0113
Drilling Company: USGS	Location: Landfill 1
Date Started drilling: 17 Oct 91	Surface Elevation:
	Drilling Crew: Dan Sweney, John Palmer, Gary Roybal, Fred Gebhardt
Drilling Method: Hollow stem auguring/mud rotary	Date completed drilling: Total Depth: 100'
Borehole diameter: 7 7/8	Drilling Fluid:
Drilling equipment: Gardner-Denver 17w	Sample type:
Logged by: Roybal, Gebhardt	

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1408	62-65	32 "	Very poorly sorted sand and gravel. (Pebbles up to 60 mm diam.), very loosely packed. Trace of silt throughout. No clay. Bottom 6 inches was clean but poorly-sorted sand. (No gravel).
18_oct-91	1445	65-69	45 "	Sand, (similar to above) 80% is moderately well-sorted fine-medium grained. Some coarse - v. coarse grained. Fair amount of granules, small amount of pebbles (small) interspersed throughout. 1" band high in calcite nodules at 66 feet.
	1520	69-72	39 "	Same as above (only no calcite).
	1600	72-75	33 "	Same as previous interval. (Small bands at 74 and 75 feet having several large pieces of gravel (up to 40 mm diam.))
	1645	75-77.5	33 "	Same as above. (Several large pieces of gravel interspersed throughout sample.)
	1730	76.5-78	27 "	Sand, majority is moderately well-sorted, fine-coarse grained. Some fine and v. fine grained. Trace of silt throughout. Some granules throughout. Several large pieces of gravel interspersed throughout sample. Bottom 6 inches is a tight light brown (5 YR 5/6) silt which will not crumble until moderate hand pressure is exerted. silt is very pure (no sand or gravel).

Borehole Log
KAFB0113

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 7 of 9
 Project number: 463536001 Site: KAFB0113
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 17 Oct 91 Drilling Crew: Dan Sweney, John Palmer, Gary Roybal, Fred Gebhardt
 Drilling Method: Hollow stem auguring/mud rotary Date completed drilling: Total Depth: 100'
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver17w Sample type:
 Logged by: Roybal, Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1825	78-81	36 "	Upper 2 inches appear dark (as though oil-soaked) (sample taken), although consistency is poorly-sorted sand with gravel as is most of the rest of this interval (primarily sand with some granules and pebbles up to 40 mm diam. interspersed throughout). Bottom 4 inches consists mostly of a tightly-bound light brown silty clay with some sand and gravel in the matrix.
18-Oct-91	1825	81-83	23 "	Upper foot is sand and gravel, poorly sorted, and a trace of silt. Gravel constitutes approximately 50% of volume and ranges from granules up to about 50 mm diam. Lower foot is poorly sorted sand with a small amount of granules and traces of small pebbles. The bottom 8 inches has calcite nodules (or pulverized).
19-Oct-91	1000	83-86	41 "	Sand, "clean", well-sorted, (fine -med. grained) color is yellowish green (5Y 7/2). Small amount of coarse sand. Trace of silt and gravel. Bottom 4 inches has increase in granules, small pebbles, and also has some calcite nodules (or powdered calcite).

Borehole Log
KAFB0113

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 8 of 9
 Project number: 463536001 Site: KAFB0113
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 17 Oct 91 Drilling Crew: Dan Sweney, John Palmer, Gary Roybal, Fred Gebhardt
 Drilling Method: Hollow stem auguring/mud rotary Date completed drilling: Total Depth: 100'
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver 17w Sample type:
 Logged by: Roybal, Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
18-Oct-91	1825	81-83	23 "	Upper foot is sand and gravel, poorly sorted, and a trace of silt. Gravel constitutes approximately 50% of volume and ranges from granules up to about 50 mm diam. Lower feet is poorly sorted sand with a small amount of granules and traces of small pebbles. The bottom 8 inches has calcite nodules (or pulverized).
19-Oct-91	1000	83-86	41 "	Sand, "clean", well-sorted (fine-med. grained) color is yellowish grey (5Y 7/2). Small amount of coarse sand. Trace of silt and gravel. Bottom 4 inches has increase in granules, small pebbles, and also has some calcite nodules (or powdered calcite).
	1041	86-89	40 "	Majority of sample is a well-sorted sand as in previous interval, however, at 86 1/2 feet, there is a 2 inch thick band of powdered calcite mixed with the sand. At about 87 feet is a 1 inch thick layer of extremely hard light brown silty clay. This is immediately followed by an overall increase in grain size (to v coarse sand and granules) for this next 4 inches. The remainder is the well-sorted sand. Some light grey silt was also seen in the bottom 6 inches.

Borehole Log
KAFB0113

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 9 of 9
 Project number: 463536001 Site: KAFB0113
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 17 Oct 91 Drilling Crew: Dan Sweney, John Palmer, Gary Roybal, Fred Gebhardt
 Drilling Method: Hollow stem auguring/mud rotary Date completed drilling: Total Depth: 100'
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver17w Sample type:
 Logged by: Roybal, Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1114	89-92	37 "	Sand, fairly well-sorted (primarily fine-med grained). Trace of granules and small pebbles throughout sample. Bottom 4 inches also has many small calcite nodules.
19-Oct-91		92-98.5	0	Note - auguring difficult and encountering problems. Will drill through to 98.5 feet before auguring the final sample for analysis.
	1520	98.5-101.5	43 "	80% sand. Mostly fine-med. grained, but all grain sizes are present. Granules and small (up to 20 mm diam.) pebbles are common. Trace of brown silty clay at upper end. Lower two feet have some silt mixed in.

**Borehole Log
KAFB0113**

Project name: Kirtland Air Force Base - Phase II, Stage 2A , Sheet 1 of 4
 Project number: 463536001 Site: KAFB0113
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 26 Aug 92 Drilling Crew: Dan Sweney, Dean Bohn, Bob Gilliland
 Drilling Method: Hollow stem
 augering/mud rotary
 Borehole diameter: 7 7/8 Date completed drilling: 26 Aug 92 Total Depth: 500
 Drilling equipment: Gardner-Denver17w Drilling Fluid: Bentonite
 Logged by: Gebhardt, Roybal Sample type: Drill cuttings

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
26-Aug-92		0-100	Not sample (already described during augering of 100 foot borehole).
		100-110	Well sorted very coarse sand and small granules, fragmented quartz, felspar, and limestone. Subrounded to subangular!
		110-115	Very similar to the above interval, however there are some large particle of limestone (≤ 5 mm). This interval also is about 30% silt.
		115-140	This interval is identical to the 100-110 interval. Very coarse sand and small granules. Well sorted.
		140-150	Poorly sorted. particle size increasing (≤ 10 mm) very coarse sand to small gravels. There is also a slight amount of silt, light brown.
		150-155	50% is well sorted very coarse sand with small granules. The remaining 50% is silt with a slight amount of clay, light brown.
		155-160	Is basically like the previous interval, however not as well sorted, slightly larger particle size and no clay.

Borehole Log
KAFB0113

Project name: Kirtland Air Force Base - Phase II, Stage 2A
Project number: 463536001
Drilling Company: USGS
Date Started drilling: 26 Aug 92
Drilling Method: Hollow stem
augering/mud rotary
Borehole diameter: 7 7/8
Drilling equipment: Gardner-Denver17w
Logged by: Gebhardt, Roybal

Site: KAFB0113
Location: Landfill 1
Drilling Crew: Dan Sweney, Dean Bohn, Bob Gilliland
Surface Elevation:
Date completed drilling: 26 Aug 92 Total Depth: 500
Drilling Fluid: Bentonite
Sample type: Drill cuttings

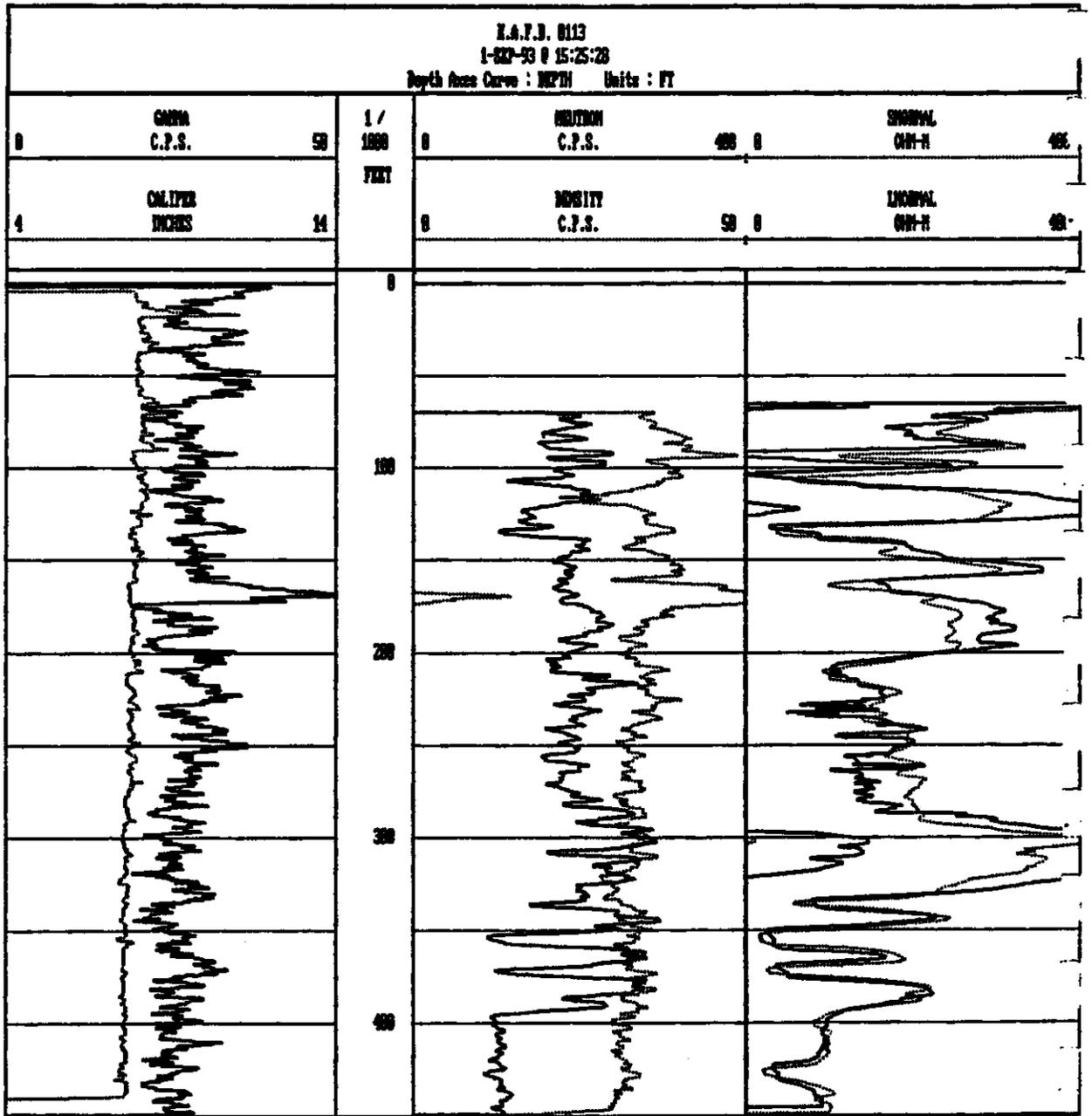
Sheet 2 of 4

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
26-Aug-92		160-195	This interval is majority of granules to small gravels (≤ 15 mm). There is also a small amount of silt mixed with a very fine sand, and some coarse sand. Poorly sorted.
		190-205	Coarse sand and small granules, fairly well sorted. There is also a small amount of fine-medium sand.
		205-215	This interval is very similar to previous interval, however poorly sorted with less of the finer sands and larger granules (≤ 5 mm).
		215-220	Same as previous interval but there is also a few clay modules, light brown.
		220-230	This interval is following the trend of the previous sample with less sand and granules with more light brown clay and silt. The ratio is approximately 50-50.
		230-250	Very coarse sand with small granules (≤ 10 mm). Poorly sorted. Clean of silt or clay.

**Borehole Log
KAFB0113**

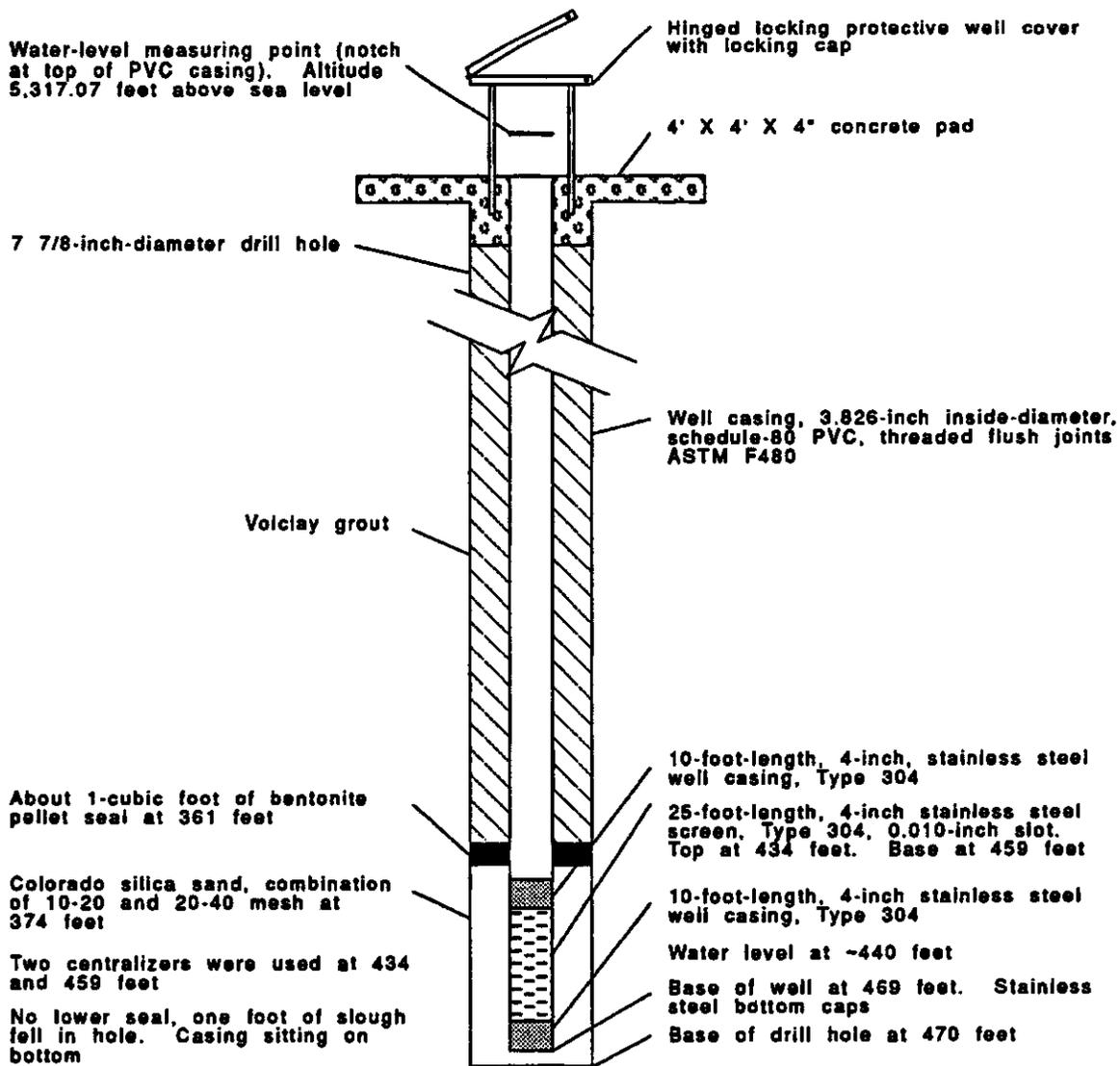
Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 3 of 4
Project number: 463536001	Site: KAFB0113
Drilling Company: USGS	Location: Landfill 1
Date Started drilling: 26 Aug 92	Surface Elevation:
Drilling Method: Hollow stem augering/mud rotary	Drilling Crew: Dan Sweney, Dean Bohn, Bob Gilliland
Borehole diameter: 7 7/8	Date completed drilling: 26 Aug 92 Total Depth: 500
Drilling equipment: Gardner-Denver17w	Drilling Fluid: Bentonite
Logged by: Gebhardt, Roybal	Sample type: Drill cuttings

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
26-Aug-92		250-260	This interval is very similar to previous interval, however with the increase of depth so did the amount of silt and clay. At 260 feet approximately 60% of sample was silt and clay (clay nodules).
		260-300	Majority of this interval is granules, very coarse sand and small gravel (≤ 15 mm). There is a very small amount of fine-medium grain sand. The larger particles are large fragments of larger gravel (quartz, feldspar, limestone).
		300-310	This interval is very similar to previous intervals. Particle size is decreasing (≤ 10 mm), with an increase in the fine and medium sand. There is also light brown silt.
		310-330	The sand and granules are the same as the previous sample. The silt has greatly increased. There is also large amounts of red clay.
		330-350	Very coarse sand - granules - gravel (≤ 15 mm). There is also some fine to medium sand but the majority of this interval is poorly sorted larger fragments.



KAFB-0113

AR 1710



NOT TO SCALE

Well-completion diagram for monitoring well KAFB 0114. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 08-12-92, completed on 08-16-92. Well drilled using mud rotary method with Wyoming sodium bentonite drilling fluid. All depths are in feet below land surface.

KAFB-0114

AR1710

Borehole Log
KAFB0114

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 1 of 3
 Project number: 463536001 Site: KAFB0114
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 20 Oct 91 Drilling Crew: Dan Sweney, John Palmer
 Drilling Method: Hollow stem auguring Date completed drilling: Total Depth:
 Borehole diameter: 7 7/8 Drilling Fluid:
 Drilling equipment: Gardner-Denver 17w Sample type:
 Logged by: G. Roybal, F. Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
20-Oct-91	1221	0-3	0	No recovery because this interval was drilled rather than augured (Surface silt and sand.)
	1243	3-7	47 inches	Light brown (5 YR 6/4) and moderate orange pink (5 YR 8/4) silt, mottled with whitish splotches of calcite. Several small pebbles intermixed throughout.
	1306	7-11	48 inches	Same as above.
	1327	11-14	40 inches	Same as above (color slightly darker, now light brown 5 YR 5/6. White splotches now almost nonexistent)
	1346	14-17	35 inches	Moderately orange pink (5 YR 8/4) silt as above several cobbles intermixed throughout matrix throughout entire interval (same as above.)
	1411	17-19	27 inches	Same as above (no change).
	1445	19-23	48 inches	Same as above (no change).
	1504	23-28	61 inches	Entire interval basically same as above, however, some caliche occurs from 24-25 feet, and a band high in granules and pebbles occurs about 27- 27 1/2 feet. Also last 4 inches are pure (hard) light brown silt (no sand or gravel).

AR 1710

**Borehole Log
KAFB0114**

Project name: Kirtland Air Force Base - Phase II, Stage 2A		Sheet 2 of 3
Project number: 463536001	Site: KAFB0114	
Drilling Company: USGS	Location: Landfill 1	Surface Elevation:
Date Started drilling: 20 Oct 91	Drilling Crew: Dan Sweney, John Palmer	Total Depth:
Drilling Method: Hollow stem auguring	Date completed drilling:	Drilling Fluid:
Borehole diameter: 7 7/8		Sample type:
Drilling equipment: Gardner-Denver17w		
Logged by: G. Roybal, F. Gebhardt		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
	1525	28-33	45 inches	Upper two feet of sample is light brown (5 YR 6/4) silt with trace of small pebbles throughout (similar to above). At about halfway, a significant increase in sand and gravel (granules and small pebbles). Color becomes much lighter. Gravel content increases steadily toward the bottom where it becomes the major component.
20-Oct-91	1550	33-35	27 inches	Upper 12 inches is a poorly sorted mix of sand, gravel, and silt. (approximately equal amount of each). Gravel typically small, but some pieces up to 50 mm diam. Remainder of sample is a light brown (5 YR 6/4) silt. (Fairly tight but crumbles under moderate hand pressure). Silt is very clean (no sand, gravel, or other impurities).
	1605	35-38	30 inches	Clean light brown silt (same as lower half of previous interval). Lower foot has trace of gravel randomly distributed throughout matrix.
31-Oct-91				From this point on, core barrel samples will be taken only at sample analysis depths (5, 25, 50, 100). Other intervals will be drilled through to vastly expedite completion of the hole.
		48-51	36 inches	Hard light brown clay (5 YR 6/4 with random swirls of very light colored silt (volcanic ash?))

Borehole Log
KAFB0114

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 3 of 3
Project number: 463536001 Site: KAFB0114
Drilling Company: USGS Location: Landfill 1 Surface Elevation:
Date Started drilling: 20 Oct 91 Drilling Crew: Dan Sweney, John Palmer
Drilling Method: Hollow stem auguring Date completed drilling: Total Depth:
Borehole diameter: 7 7/8 Drilling Fluid:
Drilling equipment: Gardner-Denver 17w Sample type:
Logged by: G. Roybal, F. Gebhardt

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
		98-101		Very-poorly-sorted sand intermixed with very poorly sorted gravel. All grain sizes seem to be equally well represented. Bottom 6 inches of sample was a grayish brown silt.

Borehole Log
KAFB0114

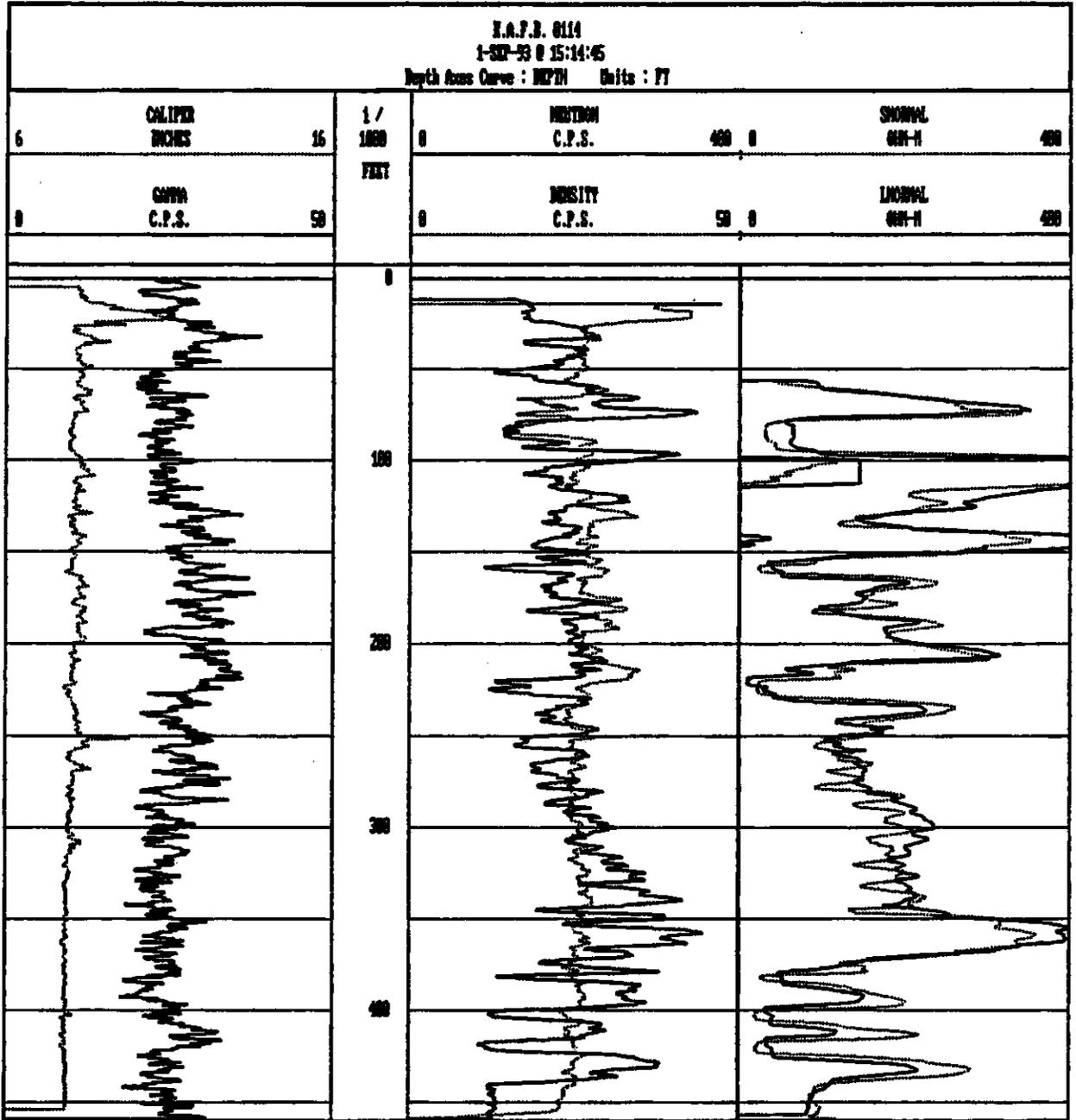
Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 1 of 2
 Project number: 463536001 Site: KAFB0114
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 12 Aug 92 Drilling Crew: Dan Sweney, Dean Bohn, Bob Gilliland
 Drilling Method: Hollow stem
 augering/mud rotary
 Borehole diameter: 7 7/8 Date completed drilling: 17 Aug 92 Total Depth: 470
 Drilling equipment: Gardner-Denver17w Drilling Fluid: Bentonite
 Logged by: Gebhardt, Roybal Sample type: Drill cuttings

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
		0-100	No sample. (This interval already described during drilling of borehole).
		100-105	Brown silt. Also has large amount of poorly-sorted sand up to very coarse grain size. Trace of brown clay (mixed in silt). Trace of very small gravel (granules).
		105-150	Sand, poorly-sorted, medium-very coarse grained, large amount of granules ranging up to very small gravel (≤ 10 mm diam). Trace of brown silt.
		150-170	Poorly-sorted sand ranging up to very small gravel (as above) only now has small amount but significantly more brown silt than previously.
		170-185	Poorly-sorted sand ranging up to small gravel similar to previous interval(s) but now a higher percentage of larger particles (gravel now ≤ 15 mm diam). Also now has moderate amount of light greyish-brown clay.
		185-215	Poorly-sorted sand ranging up to small gravel (≤ 15 mm diam.) Only slight trace of silt or clay.
		215-225	Sand, poorly-sorted ranging up to small gravel with a moderate (30-50%) amount of light brown clay.
		225-240	Light brown clay with small ($< 20\%$) amount of poorly-sorted sand ranging up to small gravel.
		240-245	Poorly-sorted ranging up to small gravel with small amount of light brown clay.
		245-310	Very similar to previous intervals, but now slight preponderance of small gravel (≤ 15 mm diam). Ranging down to medium grained sand. (no silt, no clay).

Borehole Log
KAFB0114

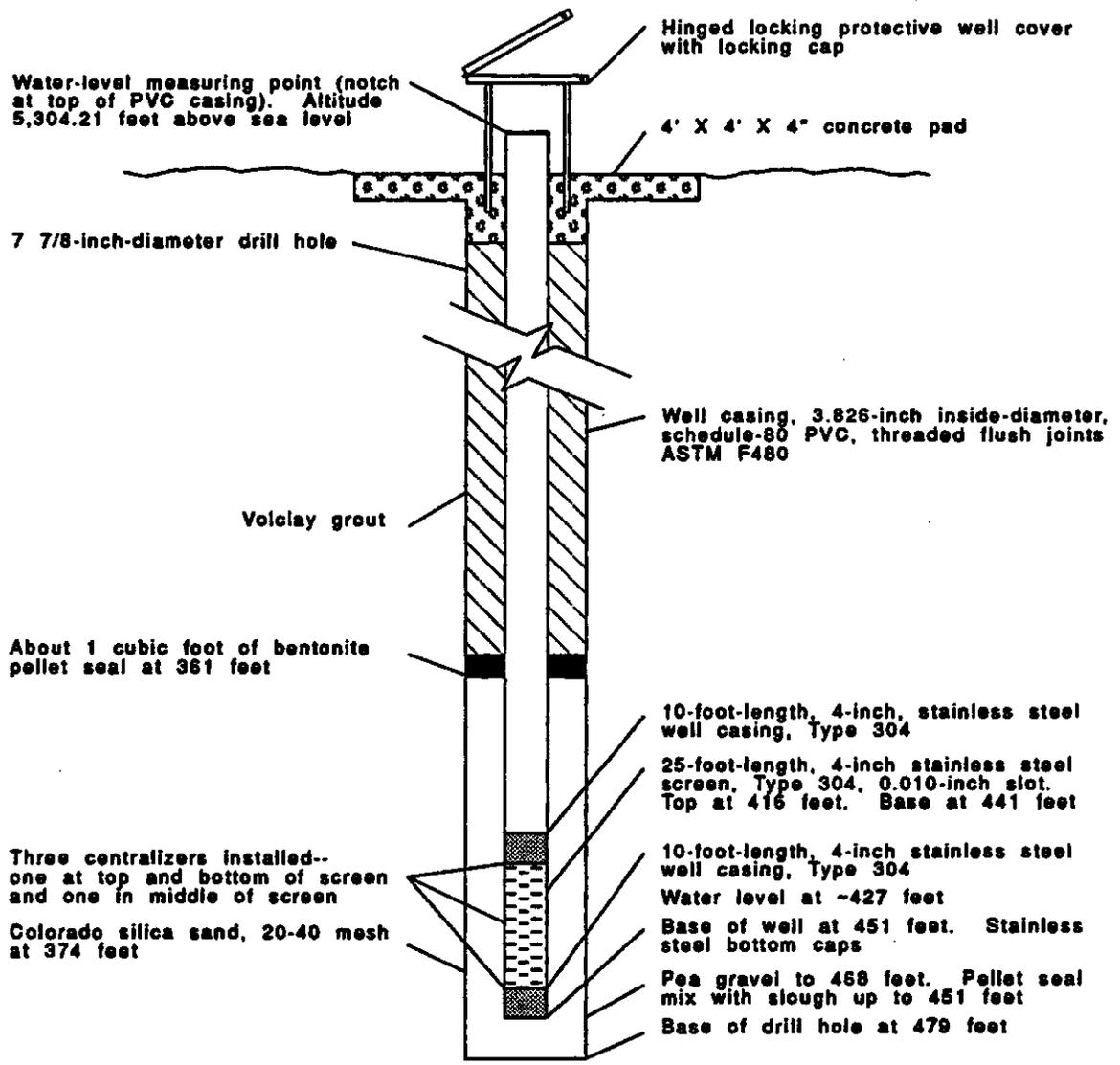
Project name: Kirtland Air Force Base - Phase II, Stage 2A		Sheet 2 of 2
Project number: 463536001	Site: KAFB0114	
Drilling Company: USGS	Location: Landfill 1	Surface Elevation:
Date Started drilling: 12 Aug 92	Drilling Crew: Dan Sweney, Dean Bohn, Bob Gilliland	
Drilling Method: Hollow stem augering/mud rotary		
Borehole diameter: 7 7/8	Date completed drilling: 17 Aug 92	Total Depth: 470
Drilling equipment: Gardner-Denver17w	Drilling Fluid: Bentonite	
Logged by: Gebhardt, Roybal	Sample type: Drill cuttings	

Date	Time	Depth(ft)	Lithology and Remarks
		310-325	Poorly-sorted small gravel (\leq 15 mm diam). Ranging down to medium grained sand (as in previous interval). Now has 20-30% brown clay.
		325-345	Poorly-sorted small gravel ranging down to medium grained sand. Only slight trace of clay.
		345-360	Poorly-sorted small gravel (somewhat less coarse than previously - generally \leq 10 mm diam.) Ranging down to medium sand. Predominantly granule-sized. Moderate amount (30-50%) of soft brown clay.
		360-390	Poorly-sorted small gravel (generally granule-sized) ranging down to medium grained sand. Slight trace of clay.
		390-420	Same as previous interval, only now 30-50% soft brown clay.
		420-430	Poorly sorted sand ranging from medium grained up to granule sized (majority of particles are granules). Very small amount of gravel larger than granules. Small amount of soft brown clay.
		430-440	Granules, sand, trace of small gravel (as in previous interval) but now has about 50-60% brown clay.
		440-460 (T.D.)	Granules, medium-very coarse poorly-sorted sand, trace of very small gravel. Small amount (\pm 10 %) of brown clay.



KAFB-0114

AR 1710



NOT TO SCALE

Well-completion diagram for monitoring well KAFB 0115. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 08-12-92, completed on 08-24-92. Well drilled using mud rotary method with Wyoming sodium bentonite drilling fluid. All depths are in feet below land surface.

KAFB-0115
AR 1710

Borehole Log
KAFB0115

Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 1 of 2
 Project number: 463536001 Site: KAFB0115
 Drilling Company: USCS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 01 Jul 91 Drilling Crew: Dan Sweney, John Palmer, Dean Bohn
 Drilling Method: Mud rotary Date completed drilling: Total Depth:
 Borehole diameter: 7 7/8 Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.
 Drilling equipment: Gardner-Denver17w Sample type:
 Logged by: G. Roybal, F. Gebhardt

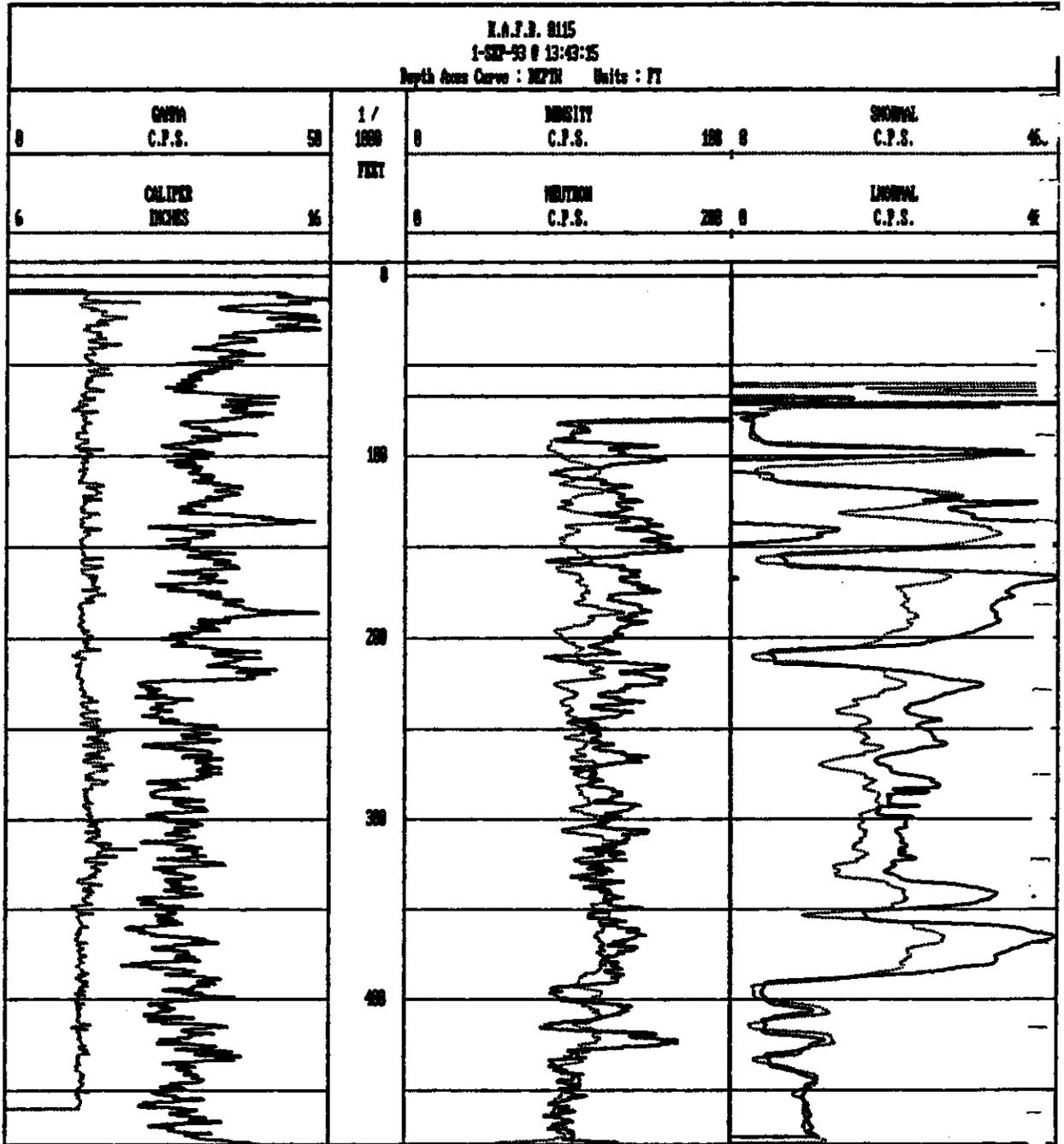
<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
13-Mar-92		0-20		(Samples not taken)
		20-35		Moderate brown clay with large amounts of poorly-sorted sand and gravel (up to about 15 mm diam.).
		35-65		Moderate brown clay with relatively small amounts of poorly-sorted sand . Trace of small gravel.
		65-75		Poorly sorted sand (probably silty), small amount of (small) gravel, some clay.
		75-95		Moderate brown clay, fairly large amount of poorly-sorted sand, trace of small gravel.
		95-105		Poorly-sorted sand with small amount of (small) gravel (no clay).
		105-115		Poorly-sorted sand (lot of granule-sized particals), trace of gravel, lot of brownish-grey clay.
		115-145		Poorly-sorted sand and granules, no clay, no gravel.
		145-155		Poorly-sorted sand and poorly-sorted gravel (up to 15 mm diam.), small amount of brown clay.

AR 1710

**Borehole Log
KAFB0115**

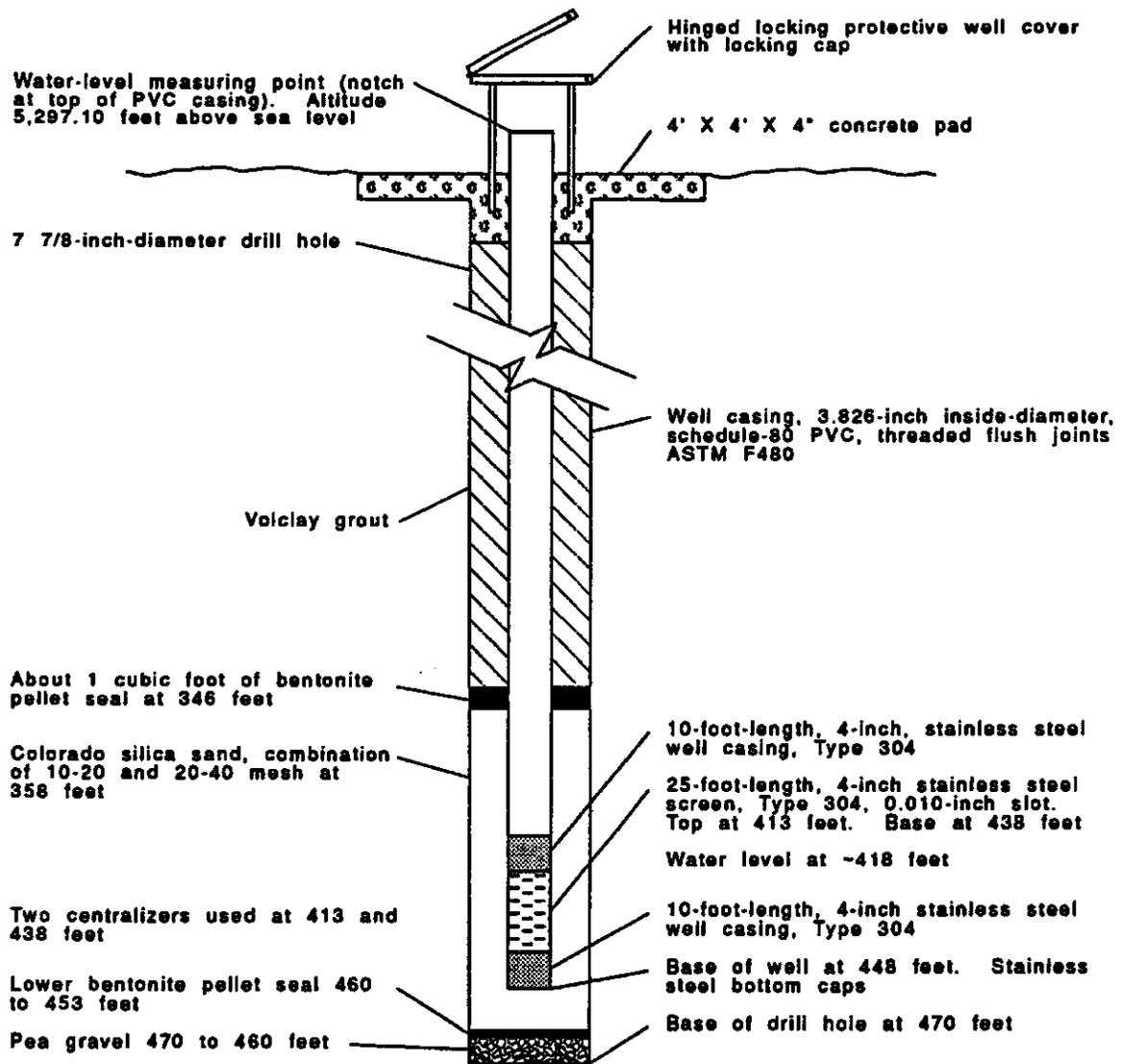
Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 2 of 2
Project number: 463536001	Site: KAFB0115
Drilling Company: USGS	Location: Landfill 1
Date Started drilling: 01 Jul 91	Drilling Crew: Dan Sweney, John Palmer, Dean Bohn
Drilling Method: Mud rotary	Date completed drilling:
Borehole diameter: 7 7/8	Drilling Fluid: Air 0-4 ft., Mud 4-4 ft.
Drilling equipment: Gardner-Denver17w	Total Depth:
Logged by: G. Roybal, F. Gebhardt	Sample type:

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
		155-160		Same as previous interval - only much more clay.
		160-165		Poorly-sorted sand and small (diameter), poorly-sorted gravel. Small amount of clay.
		165-210		Poorly-sorted sand intermixed with small poorly-sorted gravel. No clay.
		210-230		Poorly-sorted sand and granules, trace of small gravel, moderate amount of clay.
14-Mar-92		230-245		Med. - v. coarse sand, granules, some clay, trace of small gravel.
14-16-Mar-92		245-400		Granules, small gravel (up to 15 mm diam.), and med - v. coarse sand. (Small amount of sand). No clay.
16-Mar-92		400-440		Brown clay (approx. 50%), granules, small gravel, med - v. coarse sand.
16-Mar-92		440-450		Granules and v. coarse sand. Some clay. Trace of small gravel.
16-Mar-92		450-480		Granules, small gravel (up to 15 mm diam.), v. coarse sand, some clay.



KAFB-0115

AR 1710



NOT TO SCALE

Well-completion diagram for monitoring well KAFB 0117. Drilled and completed by U.S. Geological Survey, Coal Branch, Denver, Colo. Started on 08-16-92, completed on 08-19-92. Well drilled using mud rotary method with Wyoming sodium bentonite drilling fluid. All depths are in feet below land surface.

KAFB-0117

AR 1710

**Borehole Log
KAFB0117**

Project name: Kirtland Air Force Base - Phase II, Stage 2A		Sheet 1 of 2
Project number: 463536001	Site: KAFB0117	
Drilling Company: USGS	Location: Kirtland AFB	Surface Elevation:
Date Started drilling: 12 Feb 92	Drilling Crew: Dan Sweney, John Palmer, Dean Bohn	
Drilling Method: Hollow stem auguring	Date completed drilling:	Total Depth:
Borehole diameter: 77/8	Drilling Fluid:	
Drilling equipment: Gardner-Denver17w		Sample type:
Logged by: G. Roybal, F. Gebhardt		

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Drilling Speed (Min/ft)</u>	<u>Lithology and Remarks</u>
3-Nov-91		4-7		Hard-packed light brown silt (5 YR 5/6) with some gravel distributed throughout matrix. Zone of caliche-rich silt (white) at about 5.5 feet.
		23-27		Top 12 inches are poorly-sorted silt and sand (5 YR 5/6) with distributed small gravel pieces. Next 18 inches are silt (loosely packed, 5 YR 5/6) with minor clay lenses, some small gravel still present. Next 15 inches are a very tight moderate brown 5 YR 4/4 clay with no silt or sand or gravel, but has numerous large pieces of caliche randomly distributed. Bottom six inches are light brown silt (as in 4-7 foot interval).
4-Nov-91		48.5-51.1		The top and bottom 6 inches were both identical—>v. fine - fine, very-well-sorted sand. The major portion of the rest was a tight light brown silt with no gravel or coarse sand, but several small indistinct lenses of fine sand and/or clay. The clay lenses are grayish red (10 R 4/2).

AR1710

**Borehole Log
KAFB0117**

Project name: Kirtland Air Force Base - Phase II, Stage 2A **Sheet 2 of 2**
Project number: 463536001 **Site:** KAFB0117
Drilling Company: USGS **Location:** Kirtland AFB **Surface Elevation:**
Date Started drilling: 12 Feb 92 **Drilling Crew:** Dan Sweney, John Palmer, Dean Bohn
Drilling Method: Hollow stem auguring **Date completed drilling:** **Total Depth:**
Borehole diameter: 7 7/8 **Drilling Fluid:**
Drilling equipment: Gardner-Denver17w **Sample type:**
Logged by: G. Roybal, F. Gebhardt

83-85

Upper 18 inches are very-well-sorted fine-med. grained sand (pale yellowish brown 10 YR 6/2). Very clean appearance with only a couple of small pieces of gravel in 18 inch column. Bottom six inches still contains some of this same sand but is predominately gravel (up to 50 mm diam) Rounded to subrounded large variety of colors and mineral composition. No clay. No silt.

4-Nov-91

99-101

Bottom 15 inches are silty sand (moderately well-sorted) with several pieces of gravel up to 50 mm diam. Above this is a tight light brown lens of clay (about .3 foot thick) - no impurities in this clay. Above this is a very poorly sorted mixture of silt, sand, and gravel (up to about 40 mm diam).

Borehole Log
KAFB0117

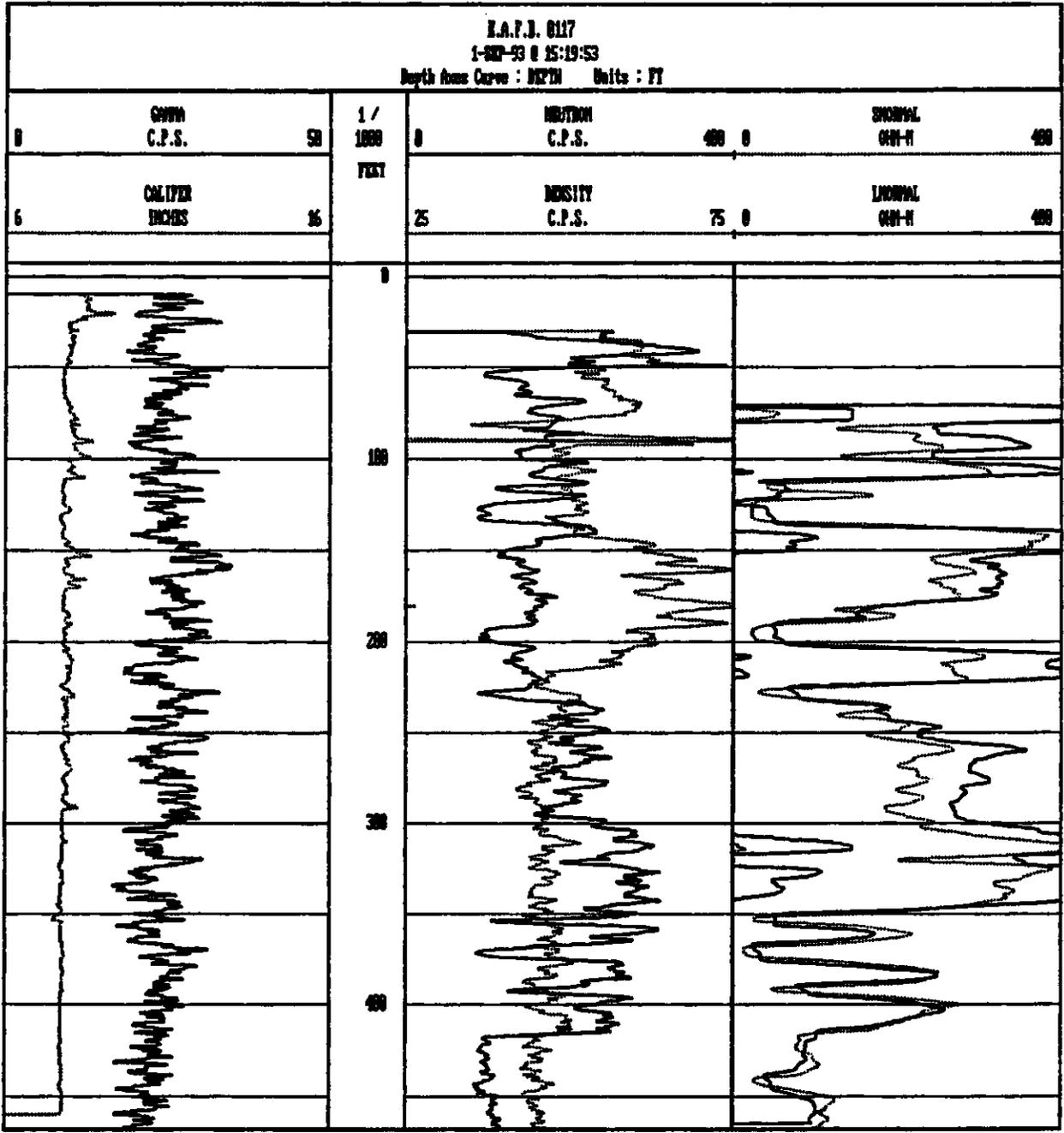
Project name: Kirtland Air Force Base - Phase II, Stage 2A Sheet 1 of 2
 Project number: 463536001 Site: KAFB0117
 Drilling Company: USGS Location: Landfill 1 Surface Elevation:
 Date Started drilling: 16 Aug 92 Drilling Crew: Dan Sweney, Dean Bohn, Bob Gilliland
 Drilling Method: Hollow stem
 augering/mud rotary
 Borehole diameter: 7 7/8 Date completed drilling: 12 Aug 92 Total Depth: 470
 Drilling equipment: Gardner-Denver17w Drilling Fluid: Bentonite
 Logged by: Gebhardt, Roybal Sample type: Drill cuttings

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
		0-100	Not sampled (already described drilling of 100-foot borehole).
		100-120	Sand, poorly-sorted ranging from medium-very coarse grained. Gravel, generally quite small (≤ 10 mm diam.), very large number of granules.
		120-125	Soft brown clay with a large amount (about 30-40%) of sand and small gravel (as in previous interval).
		125-130	Primarily sand and gravel (as in interval 100-120) with about 20% clay.
		130-140	Soft brown clay (only slight trace of sand, gravel).
		140-145	About 70-80% soft brown clay, remainder sand, gravel (as in interval 100'-120').
		145-150	About 60-70% sand, gravel (as described for interval 100-120), remainder is soft brown clay.
		150-195	Very small gravel (generally ≤ 10 mm diam), predominantly granule-sized or very slightly larger, grading down to coarse sand. Overall appearance is very similar to interval 100-120 above, but overall texture is slightly more coarse. Traces of soft brown clay.
		195-210	Approximately 80% soft brown clay, remainder gravel and sand as in previous interval.
		210-220	Gravel and sand (same as interval 150-195 above) with small amounts of brown clay and also some brown silt.
		220-230	Same as interval 150-195 above.
		220-230	Same as interval 150-195 above.

**Borehole Log
KAFB0117**

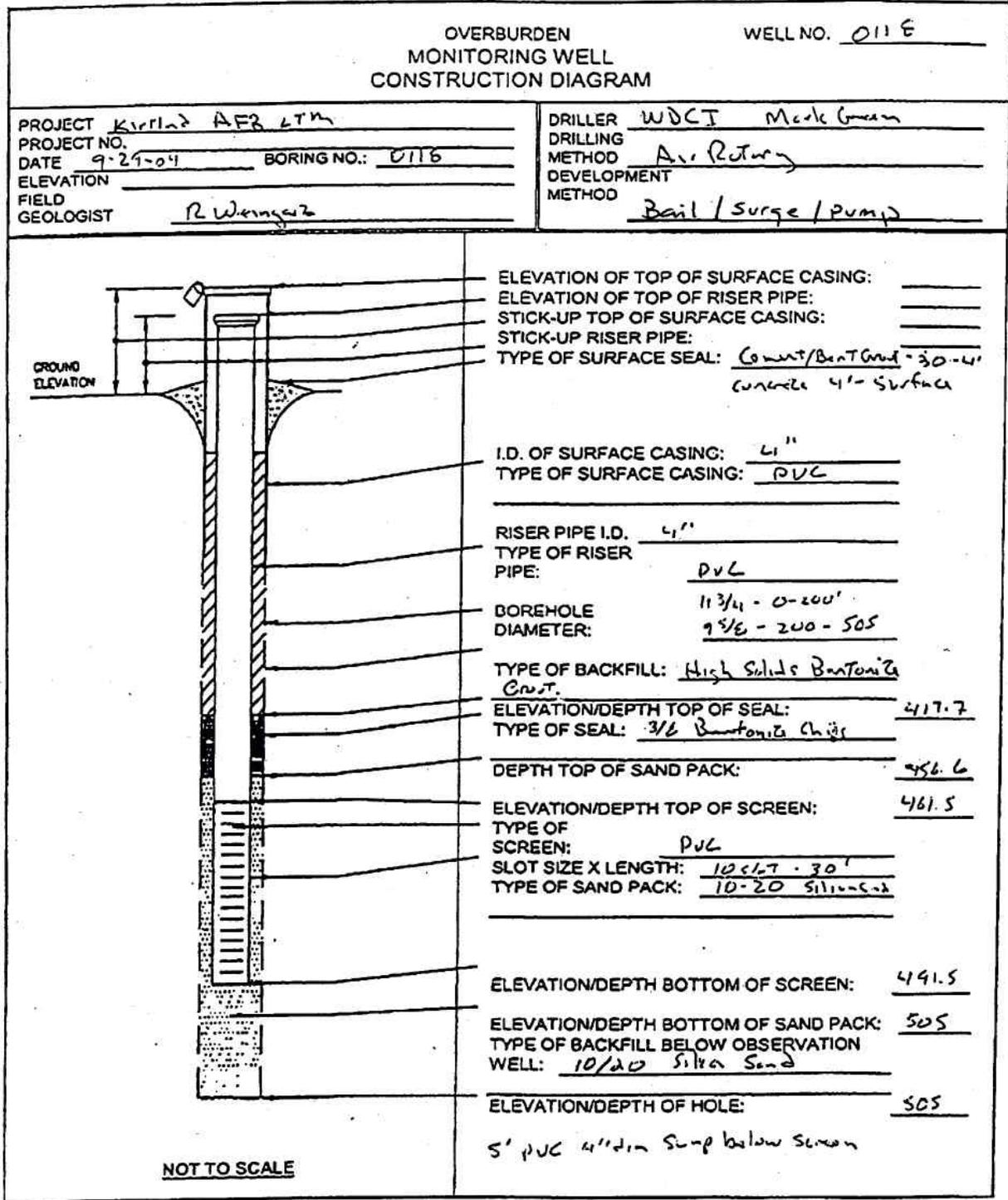
Project name: Kirtland Air Force Base - Phase II, Stage 2A	Sheet 2 of 2
Project number: 463536001	Site: KAFB0117
Drilling Company: USGS	Location: Landfill 1
Date Started drilling: 16 Aug 92	Surface Elevation:
Drilling Method: Hollow stem augering/mud rotary	Drilling Crew: Dan Sweney, Dean Bohn, Bob Gilliland
Borehole diameter: 7 7/8	Date completed drilling: 12 Aug 92 Total Depth: 470
Drilling equipment: Gardner-Denver17w	Drilling Fluid: Bentonite
Logged by: Gebhardt, Roybal	Sample type: Drill cuttings

<u>Date</u>	<u>Time</u>	<u>Depth(ft)</u>	<u>Lithology and Remarks</u>
		230-240	About 50% soft brown silty clay, 50% gravel and sand (as above)
		240-245	Gravel and sand as above with small amount of brown silty clay.
		245-290	Same as interval 150-195 above.
		290-310	Very similar to previous interval - poorly-sorted sand ranging from medium-grained up to small gravel. Overall slightly coarser than previously. (More larger particles - gravel now generally \leq 15 mm diam.)
		310-375	Small gravel (\leq 15 mm diam.) ranging down to medium-grained sand. Very poorly-sorted. Large number of particles are granule-size. Small amount of silty (and usually very sand) small brownish - red or tan clay balls present in all samples in this interval.
		375-380	About 50% gravel and sand (as in previous interval) and 50% soft brown clay. Trace of silt.
		380-385	Soft brown clay. Trace of sand and gravel (as above).
		385-390	Same as interval 375-380 above.
		390-450	Poorly-sorted sand ranging from medium-grained to very small gravel (\leq 10 mm diam.). Majority of particles are granule-sized or very coarse sand-sized. (Very similar to interval 100-120 above) Traces of brown clay in almost all samples this interval.
		450-455	Same as previous interval, only now has about 30% soft brown clay.
		455-470	Same as interval 390-450 above.
		T.D.	



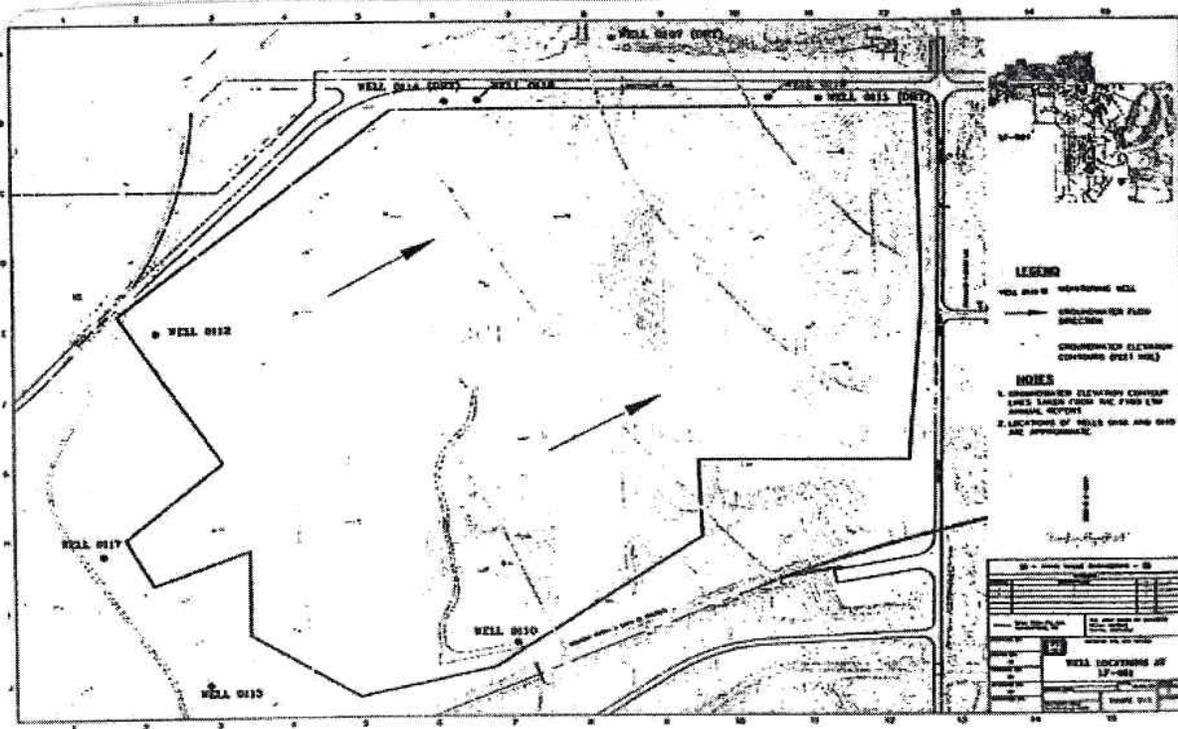
KAFB-0117

AR 1710



AR 2866

HTW DRILLING LOG					HOLE NO 0118	
1. COMPANY NAME Tetra Tech EC			2. DRILLING CONTRACTOR WDC		SHEET 1 of 27	
3. PROJECT LF-001 Well Installation			4. LOCATION Kirtland AFB			
5. NAME OF DRILLER Mark Green			6. MANUFACTURERS DESIGNATION OF DRILL			
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT		GEFCO Star 50K-CH air rotary 1 3/4" cas. 0-200 ft 9 5/8" cas. 200-505 ft		8. HOLE LOCATION LF-001		
				9. SURFACE ELEVATION 5318.57.		
				10. DATE STARTED 9/27/04	11. DATE COMPLETED 9/29/04	
12. OVERBURDEN THICKNESS 505 ft.			15. DEPTH GROUNDWATER ENCOUNTERED 471.5 ft.			
13. DEPTH DRILLED INTO ROCK 0 ft.			16. DEPTH TO WATER & TIME AFTER DRILLING COMPLETED 461.4 ft.			
14. TOTAL DEPTH OF HOLE 505 ft.			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA			
18. GEOTECHNICAL SAMPLES NA		DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES NA		
18. SAMPLES FOR CHEMICAL ANALYSIS		VOC	METALS	OTHER (Specify)	OTHER (Specify)	OTHER
						21. TOTAL CORE REC. %
22. DISPOSITION OF HOLE		BACKFILLED	MONITORING WELL	OTHER	23. SIGNATURE OF INSPECTOR	
			X			



PROJECT KAFB LF-01	HOLE NO. 0118
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AR 2866
 KAFB-0107 to KAFB-0121
 February 2009
 76 of 159

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 2 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5318.0	1.0	Poorly Graded Sand with Silt 0-35 ft. Dry, loose, red (2.5YR 5/6), silty fine sand with minor clay and gravel, (SP-SM)	3.2				
5317.0	2.0						
5316.0	3.0						
5315.0	4.0						
5314.0	5.0						
5313.0	6.0						
5312.0	7.0						
5311.0	8.0						
5310.0	9.0						
5309.0	10.0						
5308.0	11.0						
5307.0	12.0						
5306.0	13.0						
5305.0	14.0						
5304.0	15.0						
5303.0	16.0						
5302.0	17.0						
5301.0	18.0						
5300.0	19.0						
5299.0	20.0					
		PROJECT KAFB LF-01					HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 3 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5298.0	21.0	20-30 ft. color change to light reddish brown (2.5YR 6/4)	3.3				
5297.0	22.0						
5296.0	23.0						
5295.0	24.0						
5294.0	25.0						
5293.0	26.0						
5292.0	27.0						
5291.0	28.0						
5290.0	29.0						
5289.0	30.0						
5288.0	31.0	30-35 ft. increasing fine gravel	6.5				
5287.0	32.0						
5286.0	33.0						
5285.0	34.0						
5284.0	35.0						
5283.0	36.0	Silty Sand with Gravel 35-40 ft. Dry, loose, pale yellow (2.5Y 7/3), round and subrounded granite and quartz, (GM)	2.7				
5282.0	37.0						
5281.0	38.0						
5280.0	39.0						
5279.0	40.0						
		PROJECT KAFB LF-01					HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 4 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5278.0	41.0	Well Graded Sand with Gravel 40-90 ft. Dry, loose, light reddish brown (2.5YR 6/4), (SM)	2.7				
5277.0	42.0						
5276.0	43.0						
5275.0	44.0						
5274.0	45.0						
5273.0	46.0						
5272.0	47.0						
5271.0	48.0						
5270.0	49.0						
5269.0	50.0						
5268.0	51.0						
5267.0	52.0						
5266.0	53.0						
5265.0	54.0						
5264.0	55.0						
5263.0	56.0						
5262.0	57.0						
5261.0	58.0						
5260.0	59.0						
5259.0	60.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)							HOLE NO 0118
PROJECT KAFB LF-01				INSPECTOR Bryan Graham		SHEET 5 of 27	
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5258.0	61.0	40-90 ft. Dry, loose, light reddish brown (2.5YR 6/4), (SM) Cont.					
5257.0	62.0						
5256.0	63.0						
5255.0	64.0						
5254.0	65.0						
5253.0	66.0						
5252.0	67.0						
5251.0	68.0						
5250.0	69.0						
5249.0	70.0						
5248.0	71.0						
5247.0	72.0						
5246.0	73.0						
5245.0	74.0						
5244.0	75.0						
5243.0	76.0						
5242.0	77.0						
5241.0	78.0						
5240.0	79.0						
5239.0	80.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 6 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5238.0	81.0	40-90 ft. Dry, loose, light reddish brown (2.5YR 6/4), (SM) Cont					
5237.0	82.0						
5236.0	83.0						
5235.0	84.0						
5234.0	85.0						
5233.0	86.0						
5232.0	87.0						
5231.0	88.0						
5230.0	89.0						
5229.0	90.0						
5228.0	91.0	Well Graded Sand with Silt 90-100 ft. Dry, loose, pale olive (5Y 6/4), (SW)	3.2				
5227.0	92.0						
5226.0	93.0						
5225.0	94.0						
5224.0	95.0						
5223.0	96.0						
5222.0	97.0						
5221.0	98.0						
5220.0	99.0						
5219.0	100.0						

PROJECT KAFB LF-01

HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)							HOLE NO 0118
PROJECT KAFB LF-01				INSPECTOR Bryan Graham		SHEET 7 of 27	
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5218.0	101.0	Well Graded Sand with Silt 100-140 ft. Dry, loose, pale olive (5YR 6/4), medium to fine sand, fine gravel, (SW-SM)	3.2				
5217.0	102.0						
5216.0	103.0						
5215.0	104.0						
5214.0	105.0						
5213.0	106.0						
5212.0	107.0						
5211.0	108.0						
5210.0	109.0						
5209.0	110.0						
5208.0	111.0	grading from coarse to fine sand	4.6				
5207.0	112.0						
5206.0	113.0						
5205.0	114.0						
5204.0	115.0						
5203.0	116.0						
5202.0	117.0						
5201.0	118.0						
5200.0	119.0						
5199.0	120.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 8 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5198.0	121.0	color change to light olive brown (2.5 Y 5/4)	3.2				
5197.0	122.0						
5196.0	123.0						
5195.0	124.0						
5194.0	125.0						
5193.0	126.0						
5192.0	127.0						
5191.0	128.0						
5190.0	129.0						
5189.0	130.0						
5188.0	131.0						
5187.0	132.0						
5186.0	133.0						
5185.0	134.0						
5184.0	135.0						
5183.0	136.0						
5182.0	137.0						
5181.0	138.0						
5180.0	139.0						
5179.0	140.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 9 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5178.0	141.0	Poorly Grade Sand with Silt 140-174 ft. Dry, loose, light yellow brown (2.5YR 4/3), medium sand, trace of gravel, minor clay, (SP-SM)	1.4 -----				
5177.0	142.0						
5176.0	143.0						
5175.0	144.0						
5174.0	145.0						
5173.0	146.0						
5172.0	147.0						
5171.0	148.0						
5170.0	149.0						
5169.0	150.0						
5168.0	151.0	color change to light yellow brown (2.5YR 4/3)	3.3 -----				
5167.0	152.0						
5166.0	153.0						
5165.0	154.0						
5164.0	155.0						
5163.0	156.0						
5162.0	157.0						
5161.0	158.0						
5160.0	159.0						
5159.0	160.0						
		PROJECT KAFB LF-01					HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 10 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h	
5158.0	161.0	140-174 ft. Dry, loose, light yellow brown (2.5YR 4/3), medium sand, trace of gravel, minor clay, (SP-SM) Cont.						
5157.0	162.0							
5156.0	163.0							
5155.0	164.0							
5154.0	165.0							
5153.0	166.0							
5152.0	167.0							
5151.0	168.0							
5150.0	169.0							
5149.0	170.0							
5148.0	171.0			3.0				
5147.0	172.0							
5146.0	173.0							
5144.0	174.0		Pumice/Ash 174-179 ft. pale yellow (2.5YR 8/2), volcanic pumice/ash layer					
5143.0	175.0							
5142.0	176.0							
5141.0	177.0							
5140.0	178.0							
5139.0	179.0							
	180.0							
PROJECT KAFB LF-01						HOLE NO. 0118		

HTW DRILLING LOG (continuation sheet)							HOLE NO 0118
PROJECT KAFB LF-01				INSPECTOR Bryan Graham		SHEET 11 of 27	
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5138.0	181.0	Poorly Graded Sand with Silt 179-184 ft. Dry, loose, light yellow brown (2.5YR 4/3), medium to coarse sand, (SP-SM)	0.0				
5137.0	182.0						
5136.0	183.0						
5135.0	184.0	Pumice/Ash 184-186 ft. Dry, loose, pale yellow (2.5YR 8/2), volcanic pumice/ash layer	2.6				
5134.0	185.0						
5133.0	186.0	Well Graded Sand with Silt 186-200 ft. Dry, loose, light yellow brown (2.5YR 4/3), (SW)	2.5				
5132.0	187.0						
5131.0	188.0						
5130.0	189.0						
5129.0	190.0						
5128.0	191.0						
5127.0	192.0						
5126.0	193.0						
5125.0	194.0						
5124.0	195.0						
5123.0	196.0						
5122.0	197.0						
5121.0	198.0						
5120.0	199.0						
5119.0	200.0	end of day 9-27-04 drill depth 200 ft.					
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 12 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5118.0	201.0	Well Graded Gavel Sand with Silt 200-206 ft. Loose, dry, light brownish gray (2.5YR 6/2), medium to coarse sand, trace gravel, (SW-SM)	0.7				
5117.0	202.0						
5116.0	203.0						
5115.0	204.0						
5114.0	205.0						
5113.0	206.0						
5112.0	207.0	Well Graded Sand with Silt 206-208 ft. Well grounded gravel (GW)	1.6				
5111.0	208.0	Silty Sand 208-220 ft. Medium to coarse sand, trace of gravel, same as 200 ft. to 206 ft.	0.2				
5110.0	209.0						
5109.0	210.0						
5108.0	211.0						
5107.0	212.0						
5106.0	213.0						
5105.0	214.0						
5104.0	215.0						
5103.0	216.0						
5102.0	217.0						
5101.0	218.0						
5100.0	219.0						
5099.0	220.0						

PROJECT KAFB LF-01

HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 13 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5098.0	221.0	Silty Sand 220-235 ft. Dry, loose, brown to gray, silty fine sand, (SM)					
5097.0	222.0						
5096.0	223.0						
5095.0	224.0						
5094.0	225.0						
5093.0	226.0						
5092.0	227.0						
5091.0	228.0						
5090.0	229.0						
5089.0	230.0						
5088.0	231.0	increase in silt, some clay present	0.9				
5087.0	232.0						
5086.0	233.0						
5085.0	234.0						
5084.0	235.0						
5083.0	236.0	235-236 ft. layer of cobbles 1 to 2- inches in diameter					
5082.0	237.0	Well Graded Sand with Silt 236-260 ft. Dry, loose, grayish brown (2.5YR 5/2), medium to coarse sand, trace of gravel, (SW-SM)	0.8				
5081.0	238.0						
5080.0	239.0						
5079.0	240.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 14 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5078.0	241.0	236-260 ft. Dry, loose, grayish brown (2.5YR 5/2), medium to coarse sand, trace of gravel, (SW-SM) Cont.					
5077.0	242.0						
5076.0	243.0						
5075.0	244.0						
5074.0	245.0						
5073.0	246.0						
5072.0	247.0						
5071.0	248.0						
5070.0	249.0						
5069.0	250.0						
5068.0	251.0						
5067.0	252.0						
5066.0	253.0						
5065.0	254.0						
5064.0	255.0						
5063.0	256.0						
5062.0	257.0						
5061.0	258.0						
5060.0	259.0						
5059.0	260.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 15 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5058.0	261.0	Silty Gravel and Sand 260-276 ft. Coarse sandy gravel and silt, quartz	0.1				
5057.0	262.0						
5056.0	263.0						
5055.0	264.0						
5054.0	265.0						
5053.0	266.0						
5052.0	267.0						
5051.0	268.0						
5050.0	269.0						
5049.0	270.0						
5048.0	271.0						
5047.0	272.0						
5046.0	273.0						
5045.0	274.0						
5044.0	275.0						
5042.0	276.0	Well Graded Gravel with Sand 276-280 ft. Well graded gravel and sand, (GW)	1.2				
5041.0	277.0						
5040.0	278.0						
5039.0	279.0						
5039.0	280.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 16 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5038.0	281.0	Silty Gravel with Sand 280-317 ft. Coarse sandy gravel to gravelly sand with silt, (GM)	1.3				
5037.0	282.0						
5036.0	283.0						
5035.0	284.0						
5034.0	285.0						
5033.0	286.0						
5032.0	287.0						
5031.0	288.0						
5030.0	289.0						
5029.0	290.0						
5028.0	291.0						
5027.0	292.0						
5026.0	293.0						
5025.0	294.0						
5024.0	295.0						
5023.0	296.0						
5022.0	297.0						
5021.0	298.0						
5020.0	299.0						
5019.0	300.0						
		PROJECT KAFB LF-01					HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 17 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h	
5018.0	301.0	280-317 ft. Coarse sandy gravel to gravelly sand with silt, (GM) Cont.						
5017.0	302.0							
5016.0	303.0							
5015.0	304.0							
5014.0	305.0							
5013.0	306.0							
5012.0	307.0							
5011.0	308.0							
5010.0	309.0							
5009.0	310.0							
5008.0	311.0							
5007.0	312.0							
5006.0	313.0							
5005.0	314.0							
5004.0	315.0							
5003.0	316.0							
5002.0	317.0							
5001.0	318.0		Well Graded Gravel and Sand 317-337 ft. Dry, loose, gray (7.5YR 5/1), well rounded, poorly sorted, medium to coarse gravel with sand, (GW)	0.2				
5000.0	319.0			0.0				
4999.0	320.0							
PROJECT KAFB LF-01						HOLE NO. 0118		

HTW DRILLING LOG (continuation sheet)							HOLE NO 0118
PROJECT KAFB LF-01				INSPECTOR Bryan Graham			SHEET 18 of 27
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4998.0	321.0	317-337 ft. Dry, loose, gray (7.5YR 5/1), well rounded, poorly sorted, medium to coarse gravel with sand, (GW) COnt.					
4997.0	322.0						
4996.0	323.0						
4995.0	324.0						
4994.0	325.0						
4993.0	326.0						
4992.0	327.0						
4991.0	328.0						
4990.0	329.0						
4989.0	330.0						
4988.0	331.0						
4987.0	332.0						
4986.0	333.0						
4985.0	334.0						
4984.0	335.0						
4983.0	336.0						
4981.0	337.0	Well Graded Sand 337-358 ft. Dry, loose, brown (10YR 5/3), well graded, medium to fine sand, (SW)					
4980.0	338.0						
4979.0	339.0						
	340.0						

PROJECT KAFB LF-01

HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 19 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4978.0	341.0	337-358 ft. Dry, loose, brown (10YR 5/3), well graded, medium to fine sand, (SW) Cont.					
4977.0	342.0						
4976.0	343.0						
4975.0	344.0						
4974.0	345.0						
4973.0	346.0						
4972.0	347.0						
4971.0	348.0						
4970.0	349.0						
4969.0	350.0						
4968.0	351.0						
4967.0	352.0						
4966.0	353.0						
4965.0	354.0						
4964.0	355.0						
4963.0	356.0						
4962.0	357.0						
4961.0	358.0	Well Graded Sand 358-370 ft. color change to light olive brown (2.5YR 5/4)					
4960.0	359.0						
4959.0	360.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)							HOLE NO 0118
PROJECT KAFB LF-01				INSPECTOR Bryan Graham			SHEET 20 of 27
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4958.0	361.0	358-370 ft. color change to light olive brown (2.5YR 5/4) Cont.					
4957.0	362.0						
4956.0	363.0						
4955.0	364.0						
4954.0	365.0						
4953.0	366.0						
4952.0	367.0						
4951.0	368.0						
4950.0	369.0						
4949.0	370.0						
4948.0	370.0	Poorly Grade Sand with Gravel 370-383 ft. Dry, loose, light olive brown (2.5YR 5/4), (SP)	0.6				
4947.0	371.0						
4946.0	372.0						
4945.0	373.0						
4944.0	374.0						
4943.0	375.0						
4942.0	376.0						
4941.0	377.0						
4940.0	378.0						
4939.0	379.0						
	380.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 21 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4938.0	381.0						
4937.0	382.0						
4936.0	383.0						
4935.0	384.0	Silty Sand 383-395 ft. Moist, loose, light brown (2.5YR 6/2), fine silty sand, (SM)					
4934.0	385.0						
4933.0	386.0						
4932.0	387.0						
4931.0	388.0						
4930.0	389.0						
4929.0	390.0						
4928.0	391.0						
4927.0	392.0						
4926.0	393.0						
4925.0	394.0						
4924.0	395.0						
4923.0	396.0	Well Graded Sand With Gravel 395-420 ft. Dry, loose, light olive brown (2.5YR 5/4), gravelly medium sand, (SW)	1.7				
4922.0	397.0						
4921.0	398.0						
4920.0	399.0						
4919.0	400.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 22 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4918.0	401.0	395-420 ft. Dry, loose, light olive brown (2.5YR 5/4), gravelly medium sand, (SW) Cont.					
4917.0	402.0						
4916.0	403.0						
4915.0	404.0						
4914.0	405.0						
4913.0	406.0						
4912.0	407.0						
4911.0	408.0						
4910.0	409.0						
4909.0	410.0						
4908.0	411.0						
4907.0	412.0						
4906.0	413.0						
4905.0	414.0						
4904.0	415.0						
4903.0	416.0						
4902.0	417.0						
4901.0	418.0						
4900.0	419.0						
4899.0	420.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 23 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4898.0	421.0	Well Graded Gravel with Sand 420-430 ft. Moist, light olive brown (2.5YR 5/4), quartz, metamorphic, volcanics, (GW)					
4897.0	422.0						
4896.0	423.0						
4895.0	424.0						
4894.0	425.0						
4893.0	426.0						
4892.0	427.0						
4891.0	428.0						
4890.0	429.0						
4889.0	430.0						
4888.0	431.0	Poorly Graded Sand with Gravel 430-469 ft. Moist, cemented, light olive brown (2.5YR 5/4), (SP)	1.6				
4887.0	432.0						
4886.0	433.0						
4885.0	434.0						
4884.0	435.0						
4883.0	436.0						
4882.0	437.0						
4881.0	438.0						
4880.0	439.0						
4879.0	440.0						
PROJECT KAFB LF-01						HOLE NO. 0118	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 24 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4878.0	441.0	430-469 ft. Moist, cemented, light olive brown (2.5YR 5/4), (SP) Cont.					
4877.0	442.0						
4876.0	443.0						
4875.0	444.0						
4874.0	445.0						
4873.0	446.0						
4872.0	447.0						
4871.0	448.0						
4870.0	449.0						
4869.0	450.0						
4868.0	451.0						
4867.0	452.0						
4866.0	453.0						
4865.0	454.0						
4864.0	455.0						
4863.0	456.0						
4862.0	457.0						
4861.0	458.0						
4860.0	459.0						
4859.0	460.0						
		PROJECT KAFB LF-01					HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 25 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4858.0	461.0	430-469 ft. Moist, cemented, light olive brown (2.5YR 5/4), (SP) Cont.					
4857.0	462.0						
4856.0	463.0						
4855.0	464.0						
4854.0	465.0						
4853.0	466.0						
4852.0	467.0						
4851.0	468.0						
4850.0	469.0						
4849.0	470.0						
4848.0	471.0	Silty Gravel 469-478 ft. Wet, loose, silty gravel with minor clay, quartz and metamorphic clasts, (GM)					
4847.0	472.0						
4846.0	473.0						
4845.0	474.0						
4844.0	475.0						
4843.0	476.0						
4842.0	477.0						
4841.0	478.0						
4840.0	479.0						
4839.0	480.0						
		Clayey Sand 478-505 ft. Wet, loose, olive yellow (2.5YR 6/8), medium to coarse sand, (SC)					

PROJECT KAFB LF-01

HOLE NO. 0118

HTW DRILLING LOG (continuation sheet)

HOLE NO 0118

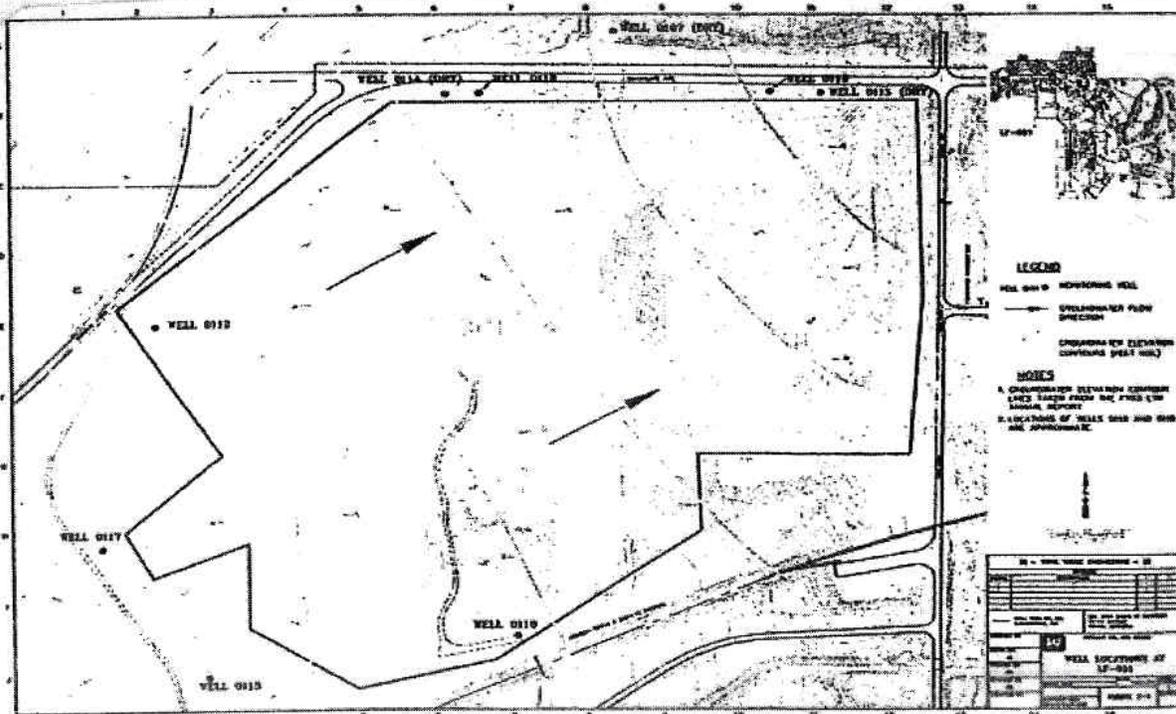
PROJECT KAFB LF-01

INSPECTOR Bryan Graham

SHEET 27 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4818.0	501.0						
4817.0	502.0						
4816.0	503.0						
4815.0	504.0						
4814.0	505.0	end of day 9-29-04 total depth 505 ft.					
4813.0	506.0						
4812.0	507.0						
4811.0	508.0						
4810.0	509.0						
4809.0	510.0						
4808.0	511.0						
4807.0	512.0						
4806.0	513.0						
4805.0	514.0						
4804.0	515.0						
4803.0	516.0						
4802.0	517.0						
4801.0	518.0						
4800.0	519.0						
4799.0	520.0						
		PROJECT KAFB LF-01					HOLE NO. 0118

HTW DRILLING LOG				HOLE NO 0119		
1. COMPANY NAME Tetra Tech EC		2. DRILLING CONTRACTOR WDC		SHEET 1 of 27		
3. PROJECT LF-001 and OT-028 Well Installation			4. LOCATION Kirtland AFB			
5. NAME OF DRILLER Mark Green			6. MANUFACTURERS DESIGNATION OF DRILL			
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT GEFCO Star 50K-CH air rotary 11 3/4" cas. 0-200 ft 9 5/8" cas. 200-505 ft		8. HOLE LOCATION LF-001		9. SURFACE ELEVATION 5313.47		
		10. DATE STARTED 9/30/01	11. DATE COMPLETED 10/2/04			
		12. OVERBURDEN THICKNESS 505 ft.		15. DEPTH GROUNDWATER ENCOUNTERED 457 ft.		
13. DEPTH DRILLED INTO ROCK 0 ft.		16. DEPTH TO WATER & TIME AFTER DRILLING COMPLETED 457 ft.				
14. TOTAL DEPTH OF HOLE 505 ft.		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA				
18. GEOTECHNICAL SAMPLES NA	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES			
18. SAMPLES FOR CHEMICAL ANALYSIS NA	VOC	METALS	OTHER (Specify)	OTHER (Specify)	OTHER	21. TOTAL CORE REC. %
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER	23. SIGNATURE OF INSPECTOR		



PROJECT LF-001 and OT-028 Well Installation HOLE NO. 0119

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HTW DRILLING LOG (continuation sheet)							HOLE NO 0119
PROJECT LF-001 and OT-028 Well Installation				INPSECTOR Bryan Graham			SHEET 2 of 27
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5313.0	1.0	Sandy Silt 0-28 ft. Dry, loose, reddish brown (2.5YR 5/4), (ML)					
5312.0	2.0						
5311.0	3.0						
5310.0	4.0						
5309.0	5.0						
5308.0	6.0						
5307.0	7.0						
5306.0	8.0						
5305.0	9.0						
5304.0	10.0						
5303.0	11.0	slightly cemented	0.3				
5302.0	12.0						
5301.0	13.0						
5300.0	14.0						
5299.0	15.0	color change to red (2.5YR 5/6)					
5298.0	16.0						
5297.0	17.0						
5296.0	18.0						
5295.0	19.0						
5294.0	20.0			0.6			

PROJECT LF-001 and OT-028 Well Installation

HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 3 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h	
5293.0	21.0							
5292.0	22.0							
5291.0	23.0							
5290.0	24.0							
5289.0	25.0							
5288.0	26.0							
5287.0	27.0							
5286.0	28.0							
5285.0	29.0	Well Graded Gravel with Silt/Sand 28-34 ft. Dry, slightly cemented, very pale brown (10YR 7/4), quartz clasts in medium sand matrix, (GW-GM)	0.4					
5284.0	30.0							
5283.0	31.0							
5282.0	32.0							
5281.0	33.0							
5280.0	34.0							
5279.0	35.0	Silty Sand 34-46 ft. Dry, loose, light reddish brown (2.5YR 6/4), trace of gravel, (SM)						
5278.0	36.0							
5277.0	37.0							
5276.0	38.0							
5275.0	39.0							
5274.0	40.0		1.1					
		PROJECT LF-001 and OT-028 Well Installation					HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INPSECTOR Bryan Graham

SHEET 4 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
5273.0	41.0						
5272.0	42.0						
5271.0	43.0						
5270.0	44.0						
5269.0	45.0						
5268.0	46.0						
5267.0	47.0	Well Graded Gravel with Silt/Sand 46-49 ft. Dry, very pale brown (10YR 7/4), (GW-GM)					
5266.0	48.0						
5265.0	49.0						
5264.0	50.0	Silty Sand 49- 60 ft. Dry, light reddish brown (2.5YR 6/4), (SM)	0.0				
5263.0	51.0						
5262.0	52.0						
5261.0	53.0						
5260.0	54.0						
5259.0	55.0						
5258.0	56.0						
5257.0	57.0						
5256.0	58.0						
5255.0	59.0						
5254.0	60.0						
PROJECT LF-001 and OT-028 Well installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 5 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5253.0	61.0	Poorly Graded sand with Silt 60-67 ft. Dry, cemented, light red (2.5YR 6/4), silty medium to fine sand, (SP-SM)	0.2				
5252.0	62.0						
5251.0	63.0						
5250.0	64.0						
5249.0	65.0						
5248.0	66.0						
5247.0	67.0		Silty Sand 67-97 ft. Dry, cemented, pale brown (10YR 6/3), gravelly, medium to coarse sand, (SM)	0.3			
5246.0	68.0						
5245.0	69.0						
5244.0	70.0						
5243.0	71.0						
5242.0	72.0						
5241.0	73.0	Dry to moist, loose, light brown (7.5YR 6/4), fine sand, silt, minor clay, siltstone clasts, (SM)		0.4			
5240.0	74.0						
5239.0	75.0						
5238.0	76.0						
5237.0	77.0						
5236.0	78.0						
5235.0	79.0						
5234.0	80.0						

PROJECT LF-001 and OT-028 Well Installation

HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 6 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5233.0	81.0						
5232.0	82.0						
5231.0	83.0						
5230.0	84.0						
5229.0	85.0						
5228.0	86.0						
5227.0	87.0						
5226.0	88.0						
5225.0	89.0						
5224.0	90.0						
5223.0	90.0	Grades to medium sand	0.2				
5222.0	91.0						
5221.0	92.0						
5220.0	93.0						
5219.0	94.0						
5218.0	95.0						
5217.0	96.0						
5216.0	97.0	Poorly Graded Sand	0.1				
5215.0	98.0	97-139 ft. Dry to moist, loose, pale brown (10YR 6/3), medium to fine sand, (SP)					
5214.0	99.0						
	100.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 7 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5213.0	101.0						
5212.0	102.0						
5211.0	103.0						
5210.0	104.0						
5209.0	105.0						
5208.0	106.0						
5207.0	107.0						
5206.0	108.0						
5205.0	109.0						
5204.0	110.0	medium to fine sand, trace gravel, color change to light yellow borwn (10YR 6/4), gravels are well rounded	-----				
5203.0	111.0		0.3				
5202.0	112.0						
5201.0	113.0						
5200.0	114.0						
5199.0	115.0						
5198.0	116.0						
5197.0	117.0						
5196.0	118.0						
5195.0	119.0						
5194.0	120.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 8 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5193.0		sand grades from coarse to medium					
	121.0						
5192.0	122.0						
	123.0						
5191.0	124.0						
	125.0						
5190.0	126.0						
	127.0						
5189.0	128.0						
	129.0						
5188.0	130.0	same as above, coarse to medium sand, trace of gravel, (SP)	0.4				
	131.0						
5187.0	132.0						
	133.0						
5186.0	134.0						
	135.0						
5185.0	136.0						
	137.0						
5184.0	138.0						
	139.0						
5183.0	140.0	Well Graded Gravel with Sand 139-178 ft Dry, gravelly sand, volcanic pumice (SW)	0.3				

PROJECT LF-001 and OT-028 Well Installation

HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INPSECTOR Bryan Graham

SHEET 9 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5173.0	141.0						
5172.0	142.0						
5171.0	143.0						
5170.0	144.0						
5169.0	145.0						
5168.0	146.0						
5167.0	147.0						
5166.0	148.0						
5165.0	149.0						
5164.0	150.0	medium sand, mafic clasts, come cemented, sandstone fragments, (SW)	0.1				
5163.0	151.0						
5162.0	152.0						
5161.0	153.0						
5160.0	154.0						
5159.0	155.0						
5158.0	156.0						
5157.0	157.0						
5156.0	158.0						
5155.0	159.0						
5154.0	160.0						
		PROJECT LF-001 and OT-028 Well Installation					HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 10 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5153.0							
	161.0						
5152.0							
	162.0						
5151.0							
	163.0						
5150.0							
	164.0						
5149.0							
	165.0						
5148.0							
	166.0						
5147.0							
	167.0						
5146.0							
	168.0						
5145.0							
	169.0						
5144.0							
	170.0						
5143.0							
	171.0						
5142.0							
	172.0						
5141.0							
	173.0						
5140.0							
	174.0						
5139.0							
	175.0						
5138.0							
	176.0						
5137.0							
	177.0						
5136.0							
	178.0						
5135.0		Well Graded Sand 178-187 ft. Dry, sandy fine gravel, quartz and tuft clasts, (GW)					
	179.0						
5134.0							
	180.0						
		PROJECT LF-001 and OT-028 Well Installation				HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 11 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5133.0		end of day 9-103-04 drill depth 180 ft.					
	181.0						
5132.0							
	182.0						
5131.0							
	183.0						
5130.0							
	184.0						
5129.0							
	185.0						
5128.0							
	186.0						
5127.0							
	187.0						
5126.0		Well Graded Sand 187- 216 ft. Dry, medium to coarse sand, minor gravels, volcanic and mafic clasts, (SW)	0.0				
	188.0						
5125.0							
	189.0						
5124.0							
	190.0						
5123.0							
	191.0						
5122.0							
	192.0						
5121.0							
	193.0						
5120.0							
	194.0						
5119.0							
	195.0						
5118.0							
	196.0						
5117.0							
	197.0						
5116.0							
	198.0						
5115.0							
	199.0						
5114.0							
	200.0						
		PROJECT LF-001 and OT-028 Well Installation					HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 12 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5113.0	201.0						
5112.0	202.0						
5111.0	203.0						
5110.0	204.0						
5109.0	205.0						
5108.0	206.0						
5107.0	207.0						
5106.0	208.0						
5105.0	209.0						
5104.0	210.0						
5103.0	211.0						
5102.0	212.0		0.2				
5101.0	213.0						
5100.0	214.0						
5099.0	215.0						
5098.0	216.0						
5097.0	217.0	Silty Sand 216-225 ft. Moist, cemented, light brown to gray (10YR 6/2), sandy silt to silty sand, minor gravel, some clay balls, (SM)	0.1				
5096.0	218.0						
5095.0	219.0						
5094.0	220.0						
		PROJECT LF-001 and OT-028 Well Installation					HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 13 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5093.0	221.0						
5092.0	222.0						
5091.0	223.0						
5090.0	224.0						
5089.0	225.0						
5088.0	226.0	Well Graded Gravel with Silt/Sand 225-243 ft. Moist, loose, light yellow brown (2.5YR 6/4), medium to coarse sand, (SW)	0.3				
5087.0	227.0						
5086.0	228.0						
5085.0	229.0						
5084.0	230.0						
5083.0	231.0						
5082.0	232.0						
5081.0	233.0						
5080.0	234.0						
5079.0	235.0						
5078.0	236.0						
5077.0	237.0						
5076.0	238.0						
5075.0	239.0						
5074.0	240.0						

PROJECT LF-001 and OT-028 Well Installation

HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 14 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5073.0	241.0						
5072.0	242.0						
5071.0	243.0						
5070.0	244.0	Well Graded Gravel with Silt/Sand 243-272 ft. Moist, cemented, light olive brown (2.5YR 5/4), silty sandy gravel, well rounded medium gravel, quartz clasts in sandy silt matrix	0.1				
5069.0	245.0						
5068.0	246.0						
5067.0	247.0						
5066.0	248.0						
5065.0	249.0						
5064.0	250.0						
5063.0	251.0						
5062.0	252.0						
5061.0	253.0						
5060.0	254.0						
5059.0	255.0						
5058.0	256.0						
5057.0	257.0						
5056.0	258.0						
5055.0	259.0						
5054.0	260.0						

PROJECT LF-001 and OT-028 Well Installation

HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 15 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5053.0			0.3				
	261.0						
5052.0							
	262.0						
5051.0							
	263.0						
5050.0							
	264.0						
5049.0							
	265.0						
5048.0							
	266.0						
5047.0							
	267.0						
5046.0							
	268.0						
5045.0							
	269.0						
5044.0							
	270.0						
5043.0		Well Graded Gravel with Sand 227-237 ft. Moist, cemented, lighth olive brown (2.5YR 5/4), sandy gravel, well rounded clasts, sand medium to coarse, (GW)	0.3				
	271.0						
5042.0							
	272.0						
5041.0							
	273.0						
5040.0							
	274.0						
5039.0							
	275.0						
5038.0							
	276.0						
5037.0							
	277.0						
5036.0							
	278.0						
5035.0							
	279.0						
5034.0							
	280.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 16 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5033.0	281.0	227-237 ft. Moist, cemented, lighth olive brown (2.5YR 5/4), sandy gravel, well rounded clasts, sand medium to coarse, (GW) Cont.					
5032.0	282.0						
5031.0	283.0						
5030.0	284.0						
5029.0	285.0						
5028.0	286.0						
5027.0	287.0						
5026.0	288.0						
5025.0	289.0						
5024.0	290.0						
5023.0	291.0						
5022.0	292.0						
5021.0	293.0						
5020.0	294.0						
5019.0	295.0						
5018.0	296.0						
5017.0	297.0						
5016.0	298.0						
5015.0	299.0						
5014.0	300.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INPSECTOR Bryan Graham

SHEET 17 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5013.0	301.0	227-237 ft. Moist, cemented, lighth olive brown (2.5YR 5/4), sandy gravel, well rounded clasts, sand medium to coarse, (GW) Cont.					
5012.0	302.0						
5011.0	303.0						
5010.0	304.0						
5009.0	305.0						
5008.0	306.0						
5007.0	307.0						
5006.0	308.0						
5005.0	309.0						
5004.0	310.0						
5003.0	311.0		0.1				
5002.0	312.0						
5001.0	313.0						
5000.0	314.0						
4999.0	315.0						
4998.0	316.0						
4997.0	317.0						
4996.0	318.0						
4995.0	319.0						
4994.0	320.0		0.2				

PROJECT LF-001 and OT-028 Well Installation

HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 18 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4993.0	321.0						
4992.0	322.0						
4991.0	323.0						
4990.0	324.0						
4989.0	325.0						
4988.0	326.0						
4987.0	327.0						
4986.0	327.0	Silty Gravel with Sand 327-343 ft. Dry, cemented, grayish brown (10YR 5/2), quartz clast, rounded, (GM)	0.3				
4985.0	328.0						
4984.0	329.0						
4983.0	330.0						
4982.0	331.0						
4981.0	332.0						
4980.0	333.0						
4979.0	334.0						
4978.0	335.0						
4977.0	336.0						
4976.0	337.0						
4975.0	338.0						
4974.0	339.0						
	340.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)							HOLE NO 0119
PROJECT LF-001 and OT-028 Well Installation				INSPECTOR Bryan Graham			SHEET 19 of 27
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4973.0	341.0						
4972.0	342.0						
4971.0	343.0						
4970.0	344.0	Well Graded Gravel with Silt/Sand 343-365 ft. Moist, cemented, light yellowish brown (2.5YR 6/4), rounded gravel, quartz, (GW-GM)	0.3				
4969.0	345.0						
4968.0	346.0						
4967.0	347.0						
4966.0	348.0						
4965.0	349.0						
4964.0	350.0						
4963.0	351.0						
4962.0	352.0						
4961.0	353.0						
4960.0	354.0						
4959.0	355.0						
4958.0	356.0						
4957.0	357.0						
4956.0	358.0						
4955.0	359.0						
4954.0	360.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)							HOLE NO 0119
PROJECT LF-001 and OT-028 Well Installation				INPSECTOR Bryan Graham		SHEET 20 of 27	
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4953.0	361.0						
4952.0	362.0						
4951.0	363.0						
4950.0	364.0						
4949.0	365.0						
4948.0	366.0	Well Graded Gravel with Sand 365-370 ft. Moist, silty gravelly sand, (GW)	0.0				
4947.0	367.0						
4946.0	368.0						
4945.0	369.0						
4944.0	370.0						
4943.0	371.0	Well Graded Gravel with Silt/Sand 370-380 ft. Same as 343 ft - 360 ft, (GW-GM)	0.3				
4942.0	372.0						
4941.0	373.0						
4940.0	374.0						
4939.0	375.0						
4938.0	376.0						
4937.0	377.0						
4936.0	378.0						
4935.0	379.0						
4934.0	380.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

PROJECT		INSPECTOR	HOLE NO
ELEV.	DEPTH		
a	b		
	381.0		

PROJECT

HOLE NO.

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 22 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4913.0							
	401.0						
4912.0							
	402.0						
4911.0							
	403.0						
4910.0							
	404.0						
4909.0							
	405.0						
4908.0							
	406.0						
4907.0							
	407.0						
4906.0							
	408.0						
4905.0							
	409.0						
4904.0							
	410.0						
4903.0		Clayey Gravel with Sand 410-430 ft. Gravel with clayey clasts, (GC)					
	411.0						
4902.0							
	412.0						
4901.0							
	413.0						
4900.0							
	414.0						
4899.0							
	415.0						
4898.0							
	416.0						
4897.0							
	417.0						
4896.0							
	418.0						
4895.0							
	419.0						
4894.0							
	420.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 23 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h	
4893.0		Gravel increases to gravelly silty sand	0.3					
	421.0							
4892.0								
	422.0							
4891.0								
	423.0							
4890.0								
	424.0							
4889.0								
	425.0							
4888.0								
	426.0							
4887.0								
	427.0							
4886.0								
	428.0							
4885.0								
	429.0							
4884.0								
	430.0							
4883.0		Well Graded Gravel with Sand 430-438 ft. Moist, cemented, pale brown (10YR 6/3), gravelly sand, (GW)						
	431.0							
4882.0								
	432.0							
4881.0								
	433.0							
4880.0								
	434.0							
4879.0								
	435.0							
4878.0								
	436.0							
4877.0								
	437.0							
4876.0								
	438.0							
4875.0		Silty Sand with Gravel 438-453 ft. Moist, cemented, pale yellow (2.5YR 7/3), silty fine sand with trace well rounded gravel, (SM)	0.3					
	439.0							
4874.0								
	440.0							

PROJECT LF-001 and OT-028 Well Installation

HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INPSECTOR Bryan Graham

SHEET 24 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4873.0							
	441.0						
4872.0							
	442.0						
4871.0							
	443.0						
4870.0							
	444.0						
4869.0							
	445.0						
4868.0							
	446.0						
4867.0							
	447.0						
4866.0							
	448.0						
4865.0							
	449.0						
4864.0							
	450.0						
4863.0							
	451.0						
4862.0							
	452.0						
4861.0							
	453.0						
4860.0		Well Graded Sand with Gravel 453-484 ft. Moist, cemented, light pale brown (1oYR 5/3), sandy gravel, (SW)	0.1				
	454.0						
4859.0							
	455.0						
4858.0							
	456.0						
4857.0							
	457.0						
4856.0							
	458.0						
4855.0							
	459.0						
4854.0							
	460.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 25 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4853.0							
	461.0						
4852.0							
	462.0						
4851.0							
	463.0						
4850.0							
	464.0						
4849.0							
	465.0						
4848.0							
	466.0						
4847.0							
	467.0						
4846.0							
	468.0						
4845.0							
	469.0						
4844.0							
	470.0						
4843.0		Same as above, cuttings are saturated					
	471.0						
4842.0							
	472.0						
4841.0							
	473.0						
4840.0							
	474.0						
4839.0							
	475.0						
4838.0							
	476.0						
4837.0							
	477.0						
4836.0							
	478.0						
4835.0							
	479.0						
4834.0							
	480.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

INSPECTOR Bryan Graham

SHEET 26 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4833.0							
	481.0						
4832.0							
	482.0						
4831.0							
	483.0						
4830.0							
	484.0						
4829.0		Silty Sand with Gravel 484-505 ft. Saturated, cemented to loose, reddish brown (2.5YR 5/3), (SM)					
	485.0						
4828.0							
	486.0						
4827.0							
	487.0						
4826.0							
	488.0						
4825.0							
	489.0						
4824.0							
	490.0						
4823.0							
	491.0						
4822.0							
	492.0						
4821.0							
	493.0						
4820.0							
	494.0						
4819.0							
	495.0						
4818.0							
	496.0						
4817.0							
	497.0						
4816.0							
	498.0						
4815.0							
	499.0						
4814.0							
	500.0						
		PROJECT LF-001 and OT-028 Well Installation					HOLE NO. 0119

HTW DRILLING LOG (continuation sheet)

HOLE NO 0119

PROJECT LF-001 and OT-028 Well Installation

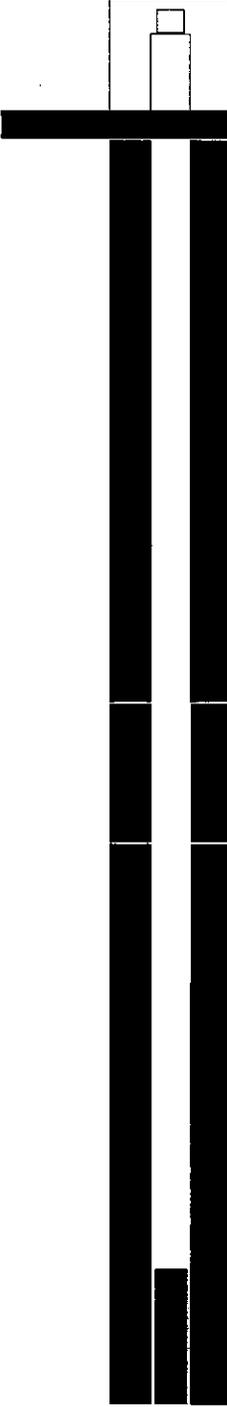
INSPECTOR Bryan Graham

SHEET 27 of 27

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4813.0	501.0	484-505 ft. Saturated, cemented to loose, reddish brown (2.5YR 5/3), (SM) Cont.					
4812.0	502.0						
4811.0	503.0						
4810.0	504.0						
4809.0	505.0						
4808.0			end of day 10-1-04 total depth 505 ft				
4807.0	506.0						
4806.0	507.0						
4805.0	508.0						
4804.0	509.0						
4803.0	510.0						
4802.0	511.0						
4801.0	512.0						
4800.0	513.0						
4799.0	514.0						
4798.0	515.0						
4797.0	516.0						
4796.0	517.0						
4795.0	518.0						
4794.0	519.0						
	520.0						
PROJECT LF-001 and OT-028 Well Installation						HOLE NO. 0119	

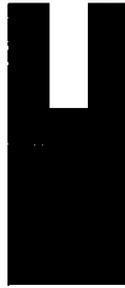
WELL DATABASE SUMMARY SHEET

Project Name: MONITOR WELL REPLACE	Geo Location: KAFB LANDFILL #1
ER ADS #:	Well Completion Date: 12-JUN-2006
Well Name: KAFB-0120	Completion Zone: SAND/GRAVEL
Owner Name: KAFB	Formation of Completion:
Date Drilling Started: 09-JUN-2009	Well Comment: BOREHOLE DIAMETER IS 11.75 INCHES FROM 0-280 FEET AND 9.75 INCHES FROM 280-465 FEET.
Drilling Contractor: WATER DEVELOPMENT CORP (V)	
Drilling Method: ARCH STAR 50K	
Borehole Depth: 465	
Casing Depth: 461.5	

Survey Data		Completion Data Measured Depths (FBGS)
Survey Date:		Casing Stickup: 3.62
Surveyed By:		
Surveyed Elevations (FAMSL)		
(X) Easting: 398566.094		Interval Start Stop
(Y) Northing: 1469081.875		GROUT/BACKFILL 1 0' 1'
		CONCRETE
Surveyed Elevations (FAMSL)		Interval Start Stop
Protective Casing:		CASING 0' 461.5'
Top of Inner Well Casing: 5289.62		SCHEDULE 80 PVC I.D. 4" O.D. 4.5"
Concrete Pad:		Interval Start Stop
Ground Surface: 5286		BOREHOLE 0' 465'
		I.D. 9.75" O.D. 11.75"
		Interval Start Stop
		GROUT/BACKFILL 2 1' 5'
		CEMENT/BENTONITE
		Interval Start Stop
		SEAL 1 5' 42'
		BENTONITE SLURRY
		Interval Start Stop
		SEAL 2 42' 368'
		BENTONITE CHIPS
		Interval Start Stop
		SECONDARY PACK 368' 418'
		SUGAR SAND
		Interval Start Stop
		PRIMARY PACK 418' 465'
		10/20 SILCA SAND
		Interval Start Stop
		SCREEN 429' 459'
		SCHEDULE 80 PVC
		Slot Size .01"
Calculated Depths and Elevations		
Initial Water Elevation: 4862.12		
(FAMSL)		
Initial Depth To Water: 427.5		
(FBGS)		
Last measured water level was 4858.84 FASL		
measured on 24-JUN-2008		
Date Updated: 05-FEB-2008	Date Printed: 14-NOV-2008	

WELL DATABASE SUMMARY SHEET

Project Name: MONITOR WELL REPLACE	Geo Location: KAFB LANDFILL #1
ER ADS #:	Well Completion Date: 12-JUN-2006
Well Name: KAFB-0120	Completion Zone: SAND/GRAVEL
Owner Name: KAFB	Formation of Completion:
Date Drilling Started: 09-JUN-2009	Well Comment: BOREHOLE DIAMETER IS 11.75 INCHES FROM 0-280 FEET AND 9.75 INCHES FROM 280-465 FEET.
Drilling Contractor: WATER DEVELOPMENT CORP (W	
Drilling Method: ARCH STAR 50K	
Borehole Depth: 465	
Casing Depth: 461.5	



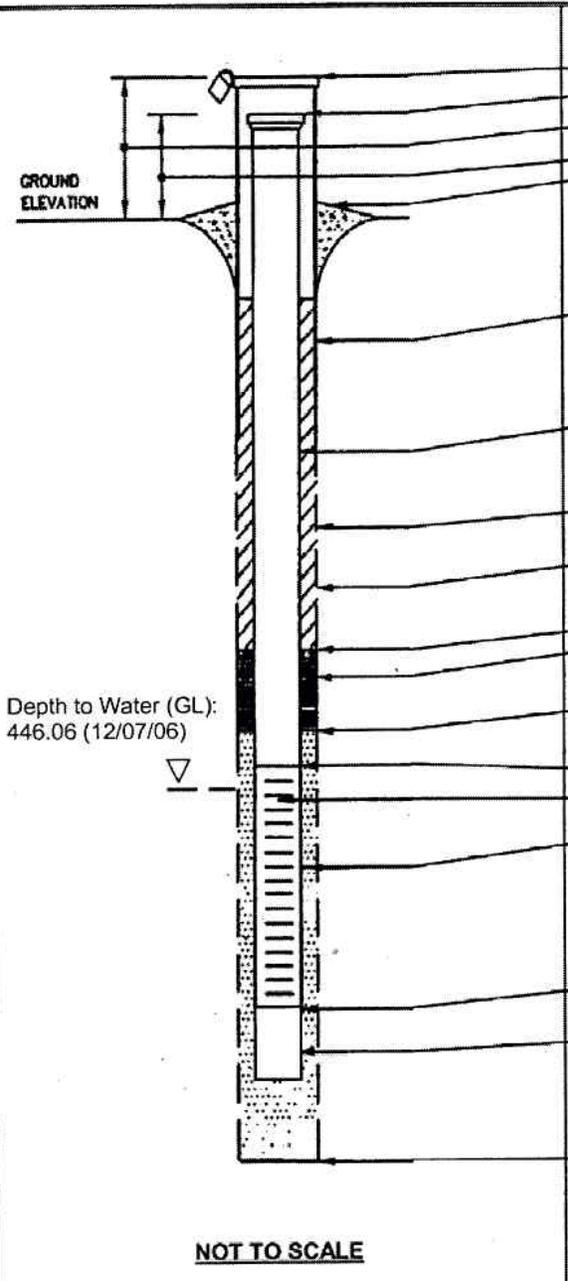
Interval	Start	Stop
SUMP	459'	461.5'
STAINLESS STEEL		
Interval	Start	Stop
PLUG BACK	461.5'	465'
10/20 SILICA SAND		

OVERBURDEN
MONITORING WELL
CONSTRUCTION DIAGRAM

WELL NO. KAFB-0121

PROJECT Monitoring Well Installation at LF-001
 PROJECT NO. DACW45-94-D-0003, Delivery Order 39
 DATE Nov. 13-24, 2006 BORING NO.: KAFB-0121
 ELEVATION _____
 FIELD _____
 GEOLOGIST P. Goetze, Tetra Tech EMI

DRILLER Q. Stevens, WDC Exploration
 DRILLING METHOD Air rotary-casing hammer (ARCH)
 DEVELOPMENT METHOD Bailing and submersible pump



ELEVATION OF TOP OF SURFACE CASING: Not available
 ELEVATION OF TOP OF RISER PIPE: Not available
 STICK-UP TOP OF SURFACE CASING: 3.51 ft
 STICK-UP RISER PIPE: 2.61 ft
 TYPE OF SURFACE SEAL: Neat cement (5-7% bentonite): 31-3 ft
Concrete: 3 ft to surface

I.D. OF SURFACE CASING: Not applicable
 TYPE OF SURFACE CASING: Not applicable

RISER PIPE I.D. 4.0 inches
 TYPE OF RISER PIPE: Schedule 80 PVC with F480 joints

BOREHOLE DIAMETER: 0 to 200 ft: 11.75 inches
200 ft to TD: 9.625 inches

TYPE OF BACKFILL: Premixed, high-yield bentonite grout (Baroid®) and hydrated bentonite chips (42-31 ft)
 ELEVATION/DEPTH TOP OF SEAL: 398 ft
 TYPE OF SEAL: Hydrated medium (3/8-inch) bentonite chips (Baroid®)
 DEPTH TOP OF SAND PACK: 431.5 ft

ELEVATION/DEPTH TOP OF SCREEN: 445.75 ft
 TYPE OF SCREEN: Factory-slot Schedule 80 PVC with F480 joints
 SLOT SIZE X LENGTH: 0.010-inch slot x 30 ft
 TYPE OF SAND PACK: 10/20 Colorado silica sand

SUMP: 5-ft PVC blank with stainless steel end cap
 ELEVATION/DEPTH BOTTOM OF SCREEN: 475.75 ft
 ELEVATION/DEPTH BOTTOM OF SAND PACK: 487.6 ft
 TYPE OF BACKFILL BELOW OBSERVATION WELL: Natural fill and 10/20 silica sand
 ELEVATION/DEPTH OF HOLE: 490 ft

NOT TO SCALE

DEPTHS DATUM: GROUND LEVEL

Notes:

Centralizers: top of centralizers at approximately 124 ft below ground surface (bgs), 164 ft bgs, 204 ft bgs, 244 ft bgs, 284 ft bgs, 324 ft bgs, 364 ft bgs, 404 ft bgs, 444 ft bgs (top of screen), and 476 ft bgs (bottom of screen).
Surface completion: 4 ft x 4 ft concrete pad with bollards at corners; 10.5-inch OD casing for surface vault.

HTRW DRILLING LOG		DISTRICT OMAHA			HOLE NUMBER KAFB-0121	
1. COMPANY NAME TETRA TECH, INC.		2. DRILL SUBCONTRACTOR WDC EXPLORATION AND WELLS			SHEET SHEETS 1 OF 26	
3. PROJECT KIRTLAND AFB, NM		4. LOCATION LANDFILL 1, LF-001				
5. NAME OF DRILLER QUENTIN STEVENS		6. MANUFACTURER'S DESIGNATION OF DRILL TRI-CONE				
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT GEFCO STAR 50K-CH 11 3/4" CASING: 0'-200' 9 5/8" CASING: 200'-400'		8. HOLE LOCATION NORTHEAST QUADRANT OF LANDFILL; EAST SIDE				11. DATE COMPLETED 11/24/2006
		9. SURFACE ELEVATION EST. 5300' FT AMSL				
12. OVERBURDEN THICKNESS 490 FT		15. DEPTH GROUNDWATER ENCOUNTERED 446.52 FT BGS				
13. DEPTH DRILLED INTO ROCK 0 FT		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 446.52 FT BGS (1 HOUR, 57 MINUTES)				
14. TOTAL DEPTH OF HOLE 490 FT		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) FOLLOWING WELL COMPLETION (11/24/2006): 445.70 FT BGS				
18. GEOTECHNICAL SAMPLES N/A		DISTURBED N/A	UNDISTURBED N/A	19. TOTAL NUMBER OF CORE BOXES N/A		
20. SAMPLES FOR CHEMICAL ANALYSIS NONE		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)
22. DISPOSITION OF HOLE BACKFILLED		MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR		
		X				
LOCATION SKETCH/COMMENTS					SCALE 1" = 50'	
PROJECT LF-001 WELL INSTALLATION					HOLE NO. KAFB-0121	

HTW DRILLING LOG (continuation sheet)							HOLE NO. KAFB-0121
PROJECT Kirtland AFB Landfill 1				INSPECTOR Phil Goetze		SHEET 2 of 26	
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5300	0	Well graded sand with silt (SM); dark red (10R3/6) to red (10R4/8); subangular to subrounded, very fine to medium grained sand; no staining or hydrocarbon (HC) odor; dry to moist					
5299			0/0				
5298							
5297			0/0				
5296							
5295	5			0/0			
5294							
5293				0/0			
5292							
5291				0/0			
5290	10	Poorly graded sand with silt and gravel (SM-SC); reddish brown (5YR5/3) to red (2.5YR4/8) subangular to subrounded, fine to medium grained sand; small gravel(<0.25 inch) intermittent; dry.					
5289			0/0				
5288							
5287							
5286							
5285	15						
5284			0/0				
5283							
5282							
5281							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 3 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5280	20						
5279							
5278							
5277							
5276							
5275	25		0/0				
5274							
5273							
5272							
5271							
5270	30	Silty sand (SM); light reddish brown (5YR6/4) to light brown (7.5YR6/3); subangular to subrounded very fine to fine grained sand; dry.					
5269							
5268							
5267							
5266							
5265	35						
5264							
5263							
5262							
5261							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 4 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
5260	40						
5259							
5258							
5257							
5256							
5255	45						
5254							
5253							
5252							
5251		Poorly graded gravel with silt and sand (GM); brown (7.5YR5/4) to yellowish red (5YR5/6); subangular to subrounded, <0.25 inch to 0.25 inch diameter gravel; dry.					
5250	50						
5249		Silty sand (SM); brown (7.5YR5/4) to yellowish red (5YR5/6); subangular to subrounded, very fine to fine grained sand, 15% to 20% silt content; dry.					
5248							
5247							
5246							
5245	55						
5244							
5243							
5242							
5241							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 5 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5240	60						
5239							
5238							
5237							
5236							
5235	65						
5234							
5233							
5232							
5231							
5230	70	Well graded sand (SW); reddish brown (5YR5/3) to light brown (7.5YR6/3); subangular to subrounded, very fine to coarse grained sand, moist to dry.					
5229							
5228		Poorly graded sand with silt (SM); brown (7.5YR5/4) to redish brown (5YR4/4); subangular to subrounded, medium to very fine grained sand, dry					
5227							
5226							
5225	75						
5224							
5223							
5222							
5221							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 6 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
5220	80	Silty clay (CL); dark reddish brown (5YR3/3); low dry strength; no dilatancy; medium plasticity, dry. Clay with sand (CL); brown (7.5YR4/4) to dark reddish brown (5YR3/4); sand content 15% to 20%; medium dry strength; no dilatancy; medium plasticity					
5219							
5218							
5217							
5216							
5215	85	Silty sand (SM); dark reddish brown (5YR3/4) to dark brown (7.5YR3/4); subangular to subrounded; very fine to medium grained sand; silt content 15% to 20%; moist to dry.					
5214							
5213							
5212							
5211							
5210	90	Well graded sand with gravel (SW); brown (7.5YR5/3) to yellowish brown (10YR5/6); subangular to subrounded, very fine to coarse grained sand; gravel 0.25 inch to 0.5 inch; moist to dry.					
5209							
5208							
5207							
5206							
5205	95						
5204							
5203							
5202							
5201							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 7 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5200	100						
5199							
5198							
5197							
5196							
5195	105						
5194							
5193							
5192							
5191							
5190	110	Clayey sand (SC); dark brown (7.5YR3/4) to dark reddish brown (5YR3/2); subangular to subrounded; very fine to coarse grained sand; clay content 15% to 25%; moist.					
5189							
5188							
5187							
5186							
5185	115	Clay (CL); reddish brown (5YR3/4) to brown (7.5YR4/3); medium dry strength; no dilatancy; medium plasticity; moist.					
5184							
5183							
5182							
5181							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 8 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
5180	120						
5179							
5178							
5177							
5176							
5175	125						
5174							
5173							
5172							
5171							
5170	130						
5169							
5168		Well graded sand with silt and gravel (SM); brown (7.5YR5/4) to reddish brown (5YR5/3); subangular to subrounded; very fine to coarse grained sand; moist.					
5167							
5166							
5165	135						
5164		Well graded gravel with sand (GW); light brown (7.5YR6/4); subangular to subrounded 0.25 inch to 1.5 inch diameter gravel; dry.					
5163							
5162							
5161							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 9 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5160	140						
5159							
5158		Poorly graded sand with silt (SM); brown (7.5YR5/4) to pale brown (10YR6/3) subangular to subrounded, very fine to medium grained sand; dry.					
5157							
5156							
5155	145	Poorly graded sand with silt and gravel (SM); brown (7.5YR5/4) to pale brown (10YR6/3); subangular to subrounded; very fine to medium grained sand; gravels >15%; dry.					
5154							
5153							
5152							
5151							
5150	150						
5149							
5148							
5147							
5146							
5145	155						
5144							
5143							
5142							
5141							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

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PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 10 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
5140	160	Well graded sand with silt (SM); brown (10YR5/3) dark brown (7.5YR3/2); subangular to subrounded, very fine to coarse grained sand (predominately quartz); very little gravel 150' to 159', then gravel content increasing with depth; dry to moist.					
5139							
5138							
5137							
5136							
5135	165						
5134							
5133							
5132							
5131							
5130	170						
5129							
5128							
5127							
5126							
5125	175						
5124							
5123							
5122							
5121							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

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PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 11 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5120	180	Well graded gravel with sand (GW); dark brown (7.5YR3/4) to brown (10YR3/3); subangular to subrounded, 0.25 inch to 1.5 inch diameter gravel; mafic, quartz, and limestone composition; dry to moist.					
5119							
5118							
5117							
5116							
5115	185						
5114							
5113							
5112							
5111							
5110	190	Well graded sand (SW); pale brown (10YR6/3) to light brown (7.5 YR6/4); subangular to subrounded; very fine to coarse grained sand (predominately quartz sand); silt content <5%; dry to moist.					
5109							
5108							
5107							
5106	195						
5105							
5104							
5103							
5102							
5101							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

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SHEET 12 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5100	200						
5099							
5098							
5097							
5096							
5095	205						
5094							
5093							
5092							
5091							
5090	210						
5089							
5088		Clay with silt (<20%) (CL); light yellowish brown (2.5Y6/3) to pale brown (10YR6/3); medium strength, no dilatancy; low plasticity; moist.					
5087							
5086							
5085	215						
5084							
5083							
5082							
5081							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 13 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5080	220	Poorly graded sand (SP) with <5% silt content; brownish yellow (10YR7/6) to light brown (7.5YR6/4) subangular to subrounded; very fine to medium grained sand; dry to moist.					
5079							
5078							
5077							
5076							
5075	225						
5074							
5073							
5072							
5071							
5070	230						
5069							
5068							
5067							
5066							
5065	235						
5064							
5063		Well graded sand with silt (5% to <10%) and gravel (>15%) (SM); yellow (10YR7/8) to reddish yellow (7.35YR6/6) subangular to subrounded; very fine to coarse grained sand; dry.					
5062							
5061							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

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PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 14 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5060	240	Poorly graded sand (SP); yellow (2.5Y8/8); cementation; subangular to subrounded, very fine to fine grained sand; dry					
5059							
5058							
5057							
5056		Silty sand with gravel (>15%) (SM); dark yellowish brown (7.5YR4/4); subangular to subrounded, very fine to coarse grained sand; gravel 0.25 inch to 2 inch diameter; subrounded to rounded; mafic, quartz, limestone composition; dry to moist.					
5055	245						
5054							
5053							
5052							
5051							
5050	250						
5049							
5048							
5047							
5046							
5045	255						
5044							
5043							
5042							
5041							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 15 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
5040	260						
5039							
5038							
5037							
5036							
5035	265						
5034							
5033							
5032		Well graded gravels with sand (GW); brown (7.5YR5/4); subangular to subrounded, 0.25 inch to 3 inch diameter gravels; mafic, quartz, and limestone; moist.					
5031							
5030	270						
5029							
5028							
5027							
5026							
5025	275						
5024							
5023							
5022							
5021							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)							HOLE NO. KAFB-0121
PROJECT Kirtland AFB Landfill 1				INSPECTOR Phil Goetze		SHEET 16 of 26	
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5020	280	Poorly graded gravel with sand (GP); brown (7.5YR5/4) to yellowish brown (10YR5/4); subangular to subrounded; 0.25 inch to 3 inch diameter gravel; moist.					
5019							
5018							
5017							
5016							
5015	285						
5014							
5013							
5012							
5011							
5010	290	Well graded gravel with silt and sand (GM); light yellowish brown (2.5Y6/4) to pale brown (10YR6/3); subangular to subrounded, 0.25 inch to 2 inch diameter clasts; mafic, quartz, and sedimentary clasts; fine to coarse grained sand; moist to dry.					
5009							
5008							
5007							
5006							
5005	295						
5004							
5003							
5002							
5001							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 17 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
5000	300						
4999							
4998							
4997							
4996							
4995	305	Silty sand with gravel(>15%) (SM); yellowish brown (2.5Y6/4) to pale brown (10YR6/3); subangular to subrounded; fine to coarse grained sand; moist.					
4994							
4993							
4992							
4991							
4990	310	Well graded gravel with silt and sand (GM); dark yellowish brown (10YR4/4) to olive brown (2.5Y4/3); subangular to rounded, 0.25 inch to 3 inch diameter gravel; mafic, quartz, and sedimentary composition; sand (>15% to 25%) silt (>15%); moist to dry					
4989							
4988							
4987							
4986							
4985	315						
4984							
4983							
4982							
4981							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 18 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4980	320						
4979							
4978							
4977							
4976							
4975	325						
4974							
4973							
4972							
4971							
4970	330						
4969							
4968							
4967		Well graded sand with silt (SM); very pale brown (10YR8/4) to pale yellow (2.5Y8/4); subangular to subrounded, very fine to coarse grained sand; dry to moist					
4966							
4965	335						
4964							
4963							
4962							
4961							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

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PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 19 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4960	340	<p>Poorly graded gravel with silt and sand (GM); yellowish brown (10YR5/6) to light olive brown (2.5Y5/4); subangular to subrounded; very fine to coarse grained sand; dry to moist.</p>					
4959							
4958							
4957							
4956							
4955	345						
4954							
4953							
4952							
4951							
4950	350						
4949							
4948							
4947							
4946							
4945	355						
4944							
4943							
4942							
4941							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 20 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4940	360	Well graded sand with silt (SM); yellowish brown (10YR5/6) to olive yellow (2.5Y6/6); subangular to subrounded, very fine to coarse grained sand; dry to moist.					
4939							
4938							
4937							
4936							
4935	365						
4934							
4933							
4932							
4931							
4930	370	Well graded sand (SW); very pale brown (10YR7/4) to pale yellow (2.5Y8/4); subangular to subrounded, very fine to coarse grained sand; dry.					
4929							
4928							
4927							
4926							
4925	375						
4924							
4923							
4922							
4921							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 21 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4920	380	Well graded gravel with silt (GM); yellowish brown (10YR5/4) to light olive brown (2.5Y5/6); subangular to subrounded, 0.25 inch to 3.5 inch diameter gravel; sand(<25%), silt (15%-20%); dry					
4919							
4918							
4917							
4916							
4915	385						
4914							
4913							
4912							
4911							
4910	390	Poorly graded sand with gravel (SP); pale brown (10YR6/3) to brown (7.5YR5/4); subangular to subrounded, fine to medium grained sand, rounded grains towards bottom of interval; dry.					
4909							
4908							
4907							
4906							
4905	395						
4904							
4903							
4902							
4901							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 22 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4900	400	Well graded sand with silt (SM); brown (7.5YR5/4) to yellowish brown (10YR5/4); subangular to subrounded, very fine to coarse grained sand; moist.					
4899							
4898							
4897							
4896							
4895	405	Well graded gravel with silt and sand (GM); dark yellowish brown (10YR4/6) to light olive brown (2.5Y6/3); subangular to subrounded, 0.25 inch to 0.75 inch diameter gravels; dry to moist.					
4894							
4893							
4892							
4891							
4890	410						
4889							
4888							
4887							
4886							
4885	415						
4884							
4883							
4882							
4881							

PROJECT Kirtland AFB Landfill 1

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HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

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ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4880	420						
4879							
4878							
4877							
4876							
4875	425	Poorly graded sand with gravel (SP); light olive brown (2.5Y5/6) to yellowish brown (10YR5/4); subangular to subrounded, fine to medium grained sand; rounded gravel towards bottom; dry.					
4874							
4873							
4872							
4871							
4870	430						
4869							
4868							
4867							
4866							
4865	435	Well graded gravel with silt and sand (GM); dark yellowish brown (10YR4/6) to light olive brown (2.5Y6/3); subangular to subrounded, 0.25 inch to 0.75 inch diameter gravel; dry to moist.					
4864							
4863							
4862							
4861							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 24 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4860	440	Well graded sand with gravel (SW); yellowish brown (10YR5/4) to pale yellow (2.5Y7/4); subangular to subrounded, very fine to fine grained sand; moist.					
4859							
4858							
4857							
4856							
4855	445						
4854							
4853							
4852							
4851							
4850	450	Clayey gravel (GC); dark brown (10YR3/3) to olive brown (2.5Y4/3); subangular to subrounded; 0.25 inch to 3 inch gravels; sand (10%-15%); moist.					
4849							
4848							
4847							
4846							
4845	455						
4844							
4843							
4842							
4841							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 25 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No.	Analytical Sample No. f	Blow Counts g	REMARKS h
4840	460						
4839							
4838							
4837							
4836							
4835	465	Well graded sand with silt and gravel (SM); brown (10YR5/3) to olive brown (2.5Y4/3); subangular to subrounded, very fine to coarse grained sand; gravels: 0.25 inch to 0.5 inch diameter subangular to subrounded; moist to saturated with water					
4834							
4833							
4832							
4831							
4830	470						
4829							
4828							
4827							
4826							
4825	475						
4824							
4823							
4822							
4821							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

HTW DRILLING LOG (continuation sheet)

HOLE NO. KAFB-0121

PROJECT Kirtland AFB Landfill 1

INSPECTOR Phil Goetze

SHEET 26 of 26

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bore No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4820	480	Silty gravel with sand (GM); brown (10YR4/3) to deep brown (7.5YR4/6); subangular to subrounded, 0.25 inch to 2 inch gravels; saturated with water.					
4819							
4818							
4817							
4816							
4815	485						
4814							
4813							
4812							
4811							
4810							

PROJECT Kirtland AFB Landfill 1

HOLE NO. KAFB-0121

