Appendix C
Field Forms

CH2M HILL, INC.

GROUNDWATER SAMPLING DATA SHEET

Site: Well No:

Casing Diam/Material:

Date:

Sample Team:

Water Level (WL): ft below top of casing

time & device:

Total Well Depth (TD): ft below top of casing

1 Casing Volume: gals = 0.0408 x (diam)^2 x (TD - WL)

3 Casing Volumes: {diam (in), TD (ft), WL (ft)}

Purge Volume: gals

Purge Device:

FIELD DATA

time	purge vol (gal)	pH	cond	temp	appearance

SAMPLE DATA

Parameters, container type/vol, preservatives:

Sample Time: Device:

Sample Appearance:

Notes:

Filename: GWFRM.XLS

Form Date: 4/13/98

Waterlevel Data Sheet

CH2M HILL

Project Number:

Waterlevel Date: _____ Quarter:

STATION DATA

Zone: Station ID: Alias: Northing:

Design: Casing Diameter (in): Easting:

Well Material: Installed Total Depth: Casing Elevation:

WATERLEVEL DATA

Sampling Team: _____ Device:

Time of measurement: _____ Dry? ☐

Depth to water (DTW): _____ ft below top of casing: Previous DTW:

Total Depth (TD): _____ ft below top of casing: Previous TD:

FREE PRODUCT

Depth to free product (DTFP): _____ ft below top of casing: Thickness (ft): _____

Sample Collected? ☐

HEALTH SAFETY

OVM Background: _____ ppm

OVM Breathing Zone: _____ ppm

OVM Top of Casing: _____ ppm

VISUAL INSPECTIONS

ID Plate: ☐ Old ☐ New ☐ None Cap: ☐ Yes ☐ No ☐ Replace

Lock: ☐ Yes ☐ No ☐ Replace Bolts: ☐ Yes ☐ No ☐ Replace

Gasket: ☐ Yes ☐ No ☐ Replace Pad: ☐ Good ☐ Fair ☐ Bad

Materials Added: Cap: ☐ Lock: ☐ Bolts: ☐ Logbook Entry? ☐

Comments:

rptWaterlevelDataSheetPre - 960612

Design: SU - Stick-up FM - Flush-mount
Well Material: PVC - Plastic SS - Stainless Steel

CH2M HILL
Chain of Custody Form
Kelly AFB - 1997 RCRA

Report Print Date: 4/24/97 10:25:54 AM

COC Number: RHA
QA Level: 3
Project: 1997 RCRA 1ST QUARTER SAMPLING
Number: 139315.AA.QS
Manager: L. Smoot
PO#:
Lab: CH2M Hill,. Montgomery AL

Sample ID	Station ID	Begin Depth	End Depth	Date & Time Collected	Matrix	Number of Containers	Analysis Requested	Comments
RHA005FD1	SS037MW032	0	0	3/25/97 09:30	WG	1	TPH_W	DUP.
RHA006	SS037MW034	0	0	3/25/97 11:25	WG	1	TPH_W	
RHA007	SS037MW038	0	0	3/25/97 15:10	WG	1	TPH_W	
RHA008	SS037MW028	0	0	3/25/97 16:30	WG	1	TPH_W	
RHA009	SS037MW026	0	0	3/25/97 08:52	WG	1	TPH_W	
RHA010	SS037MW215	0	0	3/25/97 11:10	WG	1	TPH_W	
RHA011	SS037MW217	0	0	3/25/97 10:35	WG	1	TPH_W	
RHA012	SS037MW216	0	0	3/25/97 09:55	WG	1	TPH_W	
RHA014	SS037MW076	0	0	3/26/97 08:35	WG	1	TPH_W	
RHA015	SS037MW074	0	0	3/26/97 11:05	WG	1	TPH_W	
RHA016	SS037MW025	0	0	3/26/97 14:45	WG	1	TPH_W	
RHA017	SS038MW007	0	0	3/26/97 14:00	WG	1	TPH_W	
RHA018	SS052MW121	0	0	3/26/97 10:35	WG	1	TPH_W	
RHA019	SS052MW172	0	0	3/26/97 11:55	WG	1	TPH_W	
RHA020	SS038MW012	0	0	3/26/97 13:45	WG	1	TPH_W	
RHA021	SS037MW202	0	0	3/26/97 14:50	WG	1	TPH_W	
RHA022	SS030MW043	0	0	3/26/97 08:50	WG	1	TPH_W	
RHA023FD1	SS030MW043	0	0	3/26/97 08:50	WG	1	TPH_W	
RHA024	SS030MW044	0	0	3/26/97 09:30	WG	1	TPH_W	
RHA025	WP022MW009	0	0	3/26/97 10:15	WG	1	TPH_W	
RHA026	WP022MW010	0	0	3/26/97 11:00	WG	1	TPH_W	

Sampled by: _____ Date and Time: _____ Relinquished by: _____ Date and Time: _____

Additional Samplers: _____

Received by LAB: _____ Date and Time: _____ Relinquished by: _____ Date and Time: _____

Received by LAB: _____ Date and Time: _____ Relinquished by: _____ Date and Time: _____

Shipped by: UPS BUS FED-EX HAND Other _____ Shipping No: _____

Remarks: _____

rptChainOfCustody - updated 970319

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA002AB1
Station: FIELDQC
LC#: 111A
Analysis: SVOC_W
TOC-PPM:
Bottle Type: 2.5 Liter Amber
Pres: Chilled @ 4C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA002AB1
Station: FIELDQC
LC#: 111A
Analysis: Alk_W,CL_W,Sulfate_W,TDS_W
TOC-PPM:
Bottle Type: 1 Liter Poly
Pres: Chilled @ 4C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA002AB1
Station: FIELDQC
LC#: 111A
Analysis: VOC_W
TOC-PPM:
Bottle Type: 40 mL glass
Pres: Hydrochloric Acid, 4° C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA002AB1
Station: FIELDQC
LC#: 111A
Analysis: VOC_W
TOC-PPM:
Bottle Type: 40 mL glass
Pres: Hydrochloric Acid, 4° C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA003EB1
Station: FIELDQC
LC#: 111A
Analysis: Metals_W
TOC-PPM:
Bottle Type: 500 mL poly
Pres: Nitric Acid, 4C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Montgomery AL
MONTGOMERY, AL 36116
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA003EB1
Station: FIELDQC
LC#: 111A
Analysis: TPH_W
TOC-PPM:
Bottle Type: 1 liter amber
Pres: Sulfuric Acid, 4C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA003EB1
Station: FIELDQC
LC#: 111A
Analysis: VOC_W
TOC-PPM:
Bottle Type: 40 mL glass
Pres: Hydrochloric Acid, 4° C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA002AB1
Station: FIELDQC
LC#: 111A
Analysis: Metals_W
TOC-PPM:
Bottle Type: 500 mL poly
Pres: Nitric Acid, 4C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Montgomery AL
MONTGOMERY, AL 36116
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA002AB1
Station: FIELDQC
LC#: 111A
Analysis: TPH_W
TOC-PPM:
Bottle Type: 1 liter amber
Pres: Sulfuric Acid, 4C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA002AB1
Station: FIELDQC
LC#: 111A
Analysis: VOC_W
TOC-PPM:
Bottle Type: 40 mL glass
Pres: Hydrochloric Acid, 4° C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA003EB1
Station: FIELDQC
LC#: 111A
Analysis: SVOC_W
TOC-PPM:
Bottle Type: 2.5 Liter Amber
Pres: Chilled @ 4C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA003EB1
Station: FIELDQC
LC#: 111A
Analysis: Alk_W,CL_W,Sulfate_W,TDS_W
TOC-PPM:
Bottle Type: 1 Liter Poly
Pres: Chilled @ 4C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA003EB1
Station: FIELDQC
LC#: 111A
Analysis: VOC_W
TOC-PPM:
Bottle Type: 40 mL glass
Pres: Hydrochloric Acid, 4° C
Sampled By:
Date:
Time:

Lab: CH2M Hill, Redding CA
REDDING, CA 96003
Proj: Kelly AFB - 1997 RCRA
139315.AA.QS
Sample ID: RHA003EB1
Station: FIELDQC
LC#
Analysis: VOC_W
TOC-PPM
Bottle Type: 40 mL glass
Pres: Hydrochloric Acid, 4° C
Sampled By:
Date:
Time:

Corrective Action Request Form

Originator:_____ Date:_____

Person responsible for replying:_____

Description of problem and date identified:_____

_____

_____

_____

_____

_____

_____

Sequence of Corrective Action (CA) - (If no responsible person is identified, submit this form directly to the PM)

State date, person, and action planned:_____

_____

_____

_____

_____

CA initially approved by:_____ Date:_____

Follow-up date:_____

Final CA approval by:_____ Date:_____

Information Copies to:_____

Responsible Person:_____

Field Team Leader:_____

Project Manager:_____

PROJECT NUMBER	BORING NUMBER SHEET OF

SOIL BORING LOG

PROJECT _____ LOCATION _____

ELEVATION _____ DRILLING CONTRACTOR _____

DRILLING METHOD AND EQUIPMENT _____

WATER LEVEL AND DATE _____ START _____ FINISH _____ LOGGER _____

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE AND NUMBER	RECOVERY (FT)	6"-6"-6" (N)	SOIL NAME, USGS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
0'						
5'						
10'						
15'						
20'						
25'						
30'						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET	OF
139315.AA.ZY	SS052MW270	1	2

SOIL BORING LOG

PROJECT KAFB 1997 BRA Zone 4 Offbase Drilling LOCATION Central btw Zarzamora & ~~Laredo Hwy~~ Nogalitos

ELEVATION _____ DRILLING CONTRACTOR JEDI

DRILLING METHOD AND EQUIPMENT Bl61 Mobil Drill

WATER LEVELS _____ START 8-7-97 FINISH 8-7-97 LOGGER L. McAllister

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
	1.0	—	—	—	Asphalt + Roadbase	
	3.0	—	—	—	~~Asphalt~~ + Roadbase/Gravel fill	
	5.0	1-SS	2.0	—	CLAY (OH) black, moist, firm, very homogeneous black soil	OVM=0
5	7.0	2-SS	0.1	—	CLAY (OH) as above	OVM=0
	9.0	3-SS	2.0	—	7-8' CLAY (OH) grayish brown, moist, hard 8-9' SILT (ML) tan, moist, hard w/ weathered caliche + nodules of overlying brown clay	OVM=0
10	11.0	4-SS	2.0	—	SILT (ML) tan subtle, slightly moist, hard, 30-40% weathered caliche, nodules of brown clay	OVM=0
	13.0	5-SS	1.0	—	SILT (ML) as above w/ isolated chert gravel	OVM=0
15	15.0	6-SS	1.0	—	SILT (ML) as above w/ zones of greenish grey CLAY (CL)	OVM=0
	17.0	7-SS	1.5	-	SILT (ML) as above w/ ~50% greenish grey clay	OVM=0
	19.0	8-SS	1.7	—	SILT (ML) as above, w/ specks of black organic material	OVM=0
20	21.0	9-SS	0.2	—	SILT (ML) as above, drier	OVM=0
	23.0	11-SS	0.4	—	SILT (ML) as above	OVM=0
25	25.0	12-SS	0.5	—	SILT (ML) as above, trace of v. fine sand	OVM=0
	27.0				End of Boring @ 25' lost center plug in hole. Have to grout hole & start over at new location	8/8/97 - hole relocated ~3' to west. Drilled to 25' on 8/7/97. resume @ 25' on pg. 2

REV 9/96 FORM D1586

CH2MHILL

MONITORING WELL CONSTRUCTION LOG
Standard Flush Mount

Client: _____ Well No. _____

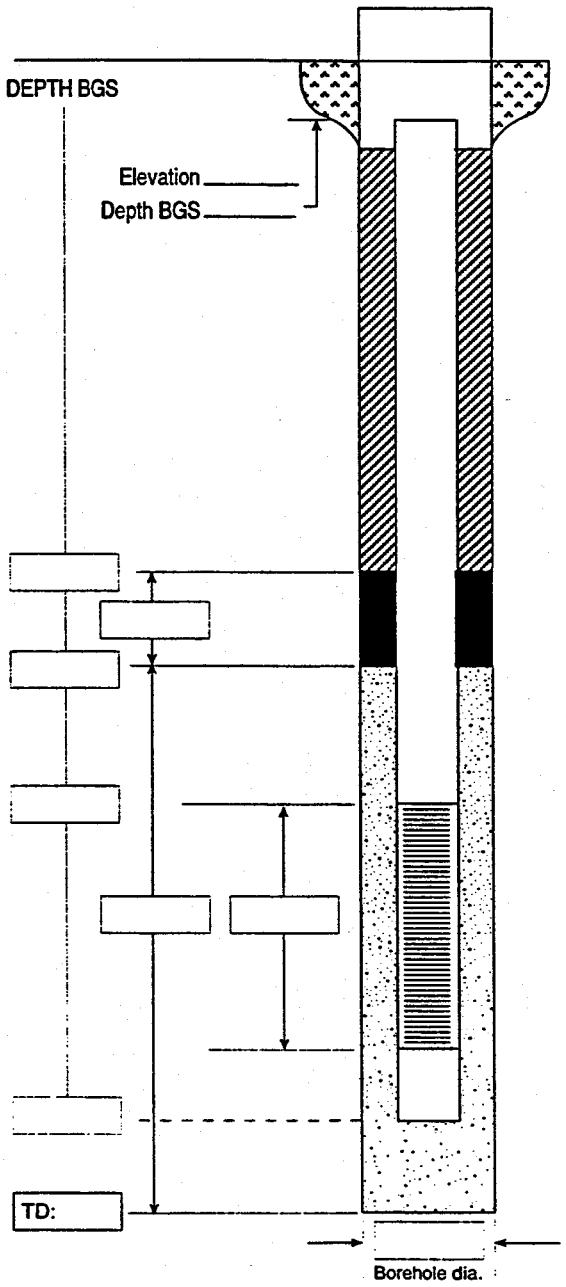
Location: _____ Project No. _____

_____ Date _____

Installed by: _____

Installation Method: _____ Start: _____

Field Engineer: _____ End: _____



PROTECTIVE CSG
Material / Type _____
Diameter _____ Water Tight Seal (Y / N)
Depth BGS _____ Weep Hole (Y / N)

SURFACE PAD
Composition & Size _____

RISER PIPE
Type _____
Diameter _____
Total Length (TOC to TOS) _____

GROUT
Composition & Proportions _____
_____
Tremied (Y / N)
Interval _____

CENTRALIZERS (Y / N)
Depth(s) _____

SEAL
Type _____
Source _____

FILTER PACK
Type _____
Amount Used _____
Tremied (Y / N)
Source _____
Gr. Size Dist. _____

SCREEN
Type _____
Diameter _____
Slot Size & Type _____
Interval BGS _____

DEVELOPMENT
Time _____
Method Used _____
Comments _____
_____

MONITORING WELL CONSTRUCTION LOG
Standard Flush Mount

CH2M HILL

Client: KAFB

Well No. SS052MW270

Location: Centennial btw Zarzamora & Nogalitos

Project No. 139315.AA.Z4

Date 8/8/97

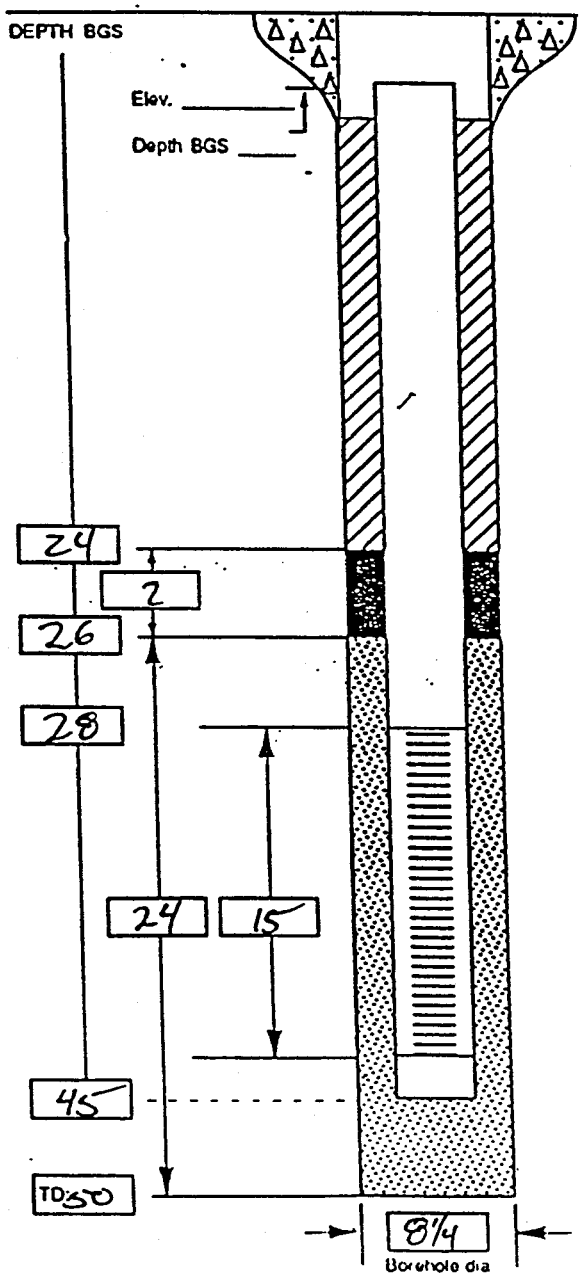
Installed by: JEDI

Installation Method: HSA

Start: 1000 (: A m)

Field Engineer M. Wilson

End: 1245 (: P m)



PROTECTIVE CSG

Material/Type

Diameter

Water Tight Seal (Y/N)

Depth BGS

Weep hole (Y/N)

SURFACE PAD

Composition & Size

RISER PIPE

Type PVC

Diameter 2"

Total Length (TOC to TOS) 1-24

GROUT

Composition & Proportions Portland/gel

Tremied (Y/N)

Interval 2-24

CENTRALIZERS (Y/N)

Depth (s)

SEAL

Type Bentonite

Source 1 Bag

FILTER PACK

Type Silica Sand

Amt Used 10 · 100 lb bags

Tremied (Y/N)

Source

Gr. Size Dist. 20-40

SCREEN

Type SS

Diameter 2"

Slot Size & Type 0.010

Interval BGS 28-43

DEVELOPMENT

Time

Method Used

Comments

WELL COMPLETION INFORMATION

Location ID			
Installation Date		Total Casing Depth (FT)	
Well Owner Code		Casing Inside Diameter (IN)	
Well Type		Casing Material Code	
Well Completion Method		Screen Begining Depth	
Geologic Comp. Zone		Screen Length (FT)	
Sole Source Aquifer		Screen Slot Size (IN)	
Seal End Depth (FT)		Screen Diameter (IN)	
Filter Pack Length (FT)		Percent Open Area (%)	
MP Elevation			

Remarks:

LITHOLOGY INFORMATION

STATION ID:

LOGGING COMPANY	LOG DATE	BEG DEPTH	END DEPTH	LITHO CODE	ASTM CODE	STRAT ORDER	DESCRIPTION
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							
CHM							

STRATORDER	LITHCOD	ASTMCODE	VISDESC
0	NSNR	NSNR	NO SAMPLE OR NO RECOVE
1	FILL	NACM	LANDFILL MATERIAL
2	FILL	NACM	FILL MATERIAL
3	CLAY	OH	BLACK CLAY
4	CLAY	OH	BROWN CLAY
5	SILT	OL	SILT
6	SD	SC	SAND
7	GVCL	GC	CLAYEY GRAVEL
8	CLAY	CL	LOWER CLAY
9	GVL	GP	GRAVEL
10	CLAY	CL	NAVARRO CLAY TRANSITION
11	CLAY	CL	NAVARRO CLAY
12	CHER	GC	CALICHE
13	CN	NACM	POURED CONCRETE
14	ASPT	NACM	ASPHALT PAVEMENT
15	OTHR	NACM	SLUDGE
16	LS	NACM	ROCK LAYER

LITHOLOGY INFORMATION

Zone 4 offbase

STATION ID: 55052MW270

LOGGING COMPANY	LOG DATE	BEG DEPTH	END DEPTH	LITHO CODE	ASTM CODE	STRAT ORDER	DESCRIPTION
CHM	3/7/97	0	1	ASPT	NACM	14	Asphalt Pavement
CHM		1	3	Fill	NACM	2	Fill Material
CHM		3	7	CLAY	OH	3	Black Clay
CHM		7	8	CLAY	OH	4	Brown Clay
CHM		8	25	Silt	OL	5	Silt
CHM	— End of boring due to mechanical						
CHM		problem					
CHM		25	32	Clay	CL	8	
CHM		32	42	GVCL	GC	7	Clayey Gravel
CHM		42	~~50~~ 48	Clay	CL	10	Navarro transition
CHM		48	50	Clay	CL	11	Navarro
CHM							
CHM							
CHM							
CHM							

STRATORDER	LITHCOD	ASTMCODE	VISDESC
0	NSNR	NSNR	NO SAMPLE OR NO RECOVE
1	FILL	NACM	LANDFILL MATERIAL
2	FILL	NACM	FILL MATERIAL
3	CLAY	OH	BLACK CLAY
4	CLAY	OH	BROWN CLAY
5	SILT	OL	SILT
6	SD	SC	SAND
7	GVCL	GC	CLAYEY GRAVEL
8	CLAY	CL	LOWER CLAY
9	GVL	GP	GRAVEL
10	CLAY	CL	NAVARRO CLAY TRANSITION
11	CLAY	CL	NAVARRO CLAY
12	CHER	GC	CALICHE
13	CN	NACM	POURED CONCRETE
14	ASPT	NACM	ASPHALT PAVEMENT

CH2MHILL WELL DEVELOPMENT LOG

Installation _____ **Well Number** _____

Site/Project _____ **Sample ID Number** _____

Project Number _____ **Development Start** date _____ time _____

Developed by _____ **Development End** date _____ time _____

Development Method _____

_____

Development Equipment: _____

Quantity of Water Loss During Drilling (if applicable) _____ gal Casing Diameter _____ in

Pre-Dev Static Water Level _____ Well TD _____ ft BTOC Maximum Pumping Rate _____ gpm

One Well Volume of Water _____ gal

Total Quantity of Water Bailed _____ gal

Total Quantity of Water Discharged by Pumping _____ gal

Discharge Water Containerized? Y / N Type of Containment _____

Time	Volume Removed (gallons)	Water Level (ft BTOC)	Turbidity	Clarity / Color	Temp °C	pH	Conductivity ( )	DO	Salinity	Remarks

CH2MHILL MONITORING WELL SAMPLING LOG

Installation _____ **Well Number** _____

Site/Project _____ **Sample ID Number** _____

Project Number _____ **Sample Start** date _____ time _____

Sampled by _____ **Sample End** date _____ time _____

Original Static Water Level _____ ft BTOC Final Static Water Level _____ ft BTOC

Screen Interval _____ — _____ ft BTOC

Time	Temperature	pH	Conductivity	Turbidity	DO	Salinity

Are parameters 20% of purge values? Y / N

Repurge? Y / N

Number of repurge volumes _____

Sampling Method

Submersible Pump ☐ Dedicated Bladder Pump ☐ Bladder ☐ Bailer ☐ SS ☐ Tef ☐ PVC ☐ Centrifugal Pump ☐ Peristaitic Pump ☐ Hand Pump ☐ Gas Lift/ Displacement Pump ☐ Other _____ _____

Sampling Equipment (Make, Model, Etc.) _____

Sampling Equipment Decontaminated ? Y / N

If pump or discrete bailer; depth(s) where pump set _____

Weather _____

Lab Analyses

VOC ☐ SVOC ☐ Metals ☐ Pesticides/PCBs ☐ Herbicides ☐ TPH ☐ Dioxin/Furans ☐

Other _____

Metals: Filtered ☐ Unfiltered ☐ Both ☐

Field Duplicates Y / N

Split Sample Y / N

MS/MSD Y / N

Comments _____

DAILY DRILLING DIARY

PROJECT NO. _____

(1) DAY: _____ DATE: ____ : ____ : ____ WORK PERIOD ____ A.M. P.M. TO ____ A.M. P.M. REPORT NO. _____

WEATHER _____ TEMP. MAX ____ °F: MIN ____ °F: PRECIPITATION _____

(2) NUMBER AND CLASS OF PERSONNEL EMPLOYED:

(3) MAJOR EQUIPMENT ON PROJECT AND AMOUNT OF USE

NO.	DESCRIPTION	SIZE/CAPACITY	HRS. OPER.

(4) WORK ACCOMPLISHED TODAY: _____

Hydrologist Signature _____ Date _____

Driller Signature _____ Date _____

PHOTO RECORD FILE INDEX

ROLL NO. _____

PERIOD FROM _____ TO _____ 19 _____

ROJECT: _____ PROJECT NO. _____

PREPARED BY: _____

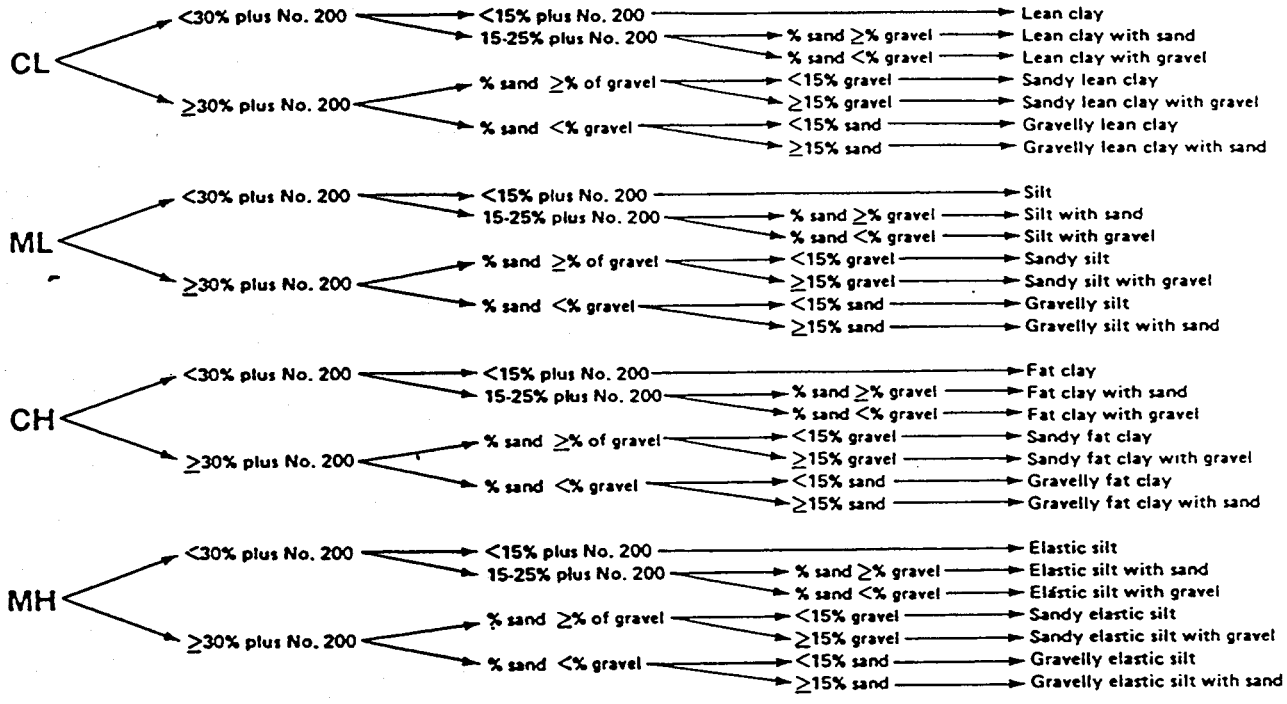
PICTURE NUMBER	PHOTO DESCRIPTION/LOCATION	DATE	DAILY LOG NUMBER

Table 5-2. Descriptions and Stratigraphic Order Numbers for Common Lithofacies at Kelly AFB
(Replacement - 21 Jun 95)

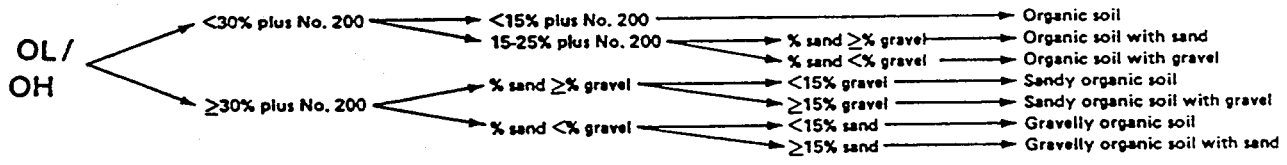
Material Description	Correct Entries for IRPIMS Fields			
	LITH CODE	ASTM CODE	STRAT ORDER	VISDESC
No recovery	NSNR	NSNR	0	No sample or no recovery obtained
Highly variable fill material (clay-gravel) containing garbage, metal, wood, plastic, and other landfill materials.	FILL	NACM	1	Landfill material
Highly variable; silty clay with varying gravel content, sand also common. Concrete and asphalt are typical man-made constituents. Sometimes may be difficult to distinguish from alluvial sediments.	FILL	NACM	2	Fill material
Organic-rich clay, trace silt, fine to coarse sand size caliche, stiff, plastic when moist, no visible internal layering.	NAUM	OH	3	Black Clay
Typically light to dark orange- to red-brown clay, trace amounts of silt and sand, isolated gravel clasts, caliche common in brown clay transitional with overlying black clay (typical as nodules). Sometimes appears mottled or crudely laminated.	NAUM	OH	4	Brown Clay
Brown to light brown silt, trace amounts of clay and fine sand. Isolated gravel and caliche common in the upper part of the unit, very thin vugs typically filled with black organic materials.	NAUM	OL	5	Silt
Fine to coarse sand, typically fine- to medium-grained. Less than 40% clay and silt, gravel texturally immature, sorting is variable but usually poor.	NAUM	SC	6	Sand
Typically brown to gray, poorly sorted limestone-chert gravel with clay-silt matrix greater than 20% but less than 30%. Often sandy and loosely consolidated. Thin caliche coatings common on gravel clasts. Clay matrix is variable in color, usually orange-brown to gray to green to black to pink. Clay in the lower part of the section are very "Navarro like" in appearance.	NAUM	GC	7	Clayey Gravel
Typically a white-gray clay with orange-brown mottles, more plastic and stiff than brown clay. Occurs predominately on the east side of Kelly AFB. Green plastic clay described in Radian boring logs from the west side of the base are also included in this lithofacies.	NAUM	CL	8	Lower Clay
Various colors but typically brown to light tan. Silt and clay content (matrix) less than 20%. Clasts are subround to angular, poorly sorted. Clast size is coarse sand to cobbles. Boulders not recovered but probably present. Clasts are limestone or chert.	NAUM	GP	9	Gravel
Typically a thin zone of mixed Navarro silty clay and alluvial gravel and/or sand. Gravel less than 50%.	NAUM	CL	10	Navarro Clay transition zone
Typically hard, plastic, laminated to mottled orange-brown, blue-gray, green-gray, and dark gray with orange-brown partings. Some fine sand layers are present and are typically oxidized (deep red-brown). Caliche occurs occasionally in the upper 6 feet.	NAUM	CL	11	Navarro Clay
Caliche.	NAUM	GC	12	Caliche
Concrete pavement. Not fill material.	CN	NACM	13	Poured concrete
Asphalt pavement. Not fill material	ASPT	NACM	14	Asphalt pavement
Sludge. Not fill material.	OTHR	NACM	15	Sludge
Rock Layer	LS	NACM	16	Rock Layer

ATTACHMENT 2

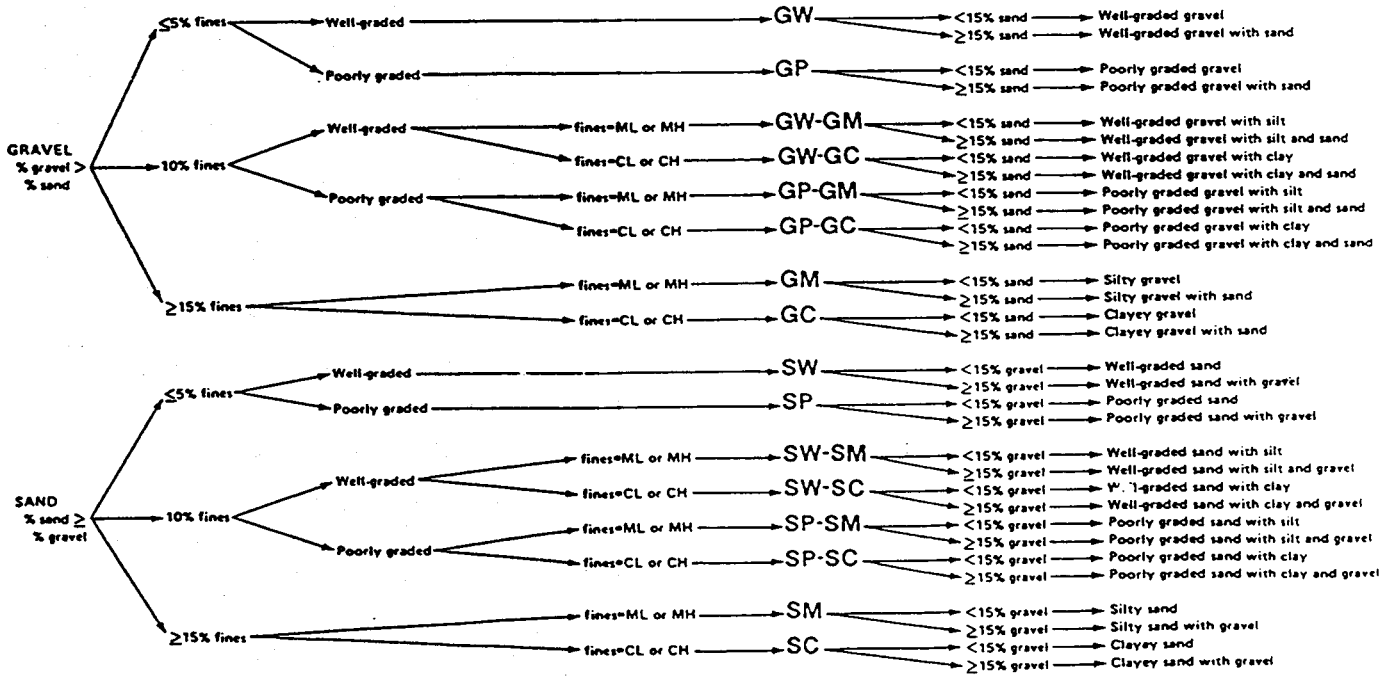
FLOW CHART FOR IDENTIFYING INORGANIC FINE–GRAINED SOIL (50% OR MORE FINES)



FLOW CHART FOR IDENTIFYING ORGANIC FINE–GRAINED SOIL (50% OR MORE FINES)



FLOW CHART FOR IDENTIFYING COARSE–GRAINED SOILS (LESS THAN 50% FINES)



NOTE—Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5 %.

Figure 3
FLOW CHARTS FOR CLASSIFICATION OF FINE–GRAINED AND COARSE–GRAINED SOILS

CH2M HILL

DIS202.11

WELCODE	Well Owner
AA	ALOHA APARTMENTS, ATWATER, CA
ALEX	ALEXANDRIA MUNICIPAL WATER DEPT.
ARCD	ARCADE WATER DISTRICT
ATWR	ATWATER DISTRICT
ATWT	CITY OF ATWATER, ATWATER, CA
CCF	CITY OF COCOA, FL
CFAB	CITY OF FAIRBORN, FAIRBORN, OH
CMB	CITY OF MYRTLE BEACH
CMH	CASTLE MOBILE HOME PACK, ATWATER, CA
COFT	COFFEE COUNTY, TN
CTI	CAL TRANS IRRIGATION
CTW	CITY OF TUCSON WATER, TUCSON, AZ
CVA	CASA VERDE APARTMENTS, ATWATER, CA
CWRM	CITY OF WARNER ROBBINS
DAYT	CITY OF DAYTON, DAYTON, OH
DNA	DEFENSE NUCLEAR AGENCY
DNRE	DELAWARE DEPT. OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
FRNK	FRANKLIN COUNTY, TN
HRWD	HIGH HILLS RWD
HUT	HEATER UTILITIES
LBBC	LONG BRANCH BAPTIST CHURCH
MERC	MERCED IRRIGATION DISTRICT, MERCED, CA
MNCH	CITY OF MANCHESTER, TN
MRTN	MARTIN MARIETTA, DENVER, CO
NRWD	NORTHRIDGE WATER DISTRICT
PRVT	PRIVATELY OWNED WELL
RB	ROBERT BLYTHE, WINTON, CA
RCP	RAY C. PRICE, MENLO PARK, CA
RIV	CITY OF RIVERSIDE, CA
RLWD	RIO LINDA WATER DISTRICT
SACI	SACRAMENTO CITY IRRIGATION
SACM	SACRAMENTO CITY MUNICIPAL
SCC	SUMTER CONCRETE CO.
STN	STATE OF TENNESSEE
TAWH	TOWN OF AIRWAY HEIGHTS, AIRWAY HEIGHTS, WA
USA	U.S. ARMY
USAF	U.S. AIR FORCE
USEP	U.S. ENVIRONMENTAL PROTECTION AGENCY
USGS	U.S. GEOLOGICAL SURVEY
WDSC	WATER DISTRICT OFFICE OF THE SOUTH CAROLINA DEPT. OF HEALTH AND ENVIRONMENTAL CONTROL, SUMTER COUNTY, SC
WHTE	WHITE SETTLEMENT MUNICIPAL WATER DEPT., WHITE SETTLEMENT, TX
WSU	WRIGHT STATE UNIVERSITY, DAYTON, OH

SAQCODE	Sole Source Aquifer
BATX	BISCAYNE AQUIFER, FL
BIA	BASS ISLAND AQUIFER, CATAWBA ISLAND, OH
BIRI	BLOCK ISLAND AQUIFER, RI
BLFT	BLUFFTOWN AQUIFER, GA
BTNY	CLINTON STREET-BALLPARK VALLEY, AQUIFER SYSTEM, BROOME AND TIOGA COUNTIES
BUAS	BURIED VALLEY AQUIFER SYSTEM, OH
BVAS	BURIED VALLEY AQUIFER SYSTEM, NJ
CADE	COLUMBIA AQUIFER, DE
CAL	CITRONELLE FORMATION, CITRONELLE, AL
CALA	CHICOT AQUIFER
CBTN	CENTRAL BASIN AQUIFER, TENNESSEE
CCMA	CAPE CODE AQUIFER, MA
CCS	CATTARAUGUS CREEK-SARDINIA, NY
CHPA	CORTLAND-HOMER-PREBLE AQUIFER SYSTEM, NY
CIA	CAMANO ISLAND AQUIFER, WA
COK	CENTRAL OKLAHOMA AQUIFER, OK
CUAG	CUSSETTA AQUIFER, GA
CVA	CROSS VALLEY AQUIFER, WA
CVRA	CEDAR VALLEY, RENTON AQUIFER, WA
DASC	DUPLIN AQUIFER, SUMTER, SC
EATX	EDWARDS AQUIFER, TX
FAFL	FLORIDAN AQUIFER, FL
FCCA	FRESNO COUNTY, CA
FPTN	FT. PAYNE AQUIFER TENNESSEE
FRED	FREDRICA AQUIFER, DE
GWOK	RUFUS GARBER T. WILLINGTON-CARVER III, OK
HAPA	HUNT-ANNAQUATUCKET-PETTAQUAMSCUTT AQUIFER SYSTEM, RI
HAS	HIGHLANDS AQUIFER SYSTEM, NY/NJ
HNOK	HENNESSEY AQUIFER, OK
HPNM	HIGH PLAINS AQUIFER, NM
HPTX	HIGH PLAIN (OGALLALA) AQUIFER, TX
HRTN	HIGHLAND RIM AQUIFER, TENNESSEE
KQNY	KINGS/QUEENS COUNTIES, NY
LBCA	LOWER BLACK CREEK AQUIFER, SUMTER, SC
MIME	MONHEGAN ISLAND, ME
MNCH	MANCHESTER AQUIFER, TN
MPA	MARYLAND PIEDMONT AQUIFER, MONTGOMERY, FREDERICK, HOWARD, CARROLL COUNTIES, MD
MVMT	MISSOULA VALLEY AQUIFER, MT
MVRA	MARTHA'S VINEYARD REGIONAL AQUIFER, MA
NAA	NEWBERG AREA AQUIFER, WA
NCSA	NOT COMPLETED IN A SOLE SOURCE AQUIFER
NFDA	NORTH FLORANCE-DUNAL AQUIFER, OR
NG	NORTHERN GUAM, GUAM

WTCCODE	Well Type
ABN	ABANDONED WELL
AU	AIR INJECTION WELL
EXW	EXTRACTION WELL
IJW	INJECTION WELL
IRR	IRRIGATION WELL
LCH	LEACHATE WELL
LYS	LYSIMETER
MNW	MONITORING WELL
OBS	OBSERVATION WELL
PRG	PURGE WELL
PRW	PRODUCTION WELL (PUBLIC WATER SUPPLY)
PZ	PIEZOMETER
TPW	TEMPORARY WELL
TST	TEST WELL
VAP	VAPOR WELL
VEW	VAPOR EXTRACTION WELL
WPT	WELL POINTS
WSW	WATER SUPPLY WELL (PRIVATE WATER SUPPLY)

GZCCODE	Geologic Completion Zone Description
?	UNKNOWN
A	AQUIFER
C	LOWER OR CONFINED AQUIFER
L	CONFINING LAYER OR AQUICLUDE
P	PERCHED AQUIFER
U	UNSATURATED ZONE
W	WATER TABLE AQUIFER

WCMCODE	Well Completion Method
C	POROUS CONCRETE
GP	GRAVEL PACK W/PERFORATIONS
GS	GRAVEL OR SAND PACK W/SCREEN
H	HORIZONTAL GALLERY/COLLECTOR
NP	NATURAL FILTER PACK
OE	OPEN-END
OP	OPEN
P	PERFORATED OR SLOTTED
S	SCREEN
SP	SAND POINT
W	WALLED OR SHORED
Z	OTHER