START

002248
2 of 2

PNL-6675 Vol. 2
UC-11, 41

6

Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period April 1 to June 30, 1988

Volume 2 — Appendices

September 1988

Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute

Battelle

PNL-6675 Vol. 2

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor Battelle Memorial Institute, nor any or their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or Battelle Memorial Institute. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

PACIFIC NORTHWEST LABORATORY
operated by
BATTELLE MEMORIAL INSTITUTE
for the
UNITED STATES DEPARTMENT OF ENERGY
under Contract DE-AC06-76RLO 1830

Printed in the United States of America
Available from
National Technical Information Service
United States Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

NTIS Price Codes
Microfiche A01

Printed Copy

Pages	Price Codes
001-025	A02
026-050	A03
051-075	A04
076-100	A05
101-125	A06
126-150	A07
151-175	A08
176-200	A09
201-225	A10
226-250	A11
251-275	A12
276-300	A13

8/88

PNL-6675 Vol.2
UC-11, 41

GROUND-WATER MONITORING COMPLIANCE PROJECTS FOR HANFORD SITE FACILITIES: PROGRESS REPORT FOR THE PERIOD APRIL 1 TO JUNE 30, 1988

Volume 2 -- Appendices

September 1988

Prepared for
the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory
Richland, Washington 99352

9 2 1 2 5 4 0 1 1 7 4

PREFACE

This is Volume 2 of a two-volume set of documents that describes the progress of 10 Hanford Site ground-water monitoring projects for the period April 1 to June 30, 1988. This volume discusses as-buil diagrams, drilling logs, and geophysical logs for wells drilled during this period in the 100-N Area (Appendix A) and near the 216-A-36B Crib (Appendix B). Volume 1 discusses the 10 projects. This work was supported by the U.S. Department of Energy under Contract DE-AC06-76RLO 1830.

9 2 1 2 5 4 0 1 7 5

APPENDIX A

WELL COMPLETION/INSPECTION REPORTS, AS-BUILT DIAGRAMS, DRILL LOGS, AND GEOLOPHYSICAL LOGS FOR WELLS DRILLED THIS QUARTER IN THE 100-N AREA

9 2 1 2 5 4 0 1 7 6

APPENDIX A

WELL COMPLETION/INSPECTION REPORTS, AS-BUILT DIAGRAMS, DRILL LOGS, AND GEOLOPHYSICAL LOGS FOR WELLS DRILLED THIS QUARTER IN THE 100-N AREA

This appendix contains drilling and completion information for wells 199-N-69 and 199-N-70 in the 100-N Area. The information is ordered for each well in the following manner:

1. Well Completion/Inspection Reports
2. As-Built Diagrams
3. Sediment Summary Sheets (if available)
4. Drill Logs
5. Geophysical Logs.

WELL 199-N-69

9 2 1 2 6 4 0 1 7 8

THIS PAGE INTENTIONALLY
LEFT BLANK

9 2 1 2 6 4 0 1 7 9

WELL COMPLETION/INSPECTION REPORT

Specification No. W-014-C1 Rev. No. 0
Project W-014
Location 1301-N Crib
Driller Louis Watkins
Drilling Co. Kaiser Drilling (KEH)
Geologist Karen R. Oster

Well No. 199-N-69 Temp. Well No. N/A
Coordinates
Casing Elevation
Ground Elevation

COMPLETION DATA

Drilled Depth 104' b.l.s. Compl Depth 100' b.l.s.
Date Started 4/29/88 Completed 6/7/88
Static Water Level/Date 67.5' b.l.s. / 5/13/88

DRILLING METHOD

Rotary Air N/A Mud N/A
Cable Tool D N/A H 0'-104'
Drilling Fluid 100-N Drilling Supply Water
Other

GEOPHYSICAL LOGGING

Sondes	Interval	Date
Density	102'-2'	5/17/88
Neutron	102'-4'	5/17/88
Nat. Gamma	102'-3'	5/17/88
	-	

PERFORATIONS

Type N/A

Depth	Schedule
-	N/A
-	N/A
-	N/A

AQUIFER TESTING

Type Step drawdown/Constant Discharge
Length of Test 5 hours
Volume Pumped 13,900 gallons
Drawdown 18.55'

INSPECTION RESULTS

CLEANING

Inspection Method visual
Acceptance Criteria spec: 4.1, 4.2, 7.1

	Accept	Reject
Drilling Tools/Rig	KRO	
Temporary Materials	KRO	
Permanent Materials	KRO	

Performed by Karen R. Oster Date 5/19/88

MATERIAL STORAGE/PACKING

Inspection Method visual
Acceptance Criteria spec: 4.0, 7.3

	Accept	Reject
Material Handling/Storage	KRO	
Material Packing	KRO	

Performed by Karen R. Oster Date 5/19/88

SCREEN

Type 6 in. type 304 Stainless Steel Length 10'2½"
Slot Size 10 slot (0.010-inch)
Depth(s) 100' - 90'
-
Inspection Method visual as per specs #'s 4.2.3
Acceptance Criteria 4.2.3
M&TE/ID Accept KRO Reject
Performed by Karen R. Oster Date 5/19/88

LUBRICANTS/ADDITIVES

Inspection Method visual
Acceptance Criteria spec 7.2

	Identify	Accept	Reject
Tool Lubricant	Crisco	KRO	
Additives	Drilling Water	KRO	

Performed by Karen R. Oster Date 5/19/88 KRO

CASING

Type	Size	Placement
6" Sch 10S, ASTM A312, 304 Stainless Steel	6"	90' - +2.5'
	—	— - —
		-

Inspection Method visual
Acceptance Criteria spec 4.2.4
M&TE/ID Accept KRO Reject
Performed by Karen R. Oster Date 5/20/88

ANNULAR SEAL

Inspection Method visual
Acceptance Criteria 4.2.6, 4.2.7, 4.2.8, 4.2.9

Type	Interval	Volume	Accept	Reject
Sand (20-40/40)	104' - 78.5'	10.5 FT³	KRO	
Ben. Pellets	78.5' - 76'	1.24 FT³	KRO	
Ben. Slurry	76' - 21'	39.26 FT³	KRO	
Cement Grout	21' - 2'	>12.7 FT³	KRO	

M&TE/ID
Performed by Karen R. Oster Date 6/3/88

STRAIGHTNESS TEST

Inspection Method visual
Acceptance Criteria Stainless Screen goes to bottom.
Accept KRO Reject
Performed by Karen R. Oster Date 5/20/88

WELL PROTECTION

Inspection Method visual
Acceptance Criteria 4.2.10, 5.3.2

	Accept	Reject
Protective Posts	KRO	
Locks	KRO	

Performed by Karen R. Oster Date 6/3/88

OTHER (check if performed) (mark N/A if not applicable)
N/A Well Abandonment
KRO Well Development
N/A Downhole TV Inspection
KRO Complete As-Built Diagram, Driller's/Geologist's Logs

Performed by Karen R. Oster Date 6/7/88

K.R. Oster 7/12/88 L.L. McMahan 7-13-88

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 199-N-69 Geologist Karen R. Oster Page 1 of 1

Reviewed by V.L. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill Rate
Description	Diagram		Diagram Litho.	Lithologic Description	
20'6" of 12" Carbon Steel Surface Pipe (Removed)		5'		SILTY SANDY GRAVEL	1.5'
		10'		SANDY GRAVEL	1.19'
		15'		"	4.29'
105'6¾" of 10" Carbon Steel Casing (Removed)		20'		GRAVELLY SAND	6'
		25'		SANDY GRAVEL	2.61'
		30'		GRAVELLY SAND	4.43'
92.5' of 6" Stainless Steel (304) Casing		35'			4.34'
		40'			3.55'
		45'		SANDY GRAVEL (CONTACT)	3
		50'		SILTY SANDY GRAVEL	3.
		55'			3.36
		60'		" "	3.9'
		65'		SILTY SANDY GRAVEL	4.48'
		70'		Static H2O Level @ 67.5' b.l.s., 5/13/83	4.17'
		75'			4.29
		80'			3.37
		85'		SANDY GRAVEL	3.9
		90'			3'
10'2½" of 6" Stainless Steel (304) 10 slot Screen		95'			3.6
		100'			
		105'		(CONTACT ± 100'3" b.l.s.)	
Completion Depth = 100' b.l.s.				Denied	
Completion Symbols ∴ Artificial Sand Pack XX Bentonite Pellet Seal ~~ Bentonite Slurry Seal XXX Cement Grout Seal					

A-1800-186 (3/87)

9 2 1 2 6 5 4 0 1 8 0

92126 40181

BOREHOLE NO. [illegible]

DEPTH	NAME	GRAVEL % BOULDER	GRAVEL % COBBLE	GRAVEL % PEBBLE	SAND % VC SAND	SAND % C SAND	SAND % M SAND	SAND % F SAND	SAND % VF SAND	FINES % SILT (m)	FINES % CLAY (c)	SORTING	FRAMEWORK % BASALT	FRAMEWORK OTHER MAJOR LITHOLOGIES	FRAMEWORK ROUNDNESS	MATRIX % BASALT	MATRIX OTHER MAJOR LITHOLOGIES	MATRIX ROUNDNESS	MATRIX DRY	MATRIX COLOR	HCl REACTION	CONSOLIDATION	DRILL METHOD	DRILL RATE	NAT. GAMMA	COMMENT	
4'-5'	ZSG	-	-	35	10	10	15	10	10	10	—	P-VP	95	[illegible]	VA-SR	90	[illegible]	VA-SR	[illegible]	[illegible]	V.SL.	U	H	1.5'		[illegible]	
9'-10	SG	—	—	40	10	10	20	15	3	2	—	P-VP	90	[illegible]	VA-SR	85	[illegible]	VA-SR	[illegible]	[illegible]	ST.	U	H	1.71		[illegible]	
14'-15'	SG	—	—	30	10	10	20	20	8	2	1	P.	95	[illegible]	VA-SR	85	[illegible]	VA-SR	[illegible]	[illegible]	ST.	U.	H	4.[illegible]		[illegible]	
19'-20	BS	—	—	20	10	15	20	20	13	2	—	P.	80	[illegible]	VA-SR	90	[illegible]	VA-SR	[illegible]	[illegible]	V.ST.	U.	H	6'		[illegible]	
24'-25	SG	—	—	35	15	10	10	15	11	4	—	P-V.P.	95	[illegible]	VA-SR	95	[illegible]	VA-SR	[illegible]	[illegible]	M	U	H	2.61		[illegible]	
29'-30	BS	—	—	25	10	15	25	15	5	5	—	P.	95	[illegible]	VA-SR	85	[illegible]	VA-SR	[illegible]	[illegible]	SL.	U	H	4.48		[illegible]	
34'-35	BS	—	—	25	10	15	30	15	10	5	—	P-V.P.	90	[illegible]	VA-SR	85	[illegible]	VA-SR	[illegible]	[illegible]	SL.	U	H	4.34'		[illegible]	
39'-40	BS	—	—	25	10	15	20	15	10	5	—	P-V.P.	90	[illegible]	VA-SA	75	[illegible]	VA-SR	[illegible]	[illegible]	M	U	H	6.50		[illegible]	
44'-45	SG	—	—	35	10	15	15	10	10	5	—	V.P.	85	[illegible]	VA-SR	90	[illegible]	VA-SR	[illegible]	[illegible]	V.ST.	C	H	2.35		[illegible]	
49'-50	ZSG	—	—	35	15	15	15	5	5	10	—	V.P.	85	[illegible]	VA-SR	85	[illegible]	VA-SR	[illegible]	[illegible]	V.ST.	C	H	[illegible]		[illegible]	
54'-55	ZBS	—	—	20	10	20	15	15	10	10	—	P.	90	[illegible]	VA-SR	90	[illegible]	VA-SR	[illegible]	[illegible]	V.ST.	C	H	6.55		[illegible]	
59'-60	ZBS	—	—	20	5	10	25	20	10	10	—	P-V.P.	90	[illegible]	VA-SR	90	[illegible]	VA-SR	[illegible]	[illegible]	ST.	M	H	3.9'		[illegible]	
[illegible]-65	ZSG	—	—	30	10	10	20	10	10	10	—	P-V.P.	85	[illegible]	VA-SR	85	[illegible]	VA-SR	[illegible]	[illegible]	V.SL.	SC	H	4.43		[illegible]	
69'-70'	ZSG	—	—	30	10	15	15	10	10	10	—	P-V.P.	85	[illegible]	VA-SR	85	[illegible]	VA-SR	[illegible]	[illegible]	V.SL.	S.C.	H	4.17'		[illegible]	
74'-75	ZSG	—	—	35	10	15	10	10	10	10	—	V.P.	95	[illegible]	VA-SR	90	[illegible]	VA-SR	[illegible]	[illegible]	No	U	H	4.29'		[illegible]	
79'-80	ZSG	—	—	55	10	10	10	5	5	5	—	P-V.P.	95	[illegible]	VA-SR	95	[illegible]	VA-SR	[illegible]	[illegible]	No	U	H	3.39		[illegible]	
84'-85	SG	—	—	35	10	15	20	10	5	5	—	P.	85	[illegible]	VA-SR	90	[illegible]	VA-SR	[illegible]	[illegible]	V.SL	S.C.	H	3.9'		[illegible]	
89'-90	BS	—	—	5	5	10	20	20	10	30	T	M.-P.	85	[illegible]	VA-SR	90	[illegible]	VA-SR	[illegible]	[illegible]	No	S.C.	H	3'		[illegible]	
94'-95	BZS	—	—	20	10	10	15	15	10	18	2	P-V.P.	85	[illegible]	VA-SR	95	[illegible]	VA-SR	[illegible]	[illegible]	M	S.C.	H	3.26		[illegible]	
99'-100	ZSG	—	—	35	10	10	10	10	10	10	5	V.P.	85	[illegible]	VA-SA	85	[illegible]	VA-SR	[illegible]	[illegible]	M	S.C.	H	1.92		[illegible]	
103'	Clay	—	—	2	2	2	1	1	1	1	90	V.W.	80	[illegible]	VA-SA	90	[illegible]	VA-SR	[illegible]	[illegible]	ST.	S.C.	H	2.09		[illegible]	

GPO 596-313

A.3

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 4/29/88	#22-14102	Depth 0' To 4'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
						Driller is Louis Watkins
				Rig was set-up on hole on 4/28/88 after being steam	0700	Completed set-up.
				cleaned at 200-E Area.	0830	Started digging
				Dug down 2' with shovel for stater hole.		starter hole with shovel
10' 6"	of 12"				0910	Add 10'6" of 12" Casing
				Total of 12" Carbon Steel Casing = 10' 6"		
					0915	Started drilling
						Add 7 gals H_2O
					0936	Add 2.5 gals H_2O
					0948	Add 2 gals H_2O
					0953	Add 2 gals H_2O
					1005	Add 2 gals H_2O
					1010	Bail Well
					1012	Resume drilling
						Add 2 gals H_2O
					1035	Drive Casing
					1043	Resume drilling
						Add 2 gals H_2O

REMARKS:

Karen R. Oster
4/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 4/29/88	#22-14102	Depth 4' To 6'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1049	Add 2 gals H_2O
					1100	Add 1 gal H_2O
					1110	Add 2 gals H_2O
	4'-5'	H	Wet	SILTY SANDY GRAVEL; 35% gravel, 55% sand, 10% silt.	1125	Using dart bailer Bailed Well
				1% v.c.p., 4% c.p., 5% m.p., 9% f.p., 16% v.f.p., 10% v.c.s.,		Drill rate = 1.5'/hr.
				10% c.s., 15% m.s., 10% f.s., 10% v.f.s., 10% silt. Poorly to	1130	Lunch
				Very Poorly Sorted. Gravels are 95% basalt, 3% quartzite,	1245	Resume drilling
				2% granite, Trace other lithologies and are very angular		Add 2 gals H_2O
				to subrounded. Sands are 90% basalt, 5% quartz, 5%	1310	Add 2 gals H_2O
				quartzite, trace other lithologies and are very angular	1318	Add 2 gals H_2O
				to subrounded. Wet Color is dark olive gray (5Y 3/2).	1325	Add 4 gals H_2O
				Dry Color is olive gray (5Y 5/2). Very slight reaction in 10%	1340	Bail Well
				HCl. Unconsolidated. No detectable radiation when	1345	Resume drilling
				monitored with G.M. Geologic samples are representative		Add 2 gals H_2O
				but may not contain the larger size pebbles.	1402	Bail Well
					1406	Resume drilling
						Add 3 gals H_2O
					1425	Bail Well.

REMARKS:

Karen R. Oster
4/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 4/29/88	# 22-14102	Depth 6' To 7.5'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1430	Resume drilling
						Add 3gals H_2O
					1442	Add 2gals H_2O
					1452	Bail Well
					1456	Resume drilling
						Add 4 gals H_2O
					1530	Done for day

REMARKS: Total Drilled Depth = 7.5'
Total 12" Casing = 10' 6"

Total H_2O Added = 48.5 gallons

Karen R. Oster
4/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 5/2/88	#22-14102	Depth 7.5' To 9.5'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'6"	of 12"				0750	Grease rig.
					0805	Start drilling
					0813	Add 5 gals H_2O
					0826	Drive Casing
					0830	Bailed Well
					0835	Resume drilling
						Add 3 gals H_2O
					0850	Bailed Well
					0856	Add 4 gals H_2O
10'6" +10'	of 12"				0900	Add 10' of 12" Casing
20'6"	of 12"			Total 12" Carbonsteel Casing = 20'6"		
					1028	Drive Casing
					1030	Resume drilling
					1040	Add 2 gals H_2O
					1050	Add 2 gals H_2O
					1058	Add 2 gals H_2O
					1106	Add 2 gals H_2O
					1115	Add 2 gals H_2O

REMARKS:

Karen R. Oster
5/2/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.P. Oster	Rig B.E. 2200	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/2/88	# 22-14102	Depth 9.5' To 10'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1128	Add 2 gals H_2O
					1140	Drive Casing
					1145	Break for lunch
					1250	Drive Casing. using dart bailer
	9'-10'	H	Wet	SANDY GRAVEL; 40% gravel, 58% sand, 2% silt.	1300	Bailed Well
				Trace c.p., 15% m.p., 10% f.p., 15% v.f.p., 10% v.c.s., 10% c.s.,		Drill rate = 1.19'/hr
				20% m.s., 15% f.s., 3% v.f.s., 2% silt. Poorly to Very	1310	Resume drilling
				Poorly Sorted. Gravels are 90% basalt, 5% granite,		Add 2 gals H_2O
				5% metamorphics and other lithologies, and are very	1320	Add 2 gals H_2O
				angular to subrounded, thin coatings of caliche are	1335	Add 2 gals H_2O
				found on ~5% of the gravels. Sands are 85% basalt,	1344	Add 2 gals H_2O
				5% quartzite, 5% quartz, 5% other sands, and are	1350	Add 2 gals H_2O
				very angular to subrounded. Wet Color is dark olive	1400	Add 2 gals H_2O
				gray (5Y 3/2). Dry Color is gray (5Y 6/1). Strong	1408	Add 2 gals H_2O
				reaction in 10% HCl. Unconsolidated. No detectable	1415	Add 1 gal H_2O
				radiation when monitored with a G.M. Similar to	1420	Drive Casing.
				previous sample with better sorting, less basalt, lighter		
				dry color, stronger HCl reaction. Geologic Samples are		

REMARKS: representative.

Karen P. Oster
5/2/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/2/88	# 22-14103	Depth 10' To 19'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	14'-15'	H	Wet	SANDY GRAVEL; 30% gravel, 68% sand, 2% silt.	1430	Using dart bailer Bailed Well
				7% m.p., 8% f.p., 15% v.f.p., 10% v.c.s., 10% c.s., 20% m.s.,		Drill rate = 4.29'/hr
				20% f.s., 8% v.f.s., 2% silt. Poorly Sorted. Gravels are	1445	Resume drilling
				95% basalt, 3% granite, 2% other lithologies and are		Add 4 gals H_2O
				very angular to subrounded. Sands are 85% basalt,	1457	Add 4 gals H_2O
				5% quartzite, 5% clear quartz, 5% other lithologies,	1500	Add 3 gals H_2O
				and are very angular to subrounded. Wet Color is	1506	Add 2 gals H_2O
				olive (5Y 4/3). Dry Color is light olive gray (5Y 6/2).	1511	Add 2 gals H_2O
				Strong reaction in 10% HCl. Unconsolidated. No	1516	Add 3 gals H_2O
				radiation detectable with G.M. Similar to previous	1525	Done for day
				sample with a decrease in grain size, increase in		
				basalt, lighter color and better sorting. Geologic		
				Samples are representative.		

REMARKS: Total Drilled Depth = 19' Total H_2O Added = 57 gallons
Total 12" Casing = 20'6" Total Drilled Today = 11.5'

Karen R. Oster
5/2/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By T.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/3/88	# 22-14102	Depth 19' To 20'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0755	Warmup rig
					0800	Start drilling
	19'-20'	H	Wet	GRAVELLY SAND; 20% gravel, 78% sand, 2% silt.	0810	Using dart bailer Bailed Well
				Trace c.p., 5% m.p., 5% f.p., 10% v.f.p., 10% v.c.s., 15% c.s., 20% m.s.,		Drill rate: 6'/hr
				20% f.s., 13% v.f.s., 2% silt. Poorly Sorted. Gravels are 80%	0815	Resume drilling
				basalt, 15% granite, 2% quartzite, 3% metamorphics and		Add 3 gals H_2O
				other lithologies, and are very angular to subrounded with	0820	Add 2 gals H_2O
				thin caliche coatings on <5% of the gravels. Sands are	0830	Add 2 gals H_2O
				70% basalt, 15% quartzite, 10% quartz, 5% other lithologies	0840	steam rising - Nothing detectable w/H.Nu 10.3 Probe
				and are very angular to subrounded. Wet Color is olive (5Y 4/3)	0845	Drive Casing
				Dry Color is pale olive (5Y 6/3). Very strong reaction in 10%	0848	Weld on ear.
				HCl. Unconsolidated. No radiation detectable with G.M.	0857	Drive Casing.
				Similar to previous sample with decrease in grain size	0903	Bail Well.
				and basalt content, slightly different color, and stronger	0909	Resume drilling
				HCl reaction. Geologic Samples are representative.		Add 4 gals H_2O
					0918	Add 2 gals H_2O
					0927	Add 2 gals H_2O
					0940	Bailed Well

REMARKS:

Karen P. Oster
5/3/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
	Date 5/3/88	#22-14102	Depth 20' To 24'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0943	Resume drilling
						Add 3 gals H_2O
					1000	Add 2 gals H_2O
					1005	Cutting on bit.
20' 4 3/4" of 10"					1115	Set 20' 4 3/4" of 10" Casing
9' 4"						
29' 8 3/4" of 10"				Total 10" Carbon Steel Casing = 29' 8 3/4"		Add 9' 4" of 10" Casing
					1140	Lunch
					1255	Resume Welding
					1400	Resume drilling
					1402	Add 4 gals H_2O
					1404	Bailed Well
					1412	Resume drilling
					1429	Add 2 gals H_2O
					1437	Add 1 gal H_2O
					1440	Drive Casing
					1445	Resume drilling
						Add 1 gal H_2O
					1450	Drive Casing

REMARKS:

Karen R. Oster
5/3/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By A.R. Oster	Rig B.E. 2210	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
	Date 5/3/88	# 22-14102	Depth 24' To 28'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	24'-25'	H	Wet.	SANDY GRAVEL; 35% gravel, 61% sand, 4% silt.	1455	Using dart bailer Baiked Well
				Trace c.p., 5% m.p., 10% f.p., 20% v.f.p., 15% v.c.s., 10% c.s.,		Drill rate = 2.61'/hr.
				10% m.s., 15% f.s., 11% v.f.s., 4% silt. Poorly to Very Poorly	1500	Resume drilling
				Sorted. Gravels are 95% basalt, 4% granite, 1%		Add 4 gals H_2O
				other lithologies and are very angular to subrounded.	1505	Add 2 gals H_2O
				Sands are 85% basalt, 5% quartzite, 5% quartz,	1508	Drive Casing
				5% other sands, and are very angular to subrounded.	1515	Add 3 gals H_2O
				Wet Color is dark olive gray (5Y 3/2). Dry Color is	1520	Started changing bits
				light olive gray (5Y 6/2). Moderate reaction in 10% HCl.	1525	Done for day.
				Unconsolidated. No radiation detectable with G.M.		
				Similar to previous sample with an increase in grain		
				size and basalt, decrease in HCl reactivity and a darker		
				color. Geologic samples are representative.		

REMARKS: Total Drilled Depth = 28'
Total Drilled Today = 9'
Total 10" Casing = 29' 8 3/4"
Total H_2O Added = 37 gallons

Aaron R. Oster
5/3/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301 - N Crib
	Date 5/4/88	# 22-14102	Depth 28' To 29'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0750	started working on
						bits and cable head
						babbit.
29' 8¾" of		10"			1100	Add 10' of 10" Casing
10'						
39' 8¾" of		10"		Total 10" Carbon Steel Casing = 39' 8¾"		
					1133	Add 4 gals H_2O
						Resume drilling
					1140	Lunch
					1250	Resume drilling
					1308	Add 2 gals H_2O
					1314	Drive Casing
					1323	Resume drilling
					1340	Bail Well
					1347	Resume drilling
					1351	Drive Casing
					1355	Resume drilling
					1358	Add 2 gals H_2O

REMARKS:

Karen R. Oster
5/4/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-88)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/4/88	# 22-14102	Depth 29' To 30'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	29'-30'	H	Wet	GRAVELLY SAND; 25% gravel, 70% sand, 5% silt.	1402	Using dart bailer Bailed Well
				1% v.c.p., 4% c.p., 5% m.p., 5% f.p., 10% v.f.p., 10% v.c.s.,		Drill rate = 4.48'/hr
				15% c.s., 25% m.s., 15% f.s., 5% v.f.s., 5% silt. Poorly	1405	Drive Casing
				Sorted. Gravels are 95% basalt, 4% granite, 1%	1410	Resume drilling
				other lithologies, and are very angular to subrounded.		Add 2 gals H_2O
				Sands are 85% basalt, 5% quartzite, 5% quartz,	1424	Add 2 gals H_2O
				5% other sands, and are very angular to subrounded	1426	Bail Well
				Wet Color is dark olive gray (5Y 3/2). Dry Color is	1430	Resume drilling
				olive gray (5Y 5/2). Slight reaction in 10% HCl.	1435	Drive Casing
				Unconsolidated., No radiation detectable with G.M.	1444	Resume drilling
				Very similar to previous sample with better sorting,		Add 2 gals H_2O
				lighter dry color and less reaction in 10% HCl.	1450	Drive Casing
				Geologic samples are representative.	1453	Resume drilling
					1457	Bail Well
					1502	Resume drilling
					1505	Add 2 gals H_2O
					1510	Add 2 gals H_2O
					1516	Drive Casing

REMARKS:

Karen R. Oster
5/4/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-88)

DRILL LOG	By K.R.Oster	Rig B.E.220	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/4/88	#22-14102	Depth 30' To 34'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1518	Resume drilling
					1522	Add 1 gal H_2O
					1530	Done for day.

REMARKS: Total Drilled Depth = 34'
Total Drilled Today = 6'
Total 10" Casing = 39'8 3/4"
Total H_2O Added = 19 gallons

Karen P. Oster
5/4/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By K.R. Oster	Rig B.E. 220	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
	Date 5/5/88	#22-14102	Depth 34' To 35'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0755	Cutting new casing and
						welding ears
					0810	Start drilling
	34'-35'	H	Wet	GRAVELLY SAND; 25% gravel, 70% sand, 5% silt.	0815	Using dart bailer Bailed Well
				4% c.p., 6% m.p., 5% f.p., 10% v.f.p., 10% v.c.s., 15% c.s., 20% m.s.,		Drill rate = 4.84'/hr
				15% f.s., 10% v.f.s., 5% silt. Poorly to Very Poorly Sorted.	0820	Drive Casing
				Gravels are 90% basalt, 5% granite, 2% quartzite,	0825	Resume drilling
				3% other lithologies, and are very angular to subrounded.		Add 2 gals H_2O
				Sands are 85% basalt, 5% quartz, 5% quartzite, 5%	0834	Add 1 gal H_2O
				other sands, and are very angular to subrounded.	0840	Stop drilling
				Wet Color is dark olive gray (5Y 3/2). Dry Color is olive	0845	Resume drilling
				gray (5Y 5/2). Slight reaction in 10% HCl. Unconsolidated.		Add 2 gals H_2O
				No radiation detectable with G.M. Very Similar to	0850	Stop drilling
				previous sample with slight decrease in grain		Prepare to weld
				size, less sorting, and less basalt in gravels. Geologic		
				Samples are representative.		
39' 8 3/4" of 10"						
9' 2 3/4"					0900	Add 9' 2 3/4" of 10" Casing
49' 1 1/2" of 10"				Total of 10" Carbon Steel Casing = 49' 1 1/2"		

REMARKS:

Karen R. Oster
5/5/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By T.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
	Date 5/5/88	#22-14102	Depth 35' To 40'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0943	Drive Casing
					0950	Resume drilling
					0954	Add 2 gals H_2O
					1000	Drive Casing
					1014	Bail Well
					1020	Resume drilling
						Add 3 gals H_2O
					1029	Drive Casing
					1033	Resume drilling
					1040	Drive Casing
	39'-40'	H	Wet	GRAVELLY SAND; 25% gravel, 70% sand, 5% silt.	1045	Using dart bailer Bailed Well
				Trace v.c.p., 4% c.p., 6% m.p., 5% f.p., 10% v.f.p., 10% v.c.s.,		Drill rate = 6.52'/hr
				15% c.s., 20% m.s., 15% f.s., 10% v.f.s., 5% silt. Poorly to	1047	Resume drilling
				Very Poorly Sorted. Gravels are 80% basalt, 10% granite,		Add 2 gals H_2O
				5% quartzite, 5% metamorphics and other lithologies and	1052	Drive Casing
				are very angular to subangular. Sands are 75% basalt,	1055	Resume drilling
				10% quartz, 5% quartzite, 5% feldspar, 5% other sands		Add 3 gals H_2O
				and are very angular to subrounded. Wet Color is dark	1105	Drive Casing

REMARKS:

Taken R. Oster
5/5/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
	Date 5/5/88	#22-14102	Depth 40' To 43'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				olive gray (5Y3/2). Dry Color is olive gray (5Y5/2).	1109	Resume drilling
				Moderate reaction in 10% HCl. No radiation detectable		Add 2gals H_2O
				with G.M. Similar to previous sample with decrease	1120	Bail Well
				in basalt, and stronger HCl reaction. Geologic Samples	1125	Resume drilling
				are representative.		Add 2gals H_2O
					1132	Drive Casing
					1133	Stop for Lunch
					1255	Resume drilling
						Add 2 gals H_2O
					1302	Drive Casing
					1304	Bail Well
					1310	Resume drilling
						Add 1gal H_2O
					1320	Add 2gals H_2O
					1330	Drive Casing
					1333	Resume drilling
					1339	Drive Casing
					1341	Resume drilling

REMARKS:

Karen R. Oster
5/5/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 220	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N-Crib
	Date 5/5/88	#22-14102	Depth 43' To 45'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
						Add 2 gals H_2O
					1347	Add 1 gal H_2O
					1350	Drive Casing
					1354	Resume drilling
						Add 2 gals H_2O
					1400	Bailed Well
					1408	Resumed drilling
						Add 2 gals H_2O
					1413	Drive Casing
					1415	Resume drilling
				Ringold Contact @ 42' b.l.s.		Add 1 gal H_2O
	44'-45'	H	Wet	SANDY GRAVEL (RINGOLD); 35% gravel, 60% sand, 5% silt	1435	Using dart bailer Bailed Well
				Trace v.c.p., 7% c.p., 10% m.p., 8% f.p., 10% v.f.p., 10% v.c.s., 15% c.s.,		Drill rate = 2.83'/hr
				15% m.s., 10% f.s., 10% v.f.s., 5% silt., Very Poorly Sorted.	1440	Drive Casing
				Gravels are 35% basalt, 25% granite, 20% quartzite, 5%	1445	Resume drilling
				caliche, 15% metamorphics and other lithologies, and are		Add 3 gals H_2O
				very angular to subrounded. Sands are 40% basalt, 20%	1500	Ready to Weld.
				quartzite, 15% quartz, 10% feldspar, 5% caliche, 10% other sands,		

REMARKS:

Karen R. Oster
5/5/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/5/88	#22-14102	Depth 45' To 47'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				and are very angular to subrounded. Wet Color is olive		
				brown (2.5Y 4/4). Dry Color is light gray (2.5Y 7/2). Very Strong		
				reaction in 10% HCl. Consolidated. No radiation detectable		
				with G.M. Different from previous sample with increase		
				in grain size, HCl reaction; decrease in basalt content;		
				color change from olive grays to olive browns: this is		
				the Ringold Formation.		
49' 1½" of 10"						
10'					1505	Add 10' of 10" Casing
59' 1½" of 10"				Total 10" Carbon Steel Casing = 59' 1½"		
					1535	Drive Casing
					1536	Done for day

REMARKS: Total Drilled Depth = 47'
Total Drilled Today = 13'
Total 10" Casing = 59' 1½"
Total H_2O Added Today = 35 gallons

Karen R. Oster
5/5/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 5/6/88	#22-14102	Depth 47' To 49'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0755	Start drilling
						Add 3 gals H_2O
					0830	Bail Well
					0835	Resume drilling
					0839	Add 1 gal H_2O
					0845	Drive Casing
					0849	Resume drilling
					0851	Add 2 gals H_2O
					0901	Add 2 gals H_2O
					0904	Add 1 gal H_2O
					0910	Drive Casing
					0925	Bail Well
					0930	Resume drilling
					0932	Add 2 gals H_2O
					0938	Drive Casing
					0942	Resume drilling
					0948	Add 1 gal H_2O

REMARKS:

Karen R. Oster
5/6/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-88)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
	Date 5/6/88	#22-14102	Depth 49' To 54'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	49'-50'	H	Wet	SILTY SANDY GRAVEL (RINGOLD); 35% gravel, 55% sand, 10% silt	0955	Using dart bailer Bailed Well
				2% c.p., 10% m.p., 10% f.p., 13% v.f.p., 15% v.c.s., 15% c.s., 15%		Drill rate = 2.94'/hr
				m.s., 5% f.s., 5% v.f.s., 10% silt. Very Poorly Sorted. Gravels	1000	Drive Casing
				are 35% basalt, 20% granite, 20% quartzite, 15% caliche	1005	Resume drilling
				10% metamorphics and other lithologies, and are very		Add 3 gals H_2O
				angular to subrounded. Sands are 35% basalt, 20%	1025	Bail Well
				quartzite, 15% quartz, 10% feldspar, 10% caliche, 10% other	1031	Resume drilling
				Sands, and are very angular to subrounded. Wet		Add 3 gals H_2O
				Color is olive brown (2.5Y 4/4). Dry Color is light gray	1038	Drive Casing
				(2.5Y 7/2). Very, Very, Strong reaction in 10% HCl. Consolidated	1042	Resume drilling
				No radiation detectable with G.M. Similar to previous		Add 3 gals H_2O
				sample with decrease in grain size, basalt, increase	1048	Drive Casing.
				in caliche, HCl reactivity. Geologic Samples are	1050	Resume drilling
				representative.		Add 3 gals H_2O
					1057	Drive Casing
				Measures 250-300 counts/min Wet on G.M.	1110	Bail Well
					1115	Drive Casing
					1118	Resume drilling

REMARKS:

Karen R. Oster
5/6/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 2210	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N-Crib
	Date 5/6/88	#22-14102	Depth 54' To 55'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
						Add 3 gals H_2O
	54'-55'	H	Wet	SLIGHTLY SILTY GRAVELLY SAND (RINGOLD); 20% gravel, 70%	1123	Using Hartbaily Bailed Well
				sand, 10% silt. Trace c.p., 5% m.p., 5% f.p., 10% v.f.p.,		Drill rate = 6.66'/hr
				10% v.c.s., 20% c.s., 15% m.s., 15% f.s., 10% v.f.s., 10% silt.	1128	Lunch
				Poorly Sorted. Gravels are 30% basalt, 20% granite,	1300	Cutting pipe.
				20% quartz, 5% siltstone 15% quartzite, 10% metamorphics and	1315	Resume drilling
				other lithologies, and are very angular to subrounded.		Add 2 gals H_2O
				Sands are 30% basalt, 20% quartzite, 20% quartz,	1330	Beveling casing
				10% feldspar, 10% caliche, 10% other sands, and are		
				very angular to subrounded. Wet Color is olive brown		
				(2.5Y 4/4). Dry Color is light gray (2.5Y 7/2). Very Very		
				Strong reaction in 10% HCl. Consolidated. 500 counts/min		
				when wet detectable with G.M. Similar to previous		
				sample with decrease in grain size, basalt, increase		
				in sorting. Geologic Samples are representative.		
59' 1½" of 10"					1345	Add 10' of 10" Casing
10'						
69' 1½" of 10"				Total of 10" Carbon Steel Casing = 69' 1½"		
					1420	Drive Casing.

REMARKS:

Karen R. Oster
5/6/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.R. Oster	Rig B.E. 220	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/6/88	# 22-14102	Depth 55' To 59'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1423	Resume drilling
						Add 2 gals H_2O
					1430	Bail Well.
					1439	Resume drilling
						Add 5 gals H_2O
					1446	Drive Casing
					1452	Resume drilling
					1458	Add 3 gals H_2O
					1506	Bailed Well
					1514	Resumed drilling
					1516	Add 2 gals H_2O
					1523	Drive Casing
					1530	Done for day

REMARKS:

Karen R. Oster
5/6/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By L.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 5/9/88	# 22-14102	Depth 59' To 60'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0755	Start drilling
						Add 3 gals H_2O
	59'-60'	H	Wet	(RINGOLD) SLIGHTLY SILTY GRAVELLY SAND; 20% gravel, 70% sand, 10% silt	0820	Using dart bailer Bailed well
				Trace v.c.p., 5% c.p., 5% m.p., 5% f.p., 5% v.f.p., 5% v.c.s., 10% c.s.,		Drill rate = 3.9'/hr
				25% m.s., 20% f.s., 10% v.f.s., 10% silt. Poorly to Very Poorly	0825	Drive Casing
				Sorted. Gravels are 40% basalt, 15% quartz, 15% quartzite,	0835	Resume drilling
				15% granite, 15% metamorphics and other lithologies, and	0841	Add 2 gals H_2O
				are very angular to subrounded. Sands are 30% basalt,	0855	Drive Casing
				20% quartzite, 20% quartz, 15% feldspar, 15% other sands	0900	Bail Well
				and are very angular to subrounded. Wet Color is olive	0910	Resume drilling
				brown (2.5Y 4/4). Dry Color is light brownish gray (2.5Y 6/2).		Add 2 gals H_2O
				Strong reaction in 10% HCl. Moderately Consolidated. 500 cont	0923	Add 1 gal H_2O
				when wet detectable with G.M. Similar to previous sample	0926	Drive Casing
				with less sorting, decrease in grain size, increase in basalt	0932	Resume drilling
				content, decrease in caliche - and HCl reaction, darker dry		Add 3 gals H_2O
				color. Geologic Samples are representative.	0940	Add 2 gals H_2O
					0945	Drive Casing
					0947	Resume drilling

REMARKS:

Lauren R. Oster
5/9/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig B.E.220 # 22-14102	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/9/88		Depth 60' To 65'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
						Add 5 gals H_2O
					0955	Bail Well
				Driller thinks he's in water @ ≈ 64' b.l.s.	0958	Resume drilling
					1010	Drive Casing
					1015	Resume drilling
	64'-65'	H	Wet	SILTY SANDY GRAVEL (RINGOLD); 30% gravel, 60% sand, 10% silt.	1025	Using dart bailer Bailed Well
				1% c.p., 4% m.p., 10% f.p., 15% v.f.p., 10% v.c.s., 10% c.s., 20% m.s.,		Drill rate = 4.48'/hr.
				10% f.s., 10% v.f.s., 10% silt. Poorly to Very Poorly Sorted.	1030	Resume drilling
				Gravels are 35% basalt, 20% quartzite, 15% quartz, 15%		Add 2 gals H_2O
				granite, 15% metamorphic sand other lithologies	1044	Add 2 gals H_2O
				and are very angular to subrounded. Sands are 35%	1050	Bail Well
				basalt, 20% quartzite, 10% quartz, 15% feldspar, 20%	1053	Resume drilling
				other sands and are very angular to subrounded. Wet	1100	Prepare to Weld
				Color is dark grayish brown (2.5Y 4/2). Dry Color is light		(Wait for R.H. to find
				gray (2.5Y 7/2). Very slight reaction in 10% HCl. Slightly		out if fresh air is
				Consolidated. 1000 counts/min radiation detectable		needed for welding
				with G.M. Similar to previous sample with an increase in		and cutting.)
				grain size, lighter color, less HCl reaction, and less	1140	Lunch

REMARKS:

Karen R. Oster
5/9/89

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-88)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N-Crib
	Date 5/9/88	#22. 14102	Depth 65' To 67'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Consolidation. Geologic Samples are representative		
					1250	shutdown to wait
						for fresh air for
						welding and grinding.
					—	No work done in
						afternoon.

REMARKS:

Karen R. Oster
5/9/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-88)

DRILL LOG	By K.R. Oster	Rig B.E. 220	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/10/88	#22-14102	Depth 67' To 70'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0755	Getting fresh air
					0840	Start beveling and grinding
69'1½" of 10"					900	Add 10' of 10" Casing
10'						
79'1½" of 10"				Total of 10" Carbon Steel Casing = 79'1½"		
					0940	Drive Casing
					0955	Resume drilling
						Add 3 gals H_2O
					1005	Drive Casing
					1010	Resume drilling
					1015	Bail Well
					1025	Resume drilling
						Add 4 gals H_2O
					1055	Drive Casing
	69'-70'	H	Wet	SILTY SANDY GRAVEL (RINGOLD); 30% gravel, 60% sand, 10% silt	1100	Using dart bailer Bail Well
				4% c.p., 6% m.p., 10% f.p., 10% v.f.p., 10% v.c.s., 15% c.s., 15%		Drill rate = 4.17'/hr.
				m.s., 10% f.s., 10% v.f.s., 10% silt. Poorly to Very Poorly	1110	Resume drilling
				Sorted. Gravels are 35% basalt, 20% quartzite, 20%		Add 2 gals H_2O

REMARKS:

Karen R. Oster
5/10/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-88)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/10/88	#22-14102	Depth 70' To 75'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				granite, 15% quartz, 10% metamorphics and other lithologies,	1125	Add 1 gal H_2O
				and are very angular to subrounded. Sands are 35%	1130	Drive Casing
				basalt, 20% quartzite, 15% quartz, 15% feldspar, 15%	1135	Lunch
				other sands and are very angular to subrounded. Wet	1305	Resume drilling
				Color is dark grayish brown. Dry Color is light gray		Add 4 gals H_2O
				(2.5Y 7/2). Very slight reaction in 10% HCl., slightly	1315	Bail Well
				Consolidated. 500 counts/min radiation detectable	1320	Resume drilling
				with G.M. Same as previous sample with a slight	1334	Drive Casing
				increase in grain size and minor lithologic changes.	1336	Resume drilling
				Geologic Samples are representative.		
	74'-75'	H	Wet.	SILTY SANDY GRAVEL (RINGOLD); 35% gravel, 55% sand, 10% silt,	1402	Using dart bailer Bailed Well
				5% c.p., 9% m.p., 10% f.p., 11% v.f.p., 10% v.c.s., 15% c.s., 10% m.s.,		Drill rate = 4.29'/hr.
				10% f.s., 10% v.f.s., 10% silt. Very Poorly Sorted. Gravels	1408	Resume drilling
				are 25% basalt, 25% quartzite, 20% granite, 15% quartz,	1437	Bail Well
				15% metamorphics and other lithologies, and are very	1440	Resume drilling
				angular to subrounded (when unbroken). Sands are	1446	Prepare to Weld
				30% basalt, 20% quartzite, 15% quartz, 15%		
				feldspar, 10% clear quartz, 10% other sands and are		

REMARKS:

Karen R. Oster
5/10/88

D - Drive Barrel H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By K. R. Oster	Rig B.E.22W # 22-14102	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/10/88		Depth 75' To 79'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				very angular to subrounded. Wet Color is dark grayish brown (2.5Y 4/2). Dry Color is light gray (2.5Y 7/2). No reaction in 10% HCl. Unconsolidated. 500 counts/min radiation detectable with G.M. Similar to previous sample with slight increase in grain size, decrease in basalt content, and reaction in 10% HCl. Geologic Samples are representative.		
79' 1½" of 10"					1450	Add 10'5" of 10" Casing
10'5"						
89'6½" of 10"				Total of 10" Carbon Steel Casing = 89'6½"		
					1530	Done for day

REMARKS:

Karen R. Oster
5/10/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/11/88	# 22-14102	Depth 79' To 80'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0800	Get Hask checked
					0815	Started Welding
					0905	Drive Casing
					0914	Resume drilling
					0930	Drive Casing
					0935	Bail Well
					0940	Resume drilling
	79'-80'	H	Wet	SILTY SANDY GRAVEL (PINGOLD); 55% gravel, 40% sand, 5% silt.	1018	Using dart bailer Bailed Well
				5% c.p., 15% m.p., 15% f.p., 20% v.f.p., 10% v.c.s., 10% c.s., 10%		Drill rate = 3.37'/hr.
				m.s., 5% f.s., 5% v.f.s., 5% silt. Poorly to Very Poorly	1019	Drive Casing
				Sorted. Gravels are 25% basalt, 25% quartzite, 20% granite,	1023	Resume drilling
				15% quartz, 15% metamorphics and other lithologies, and	1037	Bail Well
				are very angular to subrounded. Sands are 25% basalt	1040	Resume drilling
				20% quartzite, 15% quartz, 15% feldspar, 10% clear quartz,	1100	Drive Casing
				5% mica, 10% other sands, and are very angular	1105	Resume drilling
				to subrounded. Wet Color is grayish brown (2.5Y 5/2).	1130	Drive Casing
				Dry Color is light gray (2.5Y 7/2). No reaction in 10% HCl.	1135	Lunch
				Unconsolidated. 100-150 counts/min. radiation detectable	1300	Resume drilling

REMARKS:

Karen R. Oster
5/11/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/11/88	#22-14102	Depth 80' To 85'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				with G.H. Similar to previous sample with increase		
				in grain size, decrease in basalt, and silt. Geologic		
				samples are representative.		
	84'-85'	H	Wet	SANDY GRAVEL (RINGOLD); 35% gravel, 60% sand, 5% silt.	1318	Using dart bailer Bailed Well
				Trace v.c.p., 2% c.p., 5% m.p., 13% f.p., 15% v.f.p., 10% v.c.s., 15%		Drill rate = 3.9'/hr.
				c.s., 20% m.s., 10% f.s., 5% v.f.s., 5% silt. Poorly Sorted.	1320	Resume drilling
				Gravels are 35% basalt, 20% granite, 20% quartzite,		
				15% quartz, 10% metamorphics and other lithologies,		
				and are very angular to subrounded. Sands are 30%		
				basalt, 15% quartzite, 15% quartz, 15% feldspar, 10% clear		
				quartz, 5% mica, 10% other sands, and are very angular		
				to subrounded. Wet Color is grayish brown (2.5Y 5/2).		
				Dry Color is light gray (2.5Y 7/2). Very Slight reaction		
				in 10% HCl. Slightly Consolidated. 150 counts/min		
				radiation detectable with G.H. Similar to previous		
				Sample with a decrease in grain size, increase in		
				basalt, Consolidation and reaction in 10% HCl.		
				Geologic Samples are representative		

REMARKS:

Karen P. Oster
5/11/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By L.R. Oster	Rig B.E.2200	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/11/88	# 22-14102	Depth 85' To 88'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1350	Prepare to Weld
89' 6½" of 10'6		10"			1410	Add 10'6" of 10" Casing
100' ½" of		10"		Total 10" Carbon Steel Casing = 100' ½"		
					1457	Drive Casing
					1505	Resume drilling
					1510	Bail Well
					1515	Resume drilling
					1530	Done for day

REMARKS:

Larry R. Oster
5/11/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-86)

DRILL LOG	By K.R. Oster	Rig B.E. 2220	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/12/88	# 22-14102	Depth 88' To 90'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/ω = 74.5' b.l.s. (PNL 200'E-TAPE # 11053)	0815	May Not be Equilibrated.
					0825	Start drilling
					0840	Drive Casing
					0853	Resume drilling
					0900	Bail Well
					0910	Resume drilling
	89'-90'	H	Wet	SLIGHTLY GRAVELLY SAND (RINGOLD); 5% gravel, 65% sand, 30% silt.	0938	Using dart bailer Bail Well
				Trace m.p., 1% f.p., 4% v.f.p., 5% v.c.s., 10% c.s., 20% m.s.,		Drill rate = 3'/hr.
				20% f.s., 10% v.f.s., 30% silt., Trace clay, Moderately	0940	Drive Casing
				to Poorly Sorted. Gravels are 35% basalt, 20% granite,	0945	Resume drilling
				20% quartzite, 15% quartz, 10% metamorphics and	1005	Bail Well
				other lithologies, and are very angular to subrounded.	1011	Resume drilling
				Sands are 30% basalt, 15% quartzite, 15% quartz,	1030	Drive Casing
				15% feldspar, 10% mica, 5% clear quartz, 10% other	1034	Bail Well
				sands, and are very angular to subrounded. Wet Color	1038	Resume drilling
				is grayish brown (2.5Y 5/2). Dry Color is light gray	1119	Drive Casing
				(2.5Y 7/2). No reaction in 10% HCl., Slightly Consolidated.	1123	Resume drilling
				100 counts/min radiation detectable with G.M. Similar	1135	Lunch

REMARKS:

Karen R. Oster
5/12/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

Tomorrow Add 9'7¼"

DRILL LOG	By K.R. Oster	Rig B.E.2200	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/12/88	# 22-14102	Depth 90' To 98'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				to previous Sample with a decrease in grain size,	1300	Bail Well
				better sorting, and less reaction in 10% HCl. Geologic	1308	Resume drilling.
				Samples are representative.		
	94'-95'	H	Wet.	GRAVELLY SILTY SAND (RINGOLD); 20% gravel, 60% sand, 18% silt, 2% clay,	1323	Using dart bailer Bailed Well
				1% c.p., 4% m.p., 5% f.p., 10% v.f.p., 10% v.c.s., 10% c.s., 15% m.s.,		Drill rate = 3.2'/hr.
				15% f.s., 10% v.f.s., 18% silt, 2% clay. Poorly to Very Poorly	1326	Drive Casing
				Sorted. Gravels are 35% basalt, 20% granite, 20% quartzite,	1328	Resume drilling
				15% quartz, 10% metamorphics and other lithologies, and	1415	Drive Casing
				are very angular to subrounded. Sands are 35% basalt,	1420	Resume drilling
				15% quartzite, 15% quartz, 15% feldspar, 5% mica, 5% clear	1430	Bail Well
				quartz, 10% other sands and are very angular to subrounded.	1440	Resume drilling
				Wet Color is dark grayish brown (2.5Y 4/2). Dry Color is light	1510	Prepare to Weld
				gray (2.5Y 7/2). Moderate reaction in 10% HCl. Slightly	1530	Done for day
				Consolidated. 100 counts/min radiation detectable with G.M.		
				Similar to previous sample with an increase in grain		
				size, basalt content, worse sorting and stronger reaction		
				in 10% HCl. Geologic Samples are representative.		

REMARKS:

Karen R. Oster
5/12/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.P. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 5/13/88	#22-14102	Depth 98' To 100'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 67.5' b.l.s. (PNL 200' E-TAPE # 11053)	0815	
					0820	Prepare to Weld
100'	½" of	10"			0825	Add 9'7¼" of 10" Casing
	9'7¼"					
109'7¾"	of	10"		Total of 10' Carbon Steel Casing = 109'7¾"		
					0915	Drive Casing
					0930	Resume drilling
					0936	Bail Well
					0940	Resume drilling
					1005	Drive Casing
					1015	Mark Cable.
					1022	Resume drilling
	99'-100'	H	Wet	SILTY SANDY GRAVEL (RINGOLD); 35% gravel, 50% sand, 10% silt, 5% clay,	1100	using dart bailer Bailed Well
				Trace c.p., 8% m.p., 7% f.p., 20% v.f.p., 10% v.c.s., 10% c.s., 10% m.s.,		Drill rate = 1.92'/hr.
				10% f.s., 10% v.f.s., 10% silt, 5% clay. Very Poorly Sorted. Gravels	1105	Resume drilling
				are 35% basalt, 20% granite, 20% quartzite, 15% quartz,	1120	Drive Casing
				10% metamorphics and other lithologies, and are very angular	1125	Resume drilling
				to subangular. Sands are 35% basalt, 15% quartzite, 15%	1135	Lunch
				quartz, 15% feldspar, 5% mica, 5% clear quartz, 10% other sands	1300	Resume drilling

REMARKS:

Kevin P. Oster
5/13/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 5/13/88	# 22-14102	Depth 100' To 103'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				and are very angular to subrounded. Wet Color is dark	1312	Bail Well
				grayish brown (2.5Y 4/2). Dry Color is light gray (2.5Y 7/2).	1316	Resume drilling
				Moderate reaction in 10% HCl. Slightly Consolidated. 100 counts/min	1340	Drive Casing
				radiation detectable on G.M., Similar to previous sample	1345	Resume drilling
				with an increase in grain size. Geologic Samples		Add 5 gals H_2O
				are representative.		
					1355	Bailed Well.
				Clay layer starts at 101' b.l.s. (seals off H_2O).	1400	Resume drilling
						Add 6 gals H_2O
	103'	H	Wet	Clay; 2% gravel, 7% sand, 1% silt, 90% Clay.	1415	Using dart bailer Bailed Well
				1% f.p., 1% v.f.p., 2% v.c.s., 2% c.s., 1% m.s., 1% f.s., 1% v.f.s., 1%		Drill rate = 2.09'/hr.
				silt, 90% Clay. Very Well Sorted. Gravels are 80% basalt,	1420	Resume drilling
				5% quartz, 5% quartzite, 10% other lithologies and are	1435	Stop drilling.
				very angular to subangular. Sands are 50% basalt,		
				20% caliche, 10% quartz, 10% quartzite, 10% other		
				sands, and are very angular to subrounded. Wet Color		
				is grayish brown (2.5Y 5/2). Dry Color is light gray (2.5Y 7/2)		
				Strong reaction in 10% HCl. Semi Consolidated. Different		

REMARKS:

Karen R. Oster
5/13/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 5/13/88	#22-14102	Depth 103' To 104'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				from previous sample. 100 counts/min radiation		
				detectable with G.M. Geologic samples are representative.		
109'	7 3/4" of 10"				1440	Cutoff 4'1" of 10" Casing
- 4'	1"					
105'	6 3/4" of 10"			Total 10" Carbon Steel Casing = 105' 6 3/4"		
					1500	Break off bit.
					1530	Done for day

REMARKS:

Karen P. Oster
5/13/88.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.2210	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/16/88	#22-14102	Depth 104' To 104'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Casing is sealing off H_2O in Clay so unable to take a Depth to Water measurement. No Work done on this well today - waiting for Geophysical logging. Driller worked on preparations for aquifer testing at 199-N-67.		

REMARKS:

Karen R. Oster
5/16/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/17/88	# 22-14102	Depth 104' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Waiting for Geophysical Well logging		
				Well logged with the following Geophysical Probes:	1320	Start logging
				Density; 102'-2' b.l.s., Neutron; 102'-4' b.l.s., Natural		
				Gamma; 102'-3' b.l.s.,	1420	Done logging
				Measure D/B = 103' b.l.s. (PNL STEEL TAPE # L200-01).	1420	
				Pour 1/2 bag (100 lbs ea) 20-40 U.S. SIEVE SIZE Colorado	1430	
				Silica Sand in Well. Measured D/B Top of Sand @		
				100' b.l.s. (PNL STEEL TAPE # L200-01).		
					1440	Started Pulling 10".
				Pulled Casing back to 10.5' b.l.s. and stopped	1500	Stop pulling 10"
				pulling casing to go pull pump at 199-N-67.		

REMARKS:

Karen R. Oster
5/17/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.R. Oster	Rig B.E.220	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 5/18/88	# 22-1410a	Depth 100' To 100'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/B Sand = 100' 10" b.l.s. (PNL STEEL TAPE # L200-01).	0826	
				Poured 3/8 Bag (100 lbs ea) 20-40 U.S. SIEVE SIZE Colorado	0840	
				Silica Sand in Well.		
					0845	Stop work on N-69 to
				Pump at N-67 was turned on and immeadiately sucked dry		pull pump at N-67.
				(Drawdown) 72' - (Static) 65.8' = 6.2' (Total Drawdown)	1130	Lunch
				Recovered back to 66' in ≈ 5 min.	1300	Try Pump @ N-67
					1340	Resume pulling 10" Casing
					1420	Stopped Pulling
					1440	Welding new puller to D.
					1530	Done for day

REMARKS:

Karen R. Oster
5/18/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/19/88	# 22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0750	Started Pulling Casing
					0825	Stopped Pulling Casing
					0850	Started Pulling Casing
				Poured 1/4 bag (100 lbs ea) 20-40 U.S. sieve size Colorado Silica	0905	Stopped Pulling Casing
				Sand in Well. Measured D/B - Top of Sand at 99'11" b.l.s.		
				(PNL STEEL TAPE # L200-01).		
					0915	Started Pulling Casing
				Casing is pulled back to 100' b.l.s.	1015	Cut off Puller Top
105' 6 -3'	3/4" of	10"		Measured D/B Top of Sand @ 95.5' b.l.s. (PNL STEEL TAPE #	1030	Cut off 3' of 10" Casing
102' 6	3/4" of	10"		L200-01). As the casing pulled above the clay the		(Indicates Clay starts
				water came in and caused the sand to heave		@ 100'3" b.l.s. instead of 101')
				4.5' into the hole. Try bailing it out.	1035	Bailing well
				Measured D/B @ 97' b.l.s. (PNL STEEL TAPE # L200-01).	1040	
					1045	Drive Casing back
					1050	Bailing Well
					1055	Prepare to Weld again
					1100	Weld on Puller Top
					1140	Stop for Lunch

REMARKS:

Karen R. Oster
5/19/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By A.R. Oster	Rig B.E.2210	Well Number 199-N-69	Computer Number	Project or Work Order No. 1301-N Crib
	Date 5/19/88	# 22-14102	Depth 100' To 100'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1255	Welding
					1305	Drive Casing
					1308	Bail Well
					1315	Puttingon bit.
					1325	Start drilling
					1337	Bail Well
				Poured 1 1/8 bags (100 lbs ea) 20-40 U.S. SIEVE SIZE	1350	
				Colorado Silica Sand in hole. measured D/B Top		
				of Sand @ 99.5' b.l.s. (PNL STEEL TAPE #L200-01)		
				Casing is @ 103' b.l.s.		
				Setting 6" Stainless Steel Screen and Casing as follows	1435	Setting Stainless
				1 10'2½" section of 6" 10 slot 304 Stainless Steel Screen		
				with factory welded centralizers on the top.		
				1 20' section of 6" 304 Stainless Steel Casing	1530	Done for day

REMARKS:

Karen P. Oster
5/19/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Cr16
	Date 5/20/88	# 22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				1 20' section of 6" 304 stainless steel Casing w/ Centralizers (Top)	0750	Continued setting
				1 20' section of 6" 304 stainless Steel Casing		Stainless Casing
				1 20' section of 6" 304 stainless steel Casing w/ Centralizers (Top)		
				1 10' section of 6" 304 stainless Steel Casing		
				1 5' section of 6" 304 stainless steel Casing		
					0945	Welding on puller top
					1030	Started pulling casing
					1135	Lunch
					1345	Started pulling 10" again
				Poured 1¼ bags (100 lbs ea) 20-40 U.S. SIEVE SIZE Colorado	1355	
				Silica Sand in annulus. Pulled Casing back to 96' b.l.s.,		
				Measured D/B Top of Sand Pack @ 94' b.l.s. (PNL STEEL TAPE #L200-01)		
				Cut Casing off @ 100' Weld.	1400	
					1420	Weld on Puller top.
				Poured 1¼ bags (100 lbs ea) 20-40 U.S. SIEVE SIZE Colorado	1500	Started Pulling 10" Casing
				Silica Sand in annulus.	1515	Stopped Pulling Casing
				Poured 1¼ bags (100 lbs ea) 20-40 U.S. SIEVE SIZE Colorado	1525	
				Silica Sand in annulus.	1530	Done for day.

REMARKS:

Karen R. Oster
5/20/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 2200	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/23/88	# 22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0845	Started Pulling 10" Casing
				Poured 1½ bags (100 lbs ea) 20-40 U.S. sieve size Colorado	0910	
				Silica Sand in annulus. Pulled 10" Casing back to	1000	Artificial Sand Pack
				87' b.l.s. Measured D/B Top of 20-40 Sand Pack @ 85' b.l.s		(20-40) = 104'-85' b.l.s.
				(PNL STEEL TAPE # L200-01)	1130	Lunch
				Poured 3 bags (100 lbs ea) 40 mesh U.S. sieve size Colorado	1320	Artificial Sand Pack
				Silica Sand in annulus. Pulled 10" Casing back to 79' b.l.s.		(40) = 85'-78.5' b.l.s.
				Measured D/B Top of 40 mesh Sand Pack @ 78.5' b.l.s.		
				(PNL STEEL TAPE # L200-01)		
				Poured 2 buckets (50 lbs ea) ½" Volclay tablets in	1330	Bentonite Pellet Seal
				annulus. Measured D/B Top of Bentonite Pellets @ 63' b.l.s		= 78.5'-76' b.l.s.
				(PNL STEEL TAPE # L200-01). Possible bridging of pellets at the		
				top of the water table.		
				Try to shake pellets down with drive clamps	1340	
				Measured D/B Top of Bentonite Pellets @ 65' b.l.s. (PNL STEEL TAPE # L200-01)	1405	
				Driller is going to 200-E Area to talk to Lenny (Supervisor)	1433	Done here for day

REMARKS:

Karen R. Oster
5/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
	Date 5/24/88	#22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Cut off casing	0800	
						Wait for air Compressor
				Setting up for air compressor to mix a slurry in the well	0900	
				Setting tremie pipe for air compressor	1030	
				Started blowing air in hole to mix up the bentonite	1100	Add 15 gals H_2O
				pellets into a slurry and get rid of the pellet bridge		
					1135	Lunch
				Continued blowing air in hole; moving the tremie pipe	1250	
				around the annulus to breakup the pellets		
				Measured D/B Top of Slurry @ 64' b.l.s. (PNL STEEL TAPE #1200-01)	1500	
				Unsure if tape is sticking to side or if there is a ring of		
				more solid bentonite there. Continue mixing slurry	1515	Add 5 gals H_2O
				in hole with air - Will add more slurry and pull		
				back tommorrow, to see if it will go down.		
					1530	Done for day

REMARKS:

Karen R. Oster
5/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R.Oster	Rig B.E.200	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-NCrib
	Date 5/25/88	#22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Driller had meetings in morning / D/B Top Bentonite @ 70' b.l.s. (PNL STEEL TAPE #L200-01)		
				Started mixing bentonite grout (25 gals H_2O to 1 bag	1250	
				bentonite crumbles) (50 lbs ea). Cement mixer does not		
				mix bentonite slurry very well.		
				Poured a total of 2.5 bags (50 lbs ea) Bentonite Crumbles mixed	1410	
				with 40 gals H_2O into annulus.		
				Removing tremie pipe prepare to pull casing	1420	
					1445	Weld on Puller top.
					1510	Started Pulling Casing
				Pulled 10" Casing back to 76' b.l.s. Measured D/B Top of	1525	Done for day.
				Bentonite Slurry @ 50' b.l.s. (PNL STEEL TAPE #L200-01).		
				Weld showing is the 79' 1½" Weld.		

REMARKS:

Karl R. Oster
5/25/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By K.R. Oster	Rig B.E.220	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
	Date 5/26/88	#22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Measured D/B Top of Bentonite Slurry at 47' b.l.s. (PNL STEEL TAPE #L200-01)	1000	Driller had meetings in morning
					1015	Cut off Casing @ 79' weld
					1030	Put in tremie pipe
				Start pumping air down tremie pipe to mix up bentonite slurry	1045	
					1120	Remove tremie pipe
					1130	Lunch
					1250	Start pulling 10" Casing
				Pulled 10" Casing back to 70.5' b.l.s. Measured D/B Top of	1410	
				Bentonite at 50' b.l.s. (PNL STEEL TAPE #L200-01).	1415	Continue pulling 10" Casing
				Cut off 10" Casing (69' 1½" weld is just above the top of 12" casing)	1430	
				Measured D/B Top of Bentonite at 56' b.l.s. (PNL STEEL TAPE #L200-01)	1445	
				Pumping air in to mix slurry in annulus	1500	
				There is 67' 9" of 10" Casing in ground.	1530	Done for day
				Measured D/B Top of Bentonite @ 65' 9" of Bentonite Slurry		
				= 2' of Slurry inside pipe.		

REMARKS:

Karen R. Oster
5/26/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water A-6000-021 (6-86)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/27/88	#22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 66'2" b.l.s. (PNL E-TAPE # 11053)	0750	Trying to blow bentonite
						slurry off inside of 10"
						casing.
				Measured D/B Top of Bentonite Slurry @ 66'9" b.l.s. (PNL STEEL	0955	Bentonite Slurry Seal =
				TAPE # L200-01). Casing is at 67'9" b.l.s.		76' 66.75' b.l.s.
				Poured 1/2 bag (50 lbs ea) Bentonite Crumbles in annulus.	1005	Started adding Crumbles
					1015	Weld on pulley top
				Measured D/B Top of Bentonite Crumbles at 50' b.l.s. The	1045	
				crumbles have bridged.		
				Add 25 gals H_2O and set in tremie pipe to mix Crumbles	1100	
				Into a slurry.	1130	Lunch
				Pumping air into hole.	1250	
				Go to Felix's to help him.	1500	Done here for day

REMARKS:

Karen R. Oster
5/27/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 5/31/88	#22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0730	Safety Meeting
					0800	Round-up more tremie pipe
					0910	Pump air into hole
				Pull tremie pipe out - prepare for grout pump	1045	
					1100	start mixing grout
				Used 30 gals H_2O and 1/2 bag (100 lbs ea) Bighorn	1130	
				Bentonite (powdered). and poured in annulus	1140	Lunch
				(hose blew off grout pump so pouring it down instead)		
				Mixed 25 gals H_2O and >1/2 bag (100 lbs ea) Bighorn	1300	Mixing grout again
				powdered Bentonite and pumped into annulus		
				Measured D/B Top of Bentonite slurry @ 30' b.l.s. (PNL	1330	
				STEEL TAPE #L200-01).		
					1340	Start pulling 10" Casing
				Next weld exposed should be 59' 1 1/2".	1415	Cut off 10" Casing
				Measured D/B Top of Bentonite Slurry @ 44' b.l.s. (PNL STEEL TAPE #L200-01)	1440	
				Mixed 50 gals H_2O and 1 1/4 bags (100 lbs ea) Bighorn Powdered Bentonite	1445	Mixing grout.
				and pumped into the annulus.	1520	Welding on puller top
					1530	Done for day

REMARKS:

Karen R. Oster
5/31/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 6/1/88	# 22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0750	Finish Welding puller top
					0820	Shake casing to settle
						the Bentonite Slurry
				Measured D/B Top of Bentonite Slurry @ 22' b.l.s. (PNL STEEL TAPE # 1200-01)	0835	
					0840	Started pulling casing
				Cutting 10" Casing @ the 59' 1½" Weld.	0855	Cutting off 10" Casing
				Unable to measure to Top of Slurry due to a "donut" of thicker bentonite	0908	Set tremie pipe.
				that is built up at 15' b.l.s. - So will blow holes in it with the	0915	Turn on air compressor
				air compressor.		Add 5 gals H_2O
					1000	Continue blowing air.
				Measured D/B Top of Bentonite Slurry at 23' b.l.s. (PNL STEEL TAPE # 1200-01)	1045	Stopped blowing air
					1100	Weld puller top
					1110	Pulling 10" Casing
				Cut Casing @ 49' 1½" Weld.	1120	Cutting 10" Casing
					1133	Lunch
					1310	Weld puller top.
				Used 25 gals H_2O and ½ bag (100 lbs ea) Powdered Bighorn	1330	
				Bentonite to mix slurry and pumped into annulus		

REMARKS:

Kreen R. Oster
6/1/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-88)

9 2 1 2 6 5 4 0 2 3 0

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 6/1/88	# 22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1345	Resumed pulling 10"
				Cut pipe off at 39'8¾" Weld.	1430	Cut off 10" Casing
				Mixed 25gals H_2O and ½ bag (100lbseq) Powdered	1500	
				Bighorn Bentonite into Slurry and pumped into annulus.		
				Measured D/B Top of Bentonite Slurry at 18' b.l.s. (PNL STEEL		
				TAPE #L200-01).	1510	Weld pulley top
					1525	Pulling 10" Casing
					1530	Done for day

REMARKS:

Karen P. Oster
6/1/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.P. Oster	Rig B.E.22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 6/2/88	# 22-14102	Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0800	Start pulling 10" Casing
				Pulled 10" Carbon Steel Casing back to 31' b.l.s. Measured	0835	
				D/B Top of Bentonite Slurry @ 19' b.l.s. (PNL STEEL TAPE # L200-01)		
					0840	Continue pulling 10" Casing
				Cut 10" Casing off at the 29' 8 3/4" Weld.	0850	Cut off 10" Casing
					0920	Weld on puller top.
					0930	Pulling 10" Casing.
				Cut 10" Casing at 19' 8 3/4" Weld.	1000	Cut 10" Casing
				Mixed 13 gals H_2O and 1/4 bag (100 lbs ea) Powdered	1005	
				Bighorn Bentonite into a Slurry and pumped down annulus.		
					1025	Pulled rest of 10" Casing.
				Measured D/B Top of Bentonite Slurry at 21' b.l.s. (PNL STEEL	1030	Bentonite Slurry Seal =
				TAPE # L200-01).		76'-21' b.l.s.
					1045	Weld ears on 12" Casing
					1115	Started Pulling 12" Casing
					1130	Lunch.
				Mixed 70 gals H_2O and 14 bags (94 lbs ea) Portland Cement and	1250	Mixing Cement Grout and
				1/4 bag (100 lbs ea) Powdered Bentonite into a Grout and pumped in annulus.		Pulling 12" Casing
				Pulled 12" Casing back to 6' b.l.s. Measured D/B Top of Cement Grout	1530	Done for day.
				at 5.5' b.l.s. (PNL STEEL TAPE # L200-01).		

REMARKS:

Karen P. Oster
6/2/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.R. Oster	Rig B.E. 22W # 22-14102	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Crib
	Date 6/3/88		Depth 100' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0750	Cut off 12" Casing
				Measured D/B Top of Cement Grout Seal @ 5' b.l.s. (PNL STEEL	0830	
				TAPE #L200-01).	0840	Mixing Cement Grout
				Mixed 25 gals H_2O and 4 bags (94 lbs ea) Portland Cement		
				and 2 scoops Bentonite into a grout and pumped		
				into well. Measured D/B Top of Cement Grout @ 2' b.l.s.	0905	Pulled 12" Casing out
				Left ≈ 2.5' of stick-up on stainless steel Casing	0925	Cutting off top of S.S. casing
					0950	Started bailing Well
				Using teflon bailer took samples for analysis	1100	Took water samples
				by U.S. Testing	1120	Welding tab (for lock) on casing.
					1130	Lunch
					1250	Start Cleaning rig
					1440	Getting rig checked out
					1530	Done for day

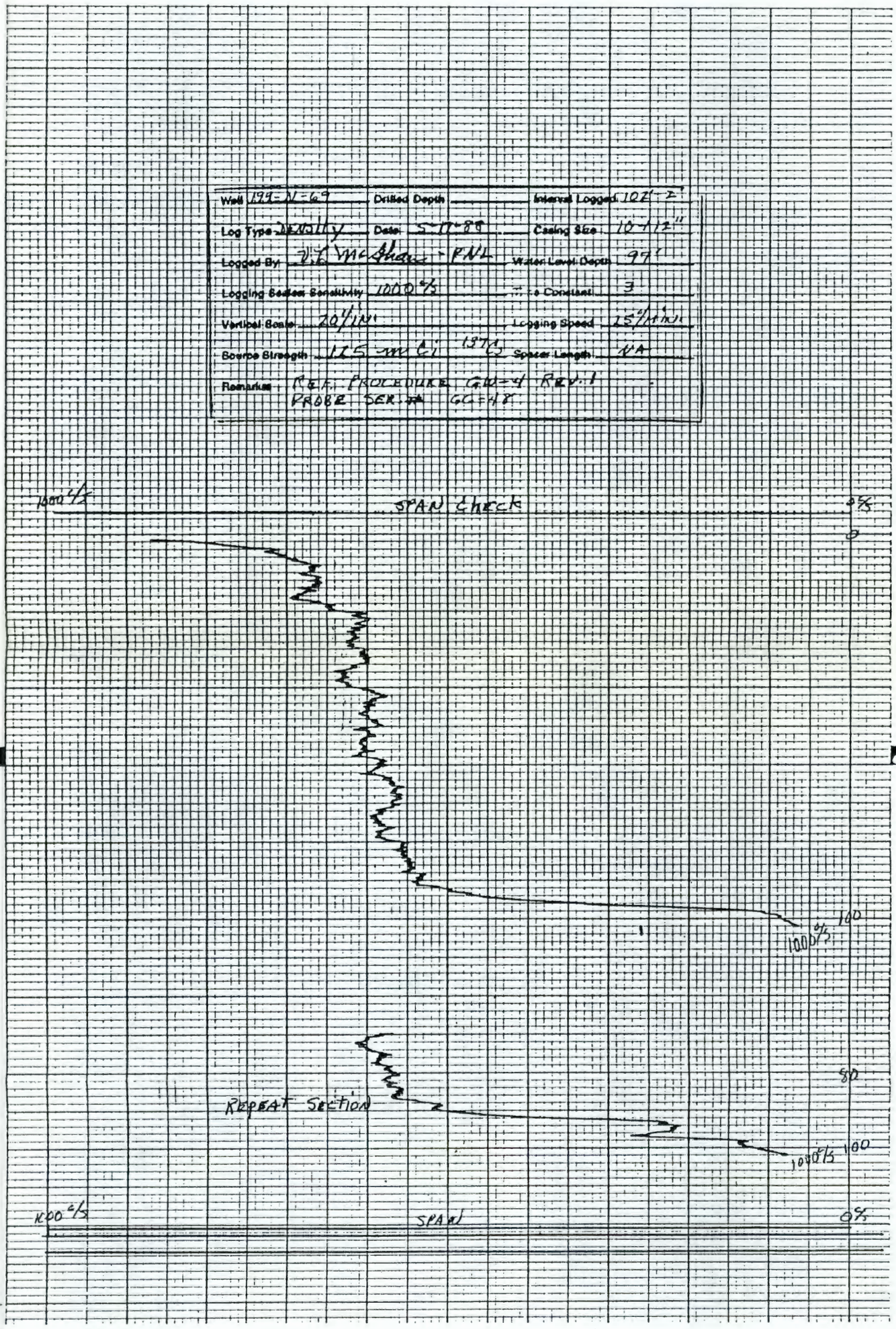
REMARKS:

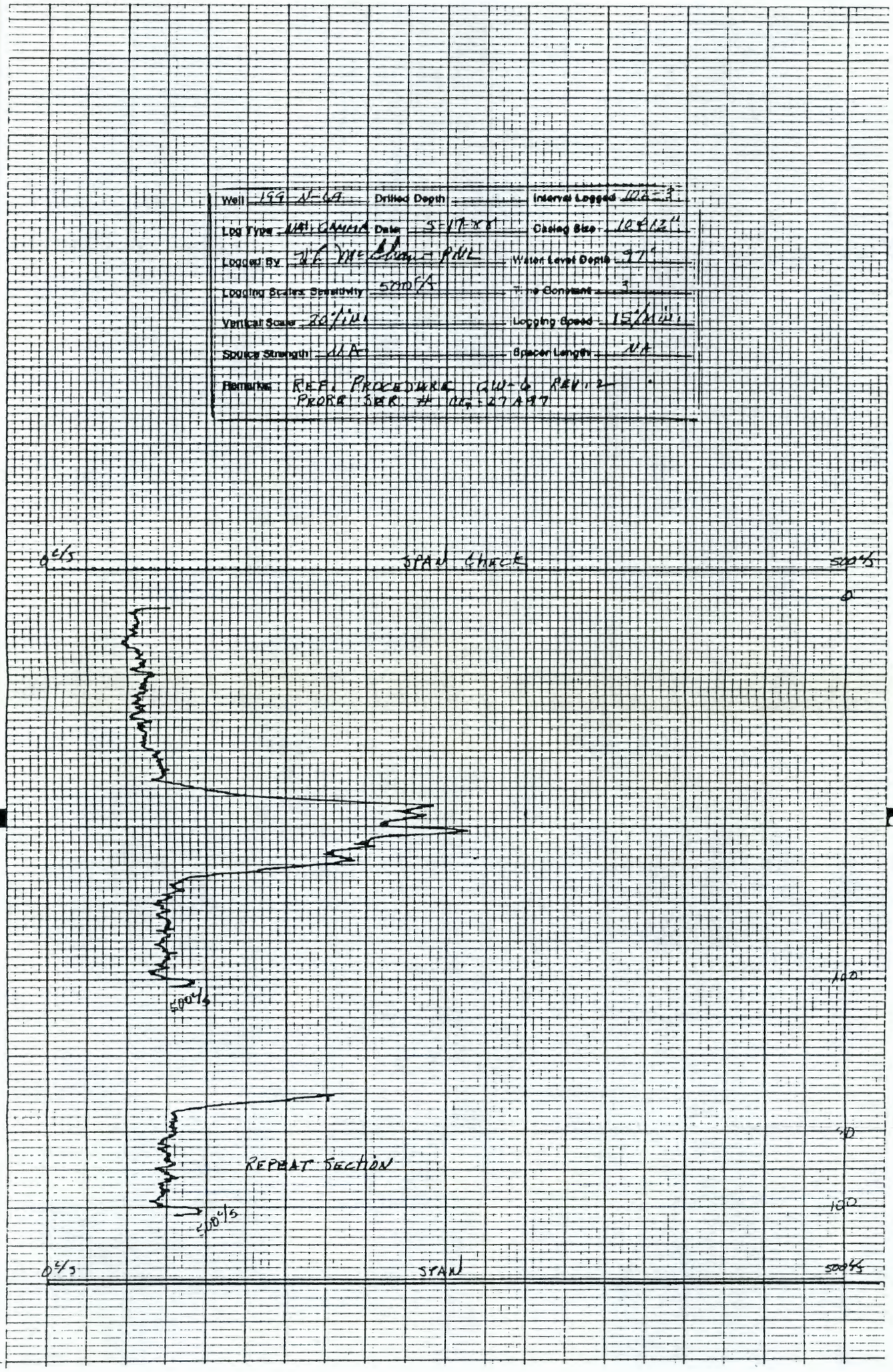
Karen R. Oster
6/3/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

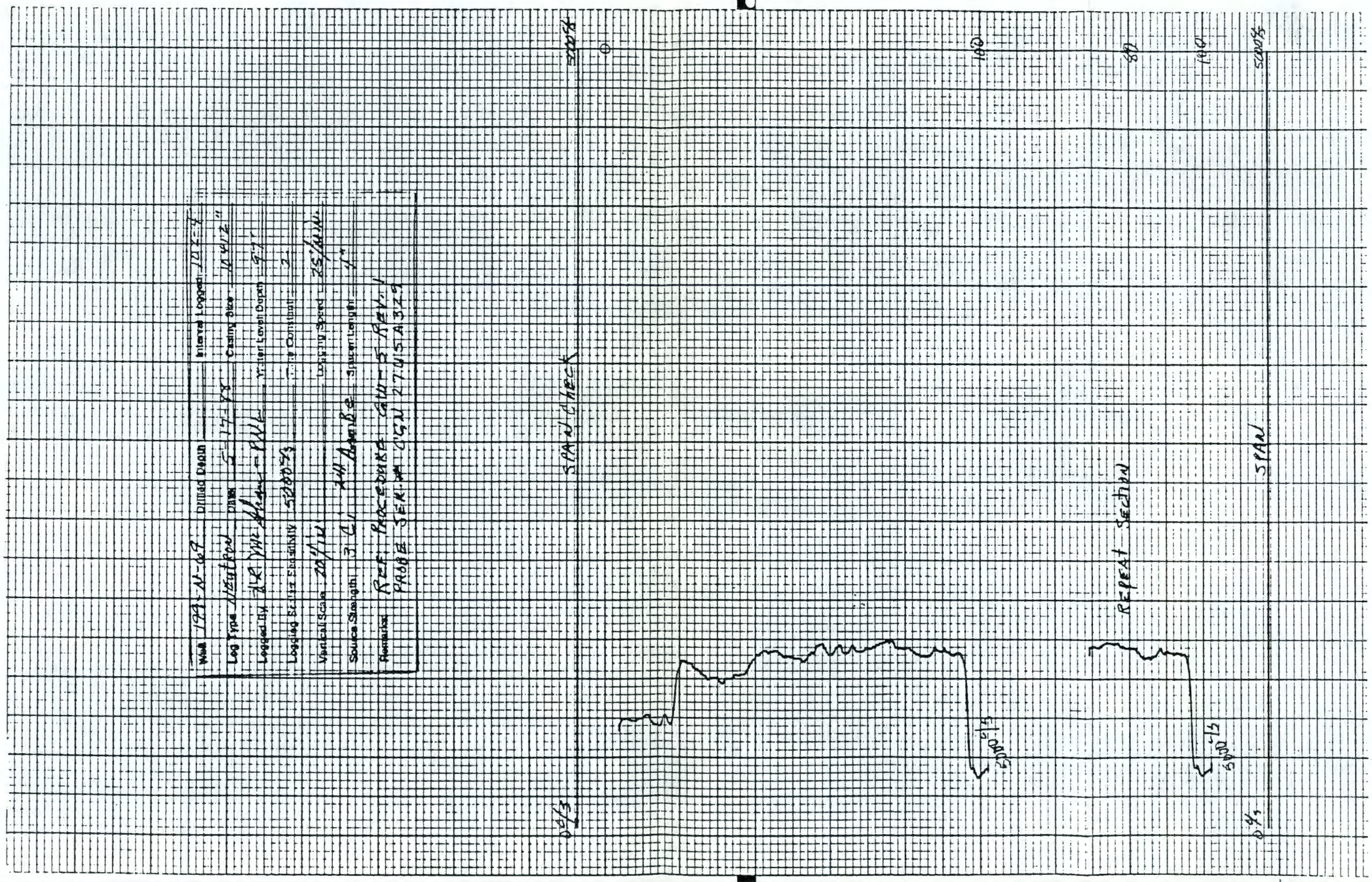
A-6000-021 (5-85)

Well 199-N-69	Drilled Depth	Interval Logged 102'-2'	
Log Type Density	Date 5-11-88	Casing Size 10-1/2"	
Logged By J.L. McShane - PNL		Water Level Depth 97'	
Logging Source Sensitivity 1000 c/s		Time Constant 3	
Vertical Scale 20'/in		Logging Speed 15'/min	
Source Strength 115 mCi Cs137		Spacer Length NA	
Remarks: REF. PROCEDURE GW-4 REV. 1 PROBE SER. # GC-148			





WESTERN TOPOGRAPHIC SERVICES, INC. ANTHONY, TEXAS
NO. 04-0173-000


Well 193-N-67
Log Type Neutron
Logged By
Logged Bottom Hole Elevation 5200'
Vertical Scale 20'/in
Source Strength 3 Ci
Remarks REF: PROCEDURE GAU-5 REV.1
PROBE SER. NO. 27 USA 3279
Drilled Depth
Interval Logged 102'-0"
Casing Size 10 3/4"
Water Level Depth 5'-1"
Logging Speed 25'/min
Spacer Length 4'
SPACIOUS CHECK
5200'
0
100
80
100'
5200'
SPAN
REPEAT SECTION
0 cps
5000 cps
6000 cps

WELL 199-N-70

9 2 1 2 6 1 0 2 3 6

THIS PAGE INTENTIONALLY
LEFT BLANK

WELL COMPLETION/INSPECTION REPORT

Specification No. W-014-CL Rev. No. 0
Project W-014 / DEF. WASTE MGT. PROJS.
Location 100 N AREA
Driller CRAIG WAMSLEY, FELIX MURPHY
Drilling Co. KAISER ENGINEERING
Geologist S. M. GOODWIN, M. A. CHAMNESS

Well No. 199-N-70 Temp. Well No. N/A
Coordinates
Casing Elevation
Ground Elevation

COMPLETION DATA

Drilled Depth 104.39' Compl Depth 99.08'
Date Started 4/13/88 Completed 6/1/88
Static Water Level/Date 58.35' / 6/1/88

DRILLING METHOD

Rotary Air N/A Mud N/A
Cable Tool D N/A H ✓
Drilling Fluid 100-N DRILL SUPPLY WATER
Other N/A

GEOPHYSICAL LOGGING

Sondes	Interval	Date
NAT. γ	103' - 3'	5/17/88
NEUTRON	103' - 4'	5/17/88
DENSITY	103' - 2'	5/17/88

PERFORATIONS

Type N/A

Depth	Schedule
-	
-	
-	

AQUIFER TESTING

Type CONSTANT Q - STEP DRAWDOWN
Length of Test 6 HRS. 1 HR.
Volume Pumped 16,900 GALLONS
Drawdown 13 FT.

INSPECTION RESULTS

CLEANING

Inspection Method VISUAL
Acceptance Criteria SECT. 4.1

	Accept	Reject
Drilling Tools/Rig	SMG	
Temporary Materials	SMG	
Permanent Materials	SMG	

Performed by S. M. GOODWIN Date 4/13/88

MATERIAL STORAGE/PACKING

Inspection Method VISUAL
Acceptance Criteria SECT. 7.3

	Accept	Reject
Material Handling/Storage	SMG	
Material Packing	SMG	

Performed by S. M. GOODWIN Date [illegible]

SCREEN

Type 6" 304 STAINLESS STEEL Length 10'
Slot Size 10
Depth(s) 99.08' - 89.08'
Inspection Method VISUAL
Acceptance Criteria SECT. 4.2.3
M&TE/ID PNL 300 #L350-07 Accept SMG Reject
Performed by S. M. GOODWIN Date 5/16/88

LUBRICANTS/ADDITIVES

Inspection Method VISUAL
Acceptance Criteria SECT. 7.2

	Identify	Accept	Reject
Tool Lubricant	NONE	SMG	
Additives	NONE	SMG	

Performed by S. M. GOODWIN Date 4/13/88

CASING

Type	Size	Placement
SCH. 10S ASTM A312 304	6"	89.08 - 2.92'
STAINLESS STEEL	-	- -

Inspection Method VISUAL
Acceptance Criteria SECT. 4.1
M&TE/ID N/A Accept SMG Reject
Performed by S. M. GOODWIN Date 4/13/88

ANNULAR SEAL

Inspection Method VISUAL
Acceptance Criteria SECT. 4.2

Type	Interval	Volume	Accept	Reject
20-40 SLOT SAND	104.39' - 93.4'	9 100LB. BAGS	SMG	
1/2" BEN. PELLETS	93.4' - 78.4'	45 GAL. BUCKETS	SMG	
GRANULAR BENT	78.4' - 13.39'	35 50LB BAGS	SMG	
CEMENT GROUT	13.39 - 1.95'	40 94LB. BAGS	SMG	

M&TE/ID PNL STEEL TAPE # L350-07
Performed by S. M. GOODWIN Date [illegible]

STRAIGHTNESS TEST

Inspection Method 9" BAILER DOWN HOLE (11' LONG)
Acceptance Criteria SECT. 8.3
Accept SMG Reject
Performed by F. MURPHY Date 5/17/88

WELL PROTECTION

Inspection Method VISUAL
Acceptance Criteria 4.2.10

	Accept	Reject
Protective Posts	SMG	
Locks	SMG	

Performed by S. S. TEEL Date 5/4/88

OTHER (check if performed) (mark N/A if not applicable)

N/A Well Abandonment
SMG Well Development
N/A Downhole TV Inspection
SMG Complete As-Built Diagram, Driller's/Geologist's Logs

Performed by Date

DR Dahl 7/12/88 D.L. Meshan 7-13-85

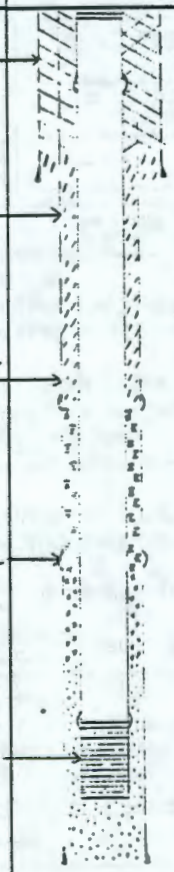
9211260402 37

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 199-N-70 Geologist SHANNON M. GOODWIN Page 1 of 1

Reviewed by W.L. McGhan Date 7-13-88

Construction Data: Description	Construction Data: Diagram	Depth in Feet	Geologic/Hydrologic Data: Diagram Litho.	Geologic/Hydrologic Data: Lithologic Description	Drill Rate Ft/Hr
21' 10 3/4" OF 12" CARBON STEEL SURFACE PIPE (REMOVED)		5'		GRAVELLY SILTY SAND	1.3'
		10'		SILTY SANDY GRAVEL	.72'
		15'		"	1.25'
		20'		"	.53'
104' 4 1/2" OF 10" CARBON STEEL CASING (REMOVED)		25'		SANDY GRAVEL	.53'
		30'		"	1.95'
		35'		RINGOLD CONTACT AT 37' B.L.S.	3.33'
		40'		SILTY SANDY GRAVEL	5.43'
92' OF 6" STAINLESS STEEL (SCH. 10S) CASING		45'		"	5.0'
		50'		"	2.6'
		55'		"	2.6'
		60'		STATIC H2O LEVEL 59.25' 10/1/88 B.L.S.	3.55
		65'		"	10.0'
FACTORY WELDED CENTRALIZER		70'		GRAVELLY SILTY SAND	4.63'
		75'		SILTY SANDY GRAVEL	5.05
		80'		"	2.86
		85'		"	6.02'
		90'		"	2.51
10' OF 6" STAINLESS STEEL (304) 10 SLOT SCREEN		95'		"	5.0'
		100'		"	3.33
		104'		GRAVELLY SILT (CLAY)	15.15
COMPLETION DEPTH = 99.08' B.L.S.				DRILLED DEPTH = 104.39' B.L.S.	

COMPLETION SYMBOLS:

xx BENTONITE PELLET SEAL
.. ARTIFICIAL SAND PACK
ZZ BENTONITE SLURRY
// GRANULAR BENTONITE
CEMENT GROUT

A-1500-186 (3/87)

9 2 1 2 6 5 4 0 2 3 8

DRILL LOG	By: S. M. Goodwin	Rig: BUCYRUS ERIE 22W #68K-19151	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 18 APRIL 1988		Depth: 0' To ~2.5'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				GEOLOGIST ARRIVED AT SITE; RIG IS SET UP	0700	
				+ DRILLER IS CRAIG WALMSLEY		
					0710	WELDING ON TOOL
					0735	DRILLING
				RPT SURVEYING SITE, 100 COUNTS / MINUTES	0915	WORKING ON TOOL
						STRING.
					0940	CONCRETE MIX
						DELIVERED
				DRILLING SLOW; COBBLES 3' BELOW SURFACE	0950	PREPARING TO
10' OF	12" C.S.			ADDED 10' OF 12" CARBON STEEL CASING,	1010	CUT 12" CASING
				TOTAL 12" CASING = 10'	1015	DRILLING
					1045	PLACING DRIVE
						CLAMPS.
					1050	DRIVING CASING
				ADDED 15 GALLONS DRILL H_2O (0730 - 1100)	1055	DRILLING
					1114	WELDING EARS
					1120	DRILLING
					1130	DRIVING CASING

REMARKS:

S. M. Goodwin 18 APR. 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 2 4 0

DRILL LOG	By S. M. Goodwin	Rig B. E. 22W	Well Number 199-N-70	Computer Number N/A	Project or Work Order No.
	Date 18 April 1988	#68K-19151	Depth ~2.5' To 5'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1135	DRILLING
					1150	DRIVING CASING
				HAVING PROBLEMS KEEPING CASING STRAIGHT IN	1200	DRILLING
				OPEN HOLE.	1220	DRIVING CASING
					1230	DRILLING
					1240	DRIVING CASING
					1245	DRILLING
				HOOKING UP COME ALONG TO RIG & CASING;	1300	
				CASING APPEARS MUCH STRAIGHTER NOW.	1315	DRIVING CASING
					1320	DRILLING
				15 GALLONS H_2O ADDED SINCE 1100	1330	HOOKING UP BAILER
	4-5'	H	W	GRAVELLY SILTY SAND: 15% P, 65% SAND,	1332	BAILING WELL w/
				20% SILT. 5% MP, 5% FP, 5% VFP, 10% VCS, 12%		DART BAILER
				CS, 20% MS, 13% FS, 10% VFS, 20% SILT. VPS	1337	DRILLING
				GRAVELS ARE VA TO SA; SANDS ARE VA TO SR.		
				WET COLOR IS 5Y 4/2 (OLIVE GRAY); DRY COLOR		
				IS 5Y 6/4 (PALE YELLOW). STRONG RX. IN HCL. UNCONSOL-		
				IDATED. GRAVELS ARE 75% BASALT, 15% QUARTZ		

REMARKS:

Alan M. Good 18 APR. 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 0 1 0 2 1 1

DRILL LOG	By S. M. GOODWIN	Rig BE 22W #68K-19151	Well Number 199-N-70	Computer Number N/A	Project or Work Order No.
	Date 18 APRIL 1988		Depth 5' To ~ 8'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	4-5'	H	W	(CONT.) FELDSPAR, 10% RX. FRAGMENTS (GRANITES	1400	DRIVING CASING
				& QUARTZITES), SANDS ARE 60% BASALT, 35%	1405	BAILING WELL
				QUARTZ & FELDSPAR, 5% RX. FRAGS. ASSUME SAMPLE	1410	DRILLING
				IS NOT REPRESENTATIVE DUE TO AMOUNT OF	1415	SLOW DRILLING;
				COBBLES DRILLER HAS HAD TO BREAK THROUGH		TOOL ON BOULDER
					1425	DRIVING CASING
					1430	DRILLING
					1445	DRIVING CASING
					1450	BAILING WELL
				RPT SURVEY; NO DETECTABLE CONTAMINATION.	1458	DRILLING.
					1505	PROBLEMS GETTING
						WELDER STARTED.
					1512	WELDING EARS
				PULLED UP CASING ~2'; STILL HAVING PROBLEMS	1515	
				KEEPING CASING STRAIGHT.	1520	RIG STOPPED; SMELLS
						LIKE BURNED WIRES.
				ADDED 10 GALLONS SINCE 1100	1530	QUIT FOR DAY

REMARKS:

TOTAL DRILL SUPPLY H_2O = 30 GALLONS

[signature] 18 APR 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-86)

9 2 1 2 , 4 1 2 2

-1-

DRILL LOG	By S.M. GOODWIN	Rig BUCYRUS ERIE 22W #68K-19151	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W014
	Date 19 APRIL 1988		Depth ~7' To ~8.5'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10' OF	12" C.S.			GEOLOGIST ARRIVED AT SITE; DRILLER IS CRAIG	0700	TRIED TO START RIG;
				WALMSLEY. WAITING FOR RIG REPAIR.		ELECTRICAL PROBLEMS.
					0740	RIG RUNNING
				PULLED BACK CASING TO GET IT STRAIGHT	0745	
				IN THE OPEN HOLE.	0750	HOOKING UP COME ALONG
				NO DETECTABLE CONTAMINATION	0755	RPT ARRIVED
					0800	DRILLING
				STILL HAVING PROBLEMS KEEPING CASING STRAIGHT;	0830	DRIVING CASING
				COBBLES ROLL IN FROM SIDES & HANG UP CASING.	0845	DRILLING
					0915	DRIVING CASING
					0917	DRILLING
					0940	DRIVING CASING
				SLOW DRILLING; BREAKING THROUGH COBBLES	0943	DRILLING
					0950	WELDING EARS ON 12"
				CASING APPEARS STRAIGHT & STATIONARY	1000	DRIVING CASING
				SEDIMENTS CONTAIN MORE GRAVEL; 10 GALLONS	1005	BAILING WELL
				H_2O ADDED SINCE 0700. NO CONTAMINATION/RPT.	1010	DRILLING
					1030	DRIVING CASING

REMARKS:

[illegible signature] 19-APRIL-1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water A 6000 021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 22W	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W014
	Date: 19 April 1986	#68K-19151	Depth: ~8.5' To ~8.5'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10' or	12" C.S.				1035	DRILLING
				PREPARING TO WELD 12" CASING, BEVELING EDGE	1055	STOPPED DRILLING
					1115	WELDING 12" C.S.
10'				ADDED 8'1" OF 12" CARBON STEEL CASING	1205	FINISHED WELDING
8'1"				TOTAL 12" CASING = 18'1"	1210	DRIVING CASING
18'1"	of 12" CASING				1225	DRILLING
					1240	WELDING EAR ON
						12" TO HOOK COMEALONG
				PULLING BACK ON CASING w/ RIG TO TRY TO DRIVE	1245	PULLING CASING
				STRAIGHT; STILL PROBLEMS w/ COBBLES PINCHING	1247	DRIVING CASING
					1250	DRILLING
					1300	PULL & DRIVE
					1305	DRILLING; HOOKED
						UP COMEALONG
					1320	DRIVING CASING
					1325	DRILLING
					1330	DRIVING CASING
					1335	DRILLING

REMARKS:

Alan R. Hook 19-APRIL-1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ___ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 22W	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W014
	Date: 19 April 1988	#68K-1915'	Depth: ~8.5' To ~8.5'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18'1" of 12" C.S.				PULLED CASING COMPLETELY OUT OF HOLE; HOLE	1350	PULL CASING
				STAYED OPEN. DRIVE SHOE APPEARS BEATEN	1355	DRILLING IN
				FROM BREAKING COBBLES & BOULDERS.		OPEN HOLE
					1400	PLACED CASING IN
						HOLE
					1405	PULLED CASING OUT
						OF HOLE
				SHOVELED MATERIAL BACK IN TO HOLE (SMALL	1410	CASING OUT
				COBBLES, GRAVELS, & FINES); NEED TO BUILD UP BIT		
				BEFORE CONTINUING DRILLING. BIT IS 9", NEED		
				~11" TO DRILL A LARGER HOLE.	1420	COVERING HOLE
				ADDED 10 GALLONS H_2O SINCE 1000	1430	QUIT FOR DAY
				TOTAL H_2O = 20 GALLONS		

REMARKS:

TOTAL DRILL SUPPLY H_2O ADDED = 20 GALLONS

Shawn M. Goodwin 19-APRIL-1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By: S. M. GOODWIN	Rig: BUCYRUS ERIE 22W #68K-1915	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W014
	Date: 20 APRIL 1988		Depth: ~8.5' To ~8.5'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18'1" of 12" C.S				GEOLOGIST ARRIVED AT SITE; DRILLER IS CRAIG	0700	BUILDING UP
				WALMSLEY.	0800	HARD TOOL
				RPT ARRIVED & SURVEYED; NO DET. CONTAMINATION	0915	FINISHED WELDING
					0920	PLACING CASING
				SHOVELING SURFACE FINES & PLACING THEM BETWEEN	0925	DRILLING
				CASING (OUTSIDE) & OPEN HOLE TO HELP STRAIGTEN		
				CASING. FILLED TO APPROX. 1' FROM GROUND SURFACE.		
				TALKED W/ JOHN KELLER; REQUESTED THAT TARPS	0930	
				BE PROVIDED TO COVER BENTONITE / CEMENT &		
				CASING (TEMP. & STAINLESS) BE PLACED OFF		
				GROUND SURFACE.		
				CASING IS STRAIGHT; PLACING DRIVE CLAMPS	1010	
				TO SEE IF IT STAYS STRAIGHT WHEN DRIVING	1020	DRIVING CASING
				CASING FOLLOWING HOLE TO ~8.5'	1030	DRILLING
					1050	SLOW DRILLING,
						SOUNDS SOLID
				CASING NOT DRIVING STRAIGHT	1110	DRIVING CASING
				PULLING BACK ON CASING	1130	ON BOULDER

REMARKS:

[signature] 20 APRIL 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 5 1 1 2 1 5

-2- .

DRILL LOG	By S.M. Goodwin	Rig BE 22W	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 20 April 1985	# 68K-1915	Depth ~8.5' To 10'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18'1"	w 12'				1131	EAR BROKE OFF
						CASING WHEN PULLING
					1134	PROBLEMS W/ WELDING
						MACHINE.
					1142	WELDING EAR
				CASING TIGHT; PULLING & DRIVING TO LOOSEN	1150	PULLING BACK CASING
				DRILLING SLOW; MATERIAL SOUNDS SOLID	1210	DRILLING
					1255	DRIVING CASING
				RPT SURVEYED; NO DETECTABLE CONTAMINATION	1305	BAILING WELL
				BAILED ANGULAR GRAVEL-SIZED CHIPS OF BASALT;	1310	DRILLING
				ASSUME DRILLER IS BREAKING THROUGH BASALT BOULDER	1330	DRIVING CASING
					1335	DRILLING
					1400	DRIVING CASING
				30 GALLONS DRILL SUPPLY H_2O ADDED SINCE 0700	1405	DRILLING
	9-10'	H	W	SILTY SANDY GRAVEL: 60% GRAVEL, 35% SAND,	1435	SAMPLED W/ DART
				5% SILT. 5% VCP, 5% CP, 20% MP, 20% FP,		BAILER
				10% VFP, 10% VCS, 10% CS, 10% MS, 5% FS	1440	DRIVING CASING
				& VFS, 5% SILT. VERY POORLY SORTED.	1445	DRILLING

REMARKS:

Shawn M. Goodwin 20 April 1985

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 22W	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 20 APR. 1988	#68K-1915	Depth: 10' To 10'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	9-10'	H	W	(CONT.) GRAVELS ARE 90% BASALT, 10% RX	1450	DRIVING CASING
				FRAGS. (GRANITICS & QUARTZITE); VA TO A.	1455	DRILLING
				SANDS ARE 85% BASALT, 10% QUARTZ & FELD.,		
				5% RX. FRAGS; VA TO SR. WET COLOR IS		
				5Y 3/2 (DARK OLIVE GRAY); DRY COLOR IS 5Y		
				6/2 (LT. OLIVE GRAY). SLIGHT RX. TO HCL		
				FORMATION UNCONSOLIDATED, BUT DRILLING DIFF-		
				ICULT DUE TO COBBLES & BOULDERS. 4x GRAVELS,		
				~1/2 THE SAND, & 1/4 THE SILT AS LAST SAMPLE;		
				NEARLY ALL BASALT. RPT SURVEYED; NO DET.		
				CONTAMINATION.		
					1515	DRIVING CASING
				CASING STRAIGHT; JUST WON'T GO DOWN.	1520	BOULDER; WILL HAVE
						TO PULL BACK &
						DRILL TOMORROW
					1525	SHUT DOWN RIG
					1530	DONE FOR DAY

REMARKS:

Allan M. Stook 20 APR. 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 22W #68K-19151	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 21 April 1988		Depth: 10' To ~12'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18' 1" or 12"		C.S.		GEOLOGIST ARANSO AT SITE; DRILLER IS CRAIG	0700	COVERING BENTONITE
				WALMSLEY.		W/ TARP
					0710	SERVICING RIG
					0730	DRILLING
					0740	DRIVING CASING
				PULLING BACK ON CASING; TRYING TO DRILL	0745	PULLING CASING
				OUT BOULDER BEFORE DRIVING CASING	0755	DRILLER TALKING
						W/ JOHN KELLER
					0805	DRILLING
					0825	DRIVING CASING
					0830	DRILLING
					0910	DRIVING CASING
				NO RPT YET.	0915	DRILLING
					0945	DRIVING CASING
				CHIPS OF BASALT, MORE SANDS & SILT; DRILLING	0955	BAILING WELL
				STILL SLOW. DEPTH ~12'. NO RPT SURVEY.	1005	DRILLING
					1020	REMOVING EAR FROM 12"
					1025	DRIVING CASING

REMARKS:

Shawn M. Goodwin 21 APR. 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. GOODWIN	Rig: BE 22W	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 21 APRIL 1988	#6BK-19151	Depth: ~12' To 15'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18'1"	of 12'	C.S.			1030	DRILLING
					1115	DRIVING CASING
					1120	DRILLING
					1130	DRIVING CASING
					1140	WELDING EAR ON 12"
				STUCK ON BOULDER; WILL PULL BACK & DRILL	1145	PULLING BACK CASING
					1150	DRILLING
					1205	DRIVING CASING
					1220	DRILLING
					1300	DRIVING CASING
					1310	DRILLING
				SIMILAR TO 0955 BAIL; STILL BROKEN BASALT,	1315	BAILING WELL
				BUT GRAVELS ARE MUCH MORE ROUNDED.	1320	DRILLING
					1335	DRIVING CASING
					1345	DRILLING
	14-15'	H	W	SILTY SANDY GRAVEL: 45% GRAVEL, 45% SAND,	1350	SAMPLED W/ DART
				10% SILT. 5% VCP, 5% CP, 15% MP, 10% FP,		BAILER
				10% VFP, 15% VCS, 10% CS, 10% MS, 5% FS,	1355	DRILLING

REMARKS:

Shawn M. Goodwin 22 APR 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By S. M. Goodwin	Rig BE 22W	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 22 April 1988	#681K-19151	Depth 15' To 16'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	14-15'	H	W	(CONT.) 5% VFS, 10% SILT. VERY POORLY SORTED.		
				GRAVELS ARE 85% BASALTIC, 10% GRANITICS,		
				5% QUARTZITE; VA TO SR. SANDS ARE 70%		
				BASALTIC, 20% QUARTZ & FELDSPAR, 10% RX.		
				FRAGS, VA TO SR. WET COLOR IS 5Y 3/1		
				(VERY DARK GRAY); DRY COLOR IS 5Y 6/1 (LT. GRAY		
				TO GRAY). SLIGHT RX. TO HCL. UNCONSOLIDATED,		
				BUT SLOW DRILLING. MORE SAND & SILT THAN		
				LAST SAMPLE; GRAVELS SLIGHTLY MORE ROUNDED.		
				SLIGHT COLOR CHANGE. REPRESENTATIVE SAMPLE		
				WOULD CONTAIN COBBLES. NO RPT SURVEY		
					1420	DRIVING CASING
					1430	DRILLING
					1435	CENTERING RIG
						& TOOL OVER HOLE
				STOPPED ON BOULDER	1440	DRILLING
				ADDING 10'11" OF 12" CARBON STEEL CASING	1445	PREPARING TO WELD
					1515	SHUT DOWN FOR DAY

REMARKS: USED 30 GALLONS DRILL SUPPLY H_2O

Shawn M. Goodwin 21 APR. 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. GOODWIN	Rig: BUCYRUS ERIE 22W #68K-19151	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 22 APR 1986		Depth: ~16 To ~18.5		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18' 1"	of 12"	C.S.		GEOLOGIST ARRIVED AT SITE; DRILLER IS CRAIG	0700	PREPARING TO WELD
				WALMSLEY.	0710	WELDING 12" CASING
18' 1"				ADDED 10' 11" of 12" CARBON STEEL CASING	0805	FINISHED WELDING
10' 11"				TOTAL 12" CASING = 29'	0815	DRILLING
29' of	12" C.S.				0825	PLACING DRIVE CLAMPS
					0835	DRIVING CASING
					0845	DRILLING
					0915	WELDING ON TOOL
					0930	DRILLING
					0950	DRIVING CASING
				DRILLING VERY SLOW; MUST BE ON BOULDER	1000	DRILLING
				BAILED MATERIAL DARK & FULL OF BASALT FRAGMENTS	1250	BAILED WELL
				25 GALLONS of H_2O ADDED SINCE 0700	1255	DRILLING
				CASING WON'T DRIVE DOWN	1410	DRIVING CASING
				USED 5 GALLONS DRILL H_2O	1420	DRILLING
				WATCHING PAINT MARK ON CABLE; HASN'T MOVED	1515	DRILLING
				APPRECIABLY SINCE 1000. BOULDER!?	1530	QUIT FOR DAY
				WILL QUIT DRILLING AT SITE UNTIL FURTHER NOTICE.	1535	

REMARKS:
TOTAL OF 30 GALLONS of DRILL SUPPLY FLUID.
NO RPT TODAY

Alan M. Hook 22 APR. 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

9 2 1 2 6 5 4 0 2 5 2

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 29 April 1988		Depth: ~18.5' to ~19'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				GEOLOGIST ARRIVED AT SITE; DRILLER IS CRAIG	0700	WORKING ON TOOL
				WALMSLEY. LARGER RIG SET UP OVER HOLE;		STRING.
				RIG WAS STEAM CLEANED, TOOLS WERE STEAM		
				CLEANED. 2'7" OF 12" CASING IS ALL		
				THAT REMAINS ABOVE 18'1" WELD.		
18'1"				TOTAL 12" CARBON STEEL CASING = 20'8"		
2'7"				(8'4" CUT FROM 22 APRIL 1988 TOTAL)		
20'8"	C.S.				0825	DRILLING
					0835	HOOKING UP BAILER
				DART BAILER; MANY CHIPS OF BASALT PRESENT	0845	BAILED WELL
				SOUNDS SOLID; SLOW DRILLING	0850	DRILLING
				CASING & BIT DROPPED DOWN ~3'4"	0915	
				MORE BASALT CHIPS, COBBLES, & GRAVEL	0920	BAILING WELL
					0925	PREPARING TO WELD
					0955	WELDING 12" C.S.
20'8"				ADDED 8'4" OF 12" C.S. CASING	1045	FINISHED WELDING
8'4"				TOTAL 12" CARBON STEEL = 29'	1055	DRILLING
29' of	12" C.S.				1130	DRIVING CASING

REMARKS:

Shawn M. Goodwin 29 April 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 29 April 1986	#22-14107	Depth: ~19' To ~19'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				BAILED GRAVELS & COBBLES (VA TO WR);	1145	BAILING WELL
				COBBLES ARE CAUSING CASING TO GET HUNG	1150	DRILLING
				UP. CASING WANTS TO TILT OFF CENTER		
				COBBLES ALSO JAMMING BETWEEN BIT & CASING.	1200	STOP FOR LUNCH
					1230	DRILLING
					1235	WORKING ON BIT
20' of	12" C.S			LEAVING 20' of 12" CASING IN HOLE;	1245	CUTTING OFF 12"
				WILL BREAK DOWN TOOL & PUT ON SMALLER	1300	CHANGING TOOLS
				BIT, THEN START SMALLER DIAMETER CASING.	1450	WELDING BARS ON 10"
21' 1"	of 10" C.S.			ADDED 21' 1" of 10" CARBON STEEL CASING	1455	WELDING ON DRIVE SHOE
					1510	HOOKING UP COME ALONG
					1512	DRILLING
					1525	SHUT DOWN RIG
					1530	DONE FOR DAY

REMARKS: ADDED 20 GALLONS of DRILL SUPPLY H_2O.
No RPT TODAY.

Shawn M. Goodwin 29 APRIL 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 2 5 4

DRILL LOG	By S. M. GOODWIN	Rig BUCYRUS ERIE 60L #22-1410B	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 2 MAY 1988		Depth ~19' To 20'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
21'1"	@ 10"	C.S.		GEOLOGIST ARRIVED AT SITE; DRILLER IS CRAIG	0700	
				WALMSLEY.	0720	DRILLING
				DART BAILER; GRAVELS + COBBLES.	0730	BAILING WELL
					0732	WELDING GARS
					0745	CUTTING 10" CASING
					0820	WELDING 10"
21'1"	@ 10"			ADDED 10'0" OF 10" CARBON STEEL CASING	0915	FINISHED WELDING
+10'0"				TOTAL 10" CASING = 31'1"	0930	DRILLING
31'1"	@ 10"				0940	DRIVING CASING
					0950	WELDING EAR
					0955	DRILLING
					1025	DRIVING CASING
					1030	DRILLING
	19-20'	H	W	SILTY SANDY GRAVEL: 40% GRAVEL, 50% SAND,	1100	SAMPLED W/ DART
				10% SILT. 10% MP, 15% FP, 15% VFP, 15% VCS, 15%		BAILER
				CS, 10% MS, 5% FS, 5% VFS, 10% SILT. VP SORTED.	1105	DRILLING
				GRAVELS ARE 75% BASALT, 15% GRANITIC, 10% QUARTZ		
				+ FELDSPAR; VA TO WR. SANDS ARE 70% BASALT,		

REMARKS:

Shawn M. Goodwin 2 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. GOODWIN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 2 MAY 1988	#22F14103	Depth 20' To ~21'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	19-20'	H	W	(CONT.) 20% QUARTZ & FELDSPAR, 10% RX. FRAGS;		
				VA TO WR. SLIGHT RX. TO HCL. WET COLOR IS		
				5Y 4/1 (DARK GRAY); DRY COLOR IS 5Y 6/1 (LT.		
				GRAY TO GRAY). UNCONSOLIDATED, BUT SLOW		
				DRILLING. SLIGHT DECREASE IN GRAVELS &		
				INCREASE IN SANDS SINCE LAST SAMPLE.		
				NO RPT SURVEY. REPRESENTATIVE SAMPLE WOULD		
				CONTAIN MORE GRAVELS & SOME COBBLES.		
				15 GALLONS OF H_2O ADDED THIS MORNING	1140	ADDING H_2O
					1145	DRIVING CASING
					1155	DRILLING
				RPT SURVEYED; NO DETECTABLE CONTAMINATION.	1305	BAILING WELL
				BAILED GRAVEL & COBBLES; SIMILAR TO 20' SAMP.	1310	DRILLING
					1420	WORKING w/ CLAMPS
					1435	DRIVING CASING
					1445	DRILLING
				SLOW DRILLING; GRAVELS & W.R. COBBLES BAILED	1450	BAILING WELL
					1455	DRILLING

REMARKS:

Sharon M. Goodwin 2 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water A-6000-021 (6-86)

DRILL LOG	By S.M. GOODMAN	Rig B.E. 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 2 MAY 1986	#22-14103	Depth ~21 TO ~21'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				CASING MOVES BACK UP WHEN DRIVING;	1515	DRIVING CASING
				DRILLER SAYS CABLE FEELS ABNORMAL	1525	DONE FOR DAY
				WHEN DRILLING.		

REMARKS: ADDED 30 GALLONS OF DRILL SUPPLY H_2O
BRIEF RIT VISIT TODAY; SURVEYED 1 BAIL. SURVEYED 2 DET. [illegible signature] 2 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water A-6000-021 (5-85)

9 2 1 2 , 1 0 2 7

DRILL LOG	By S.M. GOODWIN	Rig BUCYRUS FRIT 60L #22-14103.	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 3 MAY 1988		Depth ~21' To ~21'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				GEOLOGIST ARRIVED AT SITE; DRILLER IS CRAIG	0700	DRILLING
				WALMSLEY.	0730	BAILING WELL
				BAILED MATERIAL FINER THAN YESTERDAY; BROKEN	0740	DRIVING CASING
				GRAVELS & SANDS, LUMPS OF FINES.	0750	DRILLING
					0810	DRIVING CASING
					0815	DRILLING
					0920	DRIVING CASING
					0930	DRILLING
				BAILED GRAVELS & COBBLES; COARSER THAN LAST	0945	BAILING WELL
				MATERIAL. COBBLES COULD BE FALLING IN FROM ABOVE.	0950	DRILLING
					1010	DRIVING CASING
					1020	SERVICING RIG
				LENNEY CORDON AT SITE TO ASSIST DRILLER	1025	DRILLING
				RPT SURVEY; NO DETECTABLE CONTAMINATION	1030	
				BAILED COBBLES & ANGULAR GRAVELS; SLOW DRILLING	1050	BAILING WELL
					1055	DRILLING
					1100	DRIVING CASING
					1105	DRILLING

REMARKS:

[signature] 3 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By: S. M. GOODWIN	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 3 MAY 1988	#22-14103.	Depth: ~21' To ~21'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1115	BAILING WELL
					1120	DRILLING
					1145	WORKING ON BIT
					1200	BREAK FOR LUNCH
					1230	WELDING ON BIT
				DRILLER THREW SEVERAL BOULDERS DOWN HOLE PRIOR	1305	DRILLING
				TO DRILLING TO GET BIT DRILLING STRAIGHT.	1340	WELDING ON BIT
					1400	DRILLING
					1430	BAILED WELL
					1435	WELDING BAR ON 10"
				REMOVING 10" CASING FROM HOLE & WILL WELD ON MORE	1440	PULLING 10"
				12"; TOOL NEEDS TO BE LARGER TO BREAK THROUGH	1445	DRIVE SHOE WORN
				BOULDER. WILL CHANGE TOOL STRING & PUT ON		
				LARGER BIT.		
				GEOLOGIST LEFT FOR THE DAY; DRILLER STILL	1510	WORKING ON TOOL
				WORKING.		STRING

REMARKS:
USED 50 GALLONS OF DRILL SUPPLY H_2O
1 RPT SURVEY; < DETECTABLE CONTAMINATION.

Shawn M. Goodwin 3 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 0 4 0 2 9

DRILL LOG	By S. M. GOODWIN	Rig BUCYRUS ERIE 60L #22-14103	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 4 MAY 1988		Depth ~21' To ~21'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
~20' of	12" C.S.			GEOLOGIST AT SITE; DRILLER IS CRAIG WALKSLEY	0700	WORKING ON TOOL
						STRING
					0745	DRILLING
				NEW DRILLER; FELIX MURPHY REPLACED CRAIG.	0800	WORKING ON RIG
					0825	WELDING EAR ON 12"
					0840	DRILLING
				BAILED COBBLES & GRAVEL	0855	BAILING WELL
					0910	MEASURING STRING
					0915	DRILLING
				DRILLING SLOW & CROOKED; ON BOULDERS	0945	
				BAILED COBBLES & GRAVEL	1000	BAILED WELL
				WILL ADD 8' 4 3/4" of 12" C.S. CASING THAT	1005	PREPARING TO WELD
				WAS CUT from 22 APRIL TOTAL of 29'; CASING	1020	WELDING 12" CASING
20' 7 1/4" of 12" C.S.				IN HOLE MUST EQUAL 20' 7 1/4".		
+ 8' 4 3/4"						
29' of	12" C.S.			TOTAL 12" CASING = 29'	1120	FINISHED WELDING
					1140	DRILLING
				BAILED CRUSHED BASALT & BASALT CHIPS	1200	BAILED WELL

REMARKS:

Shawn Mc... 4 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 4 MAY 1986	#22-14103	Depth ~21' To ~21.5'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1205	STOPPED FOR LUNCH
					1235	DRILLING
					1255	WELDING ON BIT
					1315	DRILLING
				BAILED BASALT CHIPS & SOME WELL-ROUNDED	1335	BAILED WELL
				GRAVEL	1340	DRILLING
				JOHN KELLER TALKING TO DRILLER	1400	STOPPED DRILLING
				ANGULAR BASALT CHIPS; NEED TO BUILD UP	1415	BAILED WELL
				BIT - BOULDER REMOVING CUTTING EDGE.	1420	WORKING ON BIT
					1430	DRILLING
				GRAVELS & BASALT CHIPS	1515	BAILED WELL
					1520	SHUT DOWN
					1530	DONE FOR DAY

REMARKS: USED 10 GALLONS DRILL SUPPLY H_2O TODAY.
NO RPT VISIT

Shawn M. Goodwin 4 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 5 May 1986		Depth: ~21.5' To 25'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				GEOLOGIST ARRIVED; DRILLER IS FELIX MURPHY	0700	SERVICING RIG
					0730	SURVEYING SITUATION
					0750	DRILLING
				BAILED GRAVEL & BROKEN COBBLES	0810	BAILED WELL
				BAILED VA TO WR GRAVELS	0815	DRILLING
21'0"				CUT OFF 7'1¼" OF 12" CASING YESTERDAY;	0840	BAILED WELL
7'1¼"				TOTAL 12" CASING = 21'10¾"	0845	DRILLING
21'10¾"					0900	SAMPLED W/
	24-25'	H	W	SANDY GRAVEL: 45% GRAVEL, 50% SAND, 5% SILT.		DART BAILER
				5% CP, 10% MP, 15% FP, 15% VFP, 20% VCS, 10% CS,		
				10% MS, 5% FS, 5% VFS, 5% SILT. VERY POORLY SORTED.		
				GRAVELS ARE 75% BASALT, 15% GRANITIC, 10% QUARTZITE;		
				VA TO SR. SANDS ARE 70% BASALT, 20% QUARTZ &		
				FELDSPAR, 10% RY. FRAGMENTS, VA TO SR. WET COLOR		
				IS 5Y 4/1 (DRK. GRAY). DRY COLOR IS 5Y 6/1 (LT.		
				GRAY TO GRAY). NO RX. TO HCL. UNCONSOLIDATED, BUT		
				SLOW DRILLING THROUGH COBBLES & BOULDERS. MORE		
				GRAVEL & LESS SILT THAN PREVIOUS SAMPLE. NO RPT.		

REMARKS:

5 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 5 MAY 1986	#: 22-14103	Depth: 25' To ~26.5'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				CHANGING TOOL STRING & PUTTING ON SMALLER BIT	0910	WORKING ON TOOL
						STRING
31'1"	of 10"	C.S.		TOTAL 10" CARBON STEEL CASING = 31'1"	1040	ADDING 10" TO HOLE
				PROBLEMS GETTING CASING DOWN 12"; DRIVE	1105	GRINDING DRIVE
				SHOE EDGES NEED GRINDED TO EASE DOWN HOLE		SHOE
				GETTING CASING SITUATED IN 12"	1115	WELDING EAR ON 10"
					1200	STOPPED FOR LUNCH
					1230	END LUNCH
					1250	DRILLING
					1305	MEASURING STRING
					1310	DRILLING
				BAILED COARSE SANDS & BROKEN GRAVELS	1330	BAILED WELL
				SLOW DRILLING; ON SIDE OF BOULDER	1335	DRILLING
				BAILED GRAVELS	1505	BAILED WELL
				VERY SLOW GOING; CAN'T DRIVE CASING MUCH		
				BECAUSE OF CRUMMY DRIVE SHOE.	1515	SHUT DOWN RIG
					1530	DONE FOR DAY

REMARKS:
ADDED 25 GALLONS OF DRILL SUPPLY H_2O
NO RPT SURVEY TODAY

Alan M. Hood 5 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 5 1 1 2 5 3

DRILL LOG	By: S.M Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 6 MAY 1988		Depth: ~26.5' To ~28		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
31'1"	of 10"	C.S.		DRILLER IS FELIX MURPHY	0700	SERVICING RIG
				BUILDING UP BIT TO IMPROVE DRILLING	0750	WORKING ON BIT
					0915	PLACING DRIVE CLAMPS
					0925	DRIVING CASING
				BAILED BROKEN & ROUNDED GRAVELS, COARSE SAND	0950	BAILED WELL
					0955	DRILLING
					1015	DRIVING CASING
					1020	BAILING WELL
					1025	DRILLING
31'1"				CUTTING 2" OFF 10" CASING IN HOLE	1045	PREPARING TO WELD
− 2"				TOTAL IN HOLE = 30'11" OF 10"		
30'11"	of 10"				1115	WELDING 10" C.S.
+ 9'7 3/4"				ADDED 9'7 3/4" OF 10" CARBON STEEL CASING	1230	FINISHED WELDING;
40'6 3/4"				TOTAL 10" CASING = 40'6 3/4"		STOPPED for LUNCH
					1300	END LUNCH
					1315	DRIVING
					1320	DRILLING

REMARKS:

Shawn M. Goodwin 6 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. GOODWIN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 6 MAY 1988	E22-14103	Depth ~28' To ~33'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1350	DRIVING CASING
					1355	DRILLING
	29-30'	H	W	SANDY GRAVEL: 50% GRAVEL, 45% SAND, 5%	1415	BAILED W/ DART
				SILT. 2% VCP, 3% CP, 10% MP, 15% FP, 20%		BAILER
				VFP, 15% VCS, 10% CS, 10% MS, 5% FS,		
				5% VFS, 5% SILT. VERY POORLY SORTED.	1430	DRIVING CASING
				GRAVELS ARE 60% BASALT, 20% GRANITIC,	1440	DRILLING
				20% META. (QUARTZITE & GNEISS), VA TO	1450	DRIVING CASING
				WR. SANDS ARE 60% BASALT, 30%	1500	DRILLING
				QUARTZ & PLAG., 10% RX FRAGS; VA TO SR.	1510	DRIVING CASING
				WET COLOR IS 5Y 4/2 (OLIVE GRAY). DRY COLOR	1520	SHUT DOWN RIG
				IS 5Y 6/2 (LT. OLIVE GRAY). NO RX. TO HCL.		
				UNCONSOLIDATED, BIT SLOW DRILLING. COARSER		
				THAN LAST SAMPLE & LESS BASALT. NO RPT		
				SURVEY. SAMPLE FAIRLY REPRESENTATIVE; STILL		
				BREAKING THROUGH COBBLES.		
					1530	DONE FOR DAY

REMARKS: USED 20 GALLONS OF DRILL H_2O
NO RPT SURVEY TODAY

[illegible] 6 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 9 May 1988		Depth: ~33' To 35'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				GEOLOGIST ARRIVED; DRILLER IS FELIX MURPHY	0700	PREPARING TO DRILL
				BIT HITTING ON SIDE OF BOULDER	0720	DRILLING
				BAILED ROUNDED & ANGULAR GRAVELS	0740	BAILING WELL
					0745	DRILLING
					0810	DRIVING CASING
					0815	DRILLING
					0820	DRIVING CASING
				BAILED ROUNDED & ANGULAR GRAVELS	0825	BAILER WELL
					0830	DRILLING
	34-35'	H	W	SANDY GRAVEL: 45% GRAVEL, 50% SAND, 5%	0850	SAMPLED W/ DART
				SILT. 5% CP, 10% MP, 15% FP, 15% VFP, 15% VCS,		BAILER
				15% CS, 10% MS, 5% FS, 5% VFS, 5% SILT. VERY	0855	DRIVING CASING
				POORLY SORTED. GRAVELS ARE 60% BASALT, 20%	0900	DRILLING
				GRANITICS, 20% QUARTZITE; VA TO WR. SANDS	0920	DRIVING CASING
				ARE 50% BASALT, 35% QUARTZ & PLAGIOCLASE, 15%	0930	DRILLING
				RX. FRAGS; VA TO SR. WET COLOR IS 5Y 4/2 (OLIVE GRAY)		
				DRY COLOR IS 5Y 6/2 (LT. OLIVE GRAY). NO RX. TO HCL.		
				UNCONSOLIDATED. SLIGHT DECREASE IN GRAVEL		

REMARKS:

[signature] 9 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

9 2 1 2 0 1 0 3 2 0 6

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 9 MAY 1988	#22-14103	Depth: 35' To ~37'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	34-35'	H	W	(CONT.) AND INCREASE IN SANDS; MORE QUARTZ		
				& PLAG. NO RPT SURVEY.		
					0940	DRIVING CASING
				BROKEN GRAVELS & COARSE SANDS	0945	BAILED WELL
					0948	DRILLING
				DRIVING HARD; MAY HAVE HIT RINGOLD FM.	1010	DRIVING CASING
				RINGOLD FM. AT ~37'; BAILED MATERIAL	1015	BAILED WELL
				CONTAINS LESS BASALT & MORE QUARTZ-RICH	1020	PREPARING TO WELD
				MATERIAL, MORE FINES & LESS GRAVEL THAN LAST		
				SAMPLE. REACTS TO HCL. WET COLOR IS 2.5 Y		
				5/2 (GRAYISH BRN.); DRY COLOR IS 2.5 Y 7/2 (LT.		
				GRAY). DRILLER SAYS RINGOLD DRIVES HARDER		
				IN OPEN HOLE.		
40' 6 3/4" of 10"				NO DETECTABLE CONTAMINATION	1135	RPT SURVEY
+ 9' 11"				ADDED 9' 11" OF 10" CARBON STEEL CASING	1145	FINISHED WELDING
50' 5 3/4" of 10"				TOTAL 10" CASING = 50' 5 3/4"	1150	LUNCH BREAK
					1220	END LUNCH

REMARKS:

Allan M. Moore 9 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. GOODWIN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 9 MAY 1988	# 22-14103	Depth ~37' TO ~41'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1230	WELDING ON BIT
					1300	DRIVING CASING
				DRILLING EASIER IN RINGOLD FM.	1310	DRILLING
	39-40'	H	W	SILTY SANDY GRAVEL: 40% GRAVEL, 52%	1415	SAMPLED W/ DART
				SAND, 8% SILT. 10% MP, 15% FP, 15% VFP,		BAILER
				10% VCS, 12% CS, 10% MS, 10% FS, 10% VFS, 8%		
				SILT. VERY POORLY SORTED. GRAVELS ARE 30%	1420	DRILLING
				BASALT, 25% GRANITICS, 30% QUARTZITE, 15%	1445	DRIVING CASING
				OTHER META. (MOSTLY META. CONGLOMERATES);		
				VA TO SA. SANDS ARE 35% BASALT, 55%		
				QUARTZ & PLAG., 10% RX. FRAGS; VA TO SA.		
				WET COLOR IS 2.5 Y 4/2 (DRK. GRAYISH BRN), DRY		
				COLOR IS 2.5 Y 6/2 TO 7/2 (LT. GRAY TO LT. GRAYISH		
				BROWN). GOOD RX. TO HCL. UNCONSOLIDATED. FINER		
				THAN LAST SAMPLE, LESS BASALT, BROWNER IN		
				COLOR, REACTS W/ HCL; 1ST SAMPLE SINCE RING.		
				FM. AT ~37'.	1450	DRILLING
					1505	DRIVING CASING

REMARKS:

Sharon M. Goodwin 9 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. GOODWIN	Rig B.E. 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 9 MAY 1988	#22-14103	Depth ~41' To ~44'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1510	BAILING WELL
					1515	DRILLING
					1525	SHUT DOWN RIG

REMARKS: USED 20 GALLONS DRILL SUPPLY H_2O TODAY
RPT SURVEY150 1 TIME.

Sharon M. Goodwin 9 MAY 1988

.D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 10 MAY 1986		Depth: ~44' To ~48'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
50' 5 3/4" OF		10" C.S		GEOLOGIST ARRIVED; DRILLER IS FELIX MURPHY	0700	SERVICING RIG
					0715	DRILLING
	44-45'	H	W	SILTY SANDY GRAVEL: 40% GRAVEL, 50%	0750	SAMPLED W/ DART
				SAND, 10% SILT. 5% MP, 15% FP, 20% VFP,		BAILER
				15% VCS, 15% CS, 10% MS, 5% FS, 5% VFS,	0755	DRIVING CASING
				10% SILT. VERY POORLY SORTED. GRAVELS ARE	0800	DRILLING
				30% BASALT, 25% GRANITIC, 30% QUARTZITE,		
				15% OTHER META. (GNEISS, METACONG.); VA		
				TO WR. SANDS ARE 35% BASALT, 50% QUARTZ		
				& PLAGIOCLASE, 15% RX. FRAGS, VA TO SA. WET		
				COLOR IS 2.5 Y 4/2 (DARK GRAYISH BRN.) DRY COLOR IS		
				2.5 Y 7/2 (LT. GRAY). STRONG RX. TO HCL. SLIGHTLY		
				CONSOLIDATED. MORE FINES & LESS GRAVEL THAN PRE-		
				VIOUS SAMPLE. NO RPT SURVEY	0830	BAILING WELL
				BAILED GRAVELS; SEEMS COARSER THAN LAST SAMPLE	0835	DRILLING
				NO DETECTABLE CONTAMINATION	0900	RPT SURVEY
				DRIVING WELL IN OPEN HOLE	0915	DRIVING CASING
					0920	BAILING WELL

REMARKS:

Allan M. Frank 10 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. GOODWIN	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 10 MAY 1988	422-14103	Depth: ~48' To ~53'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				FM. BREAKING DOWN BIT; NEEDS BUILT UP.	0925	WELDING ON BIT
					1035	FINISHED WELDING
					1040	DRILLING
	49-50'	H	W	SILTY SANDY GRAVEL: 30% GRAVEL, 58% SAND,	1140	SAMPLED w/ DART
				12% SILT. 5% MP, 10% FP, 15% VFP, 12% VCS,		BAILER
				16% CS, 10% MS, 16% FS, 10% VFS, 12% SILT.	1145	DRILLING
				GRAVELS ARE 30% BASALT, 30% GRANITIC,	1200	STOPPED FOR LUNCH
				30% QUARTZITE, 10% OTHER META. (MOSTLY	1230	END LUNCH
				GNEISS), VA TO SR. SANDS ARE 60% QUARTZ	1240	DRILLING
				& PLAG., 30% BASALT, 10% RX FRAGS &		
				MICAS (BIOTITE & MUSCOVITE); VA TO SR.		
				WET COLOR IS 2.5Y 4/2 (DRK. GRAYISH BRN), DRY		
				COLOR IS 2.5Y 7/2 (LT. GRAY). REACTS WELL		
				W/ HCL. SLIGHTLY CONSOLIDATED; DRILLS OPEN		
				HOLE EASILY. LESS GRAVEL & MORE FINES THAN		
				LAST SAMPLE. NO RPT SURVEY. VERY POORLY		
				SORTED.		
				OPEN HOLE 5' AHEAD OF CASING; BAILED	1310	BAILED WELL

REMARKS: MATERIAL SIMILAR TO 50'

Shawn Hu... 10 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By S. M. GOODWIN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 10 MAY 1988	#22-14103	Depth ~53' To ~54'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				PROBLEMS W/ GRINDER; SHORT IN CONNECTION?	1315	PREPARING TO WELD
					1345	WELDING 10"
				NO DETECTABLE CONTAMINATION	1400	RPT SURVEY
50' 5 3/4"				ADDED 9'11" OF 10" CARBON STEEL CASING	1445	FINISHED WELD
+ 9' 11"				TOTAL 10" CASING = 60' 4 3/4"	1450	DRIVING CASING
60' 4 3/4"	OF	10"			1500	DRILLING
					1525	DRIVING CASING
					1530	SHUT DOWN RIG;
						DONE FOR DAY

REMARKS: ADDED 50 GALLONS OF DRILL SUPPLY H_2O
RPT SURVEYED TWICE; NO DETECTABLE CONTAMINATION

Shawn M. Goodwin 10 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 5 1 0 2 7 2

-1-

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 11 MAY 1986		Depth: ~54' To ~57'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				GEOLOGIST ARRIVED, DRILLER IS FELIX MURPHY	0700	SERVICING RIG
					0725	DRILLING
	54-55'	H	W	SILTY SANDY GRAVEL: 30% GRAVEL, 55% SAND,	0810	SAMPLED W/ DART
				15% SILT. TRACE CP, 5% MP, 10% FP, 15%		BAILER
				VFP, 10% VCS, 15% CS, 10% MS, 10% FS, 10%	0815	DRIVING CASING
				VFS, 15% SILT. VERY POORLY SORTED. GRAVELS ARE	0820	DRILLING
				30% BASALT, 30% QUARTZITE, 30% GRANITICS,		
				10% OTHER META; VA TO SR. SANDS ARE		
				55% QUARTZ & PLAG, 35% BASALT, 10% RX		
				FRAGS & MICAS, VA TO SA. WET COLOR IS		
				2.5Y 4/2 (DARK GRAYISH BRN). DRY COLOR IS 2.5Y 7/2 (LT.		
				GRAY). BUBBLES IN 10% HCL. SLIGHT CONSOLIDATION.		
				SIMILAR TO LAST SAMPLE; SLIGHT INCREASE IN SILT.		
				APPEARED TO BE AN INCREASE IN MICAS WITHIN		
				SILT %. NO RPT SURVEY.		
				~57'; BAILED MATERIAL SIMILAR TO 55'	0900	BAILED WELL
					0905	DRIVING CASING
					0910	DRILLING

REMARKS:

Alan M. Ard 11 MAY 1985

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 11 May 1988	#22-14103	Depth: ~57' To 60'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0920	LENGTHENING CABLE
				BAILED SIMILAR MATERIALS AT 57'	0930	BAILED WELL
					0935	DRILLING
					1010	PLACING CLAMPS
					1015	DRIVING CASING
	59-60'	H	W	SILTY SANDY GRAVEL: 35% GRAVEL, 55%	1020	SAMPLED W/ DART
				SAND, 10% SILT. 5% CP, 8% MP, 10% FP,		BAILER
				12% VFP, 10% VCS, 15% CS, 15% MS, 8% FS,	1025	PREPARING TO WELD
				7% VFS, 10% SILT. VERY POORLY SORTED.	1045	RPT SURVEY;
				GRAVELS ARE 30% BASALT, 30% GRANITIC,		NOTHING DETECTABLE
				30% QUARTZITE, 10% OTHER (GNEISS, SOME	1050	WELDING 10"
				EPIDOTE); VA TO SR. SANDS ARE 30% BASALT,		
				60% QUARTZ + PLAG., 10% RX FRAGS; VA		
				TO SA. WET COLOR IS 2.5Y 5/2 (GRAYISH BRN);		
				DRY COLOR IS 2.5Y 7/2 (LT. GRAY). GOOD RX		
				TO 10% HCL. SLIGHT CONSOLIDATION. SIMILAR		
				TO LAST SAMPLE; DECREASE IN SILTS. RPT		
				SURVEY <DET. HIT H_2O AT ~60'		

REMARKS:

H_2O AT ~60'; UNCONFINED AQUIFER

Sharon M. Goodwin 11 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60 L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 11 May 1988	#22-14103	Depth: 60' To 65'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
60' 4 3/4" or	10"	C.S		ADDED 10' 4 1/4" or 10" CARBON STEEL CASING	1140	FINISHED WELDING
10' 4 1/4"				TOTAL 10" CASING = 70' 9"	1145	DRIVING CASING
70' 9" or	10"			4' or OPEN HOLE; DRILLING EASIER AT 61.5 -	1150	STOPPED FOR LUNCH
				62' - FORMATION CHANGE?	1225	END LUNCH
					1230	DRILLING
				FILLING RIG W/ CAL. GAS	1250-1300	STOPPED DRILLING
				BAILED MATERIAL APPEARS FINER THAN 60'	1300	BAILING WELL
					1305	DRIVING CASING
					1310	DRILLING
	64-65'	H	W	SILTY SANDY GRAVEL: 35% GRAVEL, 50% SAND,	1320	SAMPLED W/
				15% SILT. 5% MP, 10% FP, 15% VFP, 5% VCS,		DART BAILER
				10% CS, 15% MS, 10% FS, 10% VFS, 15% SILT.	1325	DRIVING CASING
				VERY POORLY SORTED. GRAVELS ARE 30% BASALT,	1335	DRILLING
				25% GRANITICS, 30% QUARTZITE, 15% OTHER	1340	RPT SURVEY;
				META. (SCHIST, GNEISS, META. CONG); VA TO SA.		NO DET. CONTAM.
				SANDS ARE 60% QUARTZ + PLAG, 30% BASALT,	1400	BAILING WELL
				10% RX FRAGS, MICAS; VA TO SA. WET COLOR		
				IS 2.5Y 5/2 (GRAYISH BRN), DRY COLOR IS 2.5Y 7/2		

REMARKS:

Shawn M. Goodwin

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By S. M. GOODWIN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 11 MAY 1988	#22-14103	Depth 65' To ~68.5'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	64-65'	H	W	(CONT.) (LIGHT GRAY). MODERATE RX. TO 10% HCL.	1405	DRILLING
				UNCONSOLIDATED. EASIER DRILLING THAN LAST		
				SAMPLE; MORE SILT & FINER SANDS, MORE		
				VARIED GRAVELS. NOT ABLE TO KEEP AS MUCH		
				OPEN HOLE (~1-2'). RPT SURVEY; < DET.		
70' 9"	of 10"	C.S.				
				~68.5' (W/ 1' OPEN HOLE); SMALLER GRAVELS & MORE	1425	BAILED WELL
				SANDS. DRILLING PRETTY EASY.	1430	PREPARING TO WELD
					1450	RPT SURVEY;
						NO DETECTABLE CONT.
70' 9"	of 10"	C.S			1500	WELDING 10" C.S.
+ 10' 4 1/4"				FINISHED WELD; ADDED 10' 4 1/4" of 10"	1520	
81' 1 1/4"	of 10"			TOTAL 10" CARBON STEEL = 81' 1 1/4"	1524	SHUT DOWN RIG
					1530	END OF DAY

REMARKS: USED 30 GALLONS DRILL SUPPLY H_2O

HIT H_2O AT ~60'

Shawn M. Goodwin 11 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. GOODWIN	Rig: BUCYRUS ERIE 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 12 MAY 1986		Depth: ~68.5' To 70'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
81' 1'/4" of 10"				GEOLOGIST ARRIVED; DRILLER IS FELIX MURINY	0700	SERVICING RIG
					0715	WELDER PROBLEMS
				WELDING MACHINE WON'T START; WAITING FOR	0735	STANDBY
				NEW WELDER TO BE DELIVERED.	0930	WELDER ARRIVED
				COMPLETING 10" WELD THAT WAS STARTED 5/11	0955	WELDING
				TOTAL 10" = 81' 1'/4" OF CARBON STEEL CASING	1015	FINISHED WELD
					1025	DRIVING CASING
					1030	DRILLING
					1050	DRIVING CASING
	69-70'	H	W	GRAVELLY SILTY SAND: 25% GRAVEL, 65% SAND,	1100	SAMPLED W/ DART
				10% SILT. 5% MP, 10% FP, 10% VFP, 20% VCS,		BAILER
				15% CS, 10% MS, 10% FS, 10% VFS, 10% SILT.	1105	DRIVING CASING
				VERY POORLY SORTED. GRAVELS ARE 30% BASALT,	1110	DRILLING
				35% QUARTZITE, 25% GRANITIC, 10% OTHER (META.		
				+ SANDSTONE); VA TO R. SANDS ARE 40% BASALT,		
				50% QUARTZ + PLAG., 10% RX FRAGS (GRANITIC, MICA);		
				VA TO SR. WET COLOR IS 2.5Y 4/2 (DRK. GRAYISH		
				BRN); DRY COLOR IS 2.5Y 7/2 (LT. GRAY)		

REMARKS:

Shawn M. Goodwin 12 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 0 1 0 2 7 7

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 12 MAY 1988	#22-14103	Depth 70' to 75'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	69-70'	H	W	(CONT.) SLIGHT RR. TO 10% HCL. UNCONSOLIT-		
				DATED & EASY DRILLING. LESS GRAVEL &		
				SILT, MORE SAND; SANDS WERE COARSER.		
				SAMPLE REPRESENTATIVE; NO RPT SURVEY.		
				BAILED COARSER GRAVELS & SANDS; DRILLER SAYS	1200	BAILED WELL
				SANDS ARE HEAVING & PUSHING CASING BACK	1205	LUNCH
				UP HOLE. PUSHED UP CASING ~6'	1235	END LUNCH
				PNL STEEL TAPE # L300-07 (300')	1240	H_2O LEVEL
				HELD @ 74' - 1.47' = 72.53' - 7.8' IF 10"	1255	DRIVING CASING
				STICK UP = 64.73'. SEEMS LOW - THOUGHT	1300	DRILLING
				IT WOULD BE ~60'. WILL TAKE TOMORROW		
				IN A.M. H_2O LEVEL IN N-39 = ~59.2'		
	74-75'	H	W	SILTY SANDY GRAVEL: 40% GRAVEL, 50% SAND, 10%	1320	BAILING WELL
				SILT. 5% MG, 15% FG, 20% VFG, 15% VCS, 15% CS,		W/ DART BAILER
				10% MS, 5% FS, 5% VFS, 10% SILT. GRAVELS ARE	1325	DRILLING
				40% BASALT, 30% QUARTZITE, 20% GRANITE, 10% OTHER		
				META.; VA TO R. SANDS ARE 50% BASALT, 40%		

REMARKS:

Shawn M. Goodwin 12 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By S. M. GOODWIN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 12 MAY 1988	#22-14103	Depth 75' To ~78.5'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	74-75'	H	W	(CONT.) QUARTZ & PLAG., 10% RX. FRAGS; VA TO		NO RPT SURVEY
				SR. VERY POORLY SORTED, WET COLOR IS 2.5Y		
				4/2 (DRK. GRAYISH BRN). DRY COLOR IS 2.5Y 7/2 (LT. GRAY).		
				MODERATE RX. TO 10% HCL. SANDS NOT HEAVING;		
				UNIT IS NOW SLIGHTLY CONSOLIDATED. ABLE		
				TO KEEP 1' OF OPEN HOLE. NOT AS MUCH		
				H_2O AS LAST SAMPLE; FORMATION NOT AS OPEN.		
				COARSER SAMPLE; MORE GRAVEL & LESS SAND.		
				GRAVELS & COARSE SANDS; SIMILAR TO LAST	1350	BAILED WELL
				SAMPLE. CASING HAS BEGN DRIVING HARDER	1400	BUILDING UP BIT
					1430	DRILLING
				CASING DRIVING HARD	1445	DRIVING CASING
					1450	DRILLING
				NO DETECTABLE CONTAMINATION	1455	RPT SURVEYED
					1515	DRIVING CASING
					1520	SHUT DOWN RIG
					1530	END OF DAY

REMARKS:

Shawn M. Goodwin 12 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

9 2 1 2 5 1 1 2 7 9

DRILL LOG	By S. M. GOODWIN	Rig BUCYRUS ERIE 60L #22-14103	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 13 MAY 1988		Depth ~78.5' TO 80'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
81' 1 1/4" of 10" C.S.				GEOLOGIST ARRIVED; DRILLER IS FELIX MURPHY	0700	SERVICING RIG
				PNL STEEL TAPE #L300-07 (300')	0720	H_2O LEVEL
				HELD @ 66' - 1.74' CUT - 2.83' STICKUP = 61.43'	0730	BUILDING UP BIT
				SEEMS CORRECT; MUCH BETTER THAN YESTERDAY	0750	DRILLING
	79-80'	H	W	SILTY SANDY GRAVEL: 55% GRAVEL, 35% SAND,	0830	BAILED W/ DART
				10% SILT. 5% CP, 10% MP, 20% FP, 20% VFP,		BAILER
				5% VCS, 5% CS, 15% MS, 5% FS, 5% VFS, 10% SILT.	0835	PREPARING TO WELD
				VERY POORLY SORTED. GRAVELS ARE 80% BASALT,		
				35% QUARTZITE, 25% GRANITIC, 10% OTHER		
				(MESA. IG. & SED, GREEN RX (EPIDOTE?)), VA TO R.		
				SANDS ARE 25% BASALT, 65% QUARTZ & PLAG,		
				10% RX. FRAGS (MICA, ETC), VA TO SR, WET		
				COLOR IS 2.5Y 4/2 (DRK. GRAYISH BRN). DRY COLOR		
				IS 2.5Y 7/2 (LT. GRAY). GOOD RX. TO 10% HCL. UNIT		
				IS SLIGHTLY CONSOLIDATED. SAMPLE CONTAINS MORE		
				GRAVEL & LESS SAND; SANDS ARE MUCH FINER		
				& MOSTLY MS. ABLE TO DRILL OPEN HOLE: ~4.5'		
				AHEAD OF CASING. NO RPT SURVEY.		

REMARKS:

Shan M. Goodwin 13 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 0 1 1 2 3 9

-2-

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 13 MAY 1988	#22-14103	Depth: 80' To 85'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
81' 1 1/4" of 10"				ADDED 10' 1/4" of 10" CARBON STEEL CASING	1000	FINISHED WELDING
+ 10' 1/4"				TOTAL 10" = 91' 1 1/2"	1005	DRIVING CASING
91' 1 1/2" of 10" C.S.				DRILLING SLOW; MAY BE IN COBBLES	1015	DRILLING
				CASING DRIVING HARD	1105	DRIVING CASING
	84-85'	H	W	SILTY SANDY GRAVEL: 55% GRAVEL, 35% SAND,	1110	SAMPLED W/ DART
				10% SILT. TRACE CP, 10% MP, 20% FP, 25% VFP,		BAILER
				8% VCS, 7% CS, 10% MS, 5% FS, 5% VFS, 10%	1115	DRILLING
				SILT. VERY POORLY SORTED. GRAVELS ARE 30%		
				BASALT, 30% GRANITIC, 30% QUARTZITE, 10%		
				OTHER. (MOSTLY META. - GNEISS, SOME EPIDOTE),		
				VA TO R. SANDS ARE 30% BASALT, 60%		
				QUARTZ & PLAGIOCLASE, 10% RX. FRAGS; VA		
				TO SR. WET COLOR IS 2.5Y 4/2 (DAK. GRAYISH		
				BRN.); DRY COLOR IS 2.5Y 7/2 (LT. GRAY).		
				SLIGHT RX. TO 10% HCL. SLIGHT CONSOLIDATION,		
				DRILLING IS SLOW THROUGH GRAVELS. SIMILAR		
				TO LAST SAMPLE. NO RPT SURVEY. ~5'		
				OF OPEN HOLE.	1200	LUNCH

REMARKS:

Shari M. Goodwin 13 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

9 2 1 2 5 4 1 2 3 1

-3-

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 13 MAY 1988	# 22-14103	Depth 85' To ~92'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1230	END LUNCH
					1235	DRILLING
				DRIVING HARD; ~5' OF OPEN HOLE	1310	DRIVING CASING
					1320	WELDING ON BIT
				DRILLING SLOW; GRAVELS & COBBLES	1345	DRILLING
					1425	DRIVING CASING
	89-90'	H	W	SILTY SANDY GRAVEL: 50% GRAVEL, 40%	1435	SAMPLED W/
				SAND, 10% SILT. 5% CP, 10% MP, 15% FP, 20%		DART BAILER
				VFP, 10% VCS, 10% CS, 10% MS, 5% FS, 5% VFS,	1440	DRILLING
				10% SILT. VERY POORLY SORTED. GRAVELS ARE 30%	1500	RPT SURVEY;
				BASALT, 30% GRANITIC, 30% QUARTZITE, 10% OTHER		NO DET. CONTAM.
				META; VA TO SR. SANDS ARE 25% BASALT, 65%	1515	DRIVING CASING
				QUARTZ & PLAG., 10% RX. FRAGS; VA TO SR. WET COLOR	1525	SHUT DOWN RIG
				IS 2.5Y 4/2 (DRK. GRAYISH BRN.); DRY COLOR IS 2.5Y 7/2	1530	END OF DAY
				(LT. GRAY). STRONG RX. TO HCL. SLIGHT CONSOLIDATION.		
				LESS GRAVEL THAN LAST SAMPLE; SIMILAR MINERAL-		
				OLOGY. NO RT SURVEY.		

REMARKS: RIT SURVEY; NO DETECTABLE CONTAMINATION.

13 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 5 - 1 1 2 0 2

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 16 MAY 1988		Depth: ~92' To 95'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				GEOLOGIST ARRIVED; DRILLER IS FELIX MURPHY	0700	SERVICING RIG
66'.00 HELD				STATIC H_2O LEVEL: HELD @ 66' (PNL 300'	0715	H_2O LEVEL
2.18 CUT				STEEL TAPE # L300-07) - 2.18' CUT - 2.9'	0725	PREPARING TO WELD
63.82'				CASING STICKUP = 60.92' D/W	0815	WELDING 10"
2.90 STICKUP				ADDED 10' 1/4" OF 10" CASING	0900	FINISHED WELD
60.92' HOLD LEVEL				TOTAL 10" CARBON STEEL = 101' 1 3/4"	0910	DRIVING CASING
91' 1 1/2" OF 10"					0920	DRILLING
10' 1/4"					0940	WORKING ON RIG
101' 1 3/4"					0950	DRILLING
					1000	DRIVING CASING
	94.95'	H	W	SILTY SANDY GRAVEL: 55% GRAVEL, 35% SAND,	1015	SAMPLED W/ DART
				10% SILT. 5% CP, 10% MP, 20% FP, 20% VFP,		BAILER
				5% VCS, 5% CS, 10% MS, 10% FS, 5% VFS, 10%	1020	DRILLING
				SILT. VERY POORLY SORTED. GRAVELS ARE 35%	1030	DRILLER TO LOON
				BASALT, 30% QUARTZITE, 25% GRANITIC, 10%	1045	DRILLING
				OTHER META & SED. (GNEISS, S.S.); VA TO SR.		
				SANDS ARE 30% BASALT, 60% QUARTZ + PLAG.,		
				10% RX. FRAGS. (MOSTLY BIOTITE + MUSCOVITE IN		

REMARKS:

Alan W. Stark 13 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

A.106

DRILL LOG	By S. M. Goodwin	Rig BE 60C #22-14103	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 16 MAY 1988		Depth 95' to ~97'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	94.95'	H	W	(CONT.) FINE SANDS), VA TO SR WET COLOR		
				IS 2.5Y 4/2 (DRK. GRAYISH BRN), DRY COLOR IS 2.5Y		
				7/2 (LT. GRAY). STRONG RX. TO 10% HCL.		
				MODERATE CONSOLIDATION; SLOW DRILLING		
				THROUGH COARSE GRAVELS. MORE GRAVEL &		
				LESS SANDS; SIMILAR MINERALOGY AS LAST		
				SAMPLE. NO RPT SURVEY.		
				BAILED SMALLER GRAVELS & MORE SAND THAN LAST	1145	BAILED WELL
				SAMPLE		
				10' 20 SLOT S.S. SCREEN; NO THREADS ON END TO	1150	SCREEN DELIVERED
				MATE WITH S.S. 6" CASING. SHOULD BE 10 SLOT	1200	LUNCH BREAK
				SCREEN W/ THREADS. CHECKED SILICA SAND; WE	1230	END LUNCH
				HAVE 10-20 SLOT BAGS, SHOULD BE 20-40 SLOT.	1245	DRIVING CASING
					1255	DRILLING
				DRIVING HARD & DRILLING SLOW; DRILLER THINKS.	1315	DRIVING CASING
				WE ARE IN BOULDERS. BAILED COARSE GRAVELS.	1325	DRILLING
				10' 10 SLOT SCREEN W/ THREADS DELIVERED.	1410	BAILED WELL
					1415	PREPARING TO WELD

REMARKS:

Shawn M. Goodwin 16 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

9 2 1 2 5 - 3 1 2 3 4

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 16 MAY 1988	# 22-14103	Depth ~97' To ~97'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER HAS APPT. W/ SUPERVISOR	1445	SHUT DOWN FOR
						DAY

REMARKS:

Alan M. Stoll 16 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water A-6000-021 (5-85)

9 2 1 2 5 1 0 2 3 5

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 17 May 1988		Depth: ~97' To 100'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY	0700	SERVICING RIG
101' 1 3/4" of		10"			0720	WELDING 10"
+ 10' 3 1/4"				ADDED 10' 3 1/4" of 10" CARBON STEEL CASING	0815	FINISHED WELD
111' 5" of		10"		TOTAL 10" = 111' 5"	0825	DRIVING CASING
					0835	DRILLING
					0900	DRIVING CASING
	99-100'	H	W	SILTY SANDY GRAVEL: 50% GRAVEL, 35% SAND,	0915	SAMPLED W/ DART
				15% SILT & CLAY. TRACE CP, 10% MP, 20% FP,		BAILER
				20% VFP, 5% VCS, 5% CS, 10% MS, 10% FS, 5% VFS,	0920	DRILLING
				15% SILT & CLAY. VERY POORLY SORTED. GRAVELS	0930	STANDBY
				ARE 40% BASALT, 25% GRANITICS, 25% QUARTZITE,		
				10% OTHER META; VA TO SR. SANDS ARE 35%		
				BASALT, 55% QUARTZ & PLAG., 10% RX. FRAGS		
				(GRANITICS, MICA); VA TO SR. WET COLOR IS		
				2.5 Y 4/2 (DRK. GRAYISH BRN). DRY COLOR IS 2.5 Y 7/2		
				(LT. GRAY.) MODERATE RX. TO 10% HCL. SLIGHT		
				CONSOLIDATION. DRILLING IS EASIER; NOW OUT		
				OF BOULDERS & AT TOP OF CLAYS. SOME CLUMPS		

REMARKS:

17 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 17 MAY 1988	#22-14103	Depth: 100' To 104'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	99-100'	H	W	(CONT.) OF BROWNISH CLAY WERE PRESENT IN	0950	CUTTING OFF 10"
				SAMPLE. MORE FINES & LESS GRAVEL THAN		CASING
				LAST SAMPLE.		
111'5' OF 10"				CUT OFF 7' 1/2" OF 10" CARBON STEEL CASING	1000	
- 7' 1/2"				TOTAL 10" CASING = 104' 4 1/2"		
104' 4 1/2"						
				BAILED GRAVELLY CLAYS; WILL DRILL A LITTLE	1005	BAIL W/ DART
				MORE & CLEAN OUT WELL TO BOTTOM OF CASING		BAILER
				D/B USING CABLE TOOL = ~103'; TRIED	1015	MEASURING CABLE
				D/B W/ STEEL TAPE; MATERIAL TOO STICKY	1025	DRILLING
				TO ALLOW TAPE TO HIT BOTTOM. WILL TAKE	1030	BAILED WELL
				ANOTHER D/B AFTER BAILING WELL.	1050	DRILLING
					1055	BAILED WELL
	104'	H	W	GRAVELLY SILT: (CLAY) 15% GRAVEL, 10% SAND,	1100	DRILLING
				75% SILT & CLAY. 3% NP, 6% FP, 6% VFP, 3%	1110	BAILED WELL
				VCS, 2% CS, 2% MS, 3% FS & VFS, 75% SILT.		
				POORLY SORTED. GRAVELS ARE 40% BASALT, 25%		
				GRANITICS, 25% QUARTZITE, 10% OTHER META;		

REMARKS:

Shan M. Hood 17 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-88)

DRILL LOG	By S. M. Goodwin	Rig BE 60L #22-14103	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 17 MAY 1986		Depth 104' To 104'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	104'	H	W	(CONT.) VA TO A. SANDS ARE 35% BASALT,	1115	STRAIGHTNESS TEST;
				55% QUARTZ + PLAG., 10% RX. FRAGS (GRANITE +		11' BAILER W/9"
				MICAS, VA TO SA. WET COLOR IS 2.5Y 4/4		DIA. DOWN HOLE,
				(OLIVE BROWN). DRY COLOR IS 2.5Y 7/4		NO PROBLEMS.
				(PALE YELLOW). SLIGHT RX. TO 10% HCL.		
				EASY DRILLING IN CLAYS.		
103.82'				PNL 500' STEEL TAPE #L500-02. HELD @	1120	DEPTH TO BOTTOM
2.05				103.82' - 2.05' STICKUP (10" CASING) + 2.62'	1130	STANDBY
101.77'				OF TAPE = 104.39' D/B. STILL HARD TO		
2.62				DETERMINE D/B DUE TO STICKY SEDS.		
104.39' D/B				AT BOTTOM.		
				WELL LOGGED FOR NAT. γ, NEUTRON, &	1230	GEOPHYSICAL LOG
				DENSITY.	1300	END GEO. LOG
				USING 100 N DRILL SUPPLY FLUID TO BRING	1305	ADDING H_2O
				LEVEL UP TO ~50'; DRILLER WANTS H_2O		TO HOLE
				ADDED TO PREVENT SCREEN FROM MOVING UP		
				WHEN WE START TO PULL BACK CASING		

REMARKS:

Shawn M. Goodwin 17 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 17 MAY 1988	#22-14103	Depth 104' To 104'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/B FROM LOG IS ~103.5', CLAYS START	1310	GEOPHYSICAL LOG
				ON NAT. Y AT ~98'.	1315	NO 20-40 MESH
						SAND; CANNOT
				DRILLER BREAKING DOWN TOOL STRING &	1320	START COMPLETION
				WELDING TOOL TO SET STAINLESS CASING.		UNTIL DELIVERY
					1420	20-40 MESH SAND
						DELIVERED
					1530	END OF SHIFT

REMARKS:

Shawn M. Goodwin 17 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 18 MAY 1988	#22-14/03	Depth: 102' To 102'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY	0700	WORKING ON TOOL
						STRING
				ADDED 1 100 LB. BAG OF 20-40 SIEVE COLORADO	0830	ADDED SAND
				SILICA SAND IN 10" CASING. D/B TO TOP OF	0900	NEED TOOLS AT
				SAND = 100'. WILL COMPLETE AT THIS DEPTH		WELL N-69
				(PNL 310' STEEL TAPE # L300-07)	0930	PROBLEMS W/
						THREADS ON SCREEN
					0945	WORKING ON CLAMPS
						TO PLACE SCREEN
10' SCREEN				10' SCH. 304 STAINLESS STEEL 10 SLOT SCREEN	1030	PLACING SCREEN
20' 1/4" 6"			+	W/ CENTRALIZERS AT TOP. (6" DIA.)		
20'				1 20' 1/4" SCH. 10S S.S. 6" CASING W/ FACTORY	1045	ADDING 6" SS CASING
19' 11 1/4"			+	WELDED CENTRALIZERS AT TOP.		
20'				1 20' SCH. 10S S.S. 6" W/ CENTRALIZERS		
90' TOTAL 6"				AT TOP		
(INCLUDES 10' OF 6" SCREEN)				1 19' 11 3/4" SCH. 10S SS. 6" CASING		
				1 20' SCH. 10S S.S. 6" CASING W/ CENTRALIZERS		
				AT TOP		

REMARKS:

18 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 2 9 0

DRILL LOG	By S. M Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 18 MAY 1988	# 22-14103	Depth 102' To ~100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
90' of 6" S.S.				(Cont.)	1230	DRILLER TALKING
10'				1 10' SCH. 10S S.S. 6" CASING		W/ JOHN KELLER
2'				1 2' SCH. 10S S.S. 6" CASING	1250	LUNCH
102' of 6" S.S.				TOTAL 6" S.S. CASING = 102' (INCLUDES	1320	END LUNCH
				10' of 10 SLOT SCH. 304 SCREEN & 92' of		
				SCH. 10S 6" S.S. CASING)		
				ADDED 3 100 LB. BAGS OF 20-40 U.S. SIEVE	1330	ADDING SAND
				COLORADO SILICA SAND. D/B TO TOP OF SAND	1350	WELDING PULLER
				= 91.15'	1420	PULLING 10"
				PULLED 10" ~7"; 6" S.S. HAS SETTLED IN	1450	
				SAND ~5". WILL CONTINUE TO BACKPULL & THEN		
				PULL 6" BACK UP TO DESIRED DEPTH		
				PULLED 10" A TOTAL OF 1'9" TODAY. WILL	1520	SHUT DOWN RIG
				PULL BACK TO 2', CUT OFF 10" & MEASURE	1530	END OF SHIFT
				D/B TOMORROW.		

REMARKS:

[illegible] 18 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: Bucyrus Erie 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 19 MAY 1986		Depth: ~100' To 99.5'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY	0700	SERVICING RIG
					0720	PULLING 10"
				REMOVED 2' OF 10"	0750	CUTTING CASING
				D/B (TO BOTTOM OF 6" SCREEN): 103.5' - 2.65'	0820	
				10" STICKUP = 100.85' (PNL TAPE # L300-07).	0825	DRILLER TO N-69
						TO PICK UP BAILER
				ATTACHING BAILER TO 6" CASING TO PULL BACK .85'	0850	INSTALLING BAILER
				D/B OF STAINLESS SCREEN = 100'. WILL DO ANOTHER	0900	PULLED STAINLESS
				SHORT PULL & MEASURE D/B TO TOP OF SAND		UP.
				= 93.3'	0915	PREPARING TO WELD
						PULLER HEAD
					0925	FINISHED WELD
					0930	PULLING 10"
104'4½" of		10"		REMOVED 2'8" OF 10"; 10" TOTAL = 99'8½".	1000	CUTTING 10"
4'8"				SCREEN STILL AT 100'; ADDING 3 BAGS OF	1030	ADDING SAND
99'8½" of		10"		SAND. D/B TO TOP OF SAND = 84.4'.	1040	D/B TO SAND
					1045	PREPARING TO WELD
					1110	PULLING 10"

REMARKS:

Alan M. Smith 19 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. GOODWIN	Rig BE 60C	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 19 MAY 1986	#22-14103	Depth 99.5' TO 84'8"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
99'8½" of		10"			1145	LUNCH
4'4"				PULLED 4'4" OF 10"; TOTAL 10" = 95'4½"	1215	CUTTING 10"
95'4½" of		10"		D/B OF STAINLESS = 99.7'. D/B TO TOP OF	1230	D/B W/ PNL TAPE
				SAND = 87.65'		# L300-07
				ADDED 2 100 LB. BAGS OF 20-40 SIEVE SILICA	1245	ADDING SAND
				SAND; D/B TO TOP OF SAND = 80.60'	1255	FINISHING CUTTING
						10" OF PULLER
					1300	PREPARING TO WELD
95'4½" of		10"			1320	PULLING 10"
4'8"				CUT OFF 4'8" OF 10" CASING; TOTAL 10" = 90'8½"	1350	
90'8½"				D/B TO TOP OF SAND = 82.55'; D/B TO BOTTOM	1400	
				OF STAINLESS = 99.65'	1410	CUTTING OFF 10"
						OF PULLER
					1420	PREPARING TO WELD
					1450	PULLING 10"
				PULLED 4'2"; 10" CASING IN HOLE = 84'6½"	1510	
				D/B TO TOP OF SAND = 83.4'	1515	
				WILL START WITH PELLETS TOMOREOW	1530	DONE FOR DAY

REMARKS:

Shan Wm. Goodwin 19 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: M.A. Chamness	Rig: B.E. 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: May 20, 1988	#22-14103	Depth: 84'8" To ~79'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				84'6½" of casing in hole, top of sand at 83.4'		
				D/W - hold point 66.8', water on tape at 5.51' - 2.3' (28") stickup		steel tape is +3¼"
				D/W = 59.3' below ground	7:30	
						66.8
				Added 4 5gal buckets of udclay pellets, tagged top at 58'-2.3' = 55.7',		-5.5 wet
				has bridged on top of water, can punch thru,		61.3
				measure at 75.7' - 2.3' = 73.4' below ground.		-2.3 stickup
						59.0
						+ .3 on tape
						59.3
				Will try to pull back casing so that plug does not form in bottom of casing and then see about having water truck and tremie pipe w/ holes brought out to clean out the little plug.		
						80.5
						1.75
						78.75
				Pulled casing back 21.5" (1.75'), casing + puller head stickup = 7'		
				D/W axes 80.2' + .3 (tape) = 80.5' - 1.75' = 78.75 - 7' = 71.75' Plug		
				on top of water is no longer there. Will pull back		
				another 1-2' to see whether increase in depth to		
				pellets is from swelling, from the plug on the water		
				falling in, or a plug on the bottom of the casing		

REMARKS:

MA Chamness 5/20/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: M.A. Chamness	Rig: B.E. 60L	Well Number: 199-N-70	Computer Number:	Project or Work Order No.: W-014
	Date: 5/20/88	#22-14103	Depth: ~79' To 74'5¼"	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Stickup including puller head is 9'3½" (~9.3'), DB pellets	9:00	
				is 81.4' + .3 (tape) = 81.7' - 9.3' = 72.4' top of pellets.		
				Appears to be staying in place alright. will continue		
				to pull back casing without adding anything more		
				until pellets are close to bottom of casing.		pulled back 5'3"
				Pulled back total of 5'3" since adding bentonite pellets,	9:15	
				stickup is 10'11½" (~11'), DB is 83.35' - 11' = 72.35'. Pellets		
				staying in place		
				Stickup is 9'7" (~9.6'), DB is 81.6' + .3' (tape) = 81.9' - 9.6' = 72.3' below grnd	10:35	
				top of pellets; pulled back another ~1', DB = 74.4' (+tape) - 2.1 = 72.3'		
				below ground surface. Bottom of casing at 81'1¼" - 6'8" =		
				74'5¼" below ground surface		
				DW - hold @ 63', - 2.35' = 60.65' - 2.05 = 58.6' from ground surface	12:00	
				Added 1 50lb bag Enviroguel bentonite crumbles, DB @ 58.3' + .3' (tape)		
				= 58.6' - 2.05' stickup = 56.55'. Most of the bag has		
				apparently bridged on the water, even though it was		
				poured fairly slowly (crumbles being used by Proj. Mgmt.		
				direction). Will try to pull + push the casing to break it		
				loose.		

REMARKS:

M.A. Chamness 5/20/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 5 1 0 2 7 5

DRILL LOG	By M.A. Chamness	Rig B.E. 60L	Well Number 199-N-70	Computer Number	Project or Work Order No. W-014
	Date 5/20/88	#22-14103	Depth 74'5¼" To 73'5¼"	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DB after pulling back 1' 62.8' + 3 = 63.1' - 6.4' = 56.7' below	1:15	16'4½" stickup ≅ 6.4'
				ground surface. Bridge did not break up or break loose,		
				will have to air lift or push the crumbles down with		
				water. Waiting to have equipment brought out		
				There is still ~1'3" of overlap between the bottom of		
				the casing and the top of the bentonite pellets.		
				Then there is ~14' of water, and ~2' of bentonite		Bottom of casing - 73'5¼"
				crumbles on top of the water, or just above. I'd		Top of pellets - 72.3'
				suggest using a bentonite slurry to the top of the		Depth to water - 58.6'
				water table instead of the crumbles.		Depth to crumbles - 56.7'
				Might want to measure the water level Mon. morning.		
				My measurement inside the s.st. well is 2' different		
				from yours, I think.		

REMARKS:

MA Chamness 5/20/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

9 2 1 2 5 0 0 2 9 5

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 23 May 1986	# 22-14103	Depth 73'5"14" To 73'5"14"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY	0700	ON STANDBY;
				D/B TO TOP OF CRUMBLES = 56.18'		BRIDGED CRUMBLES
				(PNL STEEL TAPE # L300-07)	1000	TREMIE PIPE 1
						AIR COMPRESSOR
						DELIVERED
					1045	USING AIR TO BLOW
						CRUMBLES DOWN
						HOLE
				D/B TO TOP OF CRUMBLES = ~66'; CRUMBLES	1105	
				MOVED DOWN HOLE ~10' W/ AIR	1115	ADDING CRUMBLES
				ADDED 1 50 LB. BAG OF ENVIROGEL BENTONITE CRUMBLES;	1120	
				D/B TO TOP OF CRUMBLES = ~54.4'. BRIDGED	1125	USING AIR 1
				WHEN HIT H_2O; USING AIR TO BLOW DOWN		TREMIE PIPE
				D/B TO TOP OF CRUMBES = 63.6'	1130	
				ADDED 2 50 LB. BAGS OF CRUMBLES; D/B TO	1135	ADDING CRUMBLES
				TOP OF CRUMBLES = 51.05'.	1140	USING AIR
				D/B TO TOP OF CRUMBLES = 53'; DROPPED ~2'	1145	
				W/ AIR.	1200	LUNCH

REMARKS:

[signature] 23 May 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 23 May 1988	# 22-14103	Depth: 73'5 1/4" to 71' 1 1/4"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				REMOVING TREMIE PIPE	1230	END LUNCH
					1250	WELDING PULLER
						HEAD
					1305	PULLING 10"
				D/B TO TOP OF CRUMBLES = 50.4' AFTER ~2'	1325	
				PULL OF 10"; BENTONITE PLUG IS COMING	1330	CUTTING OFF PULLER
73'5 1/4" =		10" CS		UP W/ CASING		
2'4"				CUT OFF 2'4" OF 10" CASING; TOTAL 10"	1335	REMOVED 10"
71' 1 1/4" =		10"		CASING = 71' 1 1/4". REASSEMBLING TREMIE.	1345	USING AIR
				D/B TO TOP OF CRUMBLES = 50.15'. EITHER	1410	D/B
				BENTONITE IS SWELLING, OR PLUG IS NOT	1420	ADDING MORE TREMIE
				MOVING DOWN.		PIPE & USING AIR
				D/B TO TOP OF CRUMBLES = 50.92'; MOVED	1450	D/B
				DOWN HOLE .77'. WENT DOWN HOLE TO 73'	1455	ADDING H_2O TO
				W/ TREMIE PIPE & AIR		ANNULUS
				ADDED 15 GALLONS OF H_2O TO GRANULES DOWN	1500	USING TREMIE &
				ANNULUS TO BREAK UP BENTONITE PLUG.		AIR
				D/B TO TOP OF GRANULE SLURRY = 47.45	1520	D/B

REMARKS:

[signature] 23 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

9 2 1 2 6 5 4 0 2 9 8

3

DRILL LOG	By S M. GOODMAN	Rig BE 60C	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. N-014
1	Date 23 MAY 1988	#22-14107	Depth 71' 1¼" To 71' 1¼"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				CHANGE IN BENTONITE DEPTH WOULD BE DUE	1520	
				TO H2O BEING ADDED. WILL PULL IN	1530	END OF DAY
				MORNING		

REMARKS:

Shawn M. Good 23 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 5 1 1 2 7 9

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.M. GOODWIN	BE 60L	199-N-70	N/A	W-014
Date: 24 MAY 1988	# 22-14103	Depth: 71' 1¼" To 65' 10¼"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY; ADDED 15 GALLONS OF	0700	USING TREMIE
				H_2O DOWN ANNULUS.		PIPE + AIR DOWN
						HOLE
				STATIC H_2O D/W IN N-39 = 59.55'	0730	
					0740	REMOVING TREMIE
				D/B TO TOP OF BENTONITE = 47.95'	800	
				(PNL STEEL TAPE # L300-07-300')	0805	WELDING PULLER
				PULLED 10" CASING 27"	0820	PULLING 10"
				D/B TO TOP OF BENTONITE = 47.36'. ASSUME THAT	0835	D/B
				DIFFERENCE IN D/B AFTER PULL IS THAT THE	0840	PULLING 10"
				TAPE IS GETTING STUCK ON CASING SLIGHTLY		
71' 1¼"				ABOVE ACTUAL D/B.	0900	CUTTING 10"
5' 3"				REMOVED 5' 3" OF 10" CASING; TOTAL 10" CASING	0910	D/B
65' 10¼"		OF 10"		= 65' 10¼". D/B TO TOP OF BENTONITE =	0915	INSTALLING TREMIE
				43.35'; EITHER BENTONITE IS COMING UP OR	0950	USING AIR + TREMIE;
				TAPE IS STICKING. WE WILL ADD H_2O + AIR		ADDED 15 GAL. H_2O
				W/ TREMIE. BENTONITE SLURRY IS VERY THICK.		
				D/B TO BENTONITE = 44.55'; DROPPED 1.2' SINCE	1005	D/B

REMARKS:

24 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5-85)

9 2 1 2 6 5 4 0 3 0 0

DRILL LOG	By S. M. Groowin	Rig BE 60L	Well Number 199 - N - 70	Computer Number N/A	Project or Work Order No. W-014
	Date 24 MAY 1988	#22-14103	Depth 65' 10 1/4" To 65' 10 1/4"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				(CONT.) AGITATING W/ AIR	1010	AGITATING W/AIR
				D/B = 44.95'; LISTENED TO TREMIE & AIR	1030	
				DOWN HOLE; AS WE BROUGHT PIPE UP FROM		
				HOLE IT SOUNDED AS IF MIXING STOPS AT		
				~50'. COULD BE GETTING FALSE D/B DUE		
				TO STICKY CASING WALLS.		
				DRYING CASING W/ AIR & TREMIE.	1040	
				D/B = 43.65'; ~1' ABOVE LAST D/B. AIR MUST	1045	
				HAVE BLOWN MATERIAL UP PIPE & IS CAUSING PROBLEMS		
				W/ TIME.		
				ABLE TO GET D/B OF 44.55'; PUNCHED PAST	1050	
				SOME STICKY CASING	1100	ADDED 30 GAL. H_2O
					1110	AGITATING
				D/B = 48.40'; D/B IS .45' LOWER THAN 1ST	1130	D/B
				READING TODAY & 3.75' LOWER THAN LAST READING	1135	AGITATING THROUGH
						LUNCH
				D/B TO TOP OF BENTONITE = 49.25'; .85' LOWER	1205	D/B
				THAN LAST READING. ASSUME THAT THIS IS		

REMARKS:

Steven M. Groowin 24 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water A-6000-021 (5-85)

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 24 May 1988	#22-14103	Depth 65' 10¼" to 47' 9"		Subcontract No N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				(CONT.) CLOSE TO ACTUAL D/B. WILL NOW PULL	1210	REMOVING TREMIE
				10" CASING	1220	WELDING PULLER
				PULLED 2'6"	1235	PULLING 10"
				D/B = 49.92'; INITIAL READING WAS ~4' ABOVE THIS.	1245	D/B
				JIGGLED TAPE & IT BROKE AWAY FROM SIDES OF	1250	PULLING 10"
				CASING. SLIGHTLY LOWER THAN LAST READING;	1320	D/B; REMOVED
				COULD BE DUE TO SLURRY MOVING IN TO FORMATION		6'6" OF 10"
65' 10¼" OF		10"		D/B = 49.14'; SLURRY VF .78' IN HOLE, PROBABLY	1320	D/B
6' 6"				DUE TO STICKY TAPE.	1330	ADDING CRUMBLES
59' 4¼" OF		10"		D/B AFTER 1 BAG OF CRUMBLES = 49.14' - SAME	1335	ADDING CRUMBLES
				AS BEFORE ADDING BAG. TAPE MUST HAVE		
				BEEN STUCK ON SIDES EARLIER (ENVIRO-		
				GEL 50 LB BAG OF BENTONITE CRUMBLES		
				ADDED 3 MORE BAGS OF CRUMBLES; TOTAL OF	1350	
59' 4¼" OF		10"		4 ADDED TODAY. D/B TO TOP OF CRUMBLES	1355	PREPARING TO PULL 10"
11' 5¼"				= 33.72'	1410	PULLING 10"
47' 11"				REMOVED 11' 5¼" OF 10"; TOTAL 10" = 47' 11"	1430	CUTTING 10"
				D/B TO TOP OF CRUMBLES = 49.28'; WE NOW HAVE	1435	D/B

REMARKS:

[illegible] 24 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-8000-021 (5-85)

DRILL LOG	By S. M Goodwin	Rig BE 60C	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 24 MAY 1988	#22-14103	Depth 47'9" To ~39'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				(CONT). APPROX. 4' OF OPEN HOLE EXPOSED. THIS	1440	WELDING EARS ON
				SHOULD NOT BE A PROBLEM; WE ARE IN RING-		10"
				OLD & HOLE IS STAYING OPEN. 4 BAGS OF	1445	ADDING CRUMBLES
				CRUMBLES ADDED EITHER WENT DOWN INTO		
				LESS DENSE SLURRY OR OUT INTO FORMATION.		
				ADDED 11 BAGS OF CRUMBLES (50 LB. WYO-BEN ENVIRO-	1510	PREPARING TO PULL
				GEL GRANULES SIZE 8); D/B TO TOP OF CRUMBLES		10"
				= 20.26'	1515	PULLING 10"
				PULLED ~8' OF 10"; WILL CONTINUE IN A.M.	1520	BREAKDOWN; DONE
						FOR DAY.

REMARKS: USED 60 GALLONS DRILL SUPPLY H_2O TODAY

Shan Mc. Mark 24 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 25 May 1988	# 22-14103	Depth: ~39' to 53'3 1/4"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY; LATE START TODAY	1050	
				DUE TO TRAINING CLASS.	1055	WORKING ON RIG
47'11" of		10"			1215	LUNCH
8'8 1/2"				REMOVED 8'8 1/2" of 10" CASING; TOTAL 10"	1245	PREPARING TO
39'2 1/2" of		10"		CASING = 39'2 1/2".		CUT 10"
				D/B TO TOP of BENTONITE CRUMBLES = 40.8';	1300	D/B
				D/B TO BOTTOM of CASING = 36'7 1/2".		
				THERE IS ~4' of EXPOSED RINGOLD PRESENT DOWN		
				HOLE; SHOULDN'T BE A PROBLEM. AT LEAST 5'		
				of OPEN HOLE WAS DRILLED HERE. ELEVEN BAGS		
				of CRUMBLES = ~9' WHEN WE PULLED BACK.		
				ADDED 11 50LB. BAGS of No. 8 WYO-BEN	1310	ADDING CRUMBLES
				ENVIRO-GEL CRUMBLES. D/B TO TOP of BEN-	1325	PREPARING TO WELD
				TONITE CRUMBLES = 13.47' (PNL 300' STEEL		PULLER ON 10"
				TAPE # L300-07)	1355	PULLING 10"
					1415	CUTTING 10"
				D/B TO TOP of CRUMBLES = 18.85'; LOST 5 1/4'	1425	D/B
				w/ ~5' POLE.	1430	CUTTING 10" FROM PULLER HEAD

REMARKS:

Shan M. Goodwin 25 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 25 MAY 1988		Depth: 53'3¼" To ~28'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
39'2½" or		10"		REMOVED 4'9¼" of 10"; TOTAL 10" CASING =	1430	
4'9¼"				34'5¼"		
34'5¼" or		10"		ADDED 1½ 50LB. BAGS OF GUMBO-GEL CRUMBLES;	1440	D/B
				D/B TO TOP OF CRUMBLES = 12.8'	1445	PREPARING TO
						WELD PULLER
				PULLING HARD; PULLED 5'	1520	SHUT OFF RIG
					1530	END OF DAY

REMARKS:

Shawn M. Goodwin 25 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 0 1 1 3 1 5

DRILL LOG	By S. M. Goodwin	Rig BE 60C	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 26 MAY 1988	#22-14103	Depth ~29' To 26'2½"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY	0930	SERVICING RIG
34' 5¼" of 10"				REMOVED 4'11" OF 10" CASING; TOTAL 10"	0950	CUTTING 10"
- 4'1"				CASING REMAINING = 29'6¼"		
29' 6¼" of 10"				D/B TO TOP OF BENTONITE CRUMBLES = 13.55';	1010	D/B
				CRUMBLES DROPPED .75' w/ 4'11" PULL	1020	WELDING PULLER
						HEAD
29' 6¼"					1045	SITE VISITORS
- 3' 1¾"					1100	PULLING 10"
26' 4½"				REMOVED 3' 1¾" OF 10"; TOTAL 10" CASING =	1115	CUTTING 10"
				26' 4½"		
				D/B TO TOP OF CRUMBLES = 13.63, CRUMBLES	1120	D/B
				FELL ONLY .08' w/ 3' 1¾" PULL	1130	WELDING PULLER
					1145	PULLING 10"
					1200	LUNCH
					1230	WELDING EARS
						ON 10"
					1245	CUTTING 10"
				REMOVED 28'11" OF 10" CASING; THIS TOTAL IS	1300	REMOVING 10"

REMARKS:

Shan M. Goodwin 26 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 26 MAY 1986	# 22-14108	Depth: 26'2½" TO 21'10¾"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
28'1" or		10"		(CONT.) 2'6½" OFF THE ESTIMATED TOTAL IN		
26'2½"				THE HOLE. THIS PROBLEM OCCURRED DUE TO		
2'6½" OFF IN				MY ASSUMING THAT THE CASING TOTAL ON		
	CALCULATIONS			MAY 20TH LEFT BY M. CHAMNESS WAS THE		
				ACTUAL AMOUNT OF 10" CASING REMAINING,		
				BUT IT WAS THE DEPTH OF THE 10"		
				CASING W/O THE STICKUP OF 10" CASING		
				INCLUDED.		
				D/B TO TOP OF CRUMBLES = 22.2'; TOTAL	1315	D/B
				12" CASING = 21'10¾" − 9¾" STICKUP =		
				BOTTOM OF 12" AT 21'1". 1'1¼" OF OPEN		
				HOLE IS EXPOSED DUE TO MISCALCULATION OF		
				10" IN HOLE. ALL 10" CASING HAS BEEN		
				REMOVED FROM HOLE.		
				ADDED 3½ BAGS OF CRUMBLES (50 LB. WYO-BEN	1330	ADDING CRUMBLES
				ENVIROGEL CRUMBLES); D/B TO TOP = 16.27'		
					1340	WELDING ENDS ON
						12"

REMARKS:

Allen M. Goodwin 26 MAY 1986

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water A-6000-021 (5-85)

DRILL LOG	By: S. H. Goodwin	Rig: BE 60C	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 26 MAY 1988	# 22-14103	Depth: 21' 10 3/4" To 18' 11 3/4"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1350	PULLING 12"
				D/B TO TOP OF CRUMBLES = 18.77'; 18' 11 3/4"	1415	D/B
				IN 12" CASING IN HOLE. THERE IS ~2"		
				OVERLAP; WE WILL NOW BEGIN W/ CEMENT		
				GROUT.	1420	PROBLEMS W/
						GROUT MIXER
					1440	WORKING ON MIXER
					1530	END OF DAY

REMARKS:

Ahern Mac Stock 26 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. N-014
	Date 27 MAY 1983	#22-14103	Depth 18' 11 3/4" to 14' 1"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY	0700	STANDBY; CEMENT
						MIXER PLUGGED
					0720	WORKING ON MIXER
					1030	MIXING CEMENT
						GROUT
				D/B TO TOP OF BENTONITE GRANULES = 18.88';	1050	D/B
				SETTLED .01' SINCE YESTERDAY.		
					1110	ADDING CEMENT
						GROUT
				D/B TO TOP OF GROUT = 13.94'	1120	D/B
					1125	PULLING 12"
				D/B AFTER ~2' PULL OF 12" = 15.16'; LOST	1130	D/B
				1' W/ 2' PULL. WILL ADD MORE GROUT.		
				BOTTOM OF 12" = 17' 10 3/4"		
					1140	ADDING GROUT
				D/B TO TOP OF GROUT = 9.73'	1150	D/B
				PULLED 12" 5'4"	1155	PULLING 12"
					1200	CUTTING 12"

REMARKS:

Alan M. Gal 27 MAY 1983

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 27 MAY 1988	#22-14103	Depth 14'1" To 14'1"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
21'10 3/4" of 12" C.S.				REMOVED 7' 9 3/4" OF 12" CASING; TOTAL 12"	1205	
- 7' 9 3/4"				REMAINING = 14' 1"		
14'1" of 12"				D/B TO TOP OF CEMENT GROUT = 12.27'; BOTTOM	1205	D/B
				OF 12" = 12' 7 1/2". WE HAVE 4 1/4" OF		
				OVERLAP W/ CASING & CEMENT.	1210	WELDING BARS
					1230	LUNCH
				WORKING ON GROUT PUMP	1300	END LUNCH
				STATIC H_2O IN N-39 = 59.47'; PNL GTSEL	1315	
				TAKES # 6300-05.	1320	ADDING GROUT
				D/B = 11.42' TO TOP OF CEMENT GROUT	1330	D/B
					1340	PROBLEMS W/ MIXER
				D/B = 11.26' TO TOP OF CEMENT GROUT. GROUT	1420	ADDING GROUT
				APPEARS TO BE MIGRATING INTO THE FORM-		
				ATION; WE ARE ONLY GAINING UP TO 1/2'		
				W/ EACH BATCH. EACH BATCH = 2 BAGS CEMENT		
				+ 10-12 GALLONS OF H_2O. WE HAVE USED 16		
				94 LB. BAGS OF TYPE I & II PORTLAND CEMENT +		
				2 50 LB. BAGS OF GUARD-GEL GRANULES FOR		

REMARKS:

Sharon Marie Martin 27 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

-3-

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 27 MAY 1988	#22-14103	Depth: 14'1" To 11'8"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				(CONT.) FREEZE-THAW EXPANSION. ~90 GALLONS		
				OF DRILL SUPPLY H_2O WAS USED IN MIXING		
				CEMENT GROUT.	1440	PULLING 12"
					1440	PULLED ~1'
				D/B TO TOP OF CEMENT GROUT = 11.49'; BOTTOM	1445	
				OF 12" CASING = 11'8". GAP BETWEEN THE		
				CASING & GROUT = ~2"		
				OUT OF H_2O TO MIX CEMENT GROUT; CLEANING	1450	
				MIXER & ORGANIZING DRILL SITE.		
					1530	END OF DAY

REMARKS:

Sharon Mae Stoot 27 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S.M. GOODWIN	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 31 MAY 1988	#22-14103	Depth: 11'8" To 11'8"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY	0700	
				D/B TO TOP OF CEMENT GROUT = 11.18';	0715	D/B
				GAP BETWEEN 12" CASING & GROUT = ~4.5'	0800	MIXING GROUT
				CASING IS AT 11'8". CEMENT SHRUNK		
				.3' OVER THE WEEKEND. DID NOT LEAVE		
				CASING IN CEMENT DUE TO DRYING		
				OVER THE WEEKEND. (PNL STEEL TAPE #L300-07)		
				D/B TO TOP OF CEMENT GROUT = 6.4'; CAME UP	0850	D/B
				4.78' w/ ONE BATCH. SHOULD DROP & FILL IN		
				FORMATION ONCE WE BACKPULL.		
					0855	BACKPULLING 12"
				D/B TO TOP OF GROUT = 10.85'; DROPPED 4.45'	0900	PULLED
				w/ 3" PULL. OPENED UP SOME FORMATION TO	0905	STANDBY
				GROUT & LOST ALL BUT .33' w/ 2 BAG BATCH	0940	MIXING GROUT;
				OF GROUT. (2 94 LB. BAGS OF TYPE I & II PORT-		GROUT IN HOLE HAS
				LAND CEMENT + 10-12 GALLONS OF H_2O; + 2		DROPPED TO 0715
				SHOVELS OF WYO-BEN GUMMO-GEL CRUMBLES)		D/B
				D/B = 11.03'; CONTINUES TO GO INTO FORMATION.	1000	D/B

REMARKS:

Alan M. Ford 31 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-88)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60 C #22-14103	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 31 MAY 1988		Depth: 11'8" To 11'4"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				TAPE IS STUCK BELOW 12" ; PULLED CASING	1005	PULLING 12"
				3" TO TOP & FREE UP TAPE. D/B OF 12" = 11'4'/4"	1010	TAPE OUT
				NEW MIXER WAS DELIVERED & OLD GROUT	1015	MIXING GROUT
				PUMP DELIVERED TO LOUIS.		
				D/B TO TOP OF CEMENT GROUT = 10.67' AFTER 1	1030	D/B
				BATCH. 1 BATCH IN NEW MIXER = 4 BAGS	1035	MIXING GROUT
				CONCRETE + 20-24 GALLONS H_2O.		
				D/B TO TOP OF CEMENT GROUT = 10.5' ; 2 BATCHES	1050	D/B
				ADDED SINCE 1030	1055	MIXING GROUT
				D/B AFTER 3 BATCHES = 10.10'	1105	D/B
					1110	MIXING GROUT
				D/B TO TOP OF CEMENT GROUT = 5.42' AFTER 4	1125	D/B
				BATCHES.	1130	PULLING 12"
				PULLED 6" & LOST .58' OF GROUT TO HOLE. D/B	1135	D/B
				= 6.0'	1140	LETTING GROUT
						SETTLE & EXPAND
				D/B = 7.55' ; DROPPED 1.55' SINCE BEFORE LUNCH.	1230	D/B
					1232	PULLING 12"

REMARKS:

Alan M. Good 31 MAY 1988

D - Drive Barrel H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. M. Goodwin	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 31 MAY 1988	# 22-14103	Depth 11'4" To 3'4 1/2"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				PULLED CASING 1.65'; D/B TO TOP OF CEMENT	1235	PULLED CASING;
				GROUT = 7.55', SAME AS LAST D/B. DID		MIXING GROUT
				NOT LOSE ANY TO FORMATION W/ 1.65'	1250	ADDED GROUT TO
				PULL. CASING = 9'8" B.L.S. ADDED 3/4 BATCH.		GROUND SURFACE
				EAR BROKE OFF 12"; PREPARING TO WELD	1255	PULLING 12"
				PULLER HEAD ON TO 12" CASING. CASING	1310	WELDING
				IS PULLING HARD.	1330	PULLING 12"
					1350	CUTTING 12"
				REMOVED 4'1/2" OF 12" CASING; 10'1/2" OF 12"	1400	D/B
				REMAINS. D/B TO TOP OF GROUT = 6.53'	1405	ADDING GROUT;
						ADDED ~1/4 BATCH
						TO GROUND SURFACE
					1410	WELDING EARS
					1420	PULLING 12"
				D/B TO TOP OF CEMENT GROUT = 2.15'; 12" CASING	1430	D/B
				REMAINING BELOW SURFACE = 2'3"	1435	CUTTING CASING
				REMOVED 6'7 1/2" OF 12"; 3'4 1/2" OF 12" CASING	1450	
				REMAIN W/ 1'3" OF STICKUP		

REMARKS: USED 20 BAGS OF PORTLAND CEMENT (94 LBS. TYPE I & II), ~70 GALLONS H_2O, & 3 50 LB. BAGS OF W/O-BSN ENVIRO-GEL CRUMBLES TODAY.

[signature] 31 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 199-N-70	Computer Number: N/A	Project or Work Order No.: W-014
	Date: 31 MAY 1988	# 22-14103	Depth: 3' 4½" To 3' 4½"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1455	RSMANING 6" S.S.
						WELL CAP
				D/W (STATIC H_2O LEVEL) = 58.81' (PNL TAPE	1500	D/W
				# 1300-07 300')		
				D/B OF 6" STAINLESS STEEL = 99.05'; WILL	1505	D/B
				BAIL WELL W/ DART BAILER & REMEASURE AFTER	1510	BAILING WELL
				DEVELOPING WELL.		
				BAILING PRETTY CLEAN; HARDLY ANY SAND.	1525	SHUT DOWN RIG
				SHOULD ONLY HAVE TO BAIL ~1 HR TOMORROW	1530	DONE FOR DAY

REMARKS:

[illegible signature] 31 MAY 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.M. GOODWIN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
	Date 1 JUNE 1988	# 22-14103	Depth 3' 4½" To 3' 4½"		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS FELIX MURPHY	0700	
				STATIC D/W = 58.85' (PNL STEEL TAPE L300-07)	0710	D/W
				D/B TO TOP OF CEMENT GROUT (AFTER DRYING &	0715	D/B
				EXPANDING) = 1.45'		
				PULLING 12" CASING FREE OF CEMENT GROUT;	0720	PULLING 12"
				3' 4½" OF 12" REMAINS IN GROUND. 12" WILL		
				BE REMOVED WHEN CONCRETE PAD IS POURED.		
				BAILING WELL W/ DART BAILER TO DEVELOP;	0730	BAILING WELL
				BAILER HOLD ~10 GALLONS OF H_2O. BAILING		
				~1.5 x / MINUTE (30 GALLONS / MINUTE). H_2O LOOKS		
				FAIRLY CLEAR.		
				H_2O LOOKS GOOD & AS CLEAR AS IT WILL GET	0800	FINISHED BAILING
				W/O PUMPING.		
				D/B TO BOTTOM OF 6" S.S = 99.08'	0805	D/B
					0840	H_2O SAMPLES
						TAKEN
				GEOLOGIST LEFT DRILL SITE.	0900	DRILLER BREAKING
						DOWN RIG

REMARKS:

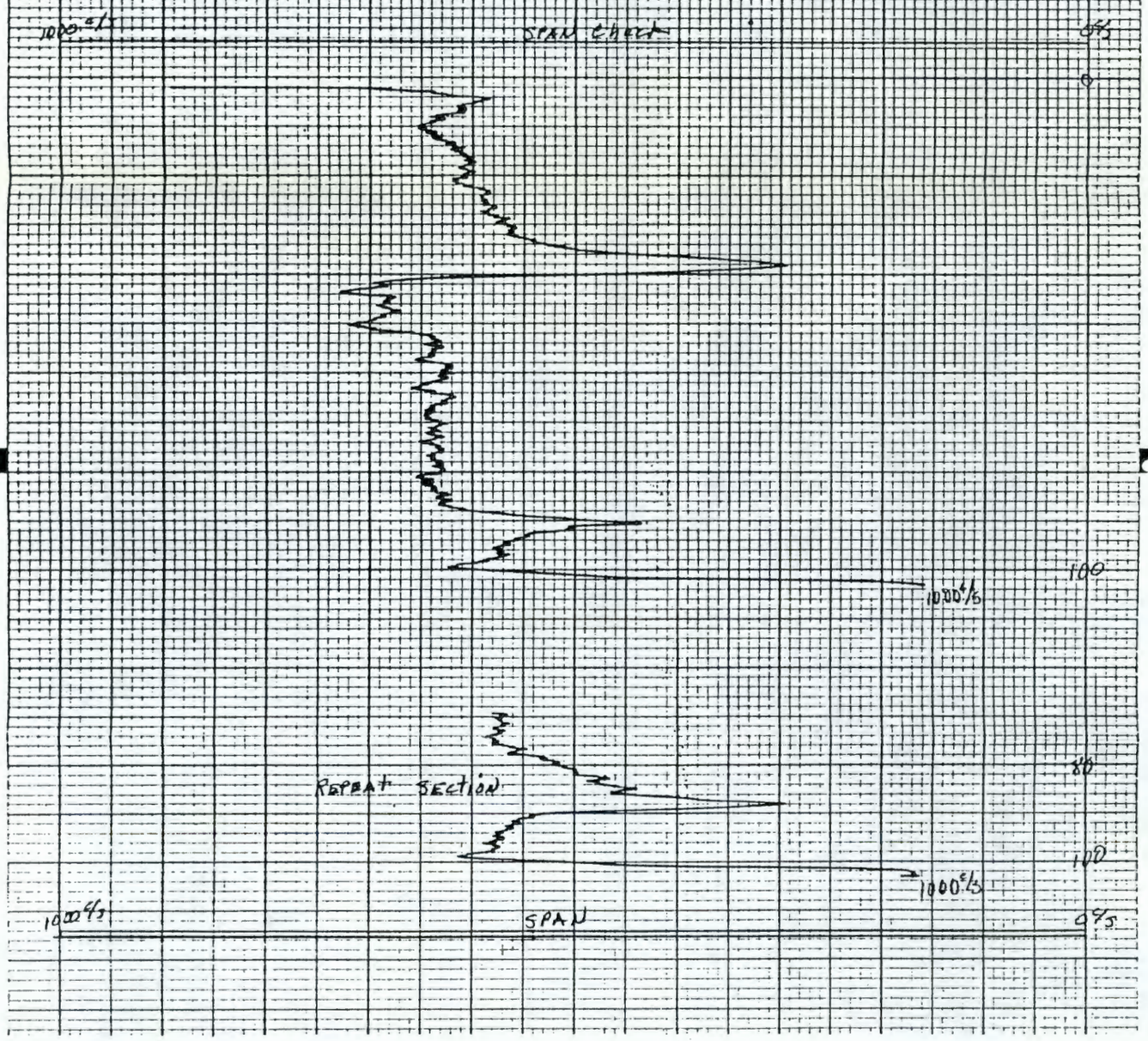
Sharon M. Goodwin 1 JUNE 1988

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

THIS PAGE INTENTIONALLY
LEFT BLANK

Well 199-N-70	Drilled Depth	Interval Logged 103'-2'	
Log Type Density	Date 5-17-88	Casing Size 10 3/4"	
Logged By D.L. McShane + PNA		Water Level Depth 101'	
Logging Scales: Sensitivity 1000 c/s		Time Constant 3	
Vertical Scale 20'/IN		Logging Speed 25'/MIN	
Source Strength 185 mCi 137Cs		Spacer Length 0A	
Remarks: REPA PROCEDURE GW-4 REV 1 PROBE SERIAL GA-48			



Well 199-N-70 Drilled Depth _____ Interval Logged 103-3'

Log Type NAT. GAMMA Date 5-19-95 Casing Size 10 & 12"

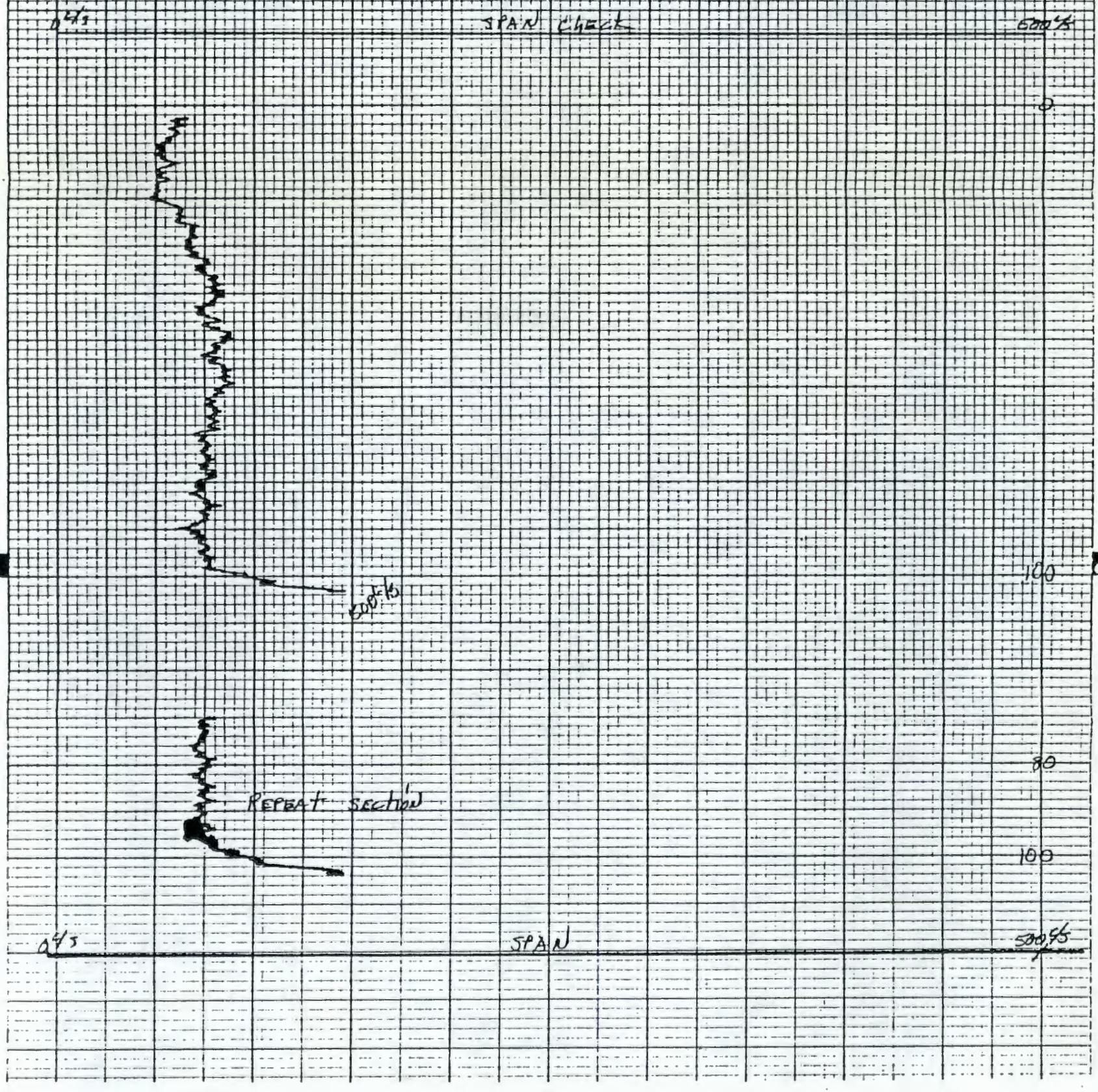
Logged By [illegible] PHL Water Level Depth 101'

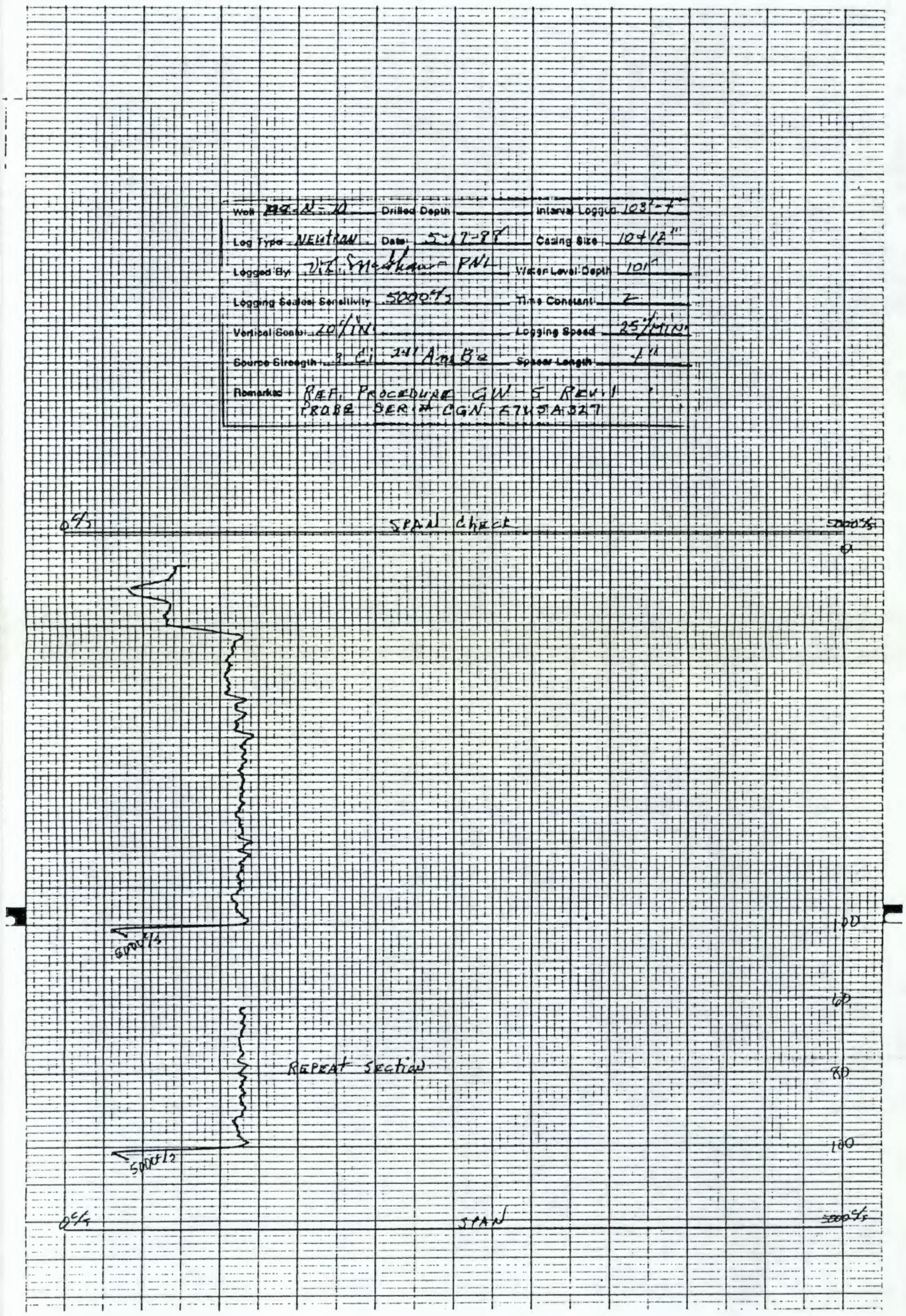
Logging Scales Sensitivity 500 c/s Time Constant 3

Vertical Scale 20'/in. Logging Speed 15'/min

Source Strength NA Spacer Length NA

Remarks: REF. PROCEDURE GW-6 REV. 2
PROBE SER # 4G2774A12




Well
Drilled Depth
Interval Logged
Log Type NEUTRON
Date
Casing Size
Logged By
Water Level Depth
Logging Scaler Sensitivity
Time Constant
Vertical Scale
Logging Speed
Source Strength
Spacer Length
Remarks
REF. PROCEDURE GW-5 REV. 1
PROBE SER. # CGN-
SPAN check
REPEAT SECTION
SPAN
100
80
60
40
20
0

APPENDIX B

AS-BUILT DIAGRAMS, DRILL LOGS, AND GEOPHYSICAL LOGS FOR WELLS DRILLED THIS QUARTER NEAR THE 216-A-36 CRIB

9 2 1 2 0 4 3 1 9

THIS PAGE INTENTIONALLY
LEFT BLANK

APPENDIX B

AS-BUILT DIAGRAMS, DRILL LOGS, AND GEOPHYSICAL LOGS FOR WELLS DRILLED THIS QUARTER NEAR THE 216-A-36 CRIB

This appendix contains drilling and completion information for wells 299-E17-14, 299-E17-15, 299-E17-16, 299-E17-17, and 299-E17-18 near the 216-A-36 Crib. The information is ordered for each well in the following manner:

1. As-Built Diagram
2. Drill Logs
3. Geophysical Logs.

9 2 1 2 5 4 0 3 2 0

THIS PAGE INTENTIONALLY
LEFT BLANK

WELL 299-E17-14

9 2 1 2 6 4 0 3 2 1

THIS PAGE INTENTIONALLY
LEFT BLANK

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-14 Geologist Karen R. Oster Page 1 of 3

Reviewed by V. L. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
141 8½" of 10" Carbon Steel		5		SANDY SILT
Casing (Removed)		10		SAND (C.-M.)
Cement Grout (30'-1.5')		15		SLIGHTLY GRAVELLY SAND
335' 1½" of 8" Carbon Steel		20		SAND (C.-M.)
Casing (Removed)		25		" (M.)
		30		" (C.-M.)
Granular Bentonite (298'-30')		35		" "
		40		" "
		45		" "
		50		SLIGHTLY GRAVELLY SAND
		55		SAND (C.-M.)
		60		" "
		65		SLIGHTLY GRAVELLY SAND
Centralizers		70		SAND (M.)
		75		SAND
		80		"
		85		"
Casing joints		90		"
		95		"
		100		"
		105		" (SILTY SAND @ 107')
		110		SAND
		115		"
		120		"
		125		"
		130		"

9221264 0322

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-14 Geologist Oster / Teel / Gilmore Page 2 of 3

Reviewed by W.L. McGlaun Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
Temporary 10" carbon steel		135		SAND
		140		"
		145		"
		150		"
		155		"
		160		"
		165		"
		170		
		175		Calcium Carbonate Cementing
		180		
		185		
		190		SLIGHTLY GRAVELLY SAND
		195		SAND
		200		
		205		
		210		
		215		
		220		
		225		
		230		Sandy Medium Gravel
		235		
		240		SILTY SAND
		245		SAND
		250		SILTY GRAVELLY SAND
		255		GRAVELLY SAND
		260		

A-1800-186 (3/87)

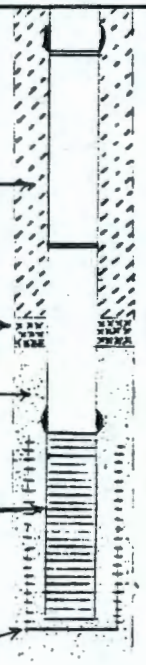
9211265403223

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299 E17 14 Geologist Gilmore Page 3 of 3

Reviewed by D. L. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		270		SAND
		275		
8-20 mesh granular bentonite		280		
seal (298-20')		285		SILTY SAND
		290		SILT intercalated w/ Sand 295-299'
Bentonite Pellet Seal		295		SANDY SILTY GRAVELLY SAND
(301-298')		300		
10-20 mesh sand pack (333-301')		305		
		310		SANDY GRAVEL
20' 7½" long, 4" dia., 20 slot		315		SILTY SANDY GRAVEL
stainless steel screen		320		SANDY GRAVEL
		325		
20' long, 8" telescoping screen:		330		Total Depth 333'
(331' 5 3/4" to 311' 7 3/4")				
upper 10' is 30 slot and lower				
10' is 10 slot.				

A-1800-186 (3/87)

9 2 1 2 6 4 0 3 2 4

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-M02	Well Number: 299 E 17 14	Computer Number: NA	Project or Work Order No.: 216-A-36B Crib
	Date: 3/22/88		Depth: 0' To 10'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Setting Rig up after steam cleaning	1300	
				Drilling	1705	
	5'	D	moist	SANDY SILT 30% VFS, 70% Silt, very well sorted, 50% BSLT, 50% Silica-rich, round - subrounded, moderate rxn in HCl, unconsolidated - slight consolidation Moist & Geol smpl	1715	Drill rate =
	10'	D	moist	SAND, 5% gravel, 90% sand, 5% silt. 1% m.p., 1% f.p., 3% v.f.p., 5% v.c.s., 10% c.s., 35% m.s., 5% f.s., 5% v.f.s., 5% silt. Well to Moderately Sorted. Gravels are 65% basalt, 10% granite, 5% quartzite and other metamorphic sand are subangular to subrounded. Sands are 60% basalt, 20% quartzite, 10% clear quartz, 5% red and orange rock fragments, 5% feldspar, Trace mica, and are very angular to subrounded. Dry Color is light gray (5Y7/2). Slight reaction in HCl. Not Consolidated. Trace organics & [illegible] sample. Moisture and geologic samples taken.	1730	Drill rate =

REMARKS:
Ft 10'
DB 10

Karen R. Oster
3/22/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/23/88	22-14102	Depth 10' To 20'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
						Driller is Louis Watkins
					0700	Started drilling
19' 10¾" of 10"				Total 10" Carbon Steel Casing = 19' 10¾"	0745	Add 19' 10¾" of 10" Casing
	15'	D	Moist	SLIGHTLY GRAVELLY SAND; 10% gravel, 85% sand, 5% silt.	0900	Sample / Core barrel
				Trace c.p., 1% m.p., 2% f.p., 7% v.f.p., 10% v.c.s., 35%		Drill rate =
				c.s., 25% m.s., 10% f.s., 5% v.f.s., 5% silt. Moderately		
				Sorted. Gravels are 75% basalt, 10% granite, 5% quartzite,		
				5% caliche, 5% metamorphics and other lithologies, and are		
				very angular to subangular. Sands are 50% basalt, 20%		
				clear quartz, 10% feldspar, 10% quartzite, 5% rock		
				fragments (red/orange), 5% mica, and are very angular		
				to subangular. Dry Color is light gray (5Y 7/2). Strong		
				reaction in 10% HCl. slightly Consolidated. Less sorting		
				and basalt than previous sample. Contains caliche		
				and some sand lumps cemented with $CaCO_3$ and rust stains		
				Geologic and moisture samples are representative.		
	19'-20'	D	Very Moist	SAND (coarse); 5% gravel, 90% sand, 5% silt.	0920	Sample / Core barrel
				Trace m.p., 1% f.p., 4% v.f.p., 15% v.c.s., 30% c.s., 25% m.s., 10% f.s.,		Drill rate =

REMARKS:

Kevin R. Oster
3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 220	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/23/88	22-14102	Depth 20' To 25'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				10% v.f.s., 5% silt. Moderately to Poorly Sorted. Gravels	0930	Stopped drilling
				are 75% basalt, 15% granite, 5% quartzite, 5% meta-	0945	Resume drilling
				morphics and other lithologies (green includes rock fragments), and		
				are very angular to subangular. Sands are 40%	1010	stopped drilling
				basalt, 20% quartz, 10% clear quartz, 10% feldspar, 10%	1015	resume drilling
				quartzite, 5% mica, 5% rock fragments (orange/green)		
				and are very angular to subangular. Dry Color is		
				light gray (5Y 7/2). Strong reaction in 10% HCl. Slightly		
				Consolidated. 2" layer of v.f. sand and silt @ 20' stays		
				together. No visable Caliche chunks or cemented		
				lumps but iron stains are still present. Less sorting		
				and basalt than previous sample. Moisture and		
				geologic samples are representative.		
	24'-25'	D	Moist	SAND (MEDIUM). 99% sand, 1% silt.	1020	Sample / Core barrel
				Trace v.c.s., 5% c.s., 90% m.s., 3% f.s., 1% v.f.s., 1% silt.		Drill rate =
				Very Well Sorted. Sands are 40% basalt, 20% quartz	1045	stopped drilling
				10% clear quartz, 10% feldspar, 10% quartzite, 10%		
				rock fragments (orange/green) Trace mica and are very angular		

REMARKS:

Karen P. Oster
3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5 85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/23/88	22-14102	Depth 25' To 30'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				to subangular. Dry Color is light olive gray (5Y 6/2). Very slight reaction in 10% HCl. Decrease grain size and reactivity from previous sample, better sorting. Unconsolidated. Moisture, Geologic and Chemical samples are representative.		
	29'-30'	D	Moist	SAND (MEDIUM TO COARSE). Trace gravel, 99% sand, 1% silt. Trace v.c.p., 5% v.c.s., 60% c.s., 30% m.s., 3% f.s., 1% v.f.s., 1% silt. ~~Very well to~~ Well sorted. Gravels are 100% basalt and are very angular. Sands are 40% basalt, 30% quartz, 10% clear quartz, 10% quartzite, 10% feldspar, 10% rock fragments (orange/green), Trace mica. and are very angular to subangular. Dry Color is light gray (5Y 7/2). Moderate reaction in 10% HCl, Unconsolidated. Increase in grain size, reactivity in HCl, decrease in sorting from previous sample. Moisture and Geologic samples are representative.	1055	Sample / Core barrel Drill rate =
19'10 3/4" of 10" + 9'11 1/2" = 29'10 1/4"				Total 10" Carbon steel Casing = 29' 10 1/4"	1100	Add 9'11 1/2" of 10" Casing
					1140	Resume drilling

REMARKS:

Karen R. Oster
3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/23/88	22-14102	Depth 30' To 40'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1200	Lunch
					1235	Resume drilling
	34'-35'	D	Moist	SAND (MEDIUM TO COARSE), 1% gravel, 98% sand 1% silt.	1245	Sample/Core barrel
				Trace f.p., 1% v.f.p., 2% v.c.s., 50% c.s., 40% m.s., 5% f.s.,		Drill rate =
				1% v.f.s., 1% silt. ~~[illegible]~~ Well sorted. Gravels are		
				100% basalt and are very angular. Sands are 45% basalt		
				20% quartz, 10% quartzite, 10% feldspar, 5% clear quartz, 10%		
				rock fragments (orange/green), Trace mica. and are very		
				angular to subangular. Dry Color is light olive gray (5Y 6/2).		
				Moderate reaction in 10% HCl. Unconsolidated. Same as		
				previous sample except slightly finer grained. Geologic		
				and Moisture samples are representative.		
29' 10 1/4" of 10" + 9' 11"					1300	Add 9' 11" of 10" Casing
39' 9 1/4" of 10"				Total of 10" Carbon Steel Casing = 39' 9 1/4"		
					1345	Resume drilling
	39'-40'	D	Moist	SAND (MEDIUM TO COARSE), 1% gravel, 98% sand, 1% silt	1400	Sample/core barrel
				1% v.f.p., 4% v.c.s., 50% c.s., 40% m.s., 3% f.s., 1% v.f.s., 1% silt.		Drill rate =
				~~[illegible]~~ Well sorted. Gravels are 60% basalt, 40%		

REMARKS:

Karen R. Oster
3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By K.R.Oster	Rig B.E.22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/23/88	22-14102	Depth 40' To 45'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				quartz and are very angular. Sands are 45% basalt, 20% quartz, 10% quartzite, 10% feldspar, 5% clear quartz, 10% rock fragments (orange/green), Trace mica, and are very angular to subangular. Dry Color is light olive gray (5Y6/2). Moderate reaction in 10% HCl. Unconsolidated. Same as previous sample except slightly coarser grained. Geologic and moisture samples are representative.		
	44'-45'	D	Moist	SAND (MEDIUM TO COARSE), 1% gravel, 98% sand, 1% silt. Trace f.p., 1% v.f.p., 9% v.c.s., 45% c.s., 40% m.s., 3% f.s., 1% v.f.s., 1% silt. ~~[illegible]~~ Well Sorted. Gravels are 75% basalt, 25% granite and are very angular. Sands are 40% basalt, 20% quartz, 10% quartzite, 10% feldspar, 5% clear quartz, 5% mica, 10% rock fragments (orange/green). and are very angular to subangular. Dry Color is light olive gray (5Y6/2) Slight reaction in 10% HCl. Unconsolidated. Same as previous sample except slightly coarser grained and increase in mica, less reactive. Geologic,	1430	Sample/Core barrel Drill rate =

REMARKS:

Karen R. Oster
3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 220	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/23/88	22-14102	Depth 45' To 50'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Moisture and Chemical Samples are representative.		
	49'-50'	D	Moist	SLIGHTLY GRAVELLY SAND; 8% gravel, 91% sand 1% silt.	1450	Sample /Core barrel
				Trace m.p., 1% f.p., 7% v.f.p., 15% v.c.s., 40% c.s., 30% m.s.,		Drill rate =
				5% f.s., 1% v.f.s., 1% silt. Well Sorted to Moderately		
				Sorted. Gravels are 70% basalt, 20% quartz, 5% feldspar,		
				5% rock fragments and are very angular to subangular.		
				Sands are 40% basalt, 20% quartz, 10% quartzite, 10%		
				feldspar, 5% clear quartz, 5% mica, 10% rock fragments		
				(orange/green). and are very angular to subangular. Dry		
				Color is light gray (5Y 7/2). Slight reaction in 10% HCl.		
				Unconsolidated. Similar to previous sample except increase		
				in grain size, decrease in basalt, sorting and lighter color.		
				Geologic and moisture samples are representative.		
39' 9¼" of 10"					1500	Add 9' 3½" of 10" Casing
9' 3½"						
49' 0¾" of 10"				Total of 10" Carbon Steel Casing = 49' 0¾"		
					1550	Drive Casing
					1555	Resume drilling

REMARKS:

Karen R. Oster
3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By K.R Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Cr16
	Date 3/23/88	22-14102	Depth 50' To 60'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	54'-55'	D	Moist	SAND (COARSE TO MEDIUM), 3% gravel, 95% sand, 2% silt. Trace f.p., 3% v.f.p., 12% v.c.s., 40% c.s., 35% m.s., 5% f.s., 3% v.f.s., 2% silt. Well to Moderately Sorted. Gravels are 85% basalt, 10% quartz, 5% feldspar, and are very angular. Sands are 40% basalt, 20% quartz, 10% quartzite, 10% feldspar, 5% clear quartz, 5% mica, 10% rock fragments (orange/green), and are very angular to subrounded. Dry color is light gray (5Y 7/1). Strong reaction in 10% HCl. Slightly Consolidated. Similar to previous sample except decrease in grain size, basalt, increase in reactivity. Contains some lumps of sand cemented by $CaCO_3$ and some iron stains. Geologic and Moisture samples are representative.	1610	Sample / Core barrel Drill rate =
	59'-60'	D	Moist	SAND (COARSE TO MEDIUM), 5% gravel, 93% sand, 2% silt. Trace m.p., 1% f.p., 4% v.f.p., 10% v.c.s., 40% c.s., 35% m.s., 5% f.s., 3% v.f.s., 2% silt. Well to Moderately Sorted. Gravels are 80% basalt, 10% quartz, 5% feldspar, 5% metamorphics and are very angular to subangular.	1630	Sample / Core barrel Drill rate = Stopped drilling

REMARKS:

Karen R. Oster
3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B-Crib.
	Date 3/23/88	22-14102	Depth 60' To 60'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Sands are 45% basalt, 20% quartz, 10% quartzite,		
				10% feldspar, 5% clear quartz, 10% rock fragments (orange/		
				green). Trace mica, and are very angular to subrounded		
				Dry Color is light gray (5Y 7/2). Moderate reaction in		
				10% HCl., Uncoreolidated. Similar to previous sample		
				except increase in grain size, decrease in mica and		
				HCl reactivity, no visable $CaCO_3$ cementing. Geologic,		
				and Moisture samples are representative.		
49' 0 3/4" of 10"					1635	Add 9'7" of 10" Casing
9' 7"						
58' 7 3/4" of 10"				Total 10" Carbon Steel Casing = 58' 7 3/4"		
					1715	Drive Casing
					1730	Done for day

REMARKS: Ft 50' Casing 58' 7 3/4"
DB 60'

Karen R. Oster
3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By L.R. Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/24/88	22-14102	Depth 60' To 65'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
58' 7 3/4" of 10"					0720	Started drilling
					0735	stopped drilling
					0820	Resumed drilling
	64'-65'	D	Slightly Moist	SLIGHTLY GRAVELLY SAND; 10% gravel, 89% sand, 1% silt.	0830	Sample/Core barrel
				1% m.p., 1% f.p., 8% v.f.p., 15% v.c.s., 40% c.s., 30% m.s., 3% f.s.,		Drill rate:
				1% v.f.s, 1% silt. Well to Moderately Sorted. Gravels are	0910	stopped drilling
				70% basalt, 15% granite, 5% quartz, 5% feldspar, 5%	0920	Resumed drilling
				rock fragments, Trace caliche, and are very angular to		
				subrounded. Sands are 40% basalt, 20% quartz, 10% quartzite,		
				10% feldspar, 5% clear quartz, 5% mica, 10% rock fragments		
				(orange/green), and are very angular to subrounded. Dry		
				Color is light gray (5Y 7/2). Slight reaction in 10% HCl.		
				Unconsolidated. Similar to previous sample except increase		
				in grainsize, mica content; decrease in basalt content,		
				HCl reactivity, contains a few caliche chips in gravel.		
				Geologic, Moisture and chemical samples are		
				representative.		

REMARKS:

Lauren R. Oster
3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 214-A-36B Crib.
	Date 3/24/88	22-14102	Depth 65' To 70'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	69'-70'	D	Moist	SAND(MEDIUM); 1% gravel, 98% sand, 1% silt.	0985	Sample/Core barrel
				1% v.f.p., 2% v.c.s., 20% c.s., 70% m.s., 5% f.s., 1%, v.f.s, 1% silt.		Drill rate =
				Well Sorted. Gravels are 70% basalt, 20% quartz, 10%	0935	Stopped drilling
				quartzite, and are very angular to subrounded. Sands		
				are 40% basalt, 20% quartz, 10% quartzite, 10% feldspar,		
				5% clear quartz, 5% mica, 10% rock fragments (orange/		
				green), and are very angular to subangular. Dry Color is light olive gray (5Y 6/2). Moderate		
				reaction in 10% HCl. Unconsolidated. Similar to previous		
				sample except decrease in grain size, increase in HCl		
				reactivity. Geologic and Moisture Samples are		
				representative.		
58' 7 3/4" of 10"					0945	Add 9'7" of 10" Casing
9' 7"						
68' 2 3/4" of 10"				Total 10" Carbon Steel Casing = 68' 2 3/4"		
					1020	Drive Casing
					1025	Resumed drilling
					1030	Stopped drilling
					1035	Resumed drilling

REMARKS:

Karen R. Oster
3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: K.R. Oster	Rig: B.E. 22W	Well Number: 299-E17-14	Computer Number: N/A	Project or Work Order No.: 216-A-36B Crib
	Date: 3/24/88	22-14102	Depth: 70' To 80'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	74'-75'	D	Moist	SAND(MEDIUM); 2% gravel, 96% sand, 2% silt.	1055	Sample/Core barrel
				2% v.f.p., 2% v.c.s., 25% c.s., 60% m.s., 7% f.s., 2% v.f.s., 2% silt.		Drill rate =
				Well to Moderately Sorted. Gravels are 70% basalt,	1110	Stopped drilling
				20% quartz, 10% quartzite, and are very angular to	1115	Resumed Drilling
				subangular. Sands are 35% basalt, 25% quartz, 10%		
				quartzite, 10% feldspar, 5% clear quartz, 5% mica, 10% rock		
				fragments (orange/green), and are very angular to subangular.		
				Dry Color is light gray (5Y 7/2). Strong reaction in 10% HCl.		
				Same as previous sample except decrease in basalt,		
				sorting, and increase in HCl reactivity. Unconsolidated.		
				Moisture and Geologic Samples are representative.		
	79'-80'	D	Moist	SAND(MEDIUM); 1% gravel, 98% sand, 1% silt.	1120	Sample/Core barrel
				1% v.f.p., 1% v.c.s., 20% c.s., 65% m.s., 10% f.s., 2% v.f.s., 1% silt.		Drill rate =
				Well to Moderately Sorted. Gravels are 75% basalt, 20%		
				quartz, 5% quartzite, and are very angular. Sands are		
				35% basalt, 25% quartz, 10% quartzite, 10% feldspar, 5%		
				clear quartz, 5% mica, 10% rock fragments (orange/green),		
				and are very angular to subangular. Dry Color is light gray (5Y 7/2).		

REMARKS:

K.R. Oster
3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 2000	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/24/88	22-14102	Depth 80' To 85'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Slight reaction in 10% HCl. Unconsolidated. Same as previous		
				sample except finer grained, decrease in HCl reactivity.		
				Geologic and Moisture Samples are representative.		
108' 2¾" of 10"					1125	Add 10' 3½" of 10" Casing
~~10' 3½"~~				Total of 10" Carbon Steel Casing = 78' 6¼"		
~~78' 6¼" of 10"~~						
					1200	Lunch
					1230	Resume drilling
	84'-85'	D	Moist	SAND (MEDIUM); 1% gravel, 98% sand, 1% silt.	1310	Sample / Core barrel
				1% v.f.p., 10% v.c.s., 30% c.s., 55% m.s., 2% f.s., 1% v.f.s., 1% silt.		Drill rate =
				Well to Moderately Sorted. Gravels are 90% basalt, 10%		
				quartz, and are very angular. Sands are 35% basalt,		
				25% quartz, 10% quartzite, 10% feldspar, 10% clear quartz,		
				10% rock fragments (orange / green), Trace mica, and		
				are very angular to subangular. Dry Color is light olive		
				gray (5Y 6/2). Strong reaction in 10% HCl. Unconsolidated.		
				Same as previous sample except; increase in grain size,		
				basalt (in gravels), and HCl reactivity, decrease in mica.		
				Geologic, Moisture, and Chemical samples are representative.		

REMARKS:

K.R. Oster
3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R.Oster	Rig B.E.2200	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 2116-A-36B Crib
	Date 3/24/88	22-14102	Depth 85' To 95'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
78'6¼" of 10"					1315	Add 7'9" of 10" Casing
7'9"						
86'3¼" of 10"				Total of 10" Carbon Steel Casing = 86'3¼".		
					1350	Drive Casing
					1355	Resume drilling
	84'-90'	D	Slightly Moist	SAND (MEDIUM); Trace gravel, 98% sand, 2% silt.	1420	Sample /Core barrel
				Trace v.f.p., 5% v.c.s., 30% c.s., 55% m.s., 5% f.s., 3% v.f.s.,		Drill rate =
				2% silt. Well Sorted. Gravels are 90% basalt, 10% quartz,		
				and are very angular. Sands are 35% basalt, 25%		
				quartz, 10% quartzite, 10% feldspar, 10% clear quartz, 10%		
				rock fragments (orange/green), Trace mica, and are		
				very angular to subangular. Dry Color is light gray		
				(5Y 7/2). Strong reaction in 10% HCl. Unconsolidated.		
				same as previous sample except decrease in grain size.		
				Geologic and Moisture samples are representative.		
	90'-95'	D	Moist	SAND (COARSE TO MEDIUM) 5% gravel, 93% sand, 2% silt.	1440	Sample /Core barrel
				Trace f.p., 5% v.f.p., 5% v.c.s., 40% c.s., 40% m.s., 5%		Drill rate =
				f.s., 3% v.f.s., 2% silt. Well Sorted. Gravels are 70%		
				basalt, 20% quartz, 5% feldspar, 5% rock fragments, and		

REMARKS:

Kevin R. Oster
3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

1545 99'-100'

DRILL LOG	By K.R. Oster	Rig B.E. 2210	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B-Crib
	Date 3/24/88	22-14102	Depth 95' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				are very angular to subangular. Sands are 35% basalt,		
				25% quartz, 15% quartzite, 10% feldspar, 5% clear quartz,		
				10% rock fragments (orange/green), trace mica, and are		
				very angular to subangular. Dry Color is light gray (5Y 7/2)		
				Very Strong reaction in 10% HCl, Unconsolidated. Same as		
				previous sample except increase in grain size, quartzite,		
				and HCl reactivity. Geologic and Moisture samples are		
				representative. Slight Chemical Smell.		
86'3¼" of 10"					1445	Add 9' of 10" Casing
9'						
95'3¼" of 10"				Total of 10" Carbon Steel Casing = 95'3¼"		
					1525	Drive Casing
					1530	Resume drilling
				The H-Nu (calibrated with benzene) with the 11.7 probe was used in hole and	1535	Used H-Nu in casing.
				it reads ~30 p.p.m. Drilled Depth = 97'		
	99'-100'	D	Slightly Moist	SAND (COARSE TO MEDIUM). 4% gravel, 94% sand, 2% silt.	1545	Sample / Core barrel
				Trace f.p., 4% v.f.p., 5% v.c.s., 35% c.s., 45% m.s., 5% f.s.,		Drill rate =
				4% v.f.s., 2% silt. Well to Moderately Sorted. Gravels are	1600	Stop drilling
				70% basalt, 15% quartz, 10% quartzite, 5% feldspar and are		

REMARKS:

Karen R. Oster
3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/24/88	22-14102	Depth 100' To 103'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				very angular to subangular. Sands are 35% basalt, 25%		
				quartz, 15% quartzite, 10% feldspar, 5% clear quartz, 10%		
				rock fragments (orange/green). Trace Mica, and are very angular to subangular. Dry Color is light gray		
				(5Y 7/2). Moderate reaction in 10% HCl., Unconsolidated.		
				Same as previous sample except decrease in grain size,		
				HCl reaction. Sample smells like chemicals-possibly		
				ammonia. Geologic and Moisture samples are representative.		
95' 3¼" of 10"						
9' 6"					1610	Add 9'6" of 10" Casing
104' 9¼"				Total of 10" Carbon Steel Casing = 104' 9¼"	1645	Resume drilling
				Using Ammonia dräger tube - reads 30 ppm w/5 pumps	1650	Stop drilling Used dräger tube
				Measured inside hole, Drilled Depth = 101'		
					1700	Resume drilling
				Used dräger tube Ammonia at drillers position - no reading	1705	Stop drilling Dräger tube
				Used dräger tube Ammonia inside hole reads >30 ppm w/5 pumps		
				Drilled Depth = 103'	1715	Pick-up
					1730	Done for day

REMARKS: Total Footage Today = 43'
Depth to Bottom = 103'
Total Casing = 104' 9¼"

Karen R. Oster
3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Ch16
	Date 3/25/88	22-14102	Depth 103' To 105'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104'9¼" of 10"				None detectable at drillers station, < 2ppm over hole.	0700	Dräger: Ammonia
					0705	Started drilling
					0735	Weld bead on core barrel
					0800	Resume drilling
	104'-105'	D	Hoist	SAND (COARSE TO MEDIUM), 1% gravel, 97% sand, 2% silt.	0815	Sample/Core barrel
				1% v.f.p., 4% v.c.s., 40% c.s., 45% m.s., 5% f.s., 3% v.f.s.,		Drill rate=
				2% silt. Well Sorted. Gravels are 70% basalt, 10% granite,		
				10% quartzite, 10% caliche cemented sand clasts, and are		
				very angular to subrounded. Sands are 30% basalt, 20%		
				quartz, 15% quartzite, 10% feldspar, 10% clear quartz, 5%		
				mica, 10% rock fragments (orange/green), and are very		
				angular to subrounded. Dry Color is light gray (5Y 7/2).		
				Very strong reaction in 10% HCl. Unconsolidated except		
				for the caliche clasts which are very hard. Similar		
				to previous sample with increasing HCl reactivity		
				and mica content, decrease in basalt and grain size.		
				Geologic, Chemical, and Moisture samples are represented here.		
				None @ drillers station; < 2ppm @ top of hole.	0820	Dräger: Ammonia

REMARKS:

Karen R. Oster
3/25/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/25/88	22-14102	Depth 105' To 110'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	107'	D	Very Moist	SILTY SAND; 75% sand, 25% silt.	0835	Silty Sandy Layer.
				Trace vcs, cs, ms, 25% f.s., 50% v.f.s., 25% silt., Well to		4"-5" thick.
				Moderately Sorted, Sands are 30% basalt, 60% quartz-rich,		
				10% mica, and are very angular. Dry Color is light gray		
				(5Y 7/2). Moderate reaction in 10% HCl. Extra sample		
				bagged for geology and jarred for Chemical sample.		
	109'-110'	D	Moist	SAND (COARSE TO MEDIUM); 2% gravel, 96% sand, 2% silt.	0850	Sample / Core barrel
				2% v.f.p., 8% v.c.s., 40% c.s., 35% m.s., 10% f.s., 3% v.f.s., 2% silt.		Drill rate =
				Well to Moderately Sorted. Gravels are 70% basalt,		
				10% quartz, 10% quartzite, 5% granite, 5% mica, and		
				are very angular to subangular. Sands are 30% basalt,		
				20% quartz, 15% quartzite, 10% feldspar, 10% clear		
				quartz, 10% mica, 5% rock fragments (orange / green)		
				and are very angular to subrounded. Dry Color is light		
				gray (5Y 7/2). Very Strong reaction in 10% HCl., Unconsolidated		
				Same as previous sample except increase in grain size		
				and poorer sorting. Geologic and Moisture samples are		
				representative. Strong Ammonia smell; ~10ppm over bucket.	0855	Dräger: Ammonia

REMARKS: None detected over casing though.

Karen R. Oster
3/25/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.2210	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B-Crib
	Date 3/25/88	22-14102	Depth 110' To 115'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104'9¼" of 10" 9'7½"					0910	Add 9'7½" of 10" Casing
114'4¾" of	10"			Total 10" Carbon Steel Casing = 114'4¾"		
					1000	Drive Casing
					1005	Resume drilling
	114'-115'	D	Moist	SAND (COARSE TO MEDIUM); 2% gravel, 96% sand, 2% silt.	1045	Sample / Core barrel
				2% v.f.p., 8% v.c.s., 45% c.s., 30% m.s., 10% f.s., 3% v.f.s.,		Drill rate =
				2% silt. Well to Moderately Sorted. Gravels are 60%		
				basalt, 20% quartz, 10% quartzite, 10% metamorphics,		
				and are very angular to subangular. Sands are 30%		
				basalt, 20% quartz, 15% quartzite, 10% feldspar, 10% clear		
				quartz, 10% mica, 5% rock fragments (orange / very few green), and		
				are very angular to subangular. Dry Color is light gray		
				(5Y 7/2). Very Strong reaction in 10% HCl. Unconsolidated.		
				Same as previous sample with a slight increase in grain		
				size. Geologic and Moisture samples are representative.		
				Ammonia smell still strong on sample.		
114'4¾" of 10" 9'5"					1120	Add 9'5" of 10" Casing
123'9¾" of 10"				Total 10" Carbon Steel Casing = 123'9¾"		

REMARKS:

Karen R. Oster
3/25/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E 220	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B-Crib
	Date 3/25/88	22-14102	Depth 115' To 125'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1155	Drive Casing
					1200	Lunch
					1230	Work on Rig
					1415	Resume drilling
	119'-120'	D	Very Moist	SAND(COARSE TO MEDIUM); 1% gravel, 97% sand, 2% silt.	1450	Sample /Core barrel.
				1% v.f.p., 9% v.c.s., 35% c.s., 40% m.s., 10% f.s., 3% v.f.s.,		Drill rate=
				2% silt. Well to Moderately Sorted. Gravels are 60%		
				basalt, 20% quartz, 10% quartzite, 10% metamorphics		
				and are very angular. Sands are 30% basalt, 20% quartz		
				15% quartzite, 10% feldspar, 10% clear quartz, 10% mica,		
				5% rock fragments (orange/green), and are very angular		
				to subrounded. Dry Color is light gray (5Y 7/2). Strong		
				reaction in 10% HCl. Unconsolidated. Same as previous		
				sample with slight decrease in grain size and		
				HCl reactivity. Ammonia smell still strong on sample.		
				Geologic, and moisture samples are representative.		
	124'-125'	D	Very Moist	SAND(MEDIUM); Trace gravel, 98% sand, 2% silt.	1520	Sample/Core barrel
				Trace v.f.p., 5% v.c.s., 20% c.s., 60% m.s., 15% f.s., 3% v.f.s., 2% silt.		Drill rate=

REMARKS:

Karen R. Oster
3/25/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib.
	Date 3/25/88	22-14102	Depth 125' To 130'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Well to moderately sorted. Sands are 30% basalt, 20% quartz, 15% quartzite, 10% feldspar, 10% clear quartz, 10% mica, 5% rock fragments (orange/green), and are very angular to subrounded. Dry Color is light gray (5Y 7/2). Strong reaction in 10% HCl. Unconsolidated. Same as previous sample with a decrease in grain size. Sample still smells strongly of Ammonia. Geologic, Moisture, and Chemical Samples are representative.		
	129'-130'	D	Moist.	SAND (COARSE TO MEDIUM); 5% gravel, 93% sand, 2% silt. 2% f.p., 3% v.f.p., 15% v.c.s., 35% c.s., 30% m.s., 10% f.s., 3% v.f.s., 2% silt. Moderately sorted. Gravels are 70% basalt, 10% granite, 10% quartzite, 10% quarte and are very angular to subrounded. Sands are 35% basalt, 20% quartz, 15% quartzite, 10% feldspar, 10% clear quartz, 5% mica, 5% rock fragments (orange/green), and are very angular to subrounded. Dry Color is light olive gray (5Y 6/2). Very strong reaction in 10% HCl Unconsolidated. Similar to previous sample,	1545	Sample/Core barrel Drill rate =

REMARKS:

Karen R. Oster
3/25/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Cr16
	Date 3/25/88	22-14102	Depth 130' To 135'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Except increase in grain size, basalt content, and		
				HCl reactivity, decrease in mica, darker color.		
				Ammonia smell is still present. Geologic and		
				Moisture samples are representative.		
	134'-135'	D	Moist	SAND (COARSE TO MEDIUM); 1% gravel, 97% sand, 2% silt.	1615	Sample /Core barrel
				1% v.f.p., 4% v.c.s., 35% c.s., 45% m.s., 10% f.s., 3% v.f.s., 2% silt,		Drill rate =
				Well to Moderately Sorted. Gravels are 70% basalt,		
				20% quartz, 10% quartzite, and are very angular. Sands		
				are 35% basalt, 20% quartz, 15% quartzite, 10% feldspar,		
				10% clear quartz, 5% mica, 5% rock fragments (orange/		
				green) and are very angular to subrounded. Dry Color		
				is light olive gray (5Y 6/2) Strong reaction in 10% HCl.		
				Unconsolidated. Same as previous sample with a		
				decrease in grain size. Ammonia smell still present.		
				Geologic and moisture samples are representative.		
123' 9 3/4" of 10"					1620	Add 9' 8 3/4" of 10" Casing
9' 8 3/4"				Total 10" Casing = 133' 6 1/2"	1655	Drive Casing
133' 6 1/2"					1700	Resume drilling.

REMARKS:

Karen R. Oster
3/25/88

Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 220	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib.
	Date 3/25/88	22-14102	Depth 135' To 140'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	139'-140'	D	Moist.	Sample Taken and jarred for geologic and moisture Samples - left description for Monday.	1725	Sample /Corebarrel Drill rate =

REMARKS: Total Footage for today = 37' Total Casing = 133' 6½"
Depth to Bottom: 140'

Karen R. Oster
3/25/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/28/88	22-14102	Depth 140' To 145'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	139'-140'	D	Moist	SAND(MEDIUM); 1% gravel, 96% sand, 3% silt.	(1725)	Description of Sample
133'6½" of 10"				1% v.f.p., 1% v.c.s., 5% c.s., 70% m.s., 15% f.s., 5% v.f.s., 3% silt.		taken Friday 3/25/88
				Well Sorted. Gravels are 75% basalt, 25% quartz, and	0700	Safety Meeting
				are very angular. Sands are 30% basalt, 20% quartz, 15%	0745	Mark cable
				quartzite, 10% feldspar, 10% clear quartz, 10% mica, 10%	0750	Start drilling
				rock fragments (mostly orange/green) and are very angular to subrounded.		
				Dry Color is light gray (5Y 7/2). Moderate reaction in 10% HCl.		
				Unconsolidated. Same as previous sample with a decrease		
				in grain size and HCl reactivity. Geologic and Moisture		
				samples are representative. Ammonia smell still present.		
	144'-145'	D	Moist	SAND(MEDIUM); 1% gravel, 97% sand, 2% silt.	0815	Sample/Core barrel
				Trace f.p., 1% v.f.p., 4% v.c.s., 10% c.s., 65% m.s., 15% f.s., 3%		Drill rate =
				v.f.s., 2% silt. Well to Moderately sorted. Gravels are		
				85% basalt, 10% quartz, and 5% mica and are very		
				angular to subangular. Sands are 30% basalt, 20%		
				quartz, 15% quartzite, 10% feldspar, 10% clear quartz,		
				10% mica, 10% rock fragments (mostly orange/green), and are		
				very angular to subrounded. Dry Color is light gray (5Y 7/2).		

REMARKS:

Karen R. Oster
3/28/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-86)

DRILL LOG	By L.R. Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/28/88	#22-14102	Depth 145' To 150'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Slight reaction in 10% HCl. Unconsolidated. Ammonia		
				smell still present but weaker. Same as previous		
				sample except increase in grain size, decrease in		
				sorting, and HCl reactivity. Chemical sample scooped		
				out of bucket into plastic jar the jar is taped		
				with white tape, labled and put in cooler with ice.		
				Chemical, Moisture and Geologic Samples are		
				representative.		
133' 6½" of 10"					0825	Add 8'2" of 10" Casing
8' 2"						
141' 8½" of 10"				Total of 10" Carbon Steel Casing = 141' 8½"		
					0900	Instal new generator.
					0935	Resume drilling
	149'-150'	D	Slightly Moist	SAND (MEDIUM); 1% gravel, 97% sand, 2% silt	1020	Sample / Core barrel
				1% v.f.p., 9% v.c.s., 20% c.s., 60% m.s., 5% f.s., 3% v.f.s., 2% silt		Drill rate =
				Well Sorted. Gravels are 80% basalt, 15% quartz, 5%		
				quartzite, and are very angular to subangular. Sands		
				are 30% basalt, 20% quartz, 15% quartzite, 10% feldspar,		
				10% clear quartz, 10% mica, 10% rock fragments (mostly green / orange) and are		

REMARKS:

Lauren R. Oster
3/28/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By K.R. Oster	Rig B.E. 2200	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/28/88	22-14102	Depth 150' To 150'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				very angular to subrounded. Dry Color is light gray (5Y 7/2)		
				Strong reaction in 10% HCl., Unconsolidated., Ammonia smell		
				still present but seems weaker. Same as previous sample		
				with increase in grain size, and HCl reactivity. Geologic		
				and Moisture samples are representative.		
141'8½" of 10"					1030	Add 6'3" of 10" Casing
6'3"						
147'11½" of 10"				Total of 10" Carbon Steel Casing = 147' 11½".		
					1130	Change to smaller Core barrel.
					1200	Lunch
					1230	Measure 8" Casings.
20'6" of 8"					1300	Start running 8" Casing
+19'9¼"						
40'3¼" of 8"						
+19'5½"						
59'8¾" of 8"						
+19'7¼"						
79'4" of 8"						
+19'4½"						
98'8½" of 8"						
+20'2¼"				Total of 8" Carbon Steel Casing = 118'10¾"		
118'10¾" of 8"						
					1725	Done for day

REMARKS: Drilled Depth = 150' Total 10" Casing = 141'8½"
Total Drilled Today = 10' Total 8" Casing = 118'10¾"

Karen R. Oster
3/28/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By A.P. Oster	Rig B.E. 22W	Well Number 299-E17-14	Computer Number N/A	Project or Work Order No. 216-A-36-B Crib
	Date 3/29/88	22-14102	Depth 150' To 150'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
118' 10 3/4"				Steam containing Ammonia is rising from well	0715	Dräger Tube = ½ pump
20' 1"				Dräger tube: If n = 5 then Ammonia >30ppm; but N = ½ so		pegged it.
138' 11 3/4"				Ammonnia = > 300ppm - WHC Respitory personel		
19' 8"				were notified and Poly test tube was used with	0735	
158' 7 3/4"				Negative results.		
				WHC Resp. Protection personel tested with dräger	0750	
				tube and got Ammonia = 400 ppm over well head		
				Driller will be on fresh air while welding; Ammonia = 5ppm		
			~1'	downwind from well head so if wind blows towards		
				controls a cartridge mask will be used.		
				Casing added today: 20' 1", 19' 8"		
				WHC Resp. Protection personel tested with dräger tube and	1245	
				found ammonia concentrations between 80 and 120ppm between		Driller says 8" core
				the 8" and 10" casing at the well head. Driller only needs to be on		barrel has been steam
				fresh air while welding. Driller is still upwind of the well head.		cleaned. It looks clean
						but cannot verify

REMARKS:

3/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 22-V1 22-14102	Well Number 299-E17-14	Computer Number NA	Project or Work Order No.
	Date 3-29-88		Depth 150' To 165'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
158' 7 3/4"					1330	Began drilling
	155'	D	Moist	SAND 10% VCS, 20% CS, 40% MS, 20% FS, 10% VFS.	1355	
				Moderately to well sorted. 20% basalt, 80% qtz and qtzite,		
				trace mica. Angular to subrounded. Dry color: 10YR 6/2 (light brownish gray)		
				Moderate reaction to 10% HCL. Unconsolidated. Similar to		
				previous samples. Moisture and geologic samples taken.		
	160'	D	Moist	SAND 1% MP, 1% FP and VFP, 10% VCS, 25% CS, 35% MS,	1420	
				16% FS, 10% VFS, 4% silt. Mod. to well sorted (Gravel) -		
				80% basalt, 20% qtz and qtzite. (Sand) - 20% basalt,		
				78% qtz and qtzite, 2% mica. Angular to subrounded.		
				Dry color: 10YR 6/2 (light brownish gray). Moderate reaction to		
				10% HCL. Unconsolidated. Similar to previous. Moisture		
				and geologic samples taken.		
	165	D	Moist	SAND 15% VCS, 25% CS, 25% MS, 20% FS, 10% VFS,	1435	
				5% silt. Moderately to well sorted. 20% basalt, 78% qtz and		
				qtzite, 2% mica. Angular to sub-rounded. Dry color: 10YR 6/2	1450	Welding
				(light brownish gray). Moderate reaction to 10% HCL. Unconsolidated.		
				Similar to previous. Moisture and geologic samples taken.	1530	End of day

REMARKS: D/B 165' footage = 15'

Added 9'4" of 8"

Steve Teel 3-29-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-55)

DRILL LOG	By S.S. Teel	Rig B.E. 22W	Well Number 299-E17-14	Computer Number	Project or Work Order No.
	Date 3-30-88	22-14102	Depth 165' To 175'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
167' 11 3/4"					0700	Driller arrives -
10 2 3/4						welding casing - driller
178 2 1/2						on fresh air.
					0750	Drilling
	170'	D	Moist	SAND 25% VCS, 50% VCS, 15% MS, 7% FS, 3% VFS.	0845	No ammonia smell
				Very well sorted. 20% basalt, 78% qtz and qtzite, 2% mica.		at borehole
				Angular to sub-rounded. Dry color: 10YR 6/2 (light brownish gray).		
				Moderate reaction to 10% HCL. Unconsolidated. Coarser than previous		
				sample. Moisture and geologic samples taken.		
	175'	D	Moist	SAND 2% MP, 2% FP, 20% VCS, 35% CS, 20% MS, 12% FS,	0900	
				6% VFS, 3% silt. Well sorted. (Gravels) - 80% basalt, 20%		
				qtz and qtzite. (Sand) - 20% basalt, 78% qtz and qtzite, 2% mica.		
				Gravels are angular to sub-angular. Sands are angular to sub-rounded.		
				Dry color: 10YR 6/2 (light brownish gray). Moderate to strong reaction		
				to 10% HCL. Unconsolidated. Not as coarse as previous.		
				Moisture and geologic samples taken.		
				Added 10' 2 3/4" of 8"	0905	Welding
178' 2 1/2"						

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 22W	Well Number 299-E17-14	Computer Number NA	Project or Work Order No.
	Date 3-30-88	22-14102	Depth 175' To 185		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
178'2½"				WHC Resp. protection personel arrive and check ammonia	0945	
				concentration with dräger tube. No ammonia detected either between		
				the 8" and 10" casing or at the 8" casing.		
					0955	Drilling
	180'	D	Moist	SAND 2% FP, 1% UFP, 25% VCS, 30% CS, 20% MS, 12% FS, 5% UFS,	1025	
				5% silt. Wellsorted. (Gravels) - 80% basalt, 20% qtz and qtzite,		
				(Sand) - 25% basalt, 73% qtz and qtzite, 2% mica. Gravels are		
				angular to sub-angular. Sands are angular to rounded.		
				Dry color: 10YR 6/2 (light brownish gray) Strong reaction to 10%		
				HCL. Unconsolidated. Similar to previous. Moisture and geologic		
				sample taken.		
	185	D	Moist	SAND 2% FP, 1% VFP, 20% VCS, 35% CS, 20% MS, 12% FS,	10:40	
				5% VFS, 5% silt. Well sorted. (Gravels) 80% basalt, 15%		
				qtz and qtzite, 5% mica. (Sand) - 25% basalt, 72% qtz and		
				qtzite, 3% mica. Gravels and sands are angular to sub-rounded		
				Dry color: 10YR 6/2 (light brownish gray). Strong reaction to 10% HCL.		
				Unconsolidated. Similar to previous. Moisture and geologic samples		
				taken.		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By C.S. Teel	Rig B.E. 22W	Well Number 299-E17-14	Computer Number	Project or Work Order No.
	Date 3-30-88	22-14102	Depth 185' To 195'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
178'2½"				Added 9' of 8" casing	1045	Welding
9 / 187 2½"					1115	Drilling
	190'	D	Moist	SLIGHTLY GRAVELLY SAND 2% Cp, 2% Mp, 3% Fp, 3% UFp, 10% VCS,	1150	Gravels
				20% CS, 30% MS, 20% FS, 10% UFS, Moderate-poor sort, predom sand		
				w/ an occasional Cp that seems out of place, SANDS: 35% Basalt,		
				65% Silica-rich (predom clr qtz w/ qtzite, Tr mica, cht, Tr		
				granites, abundant orng Fe staining on grains) Subangular-		
				Gravels: 50% Basalt 50% Si-rich, round-Subround,		
				low sphericity, Dry color 5YR 6/2 (brownish gray), Slight		
				reaction in HCl, Unconsolidated, More gravels than previous		
				Geology & Moisture samples taken	1200	Lunch
					1230	Drilling
	195'	D	Moist	SAND 5% VCS, 15% CS, 40% MS, 25% FS, 10% UFS, 5% Silt Moderate	1240	
				Sorting, 35% Basalt, 65% Silica-rich (predom clr qtz, some		
				yel-orng to wht qtzite, Tr micas, abundant Fe stain) Subangular,		
				Moderate to strong rxn in HCl, abundant $CaCO_3$ cement,		
				often associated w/ thin (1 cm) silt layers, Slight consolidation		

REMARKS: Very similar to previous, Geol & moisture samples taken

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

4/5

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 82 M102	Well Number: 299 E17 14	Computer Number: NA	Project or Work Order No.
	Date: 3/30/85		Depth: 195' To 205'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
187 3½ 8 8¾ 195 11¼				Welding 8' 8¾" of 8" 195' 11¼" Total	1255	welding
					1330	Drilling
	200'	D	Moist	SAND 2% UFp, 8% UCS, 15% CS, 35% MS, 25% FS, 10% UFS, 5% Silt,	1405	less Fe Stn
				Moderate Sort 40% Basalt, 60% Silica-rich (precam		
				clr qtz, Tr mica, occ qtzite, less Fe Stn) Subangular,		
				Dry color 5YR 6/3 (brn gy), Moderate rxn in HCl, Some		
				$CaCO_3$ cementing w/ associated silt layers, predominantly		
				unconsolidated, occ slightly consolidated, less $CaCO_3$ and		
				Fe stn than previous sample Geology & Moisture Samples		
				Taken		
	205	D	Moist	SAND 15% UCS, 30% CS, 25% MS, 20% FS, 10% UFS, Well sort,	1425	poorly developed caliche
				35% Basalt, 65% Silica-rich, (precam clr qtz, w/qtz lc, chert,)		
				Subangular to Subround, moderate to occ strong rxn in		
				HCl, Tr poorly developed caliche, Dry color 5YR 6/3 (brn gy)		
				slight to unconsolidated, sample contains more $CaCO_3$ w/ caliche		
				layer. Geology & moisture sample taken		
					1430	Welding

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-86)

9 2 1 2 6 5 4 0 3 5 7

5/5

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14102	Well Number: 299 E17 14	Computer Number: NA	Project or Work Order No.
	Date: 3/30/88		Depth: 205' To 205'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
195 11'4 8 11 3/4 204'11"				Welding 8' 11 3/4" of 8" 204' 11" Total	1430	RPT Garage 1430
					1510	Drilling
				End of Day	1530	

REMARKS:
Ft 40'
DB 205
Casing 204' 11"
3/30/88 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

154

DRILL LOG	By T Gilmore	Rig Bucyrus [illegible]	Well Number [illegible]	Computer Number UH	Project or Work Order No.
	Date 3/31/85	[illegible]	Depth 205' To 215'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204' 4" of 8"				[illegible]	[illegible]	
	210'	D	Moist	Coarse SAND 3% Fp, 7% VFp, 25% UCS, 30% CS, 15% ES, 15% VES, 5% Silt, Moderate Sort, 55% Basalt, [illegible] (driller sometimes calls "black sand"), Subangular to [illegible], Dry color 10YR 4/2 (dk grayish brown), moderate [illegible] "Silt/Caliche" layers w/ Calcareous [illegible] sands (poorly [illegible]) [illegible] with a [illegible] silt layer, slightly [illegible] to unconsolidated, Higher percentage Basalt, coarser grained than previous Sample. Geology and [illegible]	750	
	215'	D	Moist	SAND 2% Fp, 3% VFp, 25% UCS, 35% CS, 15% ES, 15% VES, [illegible], Moderate Sort 50% Basalt, 50% Silica [illegible] (pepper & salt), "Salt & pepper" appearance, subangular to [illegible], Dry color 10YR 4/2 (dk grayish brown) [illegible] of Silt/Caliche cemented Sand [illegible], [illegible], Similar to previous [illegible] Geology and moisture sample [illegible]	815	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

9 2 1 2 6 5 4 0 3 5 9

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22 14102	Well Number: 299 E17 14	Computer Number: N/A	Project or Work Order No.
	Date: 3/31/88		Depth: 215' To 225'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
304' 11" − 8' 4" = 213' 2"				welding 8' 4" 213' 4" Total	815	welding
					850	Drilling
					900	Repairing Rig
					950	Drilling
	220'	D	moist	SAND 25% VCS, 35% CS, 25% MS, 12% FS, 5% VFS, well sorted,	1010	
				55% Basalt and 45% Silica-rich (predom clr qtz w/ some qtzite)		
				most notable is Basalt vs clr/wht qtz gives a "Salt & Pepper"		
				appearance, quartz is subround, basalt sub angular to angular, 10YR 5/2		
				slight rxn in HCl, unconsolidated, similar to previous sample		
				Geology & Moisture sample Taken		
213' 2" − 10'					1015	welding
223' 2"				welding 10' of 8" 223' 2" total	1050	Drilling
	225	D	moist	SAND 3% VFP, 17% VCS, 30% CS, 25% MS, 15% FS, 5% VFS, 5% Silt,	1140	
				well-moderately sorted, 50% Basalt, 50% Silica-rich (the majority		
				is clr qtz, w/ some qtzites, chts, micas, gen metamorphics & other)		
				"Salt & pepper" appearance, Dry color 10YR 5/2 (gy brn), strong-stand moderate rxn		
				in HCl, unconsolidated, very similar to previous sample		
				Geology & moisture samples taken		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

3 of 4

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-Pico	Well Number: 299 E17 14	Computer Number: NA	Project or Work Order No.
	Date: 3/31/88		Depth: 225' To 250'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	230	D	Moist	SAND 10% VCS, 25% CS, 35% MS, 15% FS, 10% VFS, 5% Silt, moderately sorted, 45% Basalt, 55% Silica sand (predom clr qtz, w/ clt, micas, and qtzite) "Salt & pepper" appearance, Dry color 10YR 5/2 (grayish brown) Basalt is subangular, qtz is subround, Strong rxn in HCl, abundant layers of $CaCO_3$ cementing, poorly developed caliche, Some silt associated w/ $CaCO_3$ cementing, Slightly consolidated, Sample has much more $CaCO_3$ cementing than previous sample Geology and Moisture Samples taken	1155	
223' 2" + 10 3/4					1200	Lunch
233' 3/4"				welding 9' 10 3/4 of 8" 233' 3/4" Total	1230	Welding
				Before welding, Driller caught a strong whiff of ammonia,		Ammonia
				The ammonia pegged the photoionizer (11.7eV on 20 scale), Driller advised to go on fresh air		
				Respiratory protection monitors called – they are all busy, Driller will stay on fresh air		
					1345	Drilling
				Ammonia Believed to be right on top of $CaCO_3$ layer		

REMARKS:

JB

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 3 6 1

4 of 4

DRILL LOG	By T Gilmore	Rig B.E. 22-Mid2	Well Number 299 E17.4	Computer Number NA	Project or Work Order No.
	Date 5/31/87		Depth 230' To 240'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	235	D	Moist	SAND 25% VCS, 40% CS, 15% MS, 10% FS, 10% VFS, well sorted	1430	No distinct lithology
				25% Basalt, 75% Silica-rich, majority of Silica-rich rock is		changes
				clear qtz, subangular, Dry color 10YR 6/2 (brngy), Slight		
				rxn in HCl, unconsolidated, less basalt and $CaCO_3$ than		
				Previous sample, (No gravels) Geology and moisture samples taken		
	240'	D	Moist	SILTY SAND 15% VCS, 25% CS, 30% MS, 10% FS, 10% VFS, 10% Silt,	1445	
				30% Basalt, 70% Silica-rich, (predom clr qtz, some mica, qtzite,		
				and silt, Subangular - Subround, Dry color 10YR 6/2 (grayish brown),		
				strong rxn in HCl, abundant Silt and $CaCO_3$ layers, Slight		
				to unconsolidated, much more silt and $CaCO_3$ than previous		
233 10	234 1/2			Sample Geology and moisture sample taken		
243	6 1/4			10' 2 1/2" of 8" 243' 6 1/4" Total	1450	Welding
				End of Day	1530	

REMARKS:
Ft 35'
DB 240'
casing 243 6 1/4
5/31/87 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

9 2 1 2 5 4 0 3 5 2

1 of 1

DRILL LOG	By: Cordon	Rig: #1	Well Number: 299-E17-14	Computer Number	Project or Work Order No.: 245450
	Date: 3 22 88		Depth: 0 To 10		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
0	5	DB	D	Sand gravel	5:10	
	10	DB	D	Sand coarse	5:18	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very C...

B.41

9 2 1 2 6 5 4 0 3 6 3

1 of 2

DRILL LOG	By: K Watkins	Rig: #1	Well Number: 299-E17-14	Computer Number:	Project or Work Order No.: 245450
	Date: 3 23 88	22-14102	Depth: 10 To 60		Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
19'10¾		~~DB~~	~~D~~		7:00	start
9'11½	15'	DB	D	Coarse sand clay gravel	7:45	installed casing
9'11	20	DB	D	coarse sand clay	9:00	sample 15'
9'3½	25	DB	D	coarse sand	9:20	sample 20'
Total ~~45'3¾~~	30	DB	D	coarse sand " " ickest Clutch & chase tools	9:30	shut down
49 ¾	35	DB	D	coarse sand	10:10	get oil
	40	DB	D	coarse sand	10:20	sample 25'
	45	DB	D	coarse sand	~~10:45~~	weld casing
	50	DB	D	" "	10:35	sample 30
	~~50~~				1045	weld casing
					11:30	drilling
					12:00	lunch
					12:30	drilling
					12:40	sample 35'
					1:00	weld casing
					1:45	drilling
					1:50	sample 40'
					215	sample 45'
					235	sample 50'

REMARKS:

Line Hook 30' 60' 20'

3

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

9 2 1 2 0 4 0 3 5 4

2 of 2

DRILL LOG	By L Watkins	Rig #1	Well Number 299-E17-17	Computer Number	Project or Work Order No. 245450
	Date 3 23 88	22 14102	Depth 55 To 60		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
~~[illegible]~~	55	DB	D	Coarse sand	~~[illegible]~~	~~weld cas~~
~~[illegible]~~	60	DB	D	" " " "	3:10	weld casing
~~[illegible]~~					3:47	drilling
49 3/4					4:10	sample 55'
9'7					4:30	sample 60'
58'7 5/4					4:40	weld casing
					5:15	drilling
					5:30	go home

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

DRILL LOG	By: L Watkins	Rig: #1	Well Number: 299-E17-14	Computer Number	Project or Work Order No.: 245450
	Date: 3 24 88		Depth: 60 To 103'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	65'	DB	D	Coarse sand small pea gravel	7:00	Jump start Rig
58' 7 3/4	70	DB	D	" "	7:30	adjust Belt-Drive
9'7"	75	DB	D	coarse sand silt	8:15	drilling
10' 3 1/2"	80	DB	D	" "	8:30	sample 65'
7'9"	85	DB	D	fine sand coarse sand silt	9:10	Jump Rig
9'	90	DB	D	" " "	9:30	drilling
9'6"	95	DB	D	" " "	9:25	sample 70'
	100	DB	D	" " "	9:55	weld casing
					10:20	drilling
					10:55	sample 75'
104' 9 1/2					11:20	sample 80
					11:25	weld casing
					12:00	Lunch
					12:30	drilling
					1:10	sample 85'
					1:15	weld casing
					1:50	drilling
					2:20	sample 90'

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

DRILL LOG	By L Watkins	Rig	Well Number 299 E17-14	Computer Number	Project or Work Order No. 245450
	Date 3 24 88	#1	Depth 60 To 103		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					2:40	sample 95'
					2:45	weld casing
					3:30	drilling
					3:35	test for gas
					3 45	sample 100'
					4:00	weld casing
					4:45	drilling
					4:50	check well gas
					5:00	drilling
					5:05	check well gas

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000.021 (5-85)

9 2 1 2 6 5 4 0 3 6 7

1 of 4

DRILL LOG	By L Watkins	Rig	Well Number 299 E17 [illegible]	Computer Number	Project or Work Order No. 245450
	Date 3 25 88	#1	Depth 103 To 140		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104 9/4	105	DB	D	Coarse sand silt	7:00	start Rig
97 1/2	110	DB	D	" " "	7:10	drilling
144 3/4	115	DB	D	" " "	7:35	weld core Barrel
95	120	DB	D	" " "	8:00	drilling
123 9/4	125	DB	D	coarse medium sand silt	8:15	sample 105'
42 3/4	130	DB	D	" " "	8:50	sample 110'
133 1/2	135	DB	D	" " "	9:10	weld casing
	140	DB	D	" " "	10:00	drilling
					10:45	sample 115'
					11:20	weld casing
					11:55	drilling
					12:00	lunch
					1:30	~~drilling~~ work on Rig
					~~[illegible]~~	~~sample [illegible]~~
					~~[illegible]~~	~~[illegible]~~
					2:15	drilling
					2:50	sample 120'
					3:20	sample 125

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

DRILL LOG	By L Watkins	Rig	Well Number 299-E12-14	Computer Number	Project or Work Order No. 245450
	Date 3 25 88	#1	Depth 103 To 140		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
1336½					3:45	sample 130'
					4:15	sample 135'
					4:26	weld casing
					4:55	drilling
					5:25	sample 140'

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

9 2 1 2 6 5 4 0 3 6 9

1 of 5

DRILL LOG	By L Watkins	Rig #	Well Number 299 E 17-14	Computer Number	Project or Work Order No. 245450
	Date 3-28-88		Depth 140 To 150		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
133 6½	145'	DB	D	sand - medium & silt	7:20	start Rig
8 2"	150	DB	D			safety meeting
141 8½						measure cable
6 3"					7:50	start drilling
147' 11½	total 8" casing				8:15	Sample 145'
					8:25	weld casing
8"	casing				9:00	shutdown for
20' 6"						mechanic to put on new gen and regulator
199¼					9:35	drilling
19 5½					10:20	sample 150'
19 7¼					10:30	weld casing
19 4½					11:30	Change Core Barrel
20' 2¼					12:00	Lunch
					12:30	run 8" casing
118' 10¾"	8" casing installed today				5:30	go home

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse

9 2 1 2 6 4 0 3 7 0

2-6

DRILL LOG	By L Watkins	Rig #1	Well Number 289-E17-14	Computer Number 245450	Project or Work Order No.
	Date 3 29 88		Depth 150 To 165		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
118 10 3/4					220	sample 160
201					235	sample 165
198 11 3/4				DIF Did not finish welling	315	weld casing
198					330	go home
158 7 3/4						
99"						
167 11 3/4	total					

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 3 7 1

1-6

DRILL LOG	By L Wait	Rig #1	Well Number 299-E17-14	Computer Number 245450	Project or Work Order No.
	Date 3 25 88		Depth 150 To 165		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18' 10¾	155	DB	D	coarse sand	7:00	start
20'1	160	DB	D	" "	7:15	Take fork lift back
19'8"	165	DB	D	" "	7:15	Jump start Rig
9'4"					7:30	get fresh air pack
162'11¾	Total				8:00	weld casing
					8:45	Rig down
					~~8:50~~	for
						other Rig
					9:00	weld casing for other Rig
					9:30	pick up caps
					10:00	weld casing
					~~10:45~~	~~[illegible]~~
					10:45	build core Barrel
					12:00	Lunch
					12:30	weld core Barrel
					12:45	string up tools
					1:30	start drilling
					1:55	sample 155'

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5 85)

9 2 1 2 5 0 3 7 2

1-7

DRILL LOG	By L Watkins	Rig	Well Number 299-E17-14	Computer Number	Project or Work Order No. 245450
	Date 3 30 88	#1	Depth 165 To 205		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
167 11 3/4	170	DB	D	Coarse sand	7:00	start rig & grease
102 3/4	175	DB	D	" "	7:15	weld casing
178 1/2	180	DB	D	" "	750	drilling
9	185	DB	D	" "	845	sample 170'
187 1/2	190	DB	D	Coarse sand Large gravel	905	weld casing
88 3/4	195	DB	D	" " "	1025	sample 180'
9 69 1/4	200	DB	D	Coarse sand caliche gravel	1040	sample 185
811 3/4	205	DB	D	Coarse sand gravel	1045	weld casing
					1115	drilling
					1150	sample 190'
204 11					1200	lunch
					1230	Drilling
					1240	sample 195' ~~200~~
					1255	weld casing
					130	Drilling
					205	sample 200'
					225	sample 205'
					230	weld casing

REMARKS:

330 go home

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 3 7 3

1-8

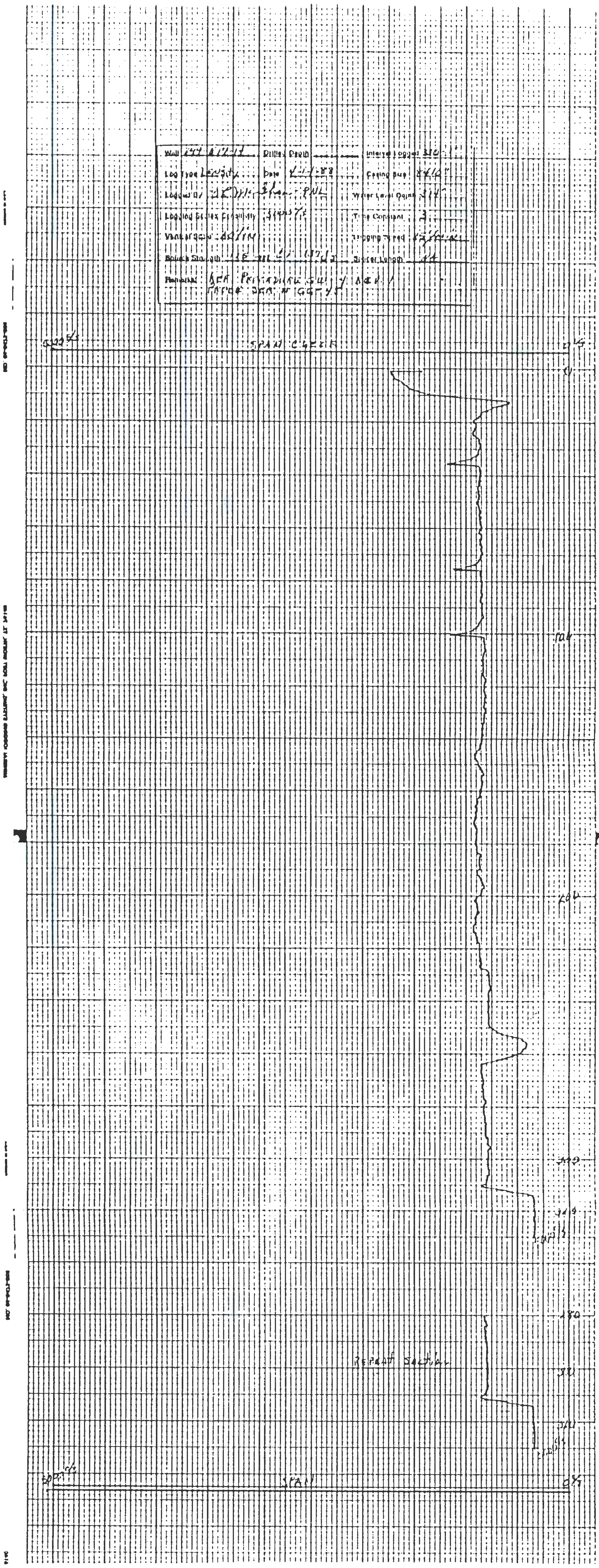
DRILL LOG	By L Watkins	Rig	Well Number 279-417-14	Computer Number 245450	Project or Work Order No.
	Date 3 ~~23~~ 31 88	#1	Depth 205 To 240	~~245~~	Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204'11	210	DB	D	coarse sand	7:00	start Rig
8'4"	215	DB	D	coarse sand	7:50	sample 210'
10'	220	DB	D	" "	8:15	sample 215'
223'3	225	DB	D	" "	8:20	weld casing
9 10	230	DB	D	" "	8:50	drilling
233 1 3/4	235	DB	D	" "	9:00	adjust belt on Rig
10 2 1/2	240	DB	D	silty coarse sand	9:30	drilling
243 4 1/4					10:10	sample 220'
					10:15	weld casing
					10:50	drilling
					11:40	sample 225'
					11:55	sample 230
					12:00	lunch
					12:30	weld casing
					1:15	drilling
					2:30	sample 235'
					2:45	sample 240
					3:00	weld casing DNP
					3:30	go home

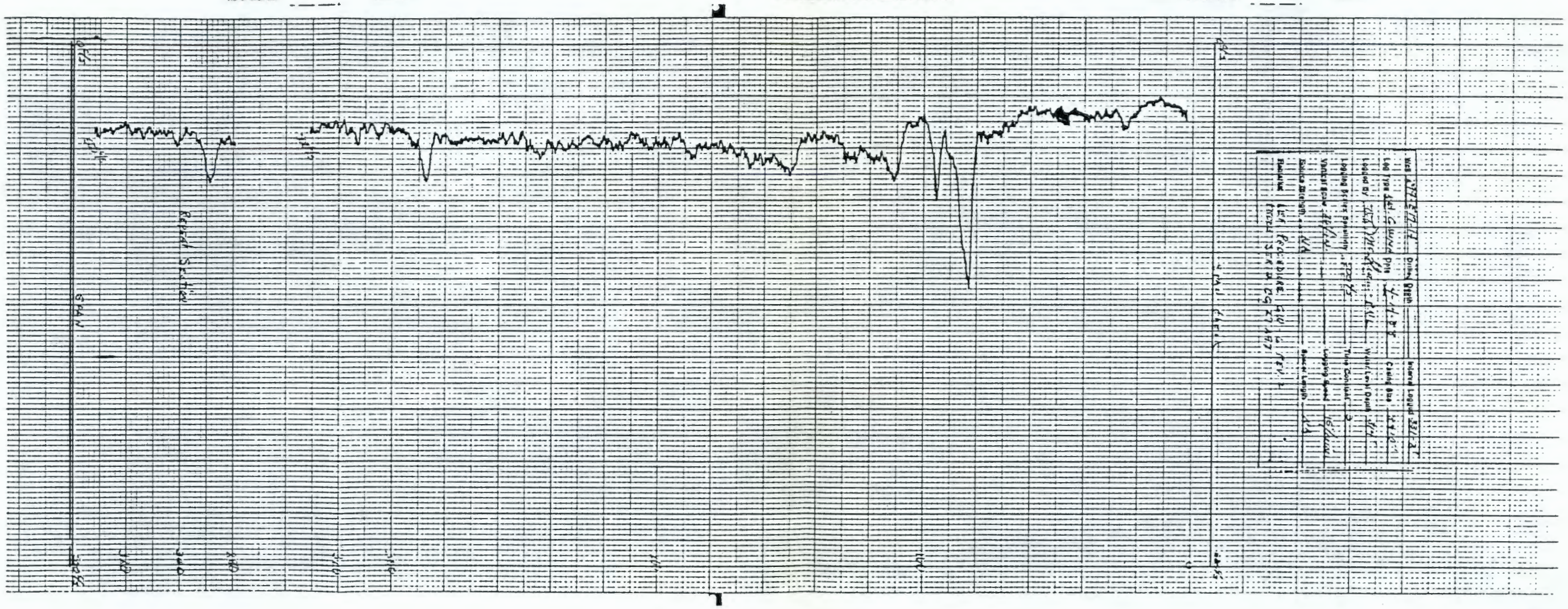
REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

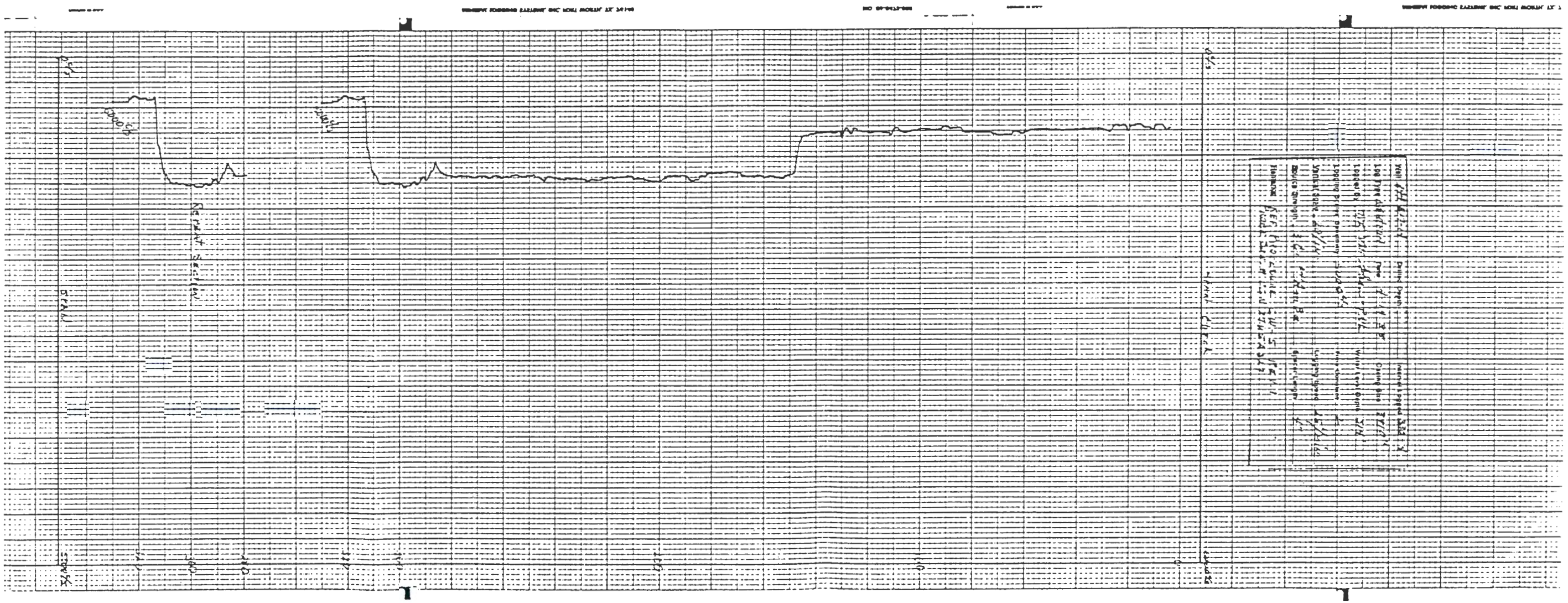
9 2 1 2 · · 4 0 3 7 4



Well
Driller Depth
Interval Logged
Log Type Density
Date
Casing Size
Logged By
Water Level Depth
Time Constant 3
Vertical Scale
Logging Speed
Source Strength
Spacer Length
Remarks
SPAN CHECK
100
200
REPEAT SECTION
SPAN


Well
Log Type
Location
Logging Date
Date
Depth Logged
Casing Size
Water Level Depth
Time Circulated
Logging Speed
Max. Temp.
Recorded By
Witnessed By
Equipment Number
Equipment Location
Remarks
Gamma Ray Probe
Fitzgerald
Gamma Ray Scaler
Depth
Scale
Time
Speed
Temp
Gamma Ray
Scale
Time
Speed
Temp
Gamma Ray

9 2 1 2 6 - 4 0 3 7 5



WELL 299-E17-15

9 2 1 2 6 0 4 0 3 7 7

THIS PAGE INTENTIONALLY
LEFT BLANK

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-15 Geologist Gilmore/Teel Page 1 of 3

Reviewed by V.E. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
Concrete Pad		5		SILTY SAND
Cement Grout (19.4-1.5')		10		SLIGHTLY GRAVELLY SAND
		15		GRAVELLY SAND
		20		GRAVELLY SAND
8-20 mesh Granular Bentonite		25		SAND
Seal (19.4 - 298')		30		SAND
		35		SAND
4" dia. Stainless Steel Casing		40		SAND
(+6" to)		45		
8" Temporary Carbon Steel		50		
Casing. (Removed)		55		
10" Temporary Carbon Steel		60		[illegible] (<1") layers of silt 62'-63'
Casing (Removed)		65		Si - [illegible]
		70		
		75		
		80		
		85		
Centralizers		90		
		95		
		100		SLIGHTLY GRAVELLY SAND
		105		SAND
Casing joints		110		Si - [illegible]
		115		~ [illegible]
		120		SAND
		125		"
		130		"

A-1800-186 (3/87)

9 2 1 2 6 4 0 3 7 8

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-15 Geologist Teel Page 2 of 3

Reviewed by D.L. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
10" Carbon Steel Casing (removed)		135		SAND
8" Carbon Steel Casing (removed)		140		"
		145		"
8" drive shoe (not removed)		150		"
		155		"
8-20 mesh granular bentonite		160		"
seal (19.4-298')		165		"
		170		"
		175		"
		180		"
		185		"
		190		"
		195		"
		200		"
		205		"
		210		"
		215		"
		220		"
		225		"
		230		"
		235		SLIGHTLY GRAVELLY SAND
		240		" " "
		245		" " "
		250		GRAVELLY SAND
		255		" "
		260		" "

A 1800 198(2/87)

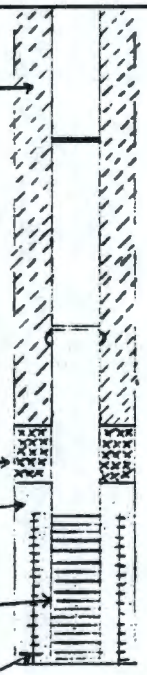
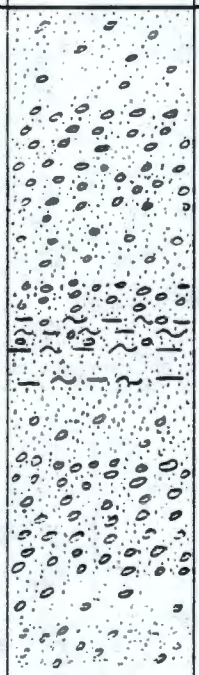
9 2 1 2 6 5 4 0 3 7 9

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-15 Geologist Teel Page 3 of 3

Reviewed by W. L. McGleam Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		~~260~~		GRAVELLY SAND
8-20 mesh granular bentonite		~~265~~		" "
seal (19.4 to 298')		~~270~~		SANDY GRAVEL
		~~275~~		" "
		~~280~~		GRAVELLY SAND
		~~285~~		SANDY GRAVEL
		~~290~~		SLIGHTLY GRAVELLY SAND with layers of SLIGHTLY GRAVELLY SILT/CLAY
		~~295~~		SAND with layers of SILT/CLAY
Bentonite pellet seal		~~300~~		GRAVELLY SAND
(298' to 305'4")		~~305~~		SANDY GRAVEL
10-20 mesh sand filter pack		~~310~~		" "
(305'4" to)		~~320~~		" "
20' long, 4" dia, 20 slot		~~325~~		GRAVELLY SAND
stainless steel screen		~~330~~		SANDY GRAVEL
8" telescoping, 20'2½" long				
20 slot, stainless steel screen				

A-1800-186 (3/87)

9 2 1 2 6 1 0 3 8 0

9 2 1 2 6 5 4 0 3 8 1

1 of 4

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14103	Well Number: 227 E17 15	Computer Number: 141	Project or Work Order No.
	Date: 3/24/88		Depth: Surface To 10'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Setting up Rig	700	Unable to confirm
						steam cleaning – however
				Drilling	1140	appearance is clean
						(tools also look clean)
	5'	D	moist	SILTY SAND 5% CS, 25% MS, 30% FS, 20% VFS, 20% Silt, wellsorted,	1145	
				60% Basalt, 40% Silica-rich (mixture of qtz, qtzite, cht, gnnites)		
				subangular, Dry color 2.5Y 5/2 (Hbrn gy), strong rxn in HCl,		
				slight consolidation		
	10'	D	moist	SLIGHTLY GRAVELY SAND 1% Cp, 2% Mp, 2% Fp, 10% VFp, 10% VCS, 15% CS,	1155	
				5% MS, 10% FS, 25% VFS, 20% Silt, poorly sorted, 60% Basalt, 40% Silica-		
				rich, subangular, Dry color 2.5Y 5/4 (lt olv brn), strong rxn in		
				HCl, unconsolidated, more gravels than previous sample		
20'3" of 10"						

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

2 of 4

DRILL LOG	By: T Gilmore	Rig: Burns Erie	Well Number: 299-E17-15	Computer Number: NA	Project or Work Order No.
	Date: 3/24/95	22-14-03	Depth: 10' To 20'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'3"	15'	D	Slightly Moist	GRAVELLY SAND (30% gravel, 70% sand,) 10% MP, 10% FP, 10% VFP, 10% VCS, 15% CS, 20% MS, 15% FS, 10% VFS. Poorly sorted. (Gravels)- 90% basalt, 10% qtz/qtzite, (Sand)- 60% basalt, 40% qtz/qtzite. Gravels are angular to rounded. Sands are angular to sub-rounded. Dry color 2.5Y 7/2 (light gray). Strong reaction to 10% HCL. Unconsolidated. Moisture and geologic samples taken.	1340	
	20'	D	Slightly Moist	GRAVELLY SAND (30% gravel, 70% sand) 3% CP, 5% MP, 15% FP, 7% VFP, 20% VCS, 25% CS, 15% MS, 6% FS, 4% VFS. Moderately to well sorted. (Gravels) - 85% basalt, 15% qtz, qtzite, and chert. (Sand)- 40% basalt, 60% Si-rich incl: qtz, qtzite, and chert. Gravels are angular to rounded. Sands are angular to sub-rounded. Dry color: 10YR 7/2 (light gray). Moderate reaction to 10% HCL. Unconsolidated. Moisture and geologic samples taken.	1415	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By: S Steel	Rig: B.E. 60W 22-14103 / Lenny	Well Number: 299-C-M-15	Computer Number: NA	Project or Work Order No.
	Date: 3-24-88		Depth: 20' To 35'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	25'	D	Moist	SAND 1% FP, 1% VFP, 10% VCS, 30% CS, 35% MS, 15%	1430	
				FS, 8% VFS, Well sorted. (Gravels) - 80% basalt, 20%		
				Si-rich. (Sand) - 20% basalt, 80% qtz and Si-rich.		
				Gravels and sand angular to sub-rounded. Dry color: 10YR 7/2		
				(light gray). Strong reaction to 10% HCL, Unconsolidated	(moisture and geologic samples taken)	
	30'	D	Moist	SAND 2% FP, 1% VFP, 10% VCS, 30% CS, 25% MS, 20% FS	1440	
				12% VFS, Mod-well sorted. (Gravels) - 80% basalt, 20% qtz +		
				Si-rich. (Sand) - 20% basalt, 80% qtz + qtzite, Gravels and		
				sands are angular to sub-rounded. Dry color 10YR 7/2 (light gray)		
				Moderate reaction to 10% HCL, Moisture + Geologic samples taken		
	35'	D	Moist	SAND 5% VCS, 10% CS, 40% MS, 30% FS, 15% VFS.	1450	
				Well sorted. 20% basalt, 80% qtz, qtzite, and chert.		
				angular to rounded. Dry color: 10YR 7/2 (light gray). Moderate		
				reaction to 10% HCL, Unconsolidated, Finer grained than		
				previous. Geologic and moisture samples taken.		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By: S.S Tool	Rig: B.E. 60W 22-14103 Leary	Well Number: 299-E17-15	Computer Number: NA	Project or Work Order No.
	Date: 3 2 1 88		Depth: 40' To 40'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'3"	40	D	Moist	SAND 25% VCS, 30% CS, 30% MS, 10% FS, 5% VFS.	1500	
20'1 / 40'4"				Well sorted, 25% basalt, 75% qtz, qtzite, and chert,		
				2% mica, Angular to rounded, Dry color: 10YR 7/2 (light		
				gray), Moderate reaction to 10% HCL, Unconsolidated,		
				Similar to previous.		
40'4"				Added 20'1" of 10"	1510	Welding

REMARKS: Ft 40 Casing 40' 4" 3/2/88
DB 40

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5)

DRILL LOG	By AIRHART	Rig BUCYRUS ERIE 22-14103	Well Number 299-E17-15	Computer Number NA	Project or Work Order No.
	Date 3-25-88		Depth 40' To 50'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					07:00	Driller on site.
	45'	D	SLIGHT MOIST	SAND: 1% gravel, 99% sand, - 1% VFP, 40%	07:30	
				VCS, 30% CS, 20% MS, 9% FS - well sorted - (gravel)		
				angular-to-subangular clasts composed of 100%		
				basalt (sand) angular-to-subrounded grains composed		
				of 20% basalt 80% si-rich (clr. qtz., f-spar, qtzite);		
				grayish brown (2.5Y 5/2); slight rxn. w/ 10% HCl -		
				appears to be a few caliche grains which rct.;		
				unconsolidated.		
49'11" of	10" casing				07:45	welding 9'7" of
					-09:10	10" casing
						40'4" + 9'7" = 49'11"
					09:15	resumed drilling
	50'	D	SM	SAND: 1% gravel 95% sand 4% silt - 1% VFP, 20% VCS	10:30	
				30% VCS, 30% MS, 10% FS, 5% VFS, 4% silt - mod sorted -		
				(gravel) subangular clasts composed of 80% basalt		
				20% qtz-rich (sand) angular-to-subangular grains composed		
				of 20% basalt 80% si-rich (clr. qtz, f-spar, qtzite); dry color		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: AIRHART	Rig: Bucyrus Erie 22-14103	Well Number: 299-E17-15	Computer Number: NA	Project or Work Order No.
	Date: 3-25-88		Depth: 50' To 60'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
49'11"				(50' cont...) light brownish gray 2.5Y 6/2 ; slight rxn. w/ 10% HCl ; unconsolidated.		
				NOTE: slightly finer grained than previous		
60'2" of 10" casing					11:00	Adding 9'3" of 10" casing 49'11" + 9'3" = 60'2"
	55'	D	SM	SAND: 2% gravel, 95% sand, 3% silt ; 2% VFP, 10% VCS 40% CS, 30% MS, 10% FS, 5% VFS, 3% silt - mod. sorted ; (gravel) angular-to-subangular clasts composed of 70% basalt 30% si-rich (igneous, qtzite) · trace clay rip-ups (sand) subangular-to-subrounded grains , 40% basalt 60% qtz-rich (clr qtz , f-spar , qtzite) - dry color light brownish gray 2.5Y 6/2 ; slight-to-no rxn. w/ 10% HCl ; unconsolidated.	11:50	
	60'	D	SM	SAND: 1% gravel , 95% sand, 4% silt ; 1 coarse pebble in sample bucket otherwise 1% VFP , 15% VCS, 35% CS, 30% MS, 10% FS, 5% VFS , 4% silt - mod.-to-well sorted ; (gravel) 60% basalt 40 qtz-rich - the coarse pebble is subrounded	13:00	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By: AIRHART	Rig: Bucyrus Erie 22-14103	Well Number: 299-E17-15	Computer Number: NA	Project or Work Order No.
	Date: 3-25-88		Depth: 60' To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
60'2"				(60' cont...) (sand) angular-to-subangular grains composed of 40% basalt 60% qtz-rich (clr. qtz, granite) - dry color light brownish gray 2.5Y 6/2; slight rxn. w/ 10% HCl; unconsolidated.		
70'1½" of 10" casing 9'2"					13:15	welding 9'11½" of 10" casing 60'2" + 9'11½" = 70'1½"
					1400	drilling
	65'	D	Moist	SAND 5% UFp, 10% UCS, 20% CS, 35% MS, 15% FS, 10% VFS, 5% Silt, Moderate-Well sort, 50% Basalt, 50% Silica-rich (predom clr qtz), abundant orng Fe stain on grains, Subangular, Dry color 2.5Y 6/2 (lt brn gy), Strong to moderate rxn in HCl, some poorly developed Caliche layers, abundant $CaCO_3$ coating, unconsolidated, more $CaCO_3$ than previous sample	1445	See series of thin (average 1" thick) silt layers separated by thin sand layers from ≈ 62-63'
79'3½"				Welding 9'2" of 10" 79'3½"	1515	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (R.88)

DRILL LOG	By Teel/Gilmore	Rig B.E.	Well Number 299-E17-15	Computer Number	Project or Work Order No.
	Date 3-25-88	22-14103	Depth 70' to 75'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
79'3½"	70'	D	Moist	SAND 2%FP, 15% VCS, 25% CS, 30% MS, 20% FS, 8% VFS	16:30	
				Moderately to well sorted. (Gravel)- 70% basalt, 30% qtz/qtzite,		
				(Sand)- 40% basalt, 60% qtz, qtzite. Gravels and sands are		
				angular to subangular. Dry color: 2.5Y 6/2 (Lt brownyray)		
				Moderate reaction to 10% HCL. Uncorsolidated. Similar to previous.		
				See $CaCO_3$ cemented (weak) aggregates. Moisture, geologic, and		
				hazardous waste sample taken.		
	75'	D	Moist	SAND 10% VCS, 20% CS, 35% MS, 25% FS, 10% VFS,	17:05	
				Moderately - well sorted. 20% basalt, 80% qtz/qtzite,		
				angular to subangular. Dry color 2.5Y 6/2 (Lt brownyray)		
				Moderate reaction to 10% HCL. Uncorsolidated. Similar to		
				previous.		
					1730	End of day
79'3½"						

REMARKS: DTB 75' drilled 35'

Steve Teel 3-25-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By S.S. Teel	Rig B.E. 22-14103	Well Number 299-E17-15	Computer Number NA	Project or Work Order No.
	Date 3-28-88		Depth 75' To 85'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
79' 3½"					0700	Drillers arrive
8'4" / 87' 7½"				Added 8'4" of 10"	0745	Welding casing
					0830	Began drilling
	80'	D	Slightly Moist	SAND 30% VCS, 35% CS, 20% MS, 10% FS, 5% VFS,	0835	
				Well sorted. 25% basalt, 70% qtz, qtzite, and chert, 5%		
				feldspar. Angular to sub-rounded. Dry color: 2.5Y 7/2 (light gray)		
				No reaction to 10% HCL. Unconsolidated. Similar to previous. Moisture,		
				Hazardous waste, and geologic samples taken.		Note: QA procedures for
				Hazardous waste sample collection procedure: fill plastic pint		Hazardous sampling currently
				jar with sample. Seal lid with white tape. fill out and attach		being written, until such time,
				sample label and sample seal to bottle including: sample number,		procedure used is described in
				date, time, and initials of collector. Place bottle in ice chest		Sample description
				with ice.		
	85'	D	Moist	SAND 32% VFp, 22% VCS, 40% CS, 10% FS, 5% VFS, 10% Silt, Moderate	1000	
				sorting, 35% Basalt, 65% Silica rich, (predom clr qtz, occasional		
				qtzite and chert) Subangular to Subrounded, Dry color 2.5YR 5/2		
				(light gray) slight rxn in HCL, occasional sand "clods" cemented w/		
				silt, Unconsolidated to slightly consolidated similar to previous		

REMARKS:

Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

Fig 4

DRILL LOG	By: T Gribmore	Rig: Bucyrus Erie 22-14 ms	Well Number: 299 E17 15	Computer Number: 1/4	Project or Work Order No.
	Date: 3/28/88		Depth: 85' To 90'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				85' cont. sample, Geol, moisture; Haz sample taken procedure for Haz sample as in previous sample description		
				Faint smell of ammonia detected around borehole, smell comes and goes. Photoionizer did not detect any volatiles at well head, a very slight deflection of the meter in the samples	1005	
87' 7½" of 10'						
97' 8" of 10"				Welding 10' ½" of 10" 97'8" Total	1020	
						RPT coverage
	90'	D	Slightly Moist	SAND 10%VCS, 30%CS, 40%MS, 15% FS, 10%VFS, 5%silt, well-moderate sorted, 30% basalt, 70% Silica-rich, (pretium clr qts, w/ occasional qtzite, chert), Subangular, Dry color 2.5YR 6/2 (lrn gy), occasional "clots" of sand w/ $CaCO_3$ cementing, Moderate to strong rxn in HCl, slight to no consolidation, very similar to previous sample, more $CaCO_3$ Geol, moist; Haz samples, Haz sample procedure as above	1155	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

9 2 1 2 6 5 4 0 3 9 1

3 of 4

DRILL LOG	By: T Gilmore	Rig: BE 33-14103	Well Number: 299 E17 15	Computer Number: NA	Project or Work Order No.
	Date: 3/28/88		Depth: 90' To 100'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	95'	D	Slightly moist	SAND 3% VFp, 12% VCS, 20% CS, 35% MS, 20% FS, 10% VFS, well-moderate sort, 35% Basalt, 65% Silica-rich (prolon-cl-qtz) Abnt Fe stn ^ Subangular, Dry color 2.5YR 6/3 (lbrn gy), slight rxn in HCl, no sand "clods", much less silt & $CaCO_3$ cement than previous, No consolidation, Sample similar to previous otherwise, Geol, moist & Haz Smpls taken, Haz procedure as above	1310	
				No Ammonia Smell around Rig	1310	
97' 8" of 10' 9' 7½" 107' 3½"				Welding 9' 7½" of 10' 107' 3½" Total	1340	
				Drilling	1450	
						RPT Coverage
	100'	D	Moist	SLIGHTLY GRAVELLY SAND 2% MP, 3% FP, 10% VFP, 10% VCS, 15% CS, 25% MS, 20% FS, 15% VFS, Moderate sort, 40% Basalt, 60% Silica-rich, (prolon-cl-qtz) abundant orng Fe staining on grains, Subangular, Dry color 5YR 6/2 (brn gy), Moderate rxn in HCl, Some $CaCO_3$ Cementing, not as much as previous, unconsolidated, very similar to previous, Geol moist & Haz conc Samples taken procedure N/A Ammonia Smell from Samples none from borehole	1500	Ammonia in Samples

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

B.72

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14103	Well Number: 299 E17 15	Computer Number: NA	Project or Work Order No.
	Date: 3/28/88		Depth: 100' To 110'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Ammonia at 30+ ppm in the borehole, none detectable	1410	
				away from borehole		
	105'	D	Moist	SAND 5% VCS, 10% CS, 40% MS, 25% FS, 20% VFS, well sorted,	1540	
				40% Basalt, 60% Si-rich (porcelanous qtz) abundant Fe staining		
				on grains, Subangular, Dry color 5YR 6/2 (brown), moderate		
				rxn in HCl, occasional sand "clot" w/ white CaCO3 cement on		
				grains, unconsolidated, better sorted w/ more CaCO3 cement		
				than previous samples; Geology, moisture & Hazardous		
				sample taken, Haz Sample procedure N/A		
107' 3½ 72						
114' 5½"				Welding 7' 2" of 10" 114' 5½" total	1545	Silt/VF Sand at ~109'
	110'	D	moist	Sand 20% MS 40% FS, 20% VFS, 20% Silt, well sorted, 40% Basalt,	1715	not well developed
				40% Silicarich, Silt/very fine sand layer approx 109' thin, ~½ foot		
				thick, Subangular, Dry color 5YR 6/2 (brown), slight rxn in HCl,		
				slightly consolidated, very fine well sorted sands and silts, may		
				be continuing layer of ammonia as in other wells, not as well developed		RPT coverage
				Geol, moisture, Haz Samples taken, Haz sampling procedure N/A	1730	End of Day

REMARKS: Ft 34' Casing 114' 5½"
D/B 114'

3/28/88 JB

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-10/93	Well Number: 299 E17 15	Computer Number: NA	Project or Work Order No.
	Date: 3/27/88		Depth: 110' To 115'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
114' 5 1/2"				Geologist & Driller on location.	655	
10-0				Greasing the Rig	700	
124' 5 1/2"				Ammonia detected at 30+ppm out at the well; the well is showing this warning likely due to a low pressure system in the area		
				Weatherford Hauling in Respirators and [illegible] to [illegible] stations; Drilling on shaker and it [illegible]	730	
				[illegible]; 1000ppm ammonia measured at wellhead, Driller logs on breathing air when welding	550	1000ppm ammonia
	11'	L	moist	(SW) 20% FP, 30% VFP, 10% MS, 15% CS, 40% MS, 20% FS, 10% VFS, moderate well sorted, 40% Basalt, 60% Silica-rich (potassium-feldspar, quartz, abundant [illegible]) [illegible], moderate reaction HCl, some $CaCO_3$ cementing evident, unconsolidated, very similar to previous sample, Geology, moisture, Hazardous [illegible]; Hazardous sample immediately placed in a pint plastic jar, taped, labeled and placed in ice chest (with date time and depth indicated)	730	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-8000-021 (5-85)

2 of 4

DRILL LOG	By: T Gilmore	Rig: Burrows Eric 22-14103	Well Number: 277 E 17 15	Computer Number: VA	Project or Work Order No.
	Date: 3/27/91		Depth: 115 To 125'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Current driller is not trained on air system; another driller	930	
				will be required to weld on casing who is trained, waiting		
124.5 ½				Well to 10' 7½" of 10" 134' 1" Total	940	
10.7 ½						
134' 1"						
	120'	D	Moist	SAND 5% VFp, 5% VCS, 10% CS, 35% MS, 30% FS, 15% VFS, well to	1110	
				moderate sort, 35% Basalt, 65% Silica-rich (red pseudomorphic qtz, w/		
				qtzite, cht + Fe stn qtz (orng)) Subangular, Dry color 5YR 6/2		
				(brn gy), No rxn in HCl, No to very slight consolidation, Sample is		
				Very similar to previous sample, less clay/silt than previous, still		
				contains fine staining as previous. Geology, moisture and Hazardous		
				Samples taken, Haz Smpl procedure as above		
	125'	D	Moist	SAND 50% VCS, 15% CS, 40% MS, 30% FS, 10% VFS, well sort,	1130	
				35% Basalt, 65% Silica-rich (pseudomorphic qtz), Subangular to		
				subround, Dry color 5YR 6/2 (brn gy), No rxn to HCl, No consol		
				Sample very similar to previous, smaller quantity in sample		
				Geology, moisture and Hazardous samples taken, Haz Smpl		
				procedure as above		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: T Gilmore	Rig: Burgess Drill	Well Number: 299 E17 15	Computer Number: NA	Project or Work Order No.
	Date: 3/29/88		Depth: 125' To 135'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	130	D	Moist	SAND 10% UCS, 15% CS, 35% MS, 30% FS, 10% VFS, well sorted	1155	RPT arrived 1120
				35% Basalt, 65% Silica-rich (predom qtz, alsoglaite, clay, Fe		
				Staining) subangular to subround, Dry color 5YR 6/2 (lt gy),		
				Norxn in HCl, no consolidation, very similar to previous sample		
				Strong ammonia smell. Geology, moisture, Hazardous samples taken,		
				Haz sample procedure as above		
134' 1" + 10' 8" = 144' 9"						
				Welding 10' 8" of 10" 144' 9" total	1000	
						WHC Respitory came
				WHC Respitory came, could not detect ammonia around		12:57
				borehole because of casing stickup, Driller will continue to		
				wear a mask. Respitory monitor will be back in morning		
	135	D	moist	SAND 5% UCS, 10% CS, 35% MS, 30% FS, 20% VFS well sort,	1350	
				35% Basalt, 65% Silica-rich (predom clr qtz) subangular, some micas		
				Dry color 2.5YR 6/3 (ly brn), Norxn in HCl, no consolidation,		
				very similar to previous, Geology, Moisture & Haz Sample taken		
				Haz Sample procedure as above		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 4 1 3 9 6

1 of 4

DRILL LOG	By: T Gilmore	Rig: [illegible]	Well Number: [illegible]	Computer Number: 1A	Project or Work Order No.
	Date: 3/29/88	[illegible]	Depth: 135' To 144'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	140'	D	moist	SAND 15% VCS, 30% CS, 25% MS, 30% FS, 5% VFS, 5% Silt Mod-well sort	1405	
				40% Basalt, 60% Silica-rich (predom clr qtz, some qtzite, Tr of mica)		
				Subangular - subround, Dry color 2.5YR 6/3 (lt orange) moderate rxn in		
				HCl some $CaCO_3$ cementing associated w/ silt/VFS, Similar to previous		
				with addition of $CaCO_3$ cementing, Geol, moist & Haz Smpls		
				taken, Haz sample procedure as above		
144' 9" 6 9"						
151' 6"				Welding 6' 9" of 10" 151' 6" Total	1410	
				End of Day	1530	

REMARKS: Ft 30' DB 144' Casing 151' 6"

Jeffrey Gilmore 3/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5-85)

182

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-1403	Well Number: 299 E17 13	Computer Number: N/A	Project or Work Order No.
	Date: 3/30/88		Depth: 144' To 145'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Geologist & Driller on location	700	
				No ammonia smell around well - waiting on WHC Respiratory monitor		
	145'	D	Moist	SAND 15% VCS, 35% CS, 30% MS, 10% FS, 5% VFS, 5% Silt, well sorted	720	
				40% Basalt, 60% Silicaceous (predominately qtz, w/ qtzite, gray metamorphic		
				Tr micas, Fe stns, Tr gypsum) subangular, Dry color 10YR 5/2		
				(grayish brown) moderate to strong rxn in HCl, CaCO3 cement		
				associated w/ silt layers; silt layer in sample are 4 cm thick,		
				no to slight consolidation in CaCO3 cement layers		
				Geology, moisture and Hazardous sample taken. Hazardous		
				sample placed immediately in plastic pint jar, sealed w/ Tape, labeled		
				w/ well #, date, time, and depth and placed in ice chest		
147' 1/2" of 10" Total				Welding 6-2 147 1/2 Total	745	
				Reviewed driller's Casing Talley and corrected casing to 147 1/2'		
				All 10" used 20-3, 20-1, 9-7, 9-3, 9-11 1/2, 7-2, 8-4 1/2, 10-1/2, 9-7 1/2, 7-2,		
				10-0, 10-7 1/2, 6-7, 6-2		
				WHC Respiratory Monitor came by, no ammonia detected	745	No ammonia

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-0[illegible]

262

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14103	Well Number: 299 E17 15	Computer Number: NA	Project or Work Order No.
	Date: 3/30/88		Depth: 145' To 146'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Driller taking core barrel off in preparation to switch	945	
				to 8" casing		
				8" added today		
				19-4, 20-1½, 19-2¼, 18-8 79-3¾ Total		
				End of Day	1530	

REMARKS: F+ 2' 10" casing total 47-½
DB 146

3/30/88 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 3 9 9

51

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14 HS	Well Number: 277 E17 15	Computer Number: 14	Project or Work Order No.
	Date: 3/31/88		Depth: 146' To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Geologist & Driller on location	700	
				Continue to weld 8" casing string		
				Casing added today 18-7, 18-1, 15-7¾, 15-8½	1430	
				148-5½ Total		
				Building 6" Drive barrel		
				End of Day	1530	

REMARKS:

3/31/88 J Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

B.80

DRILL LOG	By C-WANSLEY	Rig	Well Number 299-17-15	Computer Number	Project or Work Order No. 245450
	Date 3/31/88	22-14-103	Depth 146 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				RAN STRING of 8" PIPE	7:00	START
77'-3 3/4"						
+ 18-9 1/2"				STARTED MAKING 8" CORE BARREL	2:30	
96'-1/4"						
+ 18-1					3:30	WENT HOME
114-1 1/4						
+ 18-7 3/4						
132'-9"						
+ 17-11 1/2						
150-8 1/2						
- 2-3"						
148-5 1/2						

REMARKS:

R - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5-85)

9 2 1 2 6 5 4 0 4 0 1

DRILL LOG	By: C-WAMSLA	Rig: 22-14-103	Well Number: 299-17-15	Computer Number	Project or Work Order No.: 245950
	Date: 3-30-88		Depth: 140 To 146		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
140 10½				STARTED DRILLING FINISH PUTTING	7:00	START
+ 62	TOTAL			DOWN 10" STRING OF PIPE AT		
147'-½"	10"			146'. BROKE DOWN 10" CORE BARREL		
				TO PUT 8" ON AND STARTED RUNNING		
8"				8" STRING OF PIPE. WAS NO 8" DRIVE	9:35	
19'-4"				SHOE SO HAD TO CUT ONE OFF OF OLD		
+ [illegible]				PIECE OF PIPE AND WELD ON TO FIRST		
[illegible]				JOINT OF 8" PIPE.	12:00	
+ 20-1½						
39'-5½'						
+ 19-2¼					3:30	WENT HOME
58'-7¾'						
+ 18-8						
77-3¾						

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 02

DRILL LOG	By: C-WAMSLEY	Rig: 22-14103	Well Number: 299-17-15	Computer Number	Project or Work Order No.: 245450
	Date: 3/29/88		Depth: 113' To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				STARTED DRILLING	7:00	START
113'6"				WENT TO WELD ON NEXT JOINT OF	7:30	
+ 10-0				PIPE BUT WAS SHUT DOWN TO WELD UNTIL		
123'-6"				I GOT A FRESH AIR PACKAGE		
10' 7½"				Olin Took over	10:00	Finish welding
134'1½"				Drilling	11:00	
6'9"					12:00	
140'10½"				welding	12:30	
				Drilling	1:00	
				welding	2:15	
				Drilling	3:00	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000.021 (5-85)

9 2 1 2 6 5 4 0 4 0 3

DRILL LOG	By C-WAMSLEY	Rig 22-14-103	Well Number 299-17-15	Computer Number	Project or Work Order No. 245450
	Date 3/28/88		Depth 79 To 113		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
78-3½				STARTED DRILLING	7:00	START
+ 8-4½				WELDED ON NEXT JOINT OF PIPE 80'	8:35	SAMPLE DR. SAND
86'-8"				STARTED DRILLING 85'	10:00	SAMPLE " "
+ 10-½				WELDED ON NEXT JOINT ~~[illegible]~~ OF		
96-8½				PIPE. 90'	11:55	SAMPLE " "
+ 9-7½				STARTED DRILLING 95'	1:10	SAMPLE " "
106-4"				WELED ON NEXT JOINT 100'	3:00	SAMPLE " "
+ 7-2				OF PIPE		
113-6"				STARTED DRILLING 105'	3:40	SAMPLE " "
				WELDED ON NEXT JOINT 110	4:40	SAMPLE " "
				OF PIPE		

REMARKS: STARTED SMELLING AMMONIA ABOUT 88'

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 8000 021

DRILL LOG	By C-LUMSLEY	Rig 22-14-103	Well Number 299-17-15	Computer Number	Project or Work Order No. 245450
	Date 2/25/88		Depth 37 To 79		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40'-4"				STARTED DRILLING	7:00	START
+ 9'7"				WELDED ON NEX JOINT OF		
49'-11'				PIPE.		
+ 9-3				STARTED DRILLING		SAND
59-2				TOOK SAMPLE 45' FINE SAND	7:30	DRILL BARRELL.
+ 9-11½				TOOK SAMPLE 50' FINE SAND	10:30	" "
69-1½				WELED ON NEXT JOINT OF PIPE		
+ 9-2"				STARTED DRILLING AGAIN		
78-3½				TOOK SAMPLE 55' FINE SAND	11:50	" "
				" " 60' " "	1:00	" "
				WELDED ON NEXT JOINT		
				OF PIPE		
				TOOK SAMPLE 65' FINE SAND	2:45	" "
				" " 70' FINE SAND	4:30	" "
				WELDED ON NEXT JOIN OF		
				PIPE.		" "
				TOOK SAMPLE 75' FINE SAND	5:30	WENT HOME.

REMARKS:

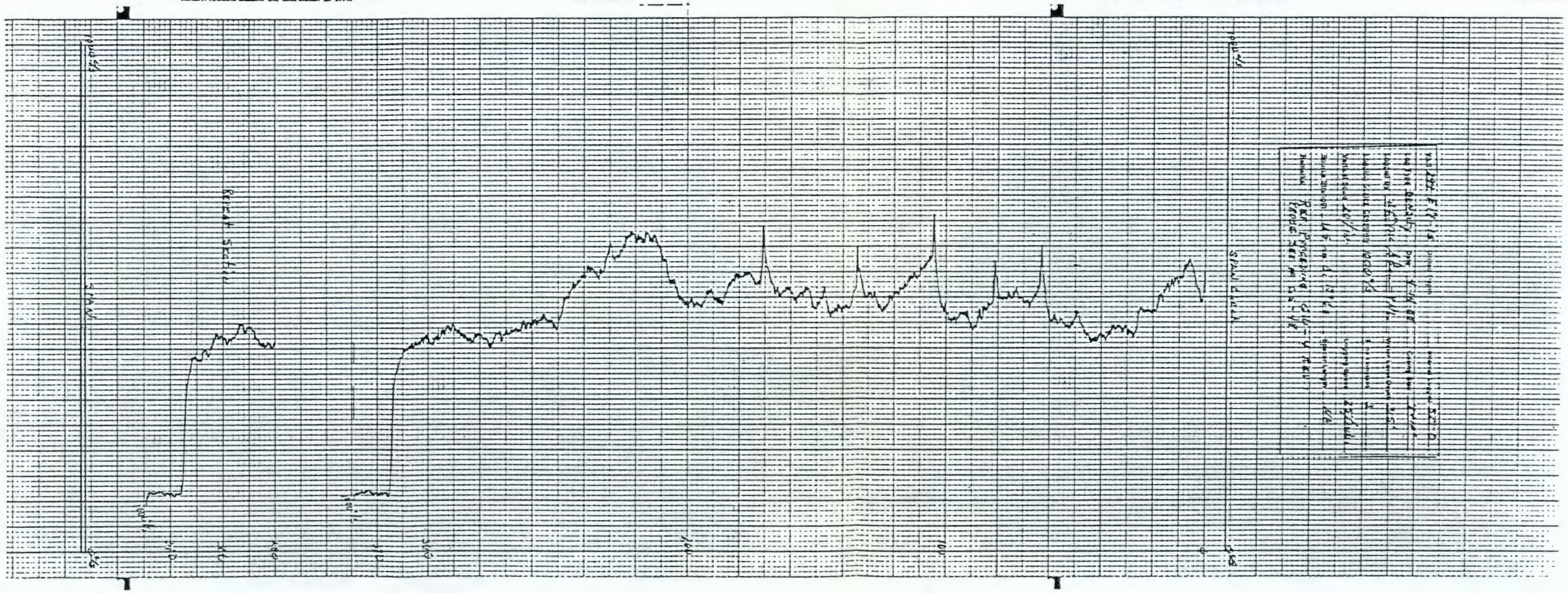
D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By C. WAMSLEY	Rig 22-14103	Well Number 299-17-15	Computer Number	Project or Work Order No. 245450
	Date 3-24-88		Depth 0 To 37		Subcontract No.

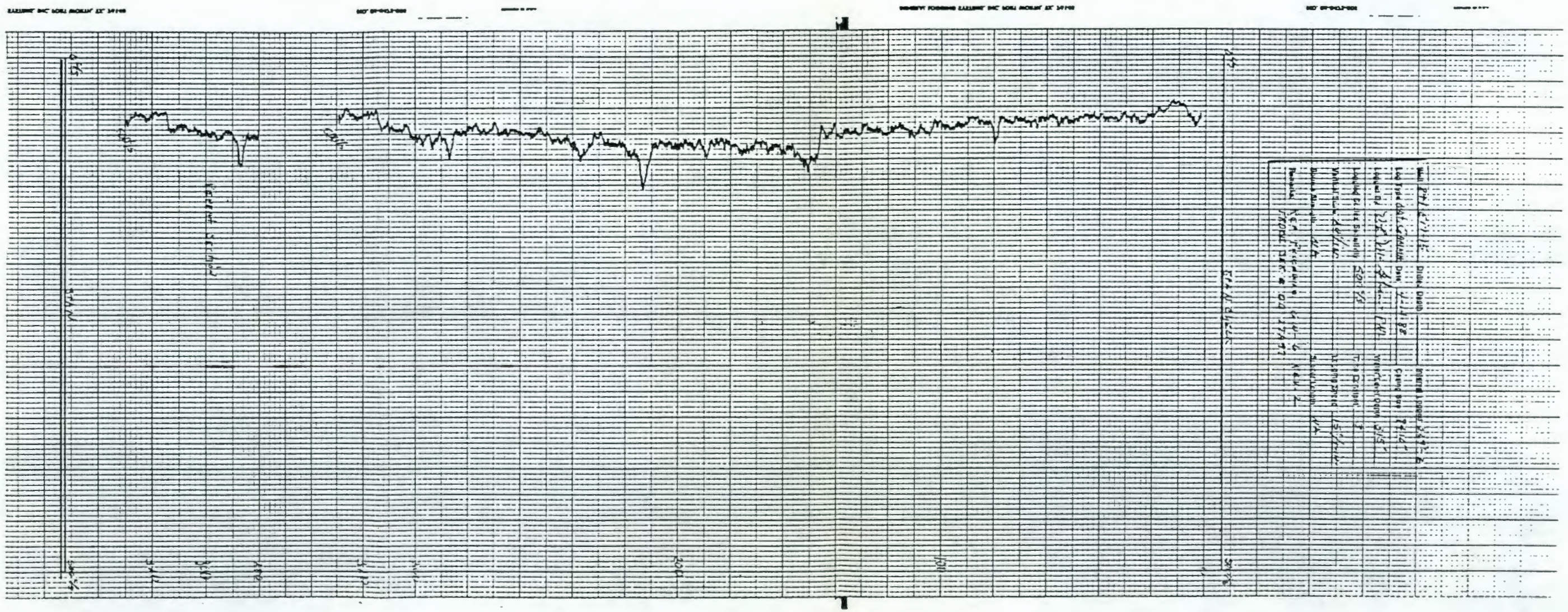
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'3"				CAME TO RIG AT 3:30		
20'1"				HAD TO FAB. UP WRENCHES TO		
40'4"				FIT SQUARES. THEN WELDED ON	3:30	STARTED
				JOINT OF PIPE 20'1" WENT		
				TO PUT PIPE TO BOTTOM of		
				HOLE BUT HAD CAVED BACK		
				IN TO 26' HAD TO REDRILL		
				BACK TO 37'	5:30	FINISHED

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

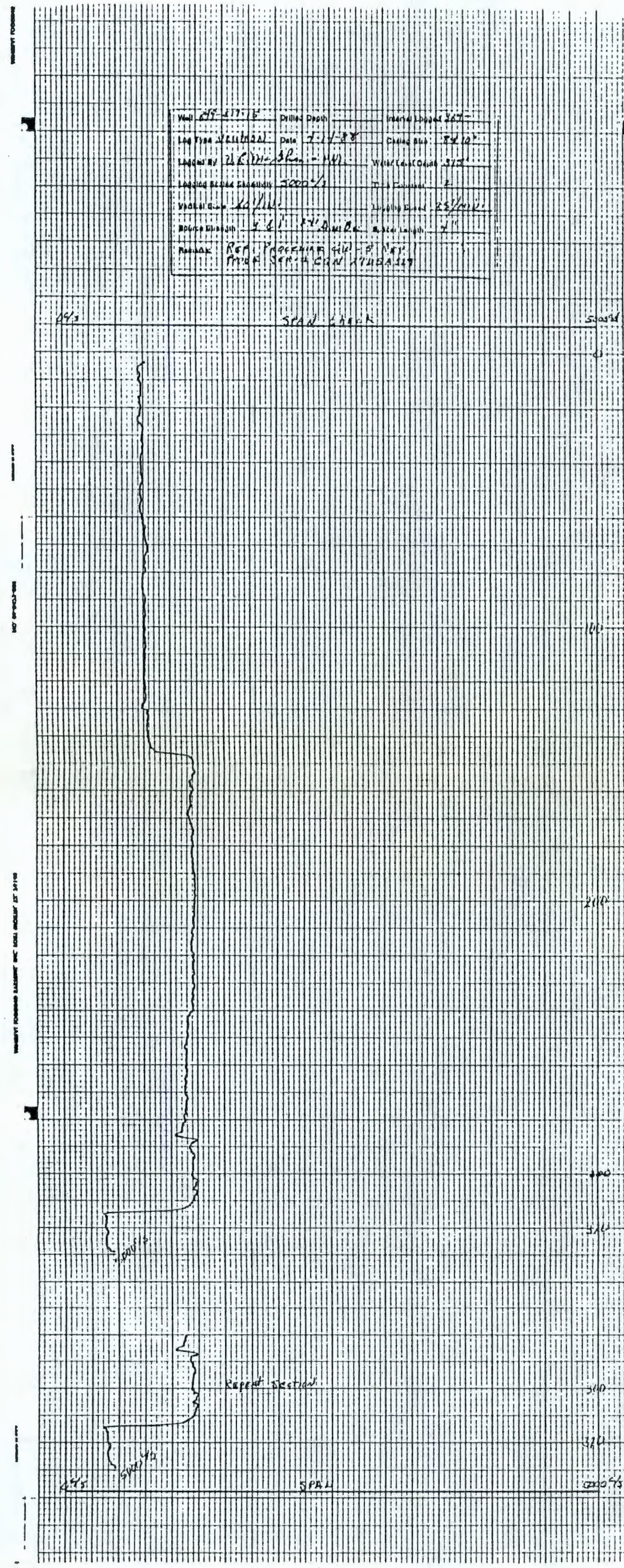


9 2 1 2 6 4 0 4 0 6



9 2 1 2 6 - 4 0 4 0 7

9 2 1 2 6 4 0 4 0 8



Well
Drilled Depth
Interval Logged
Log Type
Date 7-14-88
Casing Size
Logged By
Water Level Depth
Logging Scale Sensitivity 5000 c/s
Time Constant 2
Vertical Scale
Logging Speed
Source Strength
Source Length
Remarks
SPAN CHECK
0
100
200
300
Repeat Section
SPAN

WELL 299-E17-16

9 2 1 2 6 4 0 4 0 9

THIS PAGE INTENTIONALLY
LEFT BLANK

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299 E17 16 Geologist T. Gilmore Page 1 of 3

Reviewed by V.L. McShane Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		5		SAND w/ Silt
Cement Grout (19.0'-1.5')		10		"
		15		"
10" Temporary Carbon Steel casing		20		"
133' total		25		"
		30		"
8" Temporary Carbon Steel casing		35		" moist [illegible]
336'5 1/2" total		40		SAND coarse to medium sand
		45		"
4"-dia. Stainless Steel		50		"
casing		55		
		60		"
8-20 mesh granular		65		"
bentonite seal		70		"
(300.5'-19.5')		75		
		80		"
		85		Measured to [illegible] 2 filling at 95'
		90		SAND
		95		"
		100		"
		105		SILT at 105'-107'
		[illegible]		SAND
		[illegible]		"
		120		"
		125		"
				"

A-1800-186 (3/87)

9 2 1 2 6 4 0 4 1 0

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299 E17 16 Geologist T Gilmore Page 2 of 3

Reviewed by W.L. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
10" dia. temporary carbon steel casing		135		"
		140		"
		145		"
8" dia. temporary carbon steel casing		150		"
		155		"
		160		SAND $CaCO_3$ rich
8-30 mesh granular bentonite seal		165		"
		170		"
		175		"
4" dia. stainless steel casing		180		"
		185		"
		190		"
		195		"
		200		" Thin $CaCO_3$ cemented layers
		205		"
		210		" Thin silt layers w/ $CaCO_3$ cementing
		215		"
		220		"
		225		"
		230		"
		235		" layered (~5cm) poorly developed caliche
		240		GRAVELY SAND @ 235'
		245		SANDY GRAVEL @ 245'
		250		"
		255		"
				"

A-1800-186 (3/87)

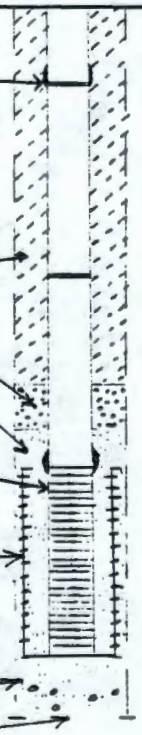
9212654041

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299 E17 16 Geologist T Gilmore Page 3 of 3

Reviewed by D. L. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
4" dia., stainless steel casing		265		"
		270		SAND
		275		"
		280		"
Granular bentonite seal (8-20 mesh) (300.5-19.5')		285		GRAVELY SAND
		290		SILT [illegible]
Bentonite Pellet Seal (305-300.5)		295		" [illegible] 296'-299'
10-20 Sand filterpack (331-305')		300		SAND
20 slot, 4" dia., stainless steel screen (329.8 to 309.1)		305		SANDY GRAVEL
		310		"
8" 30 slot Telescoping Screen		315		"
(2) 10' Wenner tagends 309'-329'		320		"
		325		SAND
		330		SANDY GRAVEL
10-30 Colo. Silica Sand 2'		335		GRAVELLY SAND
Natural fill 5'				337' Total Depth

A-1800-186 (3/87)

9 2 1 2 6 4 0 4 1 2

9 2 1 2 6 5 4 0 4 1 3

pg 1 of 4

DRILL LOG	By: Gilmore	Rig: Bucyrus Erie 22-RH, Wash 517	Well Number: 299 E17-16	Computer Number: NA	Project or Work Order No.
	Date: 3/10/88		Depth: 0 To 15'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Geologists on location	6:45	
	5'	D	Dry	SAND 2% VFp, 1% VCS, 2% CS, 5% MS, 40% FS, 40% VFS, [illegible]; Fair sort; 60% BSLT, 40% Silica-rich, (Silica, indan qtz), qtz grains are subangular occasionally frosted, [illegible]) Basalt gravels are subrounded-subangular Dry color 10YR 5/3 w slight reaction HCl, Slight to unconsolidated Moisture & geol sample taken	8:15	
15' 5 1/2" of 10"				Add 10" casing. 15' 5 1/2"		
	10'	D	Dry	SAND, trace MP 1% VFP, 2% VCS, 2% CS, 10% MS, 35% FS, 35% VFS, 15% silt. Well sorted. 60% Basalt, 40% qtz, gravels are angular to rounded; sand - angular to subrounded. Dry color: 10YR 5/3 (brown). Moderate reaction w/ 10% HCL, Unconsolidated. Moisture & Geology sample taken, Similar to previous sample	9:30	
	15'	D	Dry	SAND 10% VFp, 25% VCS, 25% CS, 15% MS, 10% FS, 10% VFS, 5% Silt, Fair-well sort, 70% Basalt, 30% silica-rich, (unconsolidated qtz) angular - [illegible] gravels have [illegible]	10:05	

REMARKS:

KENAI [illegible]
3-10-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

25'4

DRILL LOG	By Teel/Gilmore	Rig B.E. Wash 1517	Well Number 219-E17-16	Computer Number NA	Project or Work Order No.
	Date 3-10-88		Depth 15' To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	15'			[illegible] unconsol. [illegible]		Tr finer grain sample
15'5½" of 10"				layer of slight [illegible] silt, [illegible] previous		[illegible]
10'5½				sample and [illegible]		"clods" - look like ripup
25'11"	20'	D	Dry	SAND (2% gravel, 98% sand) trace MP, 1% FP, 1% VFP,	1040	clasts - [illegible]
				10% VCS, 40% CS, 25% MS, 10% FS, 13% vfs and silt		
				Mod-well sorted. (Gravels) - 80% basalt, 20% Si-rich		
				(Sand) - 60% basalt, 40% Si-rich. Gravels and sands are		
				angular to sub-angular. Dry color: 10YR 6/2 (light brownish		
				gray. No to v. slight reaction w/ 10% HCL. Unconsolidated		
				Added 10'5½" of 10" casing. Similar to previous sample.		
				At 25'-35' [illegible] gravel,		
25'11" of 10"				coarse to fine sands w/ ripup clasts in fine material		
	25'	D	Dry	SAND 1% MP (ripup clasts) 2% VFP, 20% CS, [illegible] MS, 15% FS,	1320	
				5% VFS, 5% Silt, Moderately sort, 60% Basalt, 40% Si-rich		
				(pseudo [illegible]), Subang - Subround, Dry color 10YR 6/2		
				(light brwn gy) Moderate rxn in HCL, the "ripup clasts" have a calcium		

REMARKS:

[illegible] KEH NI
3-10-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 4 1 5

3/4

DRILL LOG	By Gilmore/Tool	Rig Bucyrus Erie 22-140 Wash 15.7	Well Number 299 E17-16	Computer Number A34	Project or Work Order No.
	Date 3/10/88		Depth 25 To 35		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	25' cont.			carbonate cement, unconsolidated [illegible], coarse sand than previous		
25'11" of 10"				sample		
10 11						
36 10"				Added 10'11" of 10" casing		
	30'	D	Dry	SAND <1% F and VFP, 5% VCS, 15% CS, 25% MS,	1453	Moist zone at 34'
				30% FS, 15% VFS, 9% silt. Moderately to well-sorted		
				60% Basalt, 40% Si-rich. Angular to sub-rounded.		
				Dry color: 10YR 6/2 (lt brownish gray). Moderate reaction		
				to 10% HCL. Unconsolidated. Weak-$CaCO_3$ cemented		
				"balls" or "rip-up clasts". Slightly finer-grained than		
				previous		
	35	D	Moist	SAND 4% Fp, 4% VFp, 30% VCS, [illegible] CS, [illegible], 17% FS, 6% VFS,	1510	Samples very Moist
				5% silt, Moderate to [illegible], 70% [illegible], [illegible], ([illegible]		
				qtz), Subangular [illegible], moderate to low sphericity, Dry color		
				10YR 7/2 (light) [illegible], [illegible], [illegible]		
				[illegible] previous [illegible]		

REMARKS:

E R Shine KUNAT
3-10-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

9 2 1 2 6 1 0 4 1 6

DRILL LOG	By [illegible]	Rig Bucyrus Erie 22-1410	Well Number 209 E17 [illegible]	Computer Number N/A	Project or Work Order No.
	Date [illegible]		Depth 35 To 40		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	40	D	Moist	SAND 20% VCS, 40% CS, 20% MS, 15% FS, 5% VFS, well sorted,	1525	
				60% BSLT 40% Siliceous [illegible] clr-wht qtz, subangular,		
				Dry color 10YR 6/2 (lbn gy), Slight to moderate rxn in HCl		
				unconsolidated, better sorted than previous sample		
					1530	End of Day

REMARKS:

[illegible] 3/6/88

D.R. [illegible] 3-10-88
KEH AI

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5 86)

DRILL LOG	By Teal/Gilmore	Rig B, E, Wash 1517	Well Number 299-E17-16	Computer Number NA	Project or Work Order No.
	Date 3-11-88	Louis	Depth 415 To 45		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
36'10" of 10"				Geologists arrive on site	0700	
8'11 3/4"						
45'9 3/4" of 10"				Driller arrives - welding casing - 8'11 3/4"	0710	
				RPT arrived and checked previous samples with a GM.	0835	
				Showed readings slightly above background.		
				No noticable ammonia odor so far. (The odor is detectable	845	Began drilling
				below the TLV for ammonia)		Samples are still
						moist
	45'	D	Slightly Moist	SAND 1% FP, 1% VFP, 5% VCS, 20% CS, 40% MS, 25%	0915	
				FS, 8% VFS and silt. Well sorted. Gravels and sands are		
				60% basalt, 40% qtz (clear dom.) and Si-rich. Gravels and sands		
				are angular to sub-angular. Dry color: 10YR 6/2 light brownish		
				gray. Slight to moderate 10% HCL reaction. Unconsolidated.		
45'9 3/4"				Similar to previous sample. Moisture, hazardous waste and geol. samples taken.		
8 10 3/4						
54'8 1/2	of 10"			Added 8'10 3/4 of 10"	0930	Adding casing
				Samples appear dryer "1" on previous; very moist zone		
				was from 34' to approx 45'. Less $CaCO_3$ cemented "clods" in		
				Samples	10:30	Began drilling

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 0 4 0 4 1 3

3/4

DRILL LOG	By Gilmore/Teel	Rig Bucyrus Erie 22-1410	Well Number 299 E17 16	Computer Number N/A	Project or Work Order No.
	Date 3/4/88		Depth 50 To 55		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	50'	D	Moist	SAND 1% MP, 3% FP, 3% VFP, 15% VCS, 30% CS, 30% MS, 10% FS, 8% VFS, Well-mod sort, 65% basalt, 35% Silica-rich, Sands are angular to subangular, gravels are subangular to occasionally rounded, Dry Color 10YR 6/2 (lt brn gray), Moderate rxn in HCl, some cementing of grains forming sand clods, may possibly be layered in subsurface, but are not in sample, overall sample is unconsolidated, moisture content appears to have increased, Similar to previous sample. Moisture, Geol., and Haz waste samples collected,	11:05	
	55'	D	Moist	SAND 3% FP, 2% VFP, 10% VCS, 25% CS, 40% MS, 10% FS 10% VFS and silt. Well sorted: Gravel: 85% basalt, 15% qtz and Si-rich. Sand: 60% basalt, 40% qtz and Si-rich Gravels and sands are angular to sub-rounded. Dry color: 10YR 6/2 (lt brn gray). See $CaCO_3$ cemented clods in gravel portion. Unconsolidated. Slight to moderate reaction to 10% HCl. Similar to previous. Moisture, Geol, and Haz waste samples collected.	11:45	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: Gilmore & Teel	Rig: B.E. 22-1410 Wash 1517	Well Number: 299-E17-16	Computer Number	Project or Work Order No.
	Date: 3-11-88		Depth: 60 To 65		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	60	D	Moist	SAND 3% FP, 1% VFP, 5% VCS, 30% CS, 35% MS, 25% FS	11:55	
54'8½" of 10"				11% VFS and silt. Wellsorted. Gravel: 70% $CaCO_3$-rich		
9 7½ 64'4"	of 10"			sandy/silty "clods", 30% qtz. Sand: 55% basalt, 40% qtz and		
				Si-rich, 5% mica. Gravels are angular to sub-rounded.		
				Sands are dominantly angular to sub-angular but some sub-rounded.		
				Dry color: 10YR 6/2 (lt bra.gray). Moderate to slight HCL reaction.		
				Unconsolidated. Similar to previous except for mica. Moisture, Geol. and		Haz Waste samples taken.
				Added 9'7½" of 10"	12:00	Adding casing
					12:50	Began drilling
	65'	D	Moist	SAND 1% FP and VFP, 5% VCS, 25% CS, 40% MS, 20% FS,	13:07	
				10% VFS and silt. Moderately to well sorted. Gravel: 90% basalt		
				10% qtz. (Sand) - 55% basalt, 35% qtz and Si-rich, 5% mica		
				Gravel: angular to subangular. Sand: angular to sub-		
				rounded. Dry color: 10YR 6/2 (lt brownish gray). Moderate		
				reaction to 10% HCL. Unconsolidated. Similar to previous		
				Moisture, Geology, and Haz. Waste samples taken.		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By Teel/Gilmore	Rig B.E. 22-1410 Wash 1517 Louis	Well Number 299-E17-16	Computer Number NA	Project or Work Order No.
	Date 3-11-88		Depth 70' To 75'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	70'	D	Moist	SAND 2% FP and VFP, 3% VCS, 15% CS, 50% MS, 20% FS,	13:30	
64'4" of 10"				10% VFSand silt. Moderately to Well sorted. (Gravels): 80%		
74				basalt, 20% qtz. (Sand): 55% basalt, 40% qtz and Si-rich,		
71' 8"				5% mica. Gravels are angular to sub-angular. Sands are angular		
				to sub-rounded. Moderate reaction to 10% HCL. Dry color:		
				10YR 6/2 (H brownish gray). Unconsolidated. Similar to previous.		
				Moisture, Hazardous Waste, and Geology samples collected.		
				Added 7'4" of 10"	13:35	Adding casing
					14:10	Began drilling
				RPT shoved up, nothing above background	14:55	
	75'	D	Moist	SAND 3% Fp 2% vfp, 20% VCS, 30% CS, 20% MS, 14% FS, 11% VFS, No Silt,	14:40	
				Well sorted. Gravels 75% BSLT, 25% silica-rich Sands 60% BSLT,		
				40% Silica-rich (predom qtz w/ some qtzite, micas (Biotite))		
				Gravels are subrounded, Sands are angular to subangular, Moderate		
				rxn to HCl Dry Color 10YR 6/2 (H brn gy), unconsolidated, Very similar		
				to previous slightly more coarse and better sorted		
				Moisture, Haz waste, Geology Samples taken		

REMARKS:
Bbl hole @ 35' TD 75'
Casing 71' 8" of 10" 3/11/88 J Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By Gilmore/Teel	Rig B.E. 22-1410 Wash 1517 Louis	Well Number 299-E17-16	Computer Number NA	Project or Work Order No.
	Date 3-14-88		Depth 80' To 85'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
71'8" of 10"					0700	Driller arrives
9'7 1/4				Added 9'7 1/4" of 10"		welding casing
81 3/4						
	80'	D	Moist	SAND 1% Fp, 3% VFp, 2% VCS, 25% CS, 30% MS, 25% FS, 15% VFS, well sorted, Gravels 70% Basalt, 30% Silica-rich, Sands 50% Basalt, 50% Silica-rich (potassic qtz, Tr gen translucent qtz, yel-rd cht, Tr mica) Gravels subround, Sands subangular to angular. Dry color 10YR 5/2 (gy brn), Moderate rxn in HCl, some sand "clods" w/ $CaCO_3$ cement, unconsol, very similar to previous samples	835	
	85'	D	Moist	SAND 5% CP, 5% MP, 1% FP, 1% VFP, 15% VCS, 20% CS, 35% MS, 10% FS, 4% VFS, 4% silt, Mod-poorly sorted. (Gravels) - 80% basalt, 20% qtz, Sand - 50% basalt, 50% qtz and Si-rich including: clear + translucent qtz, chert, and 1-2% mica. Gravels are sub-angular to rounded. Sands are angular to sub-rounded. 10YR 5/2 (gray brown) -	902	
81'3 1/4"				Dry color, Moderate reaction to 10% HCL. Unconsolidated. Note: presence of MP and CP. Coarser than previous		

REMARKS: Jar samples from 0-60' feet were checked with GM and PAM before delivery to lab. No counts seen above background. Moisture samples from 0-75' also delivered to lab on 3/11/88.

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

9 2 1 2 6 4 3 4 2 2

2 of 3

DRILL LOG	By Gilmore/Teel	Rig BE 22-HD Unit 1517 Tools	Well Number 299 E17 16	Computer Number N/A	Project or Work Order No.
	Date 3/14/88		Depth 85' To 90'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	90'	C	Moist	SAND 40% CS, 40% MS, 10% FS, 10% VFS, 1 Poorly sorted	925	
				Sands 60% BSLT, 40% Siliciclastic and about clr qtz, Subangular to Angular, Dry color 10YR 6/2 gy bwn, Slight to Moderate rxn in HCl, unconsolidated, Sample is very well sorted, better sorted than previous sample. no pebbles		
81 3 1/4 9' 7" 90' 10 1/4"	of 10" of 10"			Welding 9' 7" of 10" added 90' 10 1/4" of 10" total	930	
				Ammonia smell detected at borehole, photoionizer (HNU) meter "pegged" out.	950	
				Drilling on standby until HEHE monitor, and Radiation protection Tech. (RPT) can check borehole		
				RPT did not find any radiation	1045	
				Welding use Respiratory protection monitor found 1000 ppm at the borehole of ammonia; Oxygen/Combustion detector only showed slight deflection should not be a combustion problem — Fresh Air is needed for ammonia for work near the wellhead, a fresh air setup is now being located	1100	

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

DRILL LOG	By: Gilmore/Teel	Rig: Burgus Drill	Well Number: 299 E17 16	Computer Number: N/A	Project or Work Order No.
	Date: 3/14/88		Depth: 90' To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Air Bottles arrived	1300	
				finished Welding	1430	
				HEHF monitor showed up to test for ammonia & calibration	1420	
				HEHF monitor checked concentration after casing was driven.		
				Detector tube concentration was ≈ 200ppm. OVA showed		
				readings of 1-2ppm. It was speculated that the activity		
				of driving casing could have closed off the contamination, so		
				the HEHF monitor agreed to re-check after drilling a couple		
				more feet. The 2nd check showed ammonia concentrations		
				over 1000 ppm (detector tube). The OVA (calibrated		
				for methane) showed a maximum of 5ppm of an unkown		
				organic vapor.		
				HEHF and Westinghouse Respitory Protection will be		
				out in the morning to monitor.		
				RPT arrives. GM shows no readings above background	15:15	
				Released moisture and geologic samples		
90' 10 1/4" of 10"					15:25	End of day

REMARKS:

D/B 90'
Footage - 15'

Steve Teel
3-14-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

1/5

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 20-1410 wash 1517	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/15/88		Depth: 90' To 90'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
90' 10 1/4" of 10"				Geologist & Driller on location	655	
				Check well head w/ photo ionizer - no detectable organics		
				there is no ammonia smell around well		
				checked well w/ polytest detector tube; Tube stained		
				a brown to green discoloration - Smell long; due to engine on		
				Rig? or Trace of nitrous gas possible		
				Drilling	720	
				After first drive barrel recovery, ammonia could be smelled		
				in the sediments, smell still not very strong		
				well head checked w/ photoionizer, no detection at wellhead,	740	
				there was a slight detection however in the sediments		
				Believed high pressure washing system pushing ammonia &		
				other vapors into formation		
				Respiratory Protection monitor smart up found 30 ppm ammonia	755	
				coming from sediments, none from wellhead, will be here		
				in afternoon -		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-86)

2 of 5

DRILL LOG	By: T Gilmore	Rig: B.E. 22-[illegible]	Well Number: [illegible]	Computer Number: NA	Project or Work Order No.
	Date: 3/15/88	[illegible] 1517	Depth: 90' To 100'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	95'	D	Moist	SAND, 8% VCS, 32% CS, 30% MS, 15% FS, 15% VFS, well sorted, 60% BSLT, 40% Si-rich, pardom clear quartz, Tr micas, subangular to angular, Dry color 10YR 6/2, slight to Moderate rxn in HCl, Some Sand "clots", CaCO3 cmnt, unconsolidated very similar to previous sample	755	
	100'	D	Moist	SAND, 20% CS, 30% MS, 30% FS, 20% VFS, Very well sorted, 60% BSLT, 40% Si-rich, pardom clr qtz, Tr micas, more dark micas than previous, subangular to angular, Dry color 10YR 6/2 (grayish brown), Some Sand clots, Sl-mod rxn in HCl, unconsol very similar to previous slightly less coarse grained	805	
76 10'1/4 8'3" 99'1/4"				Welding 8' 3" of 10" 99' 1¼" of 10" total	830	
				HEHF showed up, and are placing detectors on Rig and Driller for ammonia exposure	835	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

92126 10426

3/5

DRILL LOG	By: T Gilmore	Rig: BE	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/15/85	[illegible]	Depth: 100' To 110'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	105	D	Moist	SAND 5%VCS, 15%CS, 25%MS, 30%FS, 20%VFS, 5%Silt, well-sorted, 50% Basalt, 50% Si-rich (pred qtz, sd-ang clst, Fe stn on qtz) Subangular-angular, 10YR 6/2 (gy brn), Mod rxn in HCl, Sand/Silt "clods" have slig rxn in HCl, Unconsol-slight consol 7x silt layers (thin; cent thick) More silt than previous, at 107' silt layer occurs, appears several feet thick. SILT at 107' → intact core of silt showed thinly laminated bedding; aol = 2.0 cm thick, nearly uniform gr sz, some grading	945	
	110'	D	Moist	SAND 1%VFp, 9%VCS, 25%CS, 30%MS, 15%FS, 15%VFS, 5%Silt med-well srt ^ 50% BSLT, 50% Si-rich (predom qtz, lost some micas, have Fe stn) silt "clods", Subangular-angular, Dry Color 10YR 6/2, Slight to Mod rxn in HCl, unconsol, occasionally consolidated w/ silt/$CaCO_3$ cmnt less micas than previous, more silty	1005	
99 1/4 9 11/4						
108' 1/2"				Welding 9' 11/4" of 10" 108' 1/2" total	1020	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: T Gilmore	Rig: BE 22-1410 Wash 15-17	Well Number: 399 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/15/88		Depth: 110' To 125'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
108½'				RPT Showed up	1115	
	115'	D	Moist	SAND 10% VFp, 15% VCS, 20% CS, 20% MS, 20% FS, 15% VFS Moderate-well sorted, 60% BSLT, 40% Si-rich (predom clr qtz, Tr micas, Hvy, Fe stn on qtz) Dry Color 10YR 6/3 (gy brn), Moderate rxn in HCl, uncon sol, one small cobble taken from core barrel, overall coarser sample, more pebbles, less silt	1125	Coarser
	120'	D	Moist	SAND 5% VFp, 10% VCS, 20% CS, 35% MS, 15% FS, 15% VFS Moderate-well sorted, 60% BSLT, 40% Si-rich (predom clr qtz) Dry Color 10YR 6/3 (gy brn) Moderate rxn in HCl, unconsolidated Some Sand "clods" w/ Calcium Carbonate cements, Sample is very similar to previous	1140	Same
	125'	D	Moist	SAND, 2% VFp, 3% VCS, 10% CS, 30% MS, 30% FS, 25% VFS, well sorted, 60% BSLT, 40% Si-rich (predom qtz Tr micas, Tr Fe stn) Dry color 10YR 6/3 gy brn Moderate rxn in HCl, Uncon sol, Some Sand "Clots" w/ $CaCO_3$ cmnt, Finer grained than previous	1200	finer

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

B.110

DRILL LOG	By: T Gilmore	Rig: BE 22-1410 wash 1517	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/15/88		Depth: 125' To 130'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
108 1/2"				Driller Breaks for lunch	1200	
9'11 1/4"				Welding 9'11 1/4" of 10" 117'11 3/4" Total	1255	
117'11 3/4"				Respiratory Protection monitor did not find detectable amounts	1255	
				of ammonia at well head		
	130'	D	Moist	SAND 1%Mp, 1%Fp, 3%VFp, 10%VCS, 15%CS, 30%MS, 25%FS,	1420	coarser
				15%VFS Moderate - well sorted, 60% BSLT, 40% Si-rich		
				(pretlow clr - wht qtz, Tr micas, rd-orng Fe stain on qtz, cht)		
				Subangular - angular, Dry Color 2.5Y 5/2 (gy brn),		
				Moderate rxn in HCl, unconsolidated, Coarser grained than		
				previous sample		Too much open hole
117'11 3/4" 8'7"						Sand caving in
126'4 3/4"				Welding 8'7" of 10" 126'4 3/4" Total	1450	
				End of Day	1530	

REMARKS: Casing 126' 4 3/4" of 10" Footage 42' 3/15/88 T Gilmore
TD 132'

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

DRILL LOG	By: T Gilmore	Rig: BE 22 1410 Wash 1517	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 5/16/88		Depth: 130' To 140'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
126' 4 3/4" of		10"		Geologist & Driller on location	700	
				Checked well head for ammonia w/ detector tube; no detectable amounts		
				Drilling	705	
				Check for ammonia w/ detector tubes after drilling 3'; no detectable amounts	715	
	135	D	Moist	SAND 1% FP, 1% VFP, 3% VCS, 5% CS, 35% MS, 35% FS, 20% VF, well sorted, 40% BSLT, 60% Si-rich, (predominate wht qtz, occ w/ Fe stn, clt,) Subangular - Subround, Dry color 2.5Y 5/2 (gy brn), Moderate rxn in HCl, occ sand "clod" w/ $CaCO_3$ cmnt unconsolidated, very similar to previous sample (few micas)	720	
	140	D	Moist	SAND 5% CS, 30% MS, 35% FS, 25% VF, 5% Silt, very well sorted 40% BSLT, 60% Si-rich, (Predominate wht qtz) Subangular to Subround, Dry color 2.5Y 5/2 (lt brn gy) moderate rxn in HCl, some sand "clods" cemented w/ $CaCO_3$, unconsolidated, few more micas finer grained than previous sample	740	

REMARKS:

vib

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

283

DRILL LOG	By T Gailmore	Rig Bucyrus Erie 22-1410 Wash 15-17	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
	Date 3/16/88		Depth 140' To 150'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Respitory Protection Monitor started up, found no detectable ammonia	750	
126' 4 3/4" + 7 1/4						
133' 0"				Welding 6' 7 1/4" dia 133' 0" Total	755	
	145'	D	Moist	SAND, 2% Fp, 5% VFp, 8% VCS, 35% CS, 30% MS, 15% FS, 5% VFS, well sorted, 40% BSLT, 60% Si-rich (predom clr qtz, Tr micas, some Fe stn), Subangular, pebbles are subround, Dry color 2.5Y 6/2 (Hbrn gy), Slight rxn in HCl, no sand "clods" overall coarser grained, less micas, less $CaCO_3$	850	
	150'	D	Moist	SAND 1% VFp, 10% VCS, 15% CS, 25% MS, 25% FS, 20% VFS, 4% silt well sorted, 40% BSLT, 60% Si-rich (predom. clr qtz, few micas) Subangular, Dry color 2.5Y 6/2 (Hbrn gy), Moderate rxn in HCl, Some sand "Clods" w/ $CaCO_3$ & silt cmnt, (mod-strong rxn in HCl), Uncons, Finer grained than previous, more $CaCO_3$ & silt	910	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 4 3 1

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-140 Wash-1917	Well Number: 299 E17 16	Computer Number: N/A	Project or Work Order No.
	Date: 3/16/88		Depth: 150' To 150'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
133' 0" of 10" Total				Switch to 8" casing, changing drive barrel ect.	920	
				RPT showed up checked out samples	1055	
				Respitory protection monitor showed up - no ammonia detected	1309	
				approx 80' of 8" added	1500	
				RPT checked geologist out	1505	

REMARKS:
DB 152
Ft 20'
Casing 133' 0" of 10" total

T Gilmore 3/16/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

183

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-1601	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/17/88		Depth: 150' To 160'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Geologist & Driller on location	700	
				No Ammonia detected at wellhead		
				Welding 8" casing string	705	
151' 6½" of 8"				18-2¾, 20-8½, 19-8, 17-3¼, 18-9¾, 19-3¼, 19-4, 18-3		
				8" casing added		
				Drilling	1050	
	155'	D	Moist	SAND 25%CS, 40%MS, 25%FS, 10%VFS, very well sorted,	1105	
				35% Basalt, 65% Silica-rich (predom clr qtz, Tr micas, Subangular,		
				Dry color 2.5Y 5/3 (gy brn), slight rxn in HCl, unconsolidated,		
				more micas, better sorted and less rxn in HCl than		
				previous sample (No sand "clods")		
	160'	D	moist	SAND 3% VFp, 7%VCS, 10%CS, 35%MS, 25%FS, 20%VFS,	1120	
				well sorted, 40% BSLT, 60% Si-rich, (predom clr qtz, Tr mica,		
				avg-rd cht,) Dry color 2.5Y 6/3 (gy brn), Moderate rxn		

REMARKS:

Reviewed by [illegible] 3-17-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-1410	Well Number: 299 E 17-16	Computer Number: NA	Project or Work Order No.
	Date: 3/17/88		Depth: 160' To 170'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				160' Sample cont. in HCl, sand "clods" have strong rxn in HCl, appear to have $CaCO_3$ cementing, generally unconsol, Sample is slightly coarser grained and has more $CaCO_3$ than previous sample		$CaCO_3$ rich
151'-6½"						
12 1½ 163'-8"	of 8"			Welding 12' 1½ of 8" 163'-8" Total	1130	
	165'	D	moist	SAND 5% VCS, 25% CS, 35% MS, 25% FS, 10% VFS, well sorted, 40% BSLT, 60% Silica-rich, (predom clr qtz, Tr mica, ccc wht qtzite) angular to sub angular, Dry color 2.5Y 6/2 (gy brn), moderate to strong rxn in HCl, abundant sand "clods" w/ $CaCO_3$ cement, unconsolidated to slightly consolidated very similar to previous	1400	$CaCO_3$ rich
	170	D	moist	SAND 1% VFp, 24% VCS, 30% CS, 25% MS, 10% FS, 10% VFS, well sorted, 35% BSLT, 65% Si-rich, (predom qtz, more wht quartzites, few micas) subangular to angular, Dry Color 2.5Y 6/2 (gy brn), strong rxn in HCl, abundant sand "clods" w/ $CaCO_3$ cement,	1415	$CaCO_3$ rich Coarser grained qtzite

REMARKS:

Reviewed by [illegible] 3-17-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

9 2 1 2 5 0 0 0 5 4

3/3

DRILL LOG	By T Gilmore	Rig Bucyrus Erie 22-1410	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
	Date 3/17/88		Depth 170' To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				170 Sample cont. Some sand "clots" approaching a caliche unconsolidated to occasional slight consolidation, coarser grained and more $CaCO_3$ cementing than previous		
163' 8"						
~~9' 10 1/4"~~				Welding 9' 10 1/4" of 8" 173' 6 1/4"	1430	
173' 6 1/4"						
	175'	D	Moist	SAND 5% VCS, 20% CS, 40% MS, 25% FS, 10% VFS, very well sorted, 40% BSLT, 60% Si-rich (predom clr qtz, often w/ Fe stn, rec orng-brn cht, abnt wht qtzite) subangular, lity color 2.5Y 6/3 (gy brn), moderate reaction HCl, unconsolidated, less $CaCO_3$, finer grained, better sorted than previous sample	1520	
				End of Day	1530	

REMARKS: Ft 23' DB 175' Casing 173' 6 1/4"

3/17/87 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 4 3 5

1/6

DRILL LOG	By: T Gillmore	Rig: Bucyrus Erie 22-10/10	Well Number: 299 E17 16	Computer Number: 67	Project or Work Order No.
	Date: 3/18/88		Depth: 175 To 185		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
173' 6¼" of 8"				Geologist & Drillers on location	700	
	180'	D	moist	SAND 1% VCS, 19% CS, 40% MS, 30% FS, 10% VFS, very well sorted, 50% Basalt, 50% Silica-rich (predom clr qtz, some wht qtzite, Fe stn qtz, & cht) subangular to subround, Dry color 2.5Y 6/3 (lt olive gy), "salt & pepper" appearance w/ wht lsh & clr qtz, slight to moderate rxn in HCl, very few sand "clods", unconsolidated, less CaCO3 and better sorted than previous Geol & moist smpls taken	720	M Sand, no CaCO3
175' 6¼" 9' 4¼"						
182' 10½"				Welding 9' 4¼" of 8" 182' 10½"	725	
	185'	D	moist	SAND 5% CS, 55% MS, 35% FS, 5% VFS, very well sorted, 40% Basalt, 60% Silica-rich (predom clr qtz, Tr mica, wht qtzite Fe stn qtz, orng cht & a gray translucent rock) Subround to subangular, Dry color 2.5Y 6/2 (gy lsh), moderate to strong rxn in HCl, sand "clods" w/ CaCO3 cment, more CaCO3 than previous Unconsolidated Geol & moist Smpls taken	810	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

286

DRILL LOG	By: T Gilmore	Rig: BE 22-1410	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/15/88		Depth: 185' To 195'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	190'	D	Moist	SAND 5% VCS, 15% CS, 50% MS, 25% FS, 5% VFS, very well sorted, 50% BSLT, 50% Silica-rich, (predom clr qtz, few micas, abnt orng Fe stn qtz), subround to subangular, Dry color 2.5Y 6/2 (brn gy), "salt & pepper" appearance w/ Blk bslt & clr qtz, moderate rxn in HCl, some sand "clods" w/ CaCO3 cmnt, unconsol, very similar to previous Geol & Moist smpls taken	820	
18' 10½" 9' 11"						
193' 9½" of 8"				Welding 9' 11" of 8" 193 9½" of 8" total	825	
				Hole caved in ~10'		
	195'	D	Moist	SAND 1% VFp, 4% VCS, 10% CS, 45% MS, 30% FS, 10% VFS well sorted, 35% Basalt, 65% Si-rich (predom clr qtz, occ wht qtzite, orng Fe stn qtz, very few micas, no salt & pepper appearance) subangular, Dry color 2.5Y 6/2 (brn gy), slight to moderate rxn in HCl, not as well cemented as previous, unconsolidated, similar to previous sample Geol & Moist smpls taken	1020	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 4 3 7

3/6

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-1410	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/18/88		Depth: 195' To 205'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	200	D	moist	SAND 2% Fp, 3% VFp, 20% VCS, 30% CS, 25% MS, 15% FS, 5% VFS	1045	Coarser gr
				well sorted, 35% BSLT, 65% Silica-rich, (Predom clr qtz, occ wht		Calcrete layering
				qtzite, orng-yel cht, Fe stn qtz), Subangular, Dry color 2.5Y 6/2		
				(brn gy), moderate rxn in HCl, occ Sand "clots" w/ $CaCO_3$ cement,		
				Sample from core barrel shows layering 3-5 cm thick of		
				poorly developed calcrete (wht $CaCO_3$ cemented layers) This		
				layering is likely common throughout the section drilled.		
				unconsolidated, sample is slightly coarser grained than previous		
				Sample Geol & Moist samples taken		
192' 9½" 8'						
200' 9½" of 8"				Yielding 8' 0" of 8" 200' 9½" Total		
				RPT showed up	1100	
	205'	D	Moist	SAND 10% VFP, 15% VCS, 35% CS, 25% FS, 5% VFS well sorted,		
				50% BSLT, 50% Silica-rich, (Predom clr qtz and wht qtzite, occ		
				cht) Subangular, Dry Color 2.5Y 6/3 (Brn gy), "Salt and Pepper"		
				appearance w/ Blk BSLT & wht-clr qtz & qtzite) More Blk Basalts in		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 5 4 4 4 8

4 of 6

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-140	Well Number: 299 E11 16	Computer Number: N/A	Project or Work Order No.
	Date: 3/18/88		Depth: 205' To 210		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				205' Sample cont. sample moderate to strong rxn in HCl, some sandclots" or layers of poorly developed caliche, unconsol sample is coarser grained than previous sample moist: Good sampl		
				Checked for [illegible] – none detected used photo-ionizer, occasional deflection on meter, no consistent reading	1250	
200' 9½" & 4½"						
209' 2"				Welding 8' 4½" of 8" 209' 2" Total	1300	
	210	D	Moist	SAND, 2% Fp, 3% UFp, 10% VCS, 15% CS, 30% MS, 25% FS, 10% VFS, 5% Silt, wellsorted, 40% BSLT, 60% Silicaceous (predom, clr qtz, some wht qtzite), Subangular, Dry color 2.5Y 6/3 (gy brn), moderate to strong rxn in HCl, some sandclots w/ $CaCO_3$ cement unconsolidated, coarser grained than previous sample, and contains silt, some silt may form thin layers in subsurface moist: Good sampl	1350	Silt

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

9 2 1 2 6 5 4 0 4 3 9

5/6

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-1410	Well Number: 299 E17 16	Computer Number: N/A	Project or Work Order No.
	Date: 5/18/88		Depth: 210' To 220'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
209'8"						
	215'	D	moist	SAND 2% VFp, 15% VCS, 25% CS, 30% MS, 15% FS, 8% VFS, 5% Silt, moderate sorting, 50% BSLT, 50% Si-rich, (predom clr qtz and occ wht qtzite), Dry Color 2.5Y 6/2 (brngy), moderate to strong rxn in HCl, some $CaCO_3$ cemented sand "clots", fragments of a slightly to moderately consolidated silt layer, generally sand is unconsolidated, Sample has more silt than previous sample Geol: Moist Smpl	1410	Silt layer
						~~[illegible]~~ Silt $CaCO_3$ Cmnt loose Sand
9'3¼"						
218'5¼"				Welding 9'3¼" of 8" 218'5¼" Total	1415	
	220'	D	moist	SAND 3% VFp, 20% VCS, 30% CS, 25% MS, 12% FS, 10% VFS, well sorted 50% BSLT, 50% Si-rich, (predom qtz: wht qtzite) subangular, Dry Color 2.5Y 6/2 (brngy), moderate rxn in HCl, some $CaCO_3$ Cmnt, generally unconsolidated, very similar to previous without the silt Geol: moist Smpl	1500	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

9 2 1 2 0 4 0 4 4 0

6 of 6

DRILL LOG	By T Gilmore	Rig Bucyrus Erie 22-1410	Well Number 299 E17 16	Computer Number	Project or Work Order No.
	Date 3/18/88		Depth 220' To 225'	NH	Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	225	D	moist	SAND, 3% Fp, 2% VFp, 15% VCS, 25% CS, 30% MS, 20% FS, 5% VFS, well sort 50% BSLT, 50% Si-rich, Subangular Dry color 2.5Y 6/2 (Lt Gray), moderate rxn in HCl trace CaCO3 cont, unconsol, very similar to previous Moist & Good Sample taken	1525	

REMARKS: Ft 50' DB 225' Casing d18' 5/4"

Tyler Gilmore 3/18/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-410 (Kaiser)	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.: Kaiser
	Date: 3/31/88		Depth: 225' To 235'		Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
218' 5¼" of 8"				Driller: Geologist on location	700	
				Drilling	710	
	230'	D	moist	SAND 10% VCS, 30% CS, 30% MS, 20% FS, 5% VFS, 5% silt well sorted, 35% Basalt, 65% Silica-rich (incl predom clr qtz, Tr wht qtzite, grn transl rock?, obnt orng Fe stn) Subangular, Dry color 2.5Y 6/1 (brn gy), moderate to occ strng rxn in HCl, core barrel sample is layered w/ ~5cm thick CaCO3 cemented layers (poorly developed caliche) often topped w/a thin (<1cm) layer of silt, unconsolidated, similar to previous sample	720	silt layers w/caliche
218' 5¼ 9 9				Moisture: Good smpls		
228' 2¼"				Welding 9' 9" of 8" 228' 2¼" Total	740	
	235'	D	moist	GRAVELLY SAND 2% Mp, 5% Fp, 8% VFp, 20% VCS, 30% CS, 15% MS, 8% FS, 7% VFS, 5% Silt, moderate-poor sort, 50% BSLT, 50% Silicaceous (predom clr qtz w/ wht qtzite, grn transl metamorphic?, Fe stn on qtz similar to previous mineralogy), Subangular, Dry color 10YR 5/1 gray, slight to moderate rxn in HCl, unconsolidated	850	silt layers w/caliche gravel Lith Change

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

282

DRILL LOG	By T Gilmore	Rig BE 22-1410 Kaiser	Well Number 299 E17 16	Computer Number N/A	Project or Work Order No.
	Date 3/21/88		Depth 235' To 240'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				235 Cont. layering of silt - $CaCO_3$ cemented sand, Trace of		
				of better developed calcrete in sample also. Sample showed an		
				increase in $CaCO_3$ and is coarser grained than previous sample		
328' 3/4" 9'1"				Fe staining also increased at 237', abundant silt/calcrete layers, Moist; Geol smpl		
237' 3/4" at 8"				Welding 9'1" at 8" 237' 3/4" total	905	
	240'	D	Moist	SLIGHTLY GRAVELY SAND 2%Mp, 2%Fp, 6%VFp, 20%VCS, 30%CS,	1010	dk brn silt layer assec w/
				20% MS, 8%FS, 7%VFS, 5% silt, Moderate - poor sorting,		$CaCO_3$, slightly consolidated
				40% Basalt, 50% Silica-rich (predom clr qtz w/ wht, pink qtzite,		
				grn metamorphic, abundant Fe stn) Dry color 10YR 5/1(gy),		
				moderate to strong rxn in HCl, abundant pieces of dk brn silt;		
				very thin hard layers associated w/ $CaCO_3$ cemented sands, basalt		
				gravels are low sphericity (flat), subangular, slightly consolidated		
237' 3/4" 9'8 1/4" 246' 11 1/2"				Similar to previous Geol & moisture smpl.		
				Welding 9'8 1/4" at 8" 246' 11 1/2"	1030	
				John Keller of Kaiser shut rgs down for Day; Westinghouse and	1250	
				the State Dept of Ecology are in discussion		

REMARKS: DB 244' F+ 19' Casing 246' 11 1/2"

John Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

185

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-1410	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/22/88		Depth: 240' To 245'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
246' 11½"				Geologist on location	655	
				Driller on location	705	
				Changing drilling line out	710	
				Drilling	1000	
	245	D	moist	SANDY GRAVEL 1% VCp, 9% Mp, 10% Fp, 10% VFp, 15% VCS, 15% CS,	1030	
				15% MS, 10% FS, 10% VFS, 5% Silt, Moderate-poor sorting,		
				55% Basalt, 45% Silica-rich, (predom clr qtz, occ wht qtzite,		
				abundant Fe stn), 5YR 6/2 (gy brn), Moderate to strong rxn in		
				HCl, slightly consolidated, Similar to previous sample Moist: Good Smpls		
				— After lith change at ~235' the color changed slightly and remained		
				consistent from a lt tan to a brn gy (difficult to match on soil		
				color charts) sorting decreased; silt & gravel fractions increased,		
				and sample was slightly more consolidated. Change may be the		
				Ringold / Hanford contact		
				Driller having more trouble keeping sample in Core barrel		

REMARKS:

JB

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

92126 10444

2 of 5

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-1410	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/22/88		Depth: 245' To 255'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	250'	D	Moist	GRAVELY SAND 1% Cp, 4% Mp, 10% Fp, 10% VFp, 15% VCS, 20% CS, 15% MS, 10% FS, 10% VFS, 5% Silt, poor-moderate sort, 50% Basalt, 50% Silica-rich (predom clr qtz, w/ wht qtzites & abnt Fe stn), Subangular to Subround, Gravels predom subround w/ moderate sphericity, Dry color. 5Y 6/2 (gy brn) (not exact color match, need more colors), Moderate to strong rxn in HCl, Sample shows layering of wht $CaCO_3$ cemented silt & Fe stn commonly associated w/ cemented (poorly developed soils?) layering is ~ 6 cm thick usually, slightly consolidated, similar to previous, layering is more apparent than previous sample Moist & Geol Smp's	1125	RPT came 1125
	255'	D	Moist	SLIGHTLY GRAVELY SAND 1% Mp, 3% Fp, 5% VFp, 15% VCS, 25% CS, 15% MS, 10% FS, 10% VFS, 5% Silt, moderate-poor sort, 50% BSLT, 50% Silica rich (predom clr qtz, w/ wht qtzite, Fe Stn), Subround to Subangular, moderate rxn in HCl, slightly consolidated, Similar to previous sample, finer grained w/ less $CaCO_3$ layering apparent, Geol & moist Smpls taken	1200	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

9 2 1 2 6 5 4 0 4 4 5

3/5

DRILL LOG	By: T Gilmore	Rig: BE 22-1910	Well Number: 377 E12 16	Computer Number: NA	Project or Work Order No.
	Date: 3/22/88		Depth: 255' To 260'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Driller detected odor at well head, photo ionizer picked up the slightest deflection on the ppm scale and was not steady, samples did not show any deflection. Odor was not ammonia and was not identifiable by driller. Checked well w/ poly-test detector tubes, nothing detected. Well is "blowing", low pressure system likely in area	1300	
246' 11 1/3" 9 3/4"						
256' 2 3/4"				Welding 9' 3/4 of 8" 256' 2 3/4"	1300	
	260'	D	Moist	GRAVELY SAND 1% Mp, 7% Fp, 12% VFp, 20% VCS, 25% CS, 15% MS, 9% FS, 2% VFS, 5% Silt, Moderate-poor sort, 40% Basalt, 60% Silica-rich, (predom qtz & qtzite in sand fractions, some orng-yel Fe stain on grains, some qtz grains show traces of blk amphibole, parts of granites?) Gravels are predom basalts, and subround, Sands are sub angular, Dry color 5YR 6/1 (gyber), moderate to strong rxn in HCl, $CaCO_3$ cement shows up as white matrix in thin-1cm layers, associated w/ Fe stain and silt layer, slightly consolidated, similar to previous sample. Moist; Good sample	1400	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5 85)

485

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-140	Well Number: 299 E17 16	Computer Number: 1H	Project or Work Order No.
	Date: 3/22/88		Depth: 260' To 270'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
256 2¾ 9 1½				Welding 9' 1½" of 8" 265' 4¼" Total	1440	
265' 4¼"						
	265'	D	Moist	SLIGHTLY GRAVELY SAND 3% Fp, 7% VFp, 10% VCS, 20% CS, 25% MS, 15% FS, 15% VFS, 5% Silt, Moderate Sort, 50% Basalt, 50% Silica-rich (Sand predom qtz), Gravels predom Basalt, abundant Fe Stn, Sand clods of $CaCO_3$ cement, Subround to subangular, Strong to moderate rxn in HCl, abundant White $CaCO_3$ cement on Sand grains, (poorly developed caliche?), Slightly consolidated, Dry color 5YR 6/2 (lgy brn) moist: good samples	1530	
	270'	D	Moist	SAND 10% VCS, 15% CS, 30% MS, 25% FS, 15% VFS, 5% Silt, Moderate-well sort, 40% Basalt, 60% Silica-rich (predom qtz w/ qtzite) abnt yel-orng-brn Fe stn on grains and oxides on grains as previous, Subangular, moderate to strong rxn in HCl, abnt $CaCO_3$ cementing, slight consolidation, Finer grained than previous sample	1600	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

DRILL LOG	By: T Gilmore	Rig: BE 22-140	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/22/88		Depth: 270' To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
265' 4 1/2" 8 10 1/2				Welding 8' 10 1/2" of 8" 274' 2 3/4" Total	1610	
274' 2 3/4"						
	275'	D	Moist	SAND 20% VCS, 20% CS, 30% MS, 15% FS, 10% VFS, 5% Silt, Moderately well sort, 50% BSLT, 50% Si-rich, subangular, 5YR 6/2 (brn gy), moderate rxn in HCl, slight consolidation, very similar to previous moist & Grad Smpls	1725	
						RPT same 1730
				End of Day	1735	

REMARKS: Ft 35' casing 274' 2 3/4" DB 275 3/22/88 Tyler Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

184

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14101	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/23/88		Depth: 275' To 285'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
274' 2 3/4"		D	Moist	Geol & Driller on location	655	Lith change at 270'
				Drilling	700	finer grained
	280'	D	Moist	SAND 3% VCS, 12% CS, 40% MS, 25% FS, 15% VFS, 5% Silt, Moderate-well sorted, 40% Basalt, 60% Silica-rich (dubish 75% clr qtz, 15% wht qtzite, 5% pk-iron stn qtz, 5% grn translucent mineral) Sands are subangular, Dry Color 5YR 6/2, Slightly consolidated, similar to previous sample, better sorted, Sample is very similar also to many samples up hole in "Hanford fm", Color is slightly darker, browner moist & Geol sampl	730	
274' 3 3/4" & 2 3/4"						
282' 5 1/2"				Welding 8' 2 3/4 of 8" 282' 5 1/2" Total	745	
	285'	D	Moist	GRAVELY SAND 1% Small cobble, 7% Cp, 7% Mp, 10% Fp, 15% VFp, 10% VCS, 10% CS, 30% MS, 8% FS, 7% VFS, 5% Silt, poorly sorted, Gravels are 60% Basalt, 40% Silica-rich, (incl diorites), Sands 40% Basalt, 60% Silica rich (predom clr qtz w/ qtzites, micas) Gravels are subround - round low-moderate sphericity (flat), Sands are subangular, Dry color 2.5YR 5/3 (grayish brn), moderate	925	283 Gravels hit sand w/ C-M pebbles 1' Silt/Clay layer at 286'

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-1401	Well Number: 299 E17 ib	Computer Number: NA	Project or Work Order No.
	Date: 3/23/88		Depth: 285' To 290'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				285 cont. rxn in HCl, slight consolidation, Sample has much more gravels and silt than previous Geol: moist smpls		lith change at 283 to gravel; at 286 To silt/clay
				Silt layer ~1' thick hit at 286', silt/Clay layer w/ thinly laminated bedding, above which is gravel (sample 285')		Alt silt/clay & Gravelly sand
				Alternating layers of silt/clay and Gravelly Sand ~1'-2' thick each 285-		
				Silt at 288 has layers <1mm thick, are alternating lt & dk colors appear to be rythmites, (flow related) other layers 1-2cm thick w/ fine sand interbeds and fining upward into silts and clays, (Small Bouma sequences?) pinch & swell structure in silt are this layer at 289 has medium-coarse pebbles in it		
	290'	D	moist	SAND 2%Mp, 3%Fp, 5%VFp, 5%VCS, 10% CS, 35%MS, 25%FS, 10%VFS, 5%Silt, Moderate sort, predom MS, 50% QSET, 50% Silica-rich, Gravels are subround, Sands Subangular, Dry color 5YR 4/2	1025	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5 85)

3/4

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14101	Well Number: 299 E17 16	Computer Number: N/A	Project or Work Order No.
	Date: 3/23/88		Depth: 290' To 295'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				290' Cont. Moderate rxn in HCl, slight consolidation, lost most of the silt and is back to Sand moist; Good smpl		
282.5 ft 1.34						RPT come 1055
290' 6¼"				Welding 8' ¾" of 8" 290' 6¼" Total	1040	
						Interbedded silts at 93'
–	295'	D	Moist	SLIGHTLY GRAVELLY SAND 2% Clp, 3% Fp, 10% VFp, 20% VFS, 25% CS, 20% MS, 10% FS, 5% VFS, 5% Silt poor-moderate sort, Gravels are 60% BSLT, 40% Si rich (incl cht) Sands are 40% BSLT and 60% Silica-rich (predom clr qtz w/ qtzite, chts and micas) Dry color 5YR 6/2 (gy brn), Gravels subround to round, low-moderate sphericity, Sands subangular, Slight reaction in HCl, Slight consolidation, silt layers are absent from sample, but do occur at 293'-294' moisture; Good smpl	1140	silts ~ ½' thick w/ interbedd gravels
						lunch 1200 – 1230
290' 6¼" + 10						
298' 4¼"				Welding 7' 10" of 8" 298' 4¼" Total	1240	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 4 5 1

4 of 4

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14101	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/23/88		Depth: 295' To 305'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	300'	D	moist	SAND 1% Fp, 1% VFp, 8% VCS, 10% CS, 40% MS, 20% FS, 15% VFS, 5% Silt	1340	Thin Silt/$CaCO_3$ layers
				Moderate - well sort, Sands are 40% BSLT, 60% Silica-rich,		
				(predom clr qtz), Subangular, Dry color 5YR 6/2 (gyish-),		
				Moderate to Strong rxn in HCl, layers of $CaCO_3$ cemented Sands		
				(approx 5cm thick) $CaCO_3$ cmnt is associated (capped) by a very		
				thin layer of dk brn silt, Slightly consolidated, better sorted,		
				and less silt in matrix Geol: moist Smpls		
298' 4 1/4" + 7' 11 3/4" = 306' 3"						
				Welding 7' 11 3/4" of 8" 306' 3" Total	1420	
				Trouble getting sample in core barrel		RPT showed up 1500
	305'	D	moist	SANDY GRAVEL 7% Cp 8% Mp, 10% Fp, 10% VFp, 10% VCS, 10% CS, 20% MS,	1630	
				10% FS, 10% VFS, 5% Silt, poor sort, Gravels are 35% BSLT,		
				65% Si-rich (incl qtzite, clt & diorite), Sands are 30% BSLT and		
				65% Silica-rich (predom clr qtz) Gravels are round to		
				Subround, Sands are subangular, Dry color 5YR 6/2 (brn gy).		
				Moderate rxn in HCl, Sample coarser and poorer sorted than		
				previous sample Geol: moist Smpl		RPT came 1720
					1730	End of Day

REMARKS: Ft 30' Casing 306' 3"
DB 305

J Gilmore 3/23/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

1 of 2

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14101	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/24/88		Depth: 305' To 310'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
306' 3" of 8"				Geologist & Driller on location	700	
				Changing drive barrel to hard Tool		unable to verify hard tool
				& helping set rig up on E17-15		has been steam cleaned, visually
						it looks clean
313' 9½" of 8"				Welding 7' 6½" of 8" 313' 9½" Total	1025	
				Drilling	1135	Add 10gal water
	310'	H	Wet	SANDY GRAVEL 20%Fp, 20%VFp, 10%CS, 15%VCS, 15%MS, 8%FS,	1310	Note: Switch to
				7%VFS, 5%Silt, poor-moderate sort, Gravels: 60% Basalt, 40%		Hard Tool
				Silica-rich (in decr % qtzite, quartzite, granites), Sands:		
				50% Basalt, 50% Silica-rich, Gravels fragmented, Sands subangular,		
				Wet color 5YR 6/4, Dry color 5YR 6/2, moderate rxn in HCl,		Add 30gal water
313 9½ + 7.5				Slight consolidation, not a representative sample, Good sample		
321' 2½"						
				Welding 7.5 321' 2½" Total	1400	

REMARKS:

JB 3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 4 5 3

2/2

DRILL LOG	By: T Gilmore	Rig: B.E. 22-M101	Well Number: 299 E 17 1/6	Computer Number: NA	Project or Work Order No.
	Date: 3/24/88		Depth: 310 To 320		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	315'	H	wet	SANDY GRAVEL 8% MF, 12% FP, 20% VFP, 15% VCS, 15% CS, 5% MS, 10% FS, 10% VFS, 5% Silt poor sort, Gravels: 60% BSLT, 40% Silica-rich, (10% pk granite, 10% wht granite, 10% gray metamorphic), fragmented, Sands: 60% Basalt, 50% Silica-rich, (clr qtz predom) Subangular, Wet SYR 3/4, Dry SYR 3/3, Moderate rxn in HCl, Slight consolidation, Sample has more gravels than previous sample - Grd smpl taken	1510	
321' 2 1/2"						
5 11						
327' 1 1/2"				Welding 5' 11" of 8" 327' 1 1/3" Total	1605	Hit water approx 313'
	320	H	wet	SLIGHTLY GRAVELLY SAND 6% FP, 9% VFP, 15% VCS, 25% CS, 20% MS, 10% FS, 10% VFS, 5% Silt, Moderate Sort, Gravels: 35% Basalt, 65% Silica-rich (20% pk granite, 20% qtz, 20% gray metamorphics, 5% other) fragmented, Sands: 60% Basalt, 40% Silica-rich, (predom clr qtz), Subangular, Wet color 5YR 6/4, Dry color 5YR 6/1, Slight to no rxn in HCl, Slightly consolidated, more sand than previous sample	1655	

REMARKS:
TD 17'
DB 322

casing 327' 1 1/3"

Tyler Gilmore 3/24/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5 85)

1/3

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14101	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/25/88		Depth: 320 To 325'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
327 1½				Geologist and Driller on location.	655	
94				Check water level; approx 312.5'; the steel tape used		
336 5½				to measure came up cloudy, the reading may not be		
				actual static, the well is believed to be partially shut off		
				Drilling	705	
3 3/6' 5½"				Welding	715	
				Added 9 1/4" of 8"		
	325'	H	Wet	SAND 1% FP, 1% VFP, 15% MS, 33% CS, 35% MS, 10% FS, 5% VFS	0920	
				Well sorted. (Gravels) - 50% basalt, 50% qtzite and qtz. (Sand)-		
				85% basalt, 74% clear, milky, yellow, orange, gray qtz/qtzite, 1% biotite.		
				Gravels are angular to rounded. Sands are subangular to rounded. Wet color:		
				5Y 3/1 (very dark gray). Dry color: 5Y 7/2 (light gray). No		
				reaction to 10% HCL. Slightly consolidated. Less gravels than previous		
				sample. Geologic sample taken.		

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. Teel	Rig B.E. 22-14101	Well Number 299-E17-16	Computer Number NA	Project or Work Order No.
	Date 3-25-88		Depth 330 To 337(TD)		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	330	H	Wet	SANDY GRAVEL 13% MP, 12% FP, 5% VFP, 30% VCS, 25% CS, 10% MS, 10% FS, 5% VFS. Moderately sorted. (Gravels)- 60% basalt, 40% qtz, qtzite, chert, and Si-rich igneous. (Sand)- 35% basalt, 65% qtz, qtzite, and chert. Gravels are angular to sub-angular. Sands are angular to sub-angular. Wet color: 5Y 4/1 (dark gray). Dry color: 5Y 7/1 (light gray). No reaction to 10% HCL. Slightly consolidated. Coarser than previous.	10:15	
	335	H	Wet	GRAVELLY SAND 10% MP, 5% FP, 5% VFP, 10% VCS, 20% CS, 30% MS, 12% FS, 8% VFS. Poorly sorted. (Gravels) - 50% basalt, 50% granite, qtz, qtzite and chert. (Sand) 40% basalt, 60% qtz, qtzite, and chert. Gravels are angular to rounded. Sands are gen. angular to sub-rounded with a few rounded grains. Wet color: 5Y 3/1 (very dark gray). Dry color: 5Y 3/4 (lt gy) No to very slight reaction to 10% HCL. Slightly consolidated. Slightly more basalt than previous and less gravels. Granites are conspicuous in gravel portion.	11:30	
				Reached final depth, bailed a couple times and let sit over lunch for recovery. Depth to Bottom 337.5	11:50	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

3/3

DRILL LOG	By: T Gilmore	Rig: BE	Well Number: 299 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/25/88	22-14:01	Depth: TD To TD		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Water level ~313'	1240	
				Pull casing back 4'; bottom of casing at 330'	1340	
				Depth to bottom 331; pour ½ sack 10-20 Colorado Silica Sand		
				Depth to bottom 329'	1405	
				Welding (2) 10' 30 slot 8" telescoping stainless steel screen;		
				screen is different from specifications, but OK'd by PNL &		
				Westinghouse.		
				Welder is certified in Stainless Steel (ref. John Keller at Kaiser)		inspection
				One screen in original plastic wrap; the other has been		
				steam cleaned (ref. John Keller) Visually it looks clean		
				Screen Set -- Depth to Bottom 329'	1605	
				Pulled casing to expose screen - Exposed 17' (pulled back		
				to 312' of casing in ground)		

REMARKS: TD 337 Casing pulled to 314 weld
Screen at 329'
3/25/88 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

9 2 1 2 6 5 4 0 4 5 7

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 22-14/01	Well Number: 799 E17 16	Computer Number: N/A	Project or Work Order No.
	Date: 3/28/88		Depth: TD To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Geologist & Driller on location	655	
				Depth to Water 312.9' using a Steel Tape	700	
				Driller has safety meeting	705	
				Bailing on well	715	
				Water samples to be analyzed taken with a teflon bailer	750	
				prepared sample containers filled up and placed in ice chest		
				Samples are delivered to US Testing w/ chain of custody		
				forms		
				Geophysically logging well; Gamma, Neutron, & Density logs	~840	
				Done logging	~1030	
				Tearing Rig down and moving to Well E17-18		
				Pump arrives, waiting on Crane to place in hole	1230	
				End of Day	1730	

REMARKS:

3/28/88 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

92126 10458

1 of 1

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 14/01 (Mount dr)	Well Number: 899 E17 16	Computer Number: NA	Project or Work Order No.
	Date: 3/29/88		Depth: TD To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				40 hp pump just ordered has too large a diameter to fit in	700	
				well w/ measuring equipment. Need to go to a smaller pump.		
				Presently looking for alternative pump		
				Found a 30 hp to fit in well		
				Waiting to set pump and discharge line		
				End of Day	1430	

REMARKS:

3/29/88 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

18'

DRILL LOG	By: T Gilmore	Rig: Rig moved off	Well Number: 379 E17 160	Computer Number: NA	Project or Work Order No.
	Date: 3/30/88		Depth: TD To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Waiting on OK to discharge effluent from aquifer test to	700	
				A-45 Crib		
				Setting pump with a Crane	745	
				Pump and Tremmy pipe set in well	1130	
				Pump set at 327½ feet intake is at 325' 4",		
				Tremmy pipe set to 321'		
				Generator on location	1400	
				End of Day	1530	

REMARKS:

3/30/88 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

9 2 1 2 5 1 1 4 6 0

191

DRILL LOG	By T Gilmore	Rig No Rig	Well Number 299 E17 16	Computer Number N/A	Project or Work Order No.
	Date 3/31/88		Depth TD To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Standing by, waiting for OK to discharge aquifer test effluent into Crib	700	

REMARKS:

3/31/88 T Gilmore

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 4 6 1

DRILL LOG	By: R L Cordova	Rig	Well Number: 299 17-16	Computer Number	Project or Work Order No.
	Date: 3-25-88	#3	Depth: 329'6" To 329'6"		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					6:53	START
				Total 8" Casing (315'11")	7 Am	Safety Meeting
				IN Hole	7:15	Baling well
				Took off Bit put on JARS ~~[illegible]~~ Getting	8:45 -	Logging WELL
				READY TO MOVE.	10:45	morning Rig
					12:00	Moved off
						This Hole
						Len Cordova

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 031 (5-85)

92126 40462

DRILL LOG	By: RL Cordova	Rig: #3	Well Number: 299-W-16	Computer Number	Project or Work Order No.
	Date: 8-25-88		Depth: 327 To 335		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
327.8					6:55	Start
9.4					7:05	drilling
337'					7:45	welding
				TOTAL 8" CASING	7:50	unload Alum pipe
				337'	8:05	WELDING
					8:55	drilling
	325	H	W	SAND with few pieces of GRAVEL	9:15	Sample
	330	H	W	" 1 pc Gravel	10:20	Sample
	335	H	W	Sand & " "	11:30	Sample
	335.6'	—	—	— Sand & Gravel	11:35	drilling & Bailing
	Pulled 3'9"			Casing 337 - 3'9" = (333'3")	12:00	LUNCH
				WELDED TWO 10' SCREENS TOGETHER	12:40	pull casing
						TO SET SCREEN
				SCREEN Bottom AT 329.6" (Geologist OKAY)	4 pm	SET SCREEN
	Pulled 17'4"			Pulled 17'4" (-17.4 = 315'11 Casing	Pulling	CASING
				315'11" TOTAL LEFT IN HOLE		
					5:30	Shutdown
						Lin Cocalon

REMARKS:

330 - 335' 340

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 4 6 3

DRILL LOG	By	Rig	Well Number	Computer Number	Project or Work Order No.
	Date 3-24-85	#3	299-17-16		Subcontract No.
			Depth 305 To 328		

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
306.9					7AM	Took off drive barrel
+ 7.6½					7:30	Helper on bol
= 314.3½					10AM	weld casing
+ 7.5				Changed to Hard tools	10:40	Help on bol
= 321.8½					11:30	drilling
+ 5.11½					12:00	lunch
= 327.8					1:30	Driving
	310	H	W	Sand + Gravel	1:05	sample
	"				1:10	welding
					1:55	drilling
	315	H	W	Sand & Gravel	3:00	sample
				Hit Water at 313 to 317 approx.	4:00	welding
					4:40	drilling
	320	H	W	Sand	5:00	Sample
					5:30	Shut down
						Jim Gordon

REMARKS:
320' – 325 – 330

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine

92126 40464

DRILL LOG	By R.L. Cordon	Rig	Well Number 299-17-16	Computer Number	Project or Work Order No.
	Date 3-23-88	#3	Depth 275 To 305		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
274-7¾					6:56	start Rig
+ 8-2¾	280	D	D	SAND	7:25	SAMPLE
= 282-10½					7:50	welding
+ 8-3"					8:40	drilling
= 290-11¼	285	D	D	Sand + Gravel	9:25	Sample
+ 7-10	289	256-	289.5	CLAY		
298-9¼	290	D	D	Sandy Clay	10:20	Sample
+ 7-11¾				Changed to Sand + Gravel (293!)	10:35	welding
= 306-9					11:12	drilling
	295	D	D	Sand with some Gravel	11:50	sample
					12:00	Lunch
					12:30	welding
					1:15	drilling
	300	D	D	Sand with some Gravel	2:00	sample
					2:10	welding + Helper
					3:30	drilling
	305	D	D	Sand + Gravel	4:30	sample
				To much gravel cannot pick with barrel		

REMARKS:

185' - 290 - 295 - 300 - 305 - 310 - 315

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine

9 2 1 2 6 5 4 0 4 6 5

DRILL LOG	By RL Cordon	Rig #3	Well Number 299-17-14	Computer Number	Project or Work Order No.
	Date 3-22-88		Depth 243 To 275		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
147-2 3/4					7AM	Put drill line on Rig
+ 9-5 1/4					9:30	start drilling
256-8	245	D	D	Sand & Gravel (Hard to keep in hole)	10:30	Sample
+ 9-6 1/2	250	D	D	" " " " "	11:25	"
265-9 1/2	255	D	D	" " " " "	12:00	" + Lunch
+ 8-10 1/4					12:30	~~drilling~~ welding
= 274-7 3/4	260	D	D	" " " " "	1:15 2:05	drilling Sample
	265	D	D	"	3:30	- "
	270	D	D	"	3:55	Sample
					4:10	welding
					4:42	Drilling
	275	D	D	Sand	5:25	Sample
					5:30	Shut down
						Lindon Cordon

REMARKS:

Mark 255-260-265+270-275-280-285

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5-25)

9 2 1 2 5 1 0 4 5 6

DRILL LOG	By RLCordon	Rig	Well Number 299-17-16	Computer Number	Project or Work Order No.
	Date 3.21-88	#3	Depth 225 To 243		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
218-8½					7am	START
+ 9-9	230	D	D	DAMP SAND	7:20	SAMPLE
228-5½	~~235~~	~~D~~	~~D~~		7:25	welding
+ 9-1				STARTED into GRAVEL at 234'	8:15	drilling
237-6½	235	D	D	SAND & GRAVEL	8:50	SAMPLE
+ 9-8¼					9:05	welding
247-2¾					9:40	DRILLING
	240	D	D	SAND & Gravel	10:10	SAMPLE
					10:55	~~drilling~~ welding
					11.40	DRILLING
					12:00	Lunch
					12:30	DRILLING
	243'			SAND & GRAVEL	12:50	shut down
					went	to YARD

REMARKS:

Cablemark 230 - 235 - 240 - 245 - 250

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____Standing Water

A 6003 021 (5 85)

9 2 1 2 6 5 4 0 4 6 7

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L. Watkins / RL Cordero	#3	299-17-16		
Date: 3-15-85		Depth: 175 To 225		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
173.10½					6.56	START RIG
+ 9-4¼	180	D	D	DAMP SAND	7:15	SAMPLE
= ~~[illegible]~~					7.20	welding
= 183-2¾					7:35	drilling
+ 9'11"	185	D	D	DAMP SAND	8:10	Sample
+ 8'	190	D	D	" " 8:21	8:21	sample
=	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	~~[illegible]~~	8:25	weld casing
= 201-13¾	~~200~~	~~D~~	D	~~Loose damp sand 10:20~~	8:58	drilling
8"	~~[illegible]~~					
205¼	195	D	D	DAMP SAND	10 20	sample
+ 9-3¼	200	D	D	LOOSE DAMP SAND	10 40	sample
= 218-8½					10 45	weld casing
					11:20	drilling
	205	D	D	damp sand	1200	sample
					1230	weld casing
					1:25	drilling
	210	D	D	damp sand coarse	1:48	sample
	215	D	D	" " "	210	welding
	220	D	D	" " "	215	drilling
	225	D	D	" " "	220	sample
					225	sample
					230	

REMARKS:

CABLEWORK 150'-185'-190-195-200-205 210 215 220-225-230

3:35 went Home

Lindon Cordero

M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5-85)

B.150

L Watkins - Build Core Barrel 8" 7:00Am 3:30 Pm

FIGURE 3. DRILL LOG	By RL Cordon	Rig #3	Well Number 299-12-16	Computer Number	Project or Work Order No.
	Date 3-17-88		Depth 150 To 175		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
76-2½					6:55	Start
+ 18-9¾					7:05	welding Casing
= 95-¼"					11:00	drilling
+ 19-3¼	155	D	D	Damp Sand	11:10	Sample
= 114-3½	160	D	D	" "	11:25	"
+ 19-4					11:30	welding
= 133-7½					12:00	lunch
+ 18-3					12:30	welding
= 151-10½					12:50	drilling
+ 12-1½	165	D	D	Damp Sand	1:30	Sample
= 164-	170	D	D	" "	2:15	Sample
+ 9-10½					2:20	welding
= 173-10½					3:00	drilling
	175	D	D	" "	3:00	Sample
					3:30	went home
						Lindon Cordon

REMARKS: (?) 75-6" to Heal shine from 10" casing 6" from Ground.
Mark -160-165-180

C - Coarse F - Fine VF - Very Fine

9 2 1 2 6 5 4 0 4 6 9

FIGURE 3. DRILL LOG	By: N L Carter	Rig: #3	Well Number: 249-17-16	Computer Number	Project or Work Order No.
	Date: 3-16-88		Depth: 130 to 150		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
127 3/4					6:55	START
	135	D	D	CAMP SAND	7:20	SAMPLE
	140	D	D	" "	7:35	SAMPLE
+ 6-7 1/4					7:40	welding
(134-2)				TOTAL 10" CASING 134'2"	8:20	drive pipe & drilling
	145	D	D	COARSE SAND some PEA GRAVEL	8:50	SAMPLE
	150	D	D	FINE SAND	9:50	SAMPLE
						Ground Rig took up 10"
						Barrel pulled 8" Ground Ends
				18-6 3/4		8" shoe Egged out off Bottom shoe
				+ 20-8 1/4 = 39-3 1/4		
				+ 19-8 = 58-11 1/4	12:00	Lunch
				+ 17-3 1/4 = 76-3 1/2	12:30	welding stop & Casing
					3:30	Shut down
						Robert Gordon

REMARKS:
Cable Tersopen
MARK-145-150-155-160

D - Drive Barrel H - Hard Tool

92126 40470

DRILL LOG	By RL Crider	Rig	Well Number 299-17-16	Computer Number	Project or Work Order No.
	Date 3-15-88	#3	Depth 90 To 130		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
90-10¼					6:55	START
	95	D	D	WET SAND - AMMONIA ODOR	7:35	SAMPLE
	100	D	D	" " " "	8:05	SAMPLE
+ 8'5"					8:10	PATTINGER PUMP
= 99-1¼					8:20	WELDING CASING
					9:15	DRIVE CASING
					9:25	DRILLING
	105	D	D	~~WET~~ DAMP SAND - AMMONIA ODOR	9:44	SAMPLE
+ 9-11¼	110	D	D	" " " "	10:05 10:45	SAMPLE WELDING CASING
= 109-½					11:05	DRILLING
	115	D	D	SAND WITH COBBLE PIECES GRAVEL	11:20	SAMPLE
+ 9-11¼	120	D	D	DAMP SAND	11:45	SAMPLE
= 118-11¾	125	D	D	" " " " "	12:00	SAMPLE
+ 8'7"					12:25	DRILLING
= 127-6¾					12:35	WELDING CASING
					1:20	DRILLING
	130	D	D	DAMP SAND	2:20	SAMPLE
					2:30	WELDING
					3:15	DRIVE CASING
					3:30	SHUT DOWN

REMARKS:

Mark 105'-110-115-120-125-130-135-140

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ___ Standing Water

9 2 1 2 5 - 4 1 4 7 1

RL Cordova

DRILL LOG	By: LE Watkins	Rig: # 3	Well Number: 299-17-16	Computer Number	Project or Work Order No.
	Date: 3-14-85		Depth: 76' To ~~45~~ 90		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
71'	50	DB	D	Sand some locks	7:00	start
97¼	55	DB	D	" "	7:05	weld casing
81¾	90	DB	D	" "	8:35	sample 80'
9'7"					8:02	sample 85'
90-10					9:05	sample 90'
					9:30	shut down
				Found ~~[illegible]~~ ammonia in		
				well - wait for fresh air		
					11:30	wait for air
					12:—	LUNCH
					1:00	UNLOADED AIR
						TANK put on MASK
						WELDED CASING
					2:00	put CASING down
					2:20	DRILLING
				Need to use fresh air supply	2:40	MONITERING
				NEW FORMATION AT 90'	3:20	CLEAN UP
					3:30	Shut down
					3:40	went home

REMARKS:

Mark 100'

Roland Cordova

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

92126 40472

DRILL LOG	By L Watkins	Rig #3-22W	Well Number 249-17-16	Computer Number	Project or Work Order No.
	Date 3 11 85		Depth 40' To 76'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
36'10"	45	DB	D	damp sand coarse	7:00	start
8'11¾"	50	DB	D	" " "	7:10	weld casing
8'10¾"	55	DB	D	" " "	8:45	drilling
9'7½"	60	DB	D	" " "	9:15	sample 45'
7'4"	65	DB	D	" " "	9:30	weld casing
	70	DB	D	" " "	10:30	drilling
	75	DB	D	" " "	11:05	sample 50'
Casing Total					11:45	sample 55'
71'8"					11:55	sample 60
					12:00	weld casing
					12:50	drilling
				R.P.T shut drilling down at 2:30	1:07	sample 65
					1:30	sample 70
				Top mark on ~~[illegible]~~ Line 80'	1:35	weld casing
					2:10	drilling
				Grease and service Rig until 3:30	2:30	sample 75'
				Pick up around Rig	2:35	shut down drilling
				mark casing & measure	3:30	go home

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

9 2 1 2 0 0 4 0 6 7 3

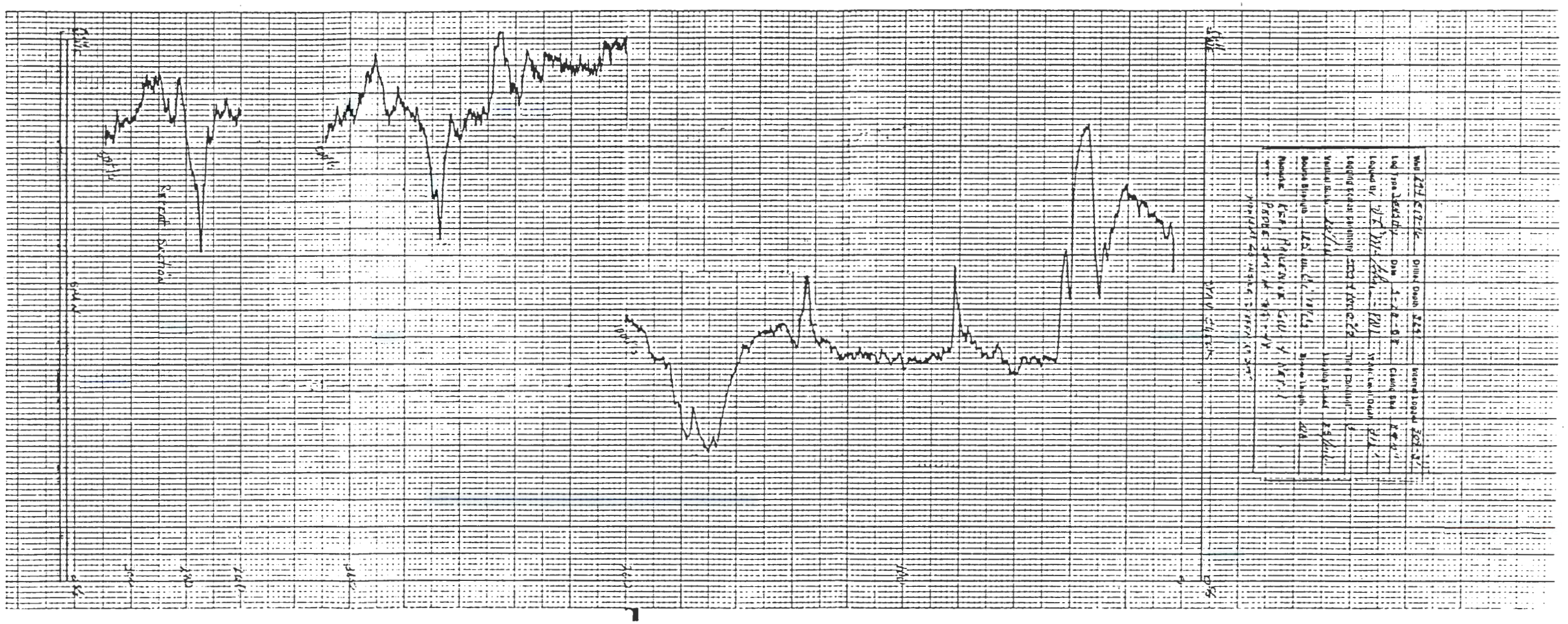
DRILL LOG	By KL Corden	Rig	Well Number 299-17-16	Computer Number	Project or Work Order No.
	Date 3/10/85	2-in	Depth 0 To 40		Subcontract No.

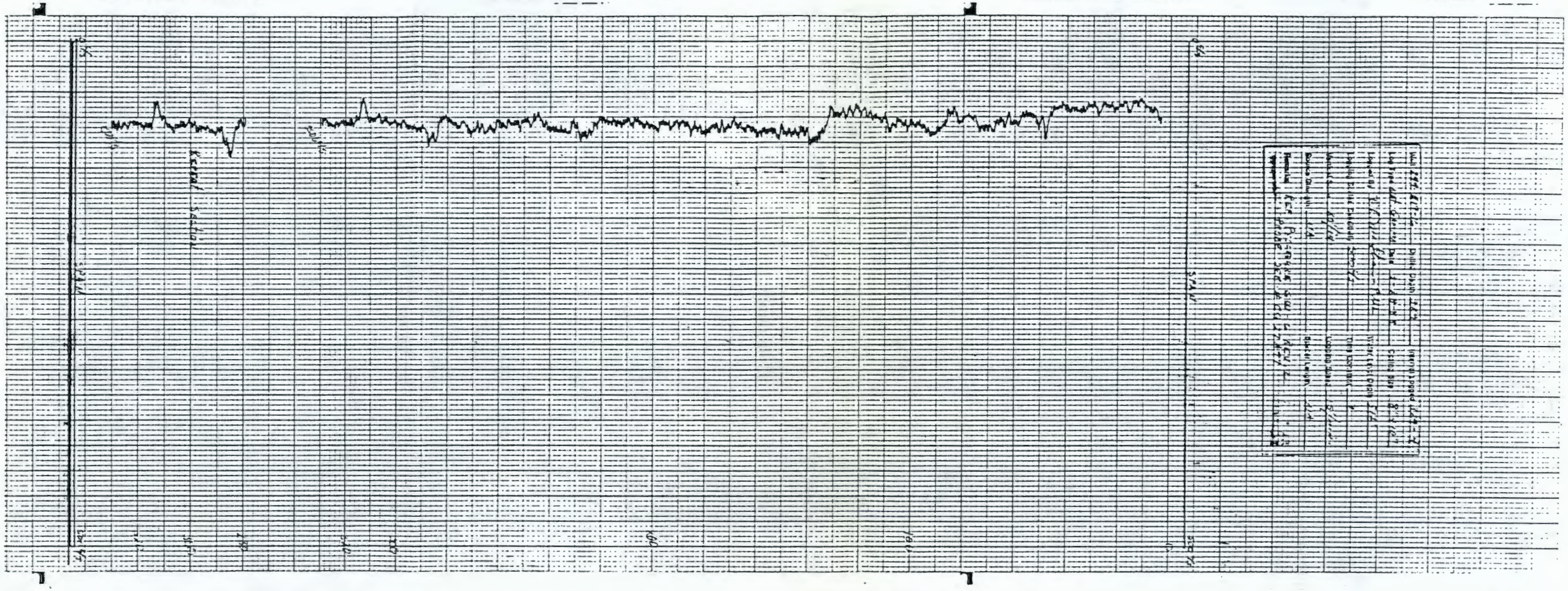
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	5			0-5 Sandy Clay	7Am	start
						welding drive barrel
	5'	D	D	Sand damp	7:15	Sample
	10'	D	D	Sand & fine Gravel	9:20	Sample
15 5/4	15'	D	D	" & " "	10:05	Sample
20 5/4	20	D	D	Fine Sand will not stay in barrel	10:45	Sample
25-11					10:50	welding Casing
10-11					11:35	Drilling
36-10					12:00	lunch
					12:30	Drilling
	25	D	D	Fine Sand will not stay in barrel	1:20	Sample
					1:30	welding
					2:20	drilling
	30	D	D	" " Some Coarse	2:50	Sample
	35	D	D	wet Sand & Silt	3:10	Sample
				CABLE MARK - 35' - 45' - 50'		
	40	D	D		3:25	Sample
					3:30	Shut down

REMARKS: USED SHOE ON d.b. CANNOT GET ANYTHING out Lindon Corden
NO SHOE ON 12" CASING -

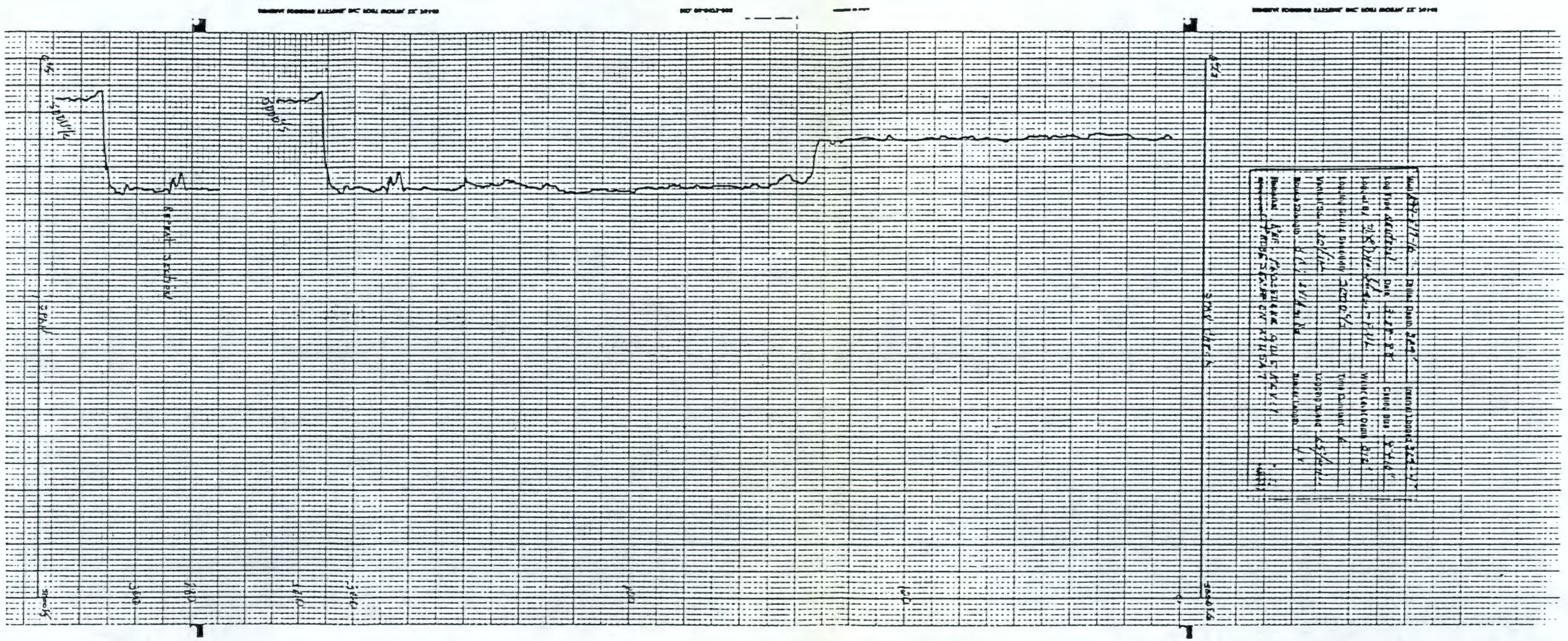
D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine

B.156





9 2 1 2 6 - 4 0 4 7 5



9 2 1 2 6 4 0 4 7 6

WELL 299-E17-17

9 2 1 2 0 4 1 4 7 7

THIS PAGE INTENTIONALLY
LEFT BLANK

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-17 Geologist AIRHART / TEEL / Gilmore Page 1 of 3

Reviewed by V.L. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
Cement Grout (19.5'-0')		5		SAND
10" dia. temporary carbon		10		SLIGHTLY GRAVELLY SAND
steel casing 143' 9 3/4"		15		SANDY SILT
total		20		SAND
		25		"
8" dia temporary carbon		30		"
steel casing 336' 5 1/2" total		35		"
		40		"
8-20 mesh granular (339.1'-19.5')		45		"
bentonite seal		50		"
		55		"
4" dia. stainless steel		60		"
casing		65		"
centralizers		70		"
		75		"
		80		"
		85		"
Casing joint		90		"
		95		"
		100		"
		105		"
		110		"
		115		"
		120		"
		125		"
		130		"

A-1800-186 (3/87)

9 2 1 2 6 4 0 4 7 8

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-17 Geologist Airhart/Teel/Gilmore Page 2 of 3

Reviewed by [illegible] Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		~~135~~		SAND
10" carbon steel casing		~~140~~		"
0-142'9 3/4"		~~145~~		"
		~~150~~		"
8" carbon steel casing		~~155~~		"
0-331'		~~160~~		"
		~~165~~		"
		~~170~~		"
		~~175~~		"
		~~180~~		"
		~~185~~		"
		~~190~~		"
		~~195~~		"
		~~200~~		"
		~~205~~		"
		~~210~~		"
		~~215~~		"
		~~220~~		"
		~~225~~		"
		~~230~~		SLIGHTLY SILTY GRAVELLY SAND
		~~235~~		GRAVELLY SAND
		~~240~~		GRAVELLY SILTY SAND
		~~245~~		GRAVELLY SAND
		~~250~~		SLIGHTLY SILTY GRAVELLY SAND
		~~255~~		" " " "
		260		SLIGHTLY GRAVELLY SILTY SAND

A-1800-186 (3/87)

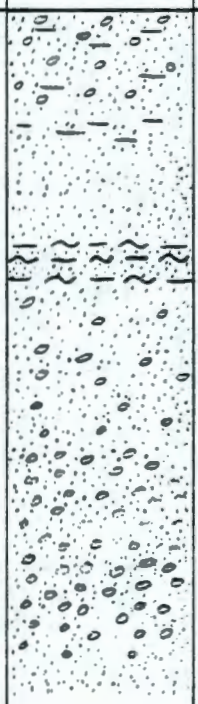
9212654047 9

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-17 Geologist Teel / Airhart / Gilmore Page 3 of 3

Reviewed by W.L. McGhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
8" dia temporary carbon steel casing.		265		GRAVELLY SILTY SAND
8-20 mesh granular bentonite seal (299.1' to 19.5')		270		SLIGHTLY SILTY GRAVELLY SAND
4" dia, stainless steel casing		275		SILTY SAND
		280		SAND
		285		SAND with layers of SILT/CLAY
Bentonite Pellet Seal (299'2" to 303'10½")		290		SLIGHTLY GRAVELLY SAND
		295		SLIGHTLY GRAVELLY SAND
10-20 mesh sand filter pack - (303'10½" to 331'3¼")		300		GRAVELLY SAND
		305		" "
20 slot, 21'½" long stainless - steel screen (330'½" to 309')		310		SANDY GRAVEL
		315		" "
		320		" "
		325		" "
20'6", 10 slot, 8" telescoping stainless steel screen with bottom plate (331.35' to 310.85')		330		SAND
(333'½" total stainless steel casing and screen)				

A-1800-186 (3/87)

9 2 1 2 6 4 0 4 3 0

9 2 1 2 6 5 4 0 4 8 1

181

DRILL LOG	By T Gilmore	Rig Bucyrus Erie 22-14100	Well Number 299 E17 17	Computer Number NA	Project or Work Order No.
	Date 3/16/88		Depth 0' To 0'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Rig on location	1530	
				Setting up		

REMARKS:

[illegible] 3/16/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5 85)

DRILL LOG	By AIRHART	Rig Craig BUCYRUS ERIE 22M100	Well Number J99 E17 17	Computer Number NA	Project or Work Order No.
	Date 3-17-88		Depth 0' To 5'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Driller arrived	0700	
				set up rig	0700 - 0820	
					0820	Began Drilling
	5'	D	DRY	SAND: 3% gravel, 97% sand ; 1% FP,	0850	
				2% VFP, 22% VCS, 10% CS, 25% MS, 20% FS, 20% VFS		
				- (gravel) subangular-to-rounded clasts composed		
				of 80% basalt 20% qtz-rich - caliche on		
				surfaces (sand) angular-to-subrounded		
				grains composed of 40% basalt 60% qtz-rich		
				(includes clr qtz, cut, tn. micn) ; mod.-poorly		
				sorted ; strong rxn w/ 10% HCl ; unconsolidated.		
				Dry color 2.5Y 6/2 (lt. brownish gray)		
					0930	Added 10'1" of
						10" carbon steel
						casing w/out drive
						shoe.
					0930-1095	Changing to 8"
						drive barrel.

REMARKS:

Reviewed by [illegible] 3/17/88 S.P. Ambrust

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5 85)

DRILL LOG	By AIRHART	Rig BULYRUS ERIE	Well Number 299-E17-17	Computer Number	Project or Work Order No.
	Date 3-17-88	22-14100	Depth 5' To 10'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'1" of 10" casing				NOTE: Used WD-40 to lubricate threads of core barrel. Geologist instructed driller to wipe off excess and to use only approved food-grade grease from here-on.	10:50	
					10:55	John Titus WMC RPT monitored spoil w/ GM - nothing detected
	10'	D	DRY	SLIGHTLY GRAVELLY SAND: 7% gravel, 88% sand, 5% silt - 2% FP, 5% VFP, 5% VCS, 20% CS, 30% MS, 20% FS, 13% VFS, 5% silt - mod. sorted - (gravels) 80% basalt, 20% qtzite, clasts ang.- to subrounded - small amount of caliche on surfaces (sand) 50% basalt, 50% qtz-rich (clr. qts., fspar, caliche chert,) - grains dom. angular - dry color 2.5Y 6/2 (lt. brownish gray - caliche grains rct. strongly - unconsolidated - NOTE: grayish-white ashy fine seds. evident in sample.	11:20	

REMARKS:

NOTE: May be drilling in disturbed seds. No sagebrush indicates possible back-fill area.

Reviewed by [illegible] 3-17-88 S.P. Airhart

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By AIRHART	Rig BUCYRUS ERIE	Well Number 299-E17-17	Computer Number	Project or Work Order No.
	Date 5-17-88	22-14100	Depth 10' To 15'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'1"					13:10	Added 8'8½" of 10" casing
18'9½" of 10" casing						10'1" + 8'8½" = 18'9½"
					13:40	Driller having
						problems w/ core-
						barrel hitching on
						inside of pipe -
				Coarser gravels (MP-CP) noted @ ~12'-13'. Seds.	14:30	
				remain sand, however.		
	15'	D	DRY	SANDY SILT: 3% gravel, 37% sand, 60% silt: 3% VFP,	14:50	
				10% VCS, 10% CS, 5% MS, 5% FS, 7% VFS, 60% silt -		
				Mod. sorted - (gravel) 70% basalt, 30% si-rich		
				(qtzite, granitic) - clasts angular-to-subangular		
				(sand) 50% basalt 50% si-rich (clr. qtz., f-spars) caliche		
				angular-to-subangular - dry color 2.5Y 7/2		
				light gray - caliche grains ret. w/ 10% HCl		
				∴ mod. rxn. - unconsolidated.		
				NOTE: Finer & Dryer than prev. sample.		
					15:30	Shut Down

REMARKS:

S.P. Airhart 5/17

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5-85)

DRILL LOG	By: AIRHART	Rig: BUCYRUS ERIE 22-14100	Well Number: 299-E17-17	Computer Number: NA	Project or Work Order No.
	Date: 3-18-88		Depth: 15' To 18'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18'9½" of 10" casing					0700	DRILLER arrived
				Driller continues to have problems drive barreling	0920	
				in this interval. Sediment is fine grained		
				and dry. Either the barrel hitches against		
				casing or the seds drop out.		
				Sediment too dry - added ~ 5 gals H_2O	0935	
				Added ~ 3 gals H_2O	1000	
				Cutting off ~ 1.5' of drive barrel	1040	
				Added ~ 1 gal. H_2O	1045	
					1053	John Titus - WHC
						RPT - surveyed
						spoil w/ PAM -
						nothing detected
28'4" of 10" casing					1200	Adding 9'6½" of 10"
						casing.
						18'9½" + 9'6½" = 28'4"

REMARKS:

SP [illegible] 3/14

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By AIRHART	Rig BUCYRUS ERIE	Well Number 299-E17-17	Computer Number	Project or Work Order No.
	Date 3-18-88	22-14100	Depth 18' To 25'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
28'4"	20'	D	Dry	SAND: 3% gravel, 97% sand : 1% FP, 2% VFP, 5% VCS,	13:35	
				10% CS, 40% MS, 30% FS, 12% VFS - mod.-to-well sorted,		
				(gravel) angular to subrounded clasts composed		
				of 70% basalt, 30% qtzite (sand) angular to		
				subangular grains composed of 30% basalt		
				70% si-rich (incl. clr. qtz. f-spar, qtzite, mica)		
				- dry color 2.5Y6/2 light brownish gray -		
				mod rxn w/ 10% HCl, unconsolidated		
				NOTE: slightly compacted clods of sand		
				w/ $CaCO_3$ matrix; less basalt in		
				sand fraction - Took moisture sample		
				(have been failing to note: moisture samples	14:25	Added ~1gal. H_2O.
				taken on all previous samples)		
	25'	D	Dry	SAND: 1% VFP, 99% sand : 1% VFP, 10% VCS, 25% CS,	1515	
				40% MS, 15% FS, 9% VFS - mod-to-well sorted (gravel) no	1520	RPT coverage -
				Δ in gravel fraction (sand) angular-to-subangular,		scanned w/ ~~BY~~ GM -
				30% basalt, 70% si-rich (clr. qtz, f-spar, cht, less mica)		nothing detected
				dry color 2.5Y6/2 light brownish gray - mod rxn. w/		
REMARKS:				10% HCl, unconsolidated.		
				Took moisture sample; sediment c.nt. sample		S.P Ackland 3/18

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-21-88	22-14100 Craig	Depth 25' To 35'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
28'4" of 10"					0700	Driller arrives
9'5½"						- measuring-in
37'9½"				Added 9'5½" of 10"		welding casing
					0910	Began drilling
	30'	D	Dry	SAND 1% MP, 1% FP, 1% VFP, 7% VCS, 35% CS, 30%	0940	
				MS, 15% FS, 10% VFS. Mod.-well sorted.		
				(Gravels) - 50% qtz and Si-rich, 50% Basalt. (Sand) -		
				35% basalt, 65% qtz and Si-rich. Gravels are angular to		
				sub-rounded. Sands are angular to sub-rounded.		
				Dry color: 10YR 6/2 (light brownish gray). Slight reaction to		
				10% HCL. Unconsolidated. Moisture and geologic samples taken.		
	35'	D	Dry	SAND 5% FP, 3% VFP, 25% VCS, 30% CS, 25% MS,	1025	
				7% FS, 5% VFS. Well sorted. (Gravels) 70% basalt,		
				30% qtz and Si-rich including granite and qtzite. (Sand) -		
				60% basalt, 40% qtz, qtzite, and minor chert. Trace mica.		
				Gravels are angular to sub-angular. Sands are angular to sub-angular.		
				Dry color: 10YR 6/2 (light brownish gray). None to slight reaction to		
				10% HCL. Unconsolidated. Slightly coarser than previous.		

REMARKS: Moisture and geologic samples taken.

S.S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-21-88	Craig	Depth 35' To 40'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
37'9½" of 10"				Added 10'½" of 10"	1030	welding casing
10 ½"					1145	Began drilling
47'10"					12-12:30	Lunch
	40'	D	Dry	SAND 2% MP, 2% FP, 1% VFP, 30% VCS, 30% CS,	12:50	
				20% MS, 10% FS, 5% VFS. Well sorted. (Gravels)—		
				65% basalt, 35% qtz and Si-rich including: chert, qtz, qtzite,		
				"granite". (Sand)— 60% basalt, 40% qtz, qtzite, chert and		
				other Si-rich. Gravels are angular to sub-rounded, sands		
				are angular to sub rounded. Dry color: 10YR 6/2 (light brownish		
				gray). None to slight HCL reaction. Unconsolidated. Similar		
				to previous. Note: presence of thin (1-2 inch?) $CaCO_3$		
				cemented layers. Moisture & Geologic Samples taken.		
				John Keller arrived on site. Shut down work for day.	12:50	End of Day

REMARKS: 47'10" of 10" 42' D/B 17' drilled today

Steve Teel 3-21-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100 Olen/Craig	Well Number 299-E17 17	Computer Number NA	Project or Work Order No.
	Date 3-22-88		Depth 42' To 50'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
47'10' of 10"					0700	Drillers arrive
10' 3¾"						begin drilling
58' 1¾"						
	45'	D	Dry	SAND 1% MP, 2% FP, 2% VFP, 25% VCS, 25% CS, 25% MS, 15% FS, 5% VFS. Mod-well sorted. (Gravels) - 70% basalt, 30% qtz and Si-rich. (Sand) - 50% basalt; 40% clear, white, and yellow qtz/qtzite; minor chert; 1% mica. Gravels are angular to sub-rounded. Sands are angular to sub-rounded. Dry color: 10YR 6/2 (light brownish gray). Moderate to strong reaction to 10% HCL. Unconsolidated. Still see "clumps" of weakly $CaCO_3$ cemented material that may correspond to layers. Similar to previous. Moisture, Geologic, and hazardous waste samples taken.	8:15	
				Added 10' 3¾" of 10"	8.55	Welding casing
					9:40	Begin drilling
	50'	D	Dry	SAND 1% FP, 1% VFP, 15% VCS, 20% CS, 30% MS, 20% FS 13% VFS. Mod-well sorted. (Gravels) - 70% basalt, 30% qtz and Si-rich. (Sand) - 50% basalt, 50% clear, white, yellow & orange qtz/qtzite, trace mica. Gravels are angular to sub-rounded	10:05	
58' 1¾"						

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig BE 60W 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-22-88		Depth 50' To 55'		Subcontract No. N4

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
58' 1 3/4"				(50' continued) Sands are angular to subrounded. Dry color:		
8' 7"				10YR 6/2 (light brownish gray). Moderate reaction to 10% HCL.		
66' 8 3/4"				Unconsolidated. Similar to previous sample except more abundant		
				Finer grained sands + less gravel. $CaCO_3$ cemented "clumps" still present		
				but not as abundant. Moisture and Geologic samples collected.		
	55'	D	Dry	SAND 2% MP, 2% FP, 1% VFP, 25% VCS, 30% CS, 25% MS,	10:35	
				10% FS, 5% VFS. Well sorted. (Gravels) - 65% basalt,		
				35% qtz/si-rich including white qtzite, chert, granite. (Sand) -		
				60% basalt, 40% white, clear, + yellow qtz/qtzite, and brown chert,		
				trace mica. Dry color: 10YR 6/2 (light brownish gray). Slight to mod.		
				HCL reaction. Unconsolidated. Similar to previous sample. $CaCO_3$ "clumps"		
				present. Geologic and moisture samples collected.		
				RPT arrives with GM. No counts above background	1100	
				Added 8' 7" of 10"	1110	Welding casing
					1145	Began drilling
					12-12:30	Lunch
66' 8 3/4"						

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5 85)

DRILL LOG	By: S.S. Teel	Rig: B.E. 60W 22-14100 Olen	Well Number: 299-E17-17	Computer Number: NA	Project or Work Order No.
	Date: 3-22-88		Depth: 55' To 65'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
66'8 3/4" 9'6 1/2 76'3 1/4	60'	D	Dry	SAND 1% MP, 3% FP, 1% VFP, 20% VCS, 30% CS, 25% MS, 15% FS, 5% VFS. Well sorted. (Gravel) - 70% basalt, 30% qtz/qtzite, chert, + granite. (Sand) - 65% basalt, 35% qtz/Si-rich including: clear, white, yellow/orange qtz/qtzite, brown chert. Gravels are angular to sub-rounded. Sands are angular to sub-rounded. Dry color: 10YR 6/2 (light brownish gray). Slight to mod. reaction to 10% HCL. Unconsolidated. Similar to previous sample. Still see weakly cemented ($CaCO_3$) "clumps". Moisture and geologic samples collected.	1307	
	65'	D	Dry	SAND 2% MP, 2% FP, 1% VFP, 10% VCS, 25% CS, 30% MS 20% FS, 10% VFS. Mod - well sorted. (Gravel) - 80% basalt, 20% qtz and qtzite. (Sand) - 58% basalt, 40% white, clear, yellow, gray qtz/qtzite; brown chert; 2% mica. Gravels and Sands are angular to sub-rounded. Dry color: 10YR 6/2 (light brownish gray). Slight to moderate reaction to 10% HCL. Unconsolidated. Weak $CaCO_3$-cemented "clumps" more abundant. Similar to previous. Geologic, Moisture, and Hazardous waste samples taken	1340	
76'3 1/4"				Added 9'6 1/2" of 10"	1400	Welding casing

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-22-88		Depth 65' To 75'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
76'3¼"					14:45	Began drilling
9'6½" 85'9¾"	70'	D	Slightly Moist	SAND 3% VFP, 10% VCS, 15% CS, 25% MS, 25% FS, 15% VFS	15.20	Slightly moist starting
				8% silt. Well sorted. (Gravels) - 80% basalt, 20% qtz/qtzite and chert		at ≈ 67'
				(Sand) - 35% basalt, 65% qtz/qtzite, chert, and trace mica.		- Also slightly finer grained
				Gravels and Sands are angular to sub-rounded. Dry color 10YR 7/3 - 10YR 6/2		
				(Very pale brown - light brownish gray). Slight - mod. reaction to 10% HCL		
				Unconsolidated, Similar to previous except slightly more moisture/silt		
				Still has weak $CaCO_3$ cemented "clumps". Moisture + Geologic samples	taken	
	75'	D	Slightly Moist	SAND 1% VFP, 14% VCS, 15% CS, 30% MS, 25% FS, 15% VFS.	15:50	
				Moderately - Well sorted. 35% basalt, 65% clear, gray, white, yellow		
				qtz/qtzite, brown chert; trace mica. Angular to sub-rounded.		
				Dry color 10YR 6/2 (light brownish gray). Slight - moderate reaction to 10% HCL		
				Unconsolidated. Similar to previous except no silt. Still see very weakly		
				cemented ($CaCO_3$) "clumps". Moisture and geologic samples taken.		
				Added 9'6½" of 10"	16:15	Welding casing
					16:50	Began drilling
85'9¾"						

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-35)

9 2 1 2 6 5 4 0 4 9 3

DRILL LOG	By S. S. Teel	Rig B.E. 60W 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-22-88		Depth 75' To 80'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
85' 9 3/4" of 10"						
	80'	D	Dry	SAND 1% CP, 2% MP, 1% FP, 1% VFP, 20% VCS, 25% CS		
				30% MS, 15% FS, 5% VFS. Well sorted. (Gravels) -		
				80% basalt, 20% qtz + Si-rich. (Sand) - 40% basalt,		
				60% qtz/qtzite and Si-rich. Gravels and sands are		
				angular to sub-rounded. Dry color: 10YR 6/2 (light		
				brownish gray). Moderate reaction to 10% HCL. Unconsolidated.		
				Similar to previous. Geologic + moisture samples taken.		
					1730	End of day
						R.P.T coverage
						- no counts above
						background
85' 9 3/4" of 10'						

REMARKS: drilled 38' D/B 80'

Steve Teel 3-22-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5 85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-23-88		Depth 80' To 90'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
85'9¾" of 10'					0700	Driller arrives
To 95'9¾"	85'	D	Dry	SAND 2% FP, 15% VCS, 25% CS, 35% MS, 18% FS, 5% VFS.	0723	
				Well sorted. (Gravels) - 80% basalt, 20% qtz and Si-rich.		
				(Sand) - 30% basalt, 70% qtz/qtzite, chert, Si-rich met?,		
				and minor mica. Gravels and sands are angular to sub-rounded.		
				Dry color: 10YR 6/2 (light brownish gray). Slight reaction to 10%		
				HCL. Unconsolidated. Similar to previous. Still see a few small		
				weakly-cemented ($CaCO_3$) "clumps". Hazardous waste, Moisture,		
				and geologic samples taken.		
	90'	D	Dry	SAND 2% MP, 2% FP, 1% VFP, 15% VCS, 25% CS, 30% MS,	0745	
				20% FS, 5% VFS. Well sorted. (Gravels) - 80% basalt, 20%	0755	Welding casing
				qtz/Si-rich including gray, milky, and orange qtzite, and mica.		
				(Sand) - 30% basalt, 69% gray, clear, milky, and brown qtz/qtzite,		
				1% mica. Gravels and sands are angular to sub-rounded. Dry color:		
				10YR 6/2 (light brownish gray). Slight to moderate reaction to 10% HCL.		
				Unconsolidated. Similar to previous. Moisture and geologic samples		
				taken.		
95'9¾"				Alled 10' of 10"		

REMARKS:

S.S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22 14100 Okev	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-23-88		Depth 90' To 100'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
95'9 3/4" of 10"					0825	Began drilling
9 10 105 7 3/4"	95'	D	Dry	SAND 1% MP, 3% FP, 1% VFP, 25% VCS, 30% CS, 25% MS, 10% FS, 5% VFS. Moderately to well sorted. (Gravels) - 80% basalt, 20% qtz, qtzite, and Si-rich. (Sand) - 40% basalt, 60% clear, gray, brown, milky qtz/qtzite, trace mica. Gravels and sands are angular to subrounded. Dry color: 10YR 6/2 (light brownish gray). Slight to moderate reaction to 10% HCL. Unconsolidated. Similar to previous. Still see weakly $CaCO_3$-cemented "clumps". Moisture and geologic samples taken.	0935	
				Added 9' 10" of 10"	1000	welding
					1100	RPT coverage —
	100'	D	Dry	SAND 2% CP, 1% MP, 1% FP, 25% VCS, 30% CS, 26% MS, 10% FS, 5% VFS. Wellsorted. (Gravels) 80% basalt, 20% qtz, qtzite, chert and granite. (Sand) - 30% basalt, 70% qtz, qtzite, chert and other Si-rich. Gravels and sands are angular to rounded. Dry color: 10YR 6/2 (light brownish gray). Slight reaction to 10% HCL. Unconsolidated. Similar to previous except for presence of coarse pebble. Still see "clumps". Moisture and geologic samples taken	1145	no counts above background.
105'7 3/4"						

REMARKS:

S.S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S.Tech	Rig B.E. 60W 22-14100 Diesel	Well Number 299 E17-17	Computer Number NA	Project or Work Order No.
	Date 3-23-88		Depth 100' To 105		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
105'7¾"					12-12 30	Lunch
10 115'7¾"	105'	D	Dry	SAND 3% FP, 1% VFP, 26% VCS, 30% CS, 20% MS,	1300	The core barrel previous
				15% FS, 5% VFS. Well sorted. (Gravels) - 80% basalt,		to this one (103-104')
				20% qtz, qtzite, and Si-rich. (Sand) 40% basalt, 60%		was more silt and fine
				gray, clear, milky, brown qtz/qtzite and chert. Gravel and		sand rich and seemed to
				sands are angular to rounded. Dry color: 10YR 6/2 to 5/2		show layering.
				(light brownish gray to grayish brown). Moderate to strong reaction		
				to 10% HCL. Unconsolidated. Similar to previous except more		
				basalt and stronger HCL reaction. $CaCO_3$ cemented aggregates		
				("clumps") are still present but are slightly stronger cemented.		
				These aggregates appear to be once-continuous cemented layers but		
				are disturbed from the core barrel. Moisture, geologic, and hazardous	1325	Welding
				waste samples taken.		
				Added 10' of 10" casing		
115'7¾"						

REMARKS:

S.S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-23-88		Depth 105 To 115'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
115' 7 3/4"	110'	D	Dry	SAND 1% MP, 3% FP, 1% VFP, 15% VCS, 25% CS, 30% MS,	1432	
9' 3 1/2				25% FS. Well sorted. (Gravel) - 80% basalt, 20% qtz and		
124 11 1/4				qtzite. (Sand) - 30% basalt, 70% qtz, qtzite, chert, and		
				other Si-rich. Trace mica. Gravels and sands are angular to		
				rounded. Dry color: 10YR 6/2 to 10YR 5/2 (light brownish gray to		
				grayish brown). Strong reaction to 10% HCL. Unconsolidated.		
				Similar to previous sample. $CaCO_3$ cemented (weak) aggregates		
				still present. Moisture and geologic samples taken.		
				RPT coverage. No counts above background.	1505	
	115'	D	Dry	SAND 1% MP, 2% FP, 25% VCS, 32% CS, 25% MS, 10% FS	1535	
				5% VFS. Well sorted. (Gravel) - 60% basalt, 40% qtz and	1540	Welding casing
				qtzite. (Sand) - 30% basalt, 70% clear, white, orange, gray,		
				qtz/qtzite. Trace mica. Gravels and sands are angular to sub-		
				rounded. Dry color: 10YR 6/2 (light brownish gray). Moderate		
				reaction to 10% HCL. Unconsolidated. Similar to previous.		
				Still see weak $CaCO_3$-cemented aggregates. Moisture and geologic		
				samples taken.		
124' 11 3/4"				Added 9' 3 1/2" of 10"		

REMARKS:

S.S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-23-88		Depth 115' To 124		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
124' 11 3/4"	120'	D	Dry	SAND 3% FP, 1% UFP, 15% VCS, 30% CS, 30% MS, 15% FS, 6% UFS	1700	
				Well sorted. (Gravel) - 80% basalt, 20% qtz / qtzite,		
				(Sand) - 25% basalt, 74% qtz, qtzite, and chert, 1% mica.		
				Gravels and sands are angular to sub-rounded. Dry color;		
				10YR 6/2 (light brownish gray). Moderate reaction to 10% HCL.		
				Unconsolidated. Similar to previous samples. Still see		
				$CaCO_3$-cemented aggregates.		
					1730	End of day
124' 11 3/4"						

REMARKS: 44' drilled D/B 124'

Steve Teel 3-23-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5 85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100 Oler.	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-24-88		Depth 124 To 130'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
124' 11 3/4"					0700	Driller arrives
10 134' 11 3/4"	125'	D	Dry	SAND 1% FP, 5% VCS, 20% CS, 40% MS, 25% FS, 9% VFS	0725	
				Very well to well-sorted. 20% basalt, 78% qtz/Si-rich including:		
				clear, white, gray, orange qtz/qtzite, 2% mica. Sands are angular to		
				sub-rounded. Dry color: 10YR 6/2 (light brownish gray). Moderate		
				reaction to 10% HCL. Unconsolidated. Finer grained than previous.		
				Still see $CaCO_3$-cemented aggregates. Hazardous waste, moisture, and		
				geologic samples taken.	0750	Welding casing
				Added 10' of 10"	0830	Drilling
	130'	D	Dry	SAND 2% FP, 1% VFP, 25% VCS, 35% CS, 20% MS, 10% FS, 7% VFS	0915	
				Well sorted. (Gravels) - 70% basalt, 30% qtz/qtzite. (Sand) -		
				30% basalt, 60% Si-rich including: milky, clear, gray, orange qtzite and		
				qtz, 5% green met., 3% mica, 2% feldspar. Gravels are angular to		
				subrounded. Sands are angular to subangular. Dry color: 10YR 6/2		
				(light brownish gray). Moderate to 10% HCL. Unconsolidated.		
				Coarser than previous. Still see a few $CaCO_3$-cemented aggregates.		
134' 11 3/4"						

REMARKS:

S.S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-24-88		Depth 130' To 140'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
131'11 3/4"	135'	D	Dry	SAND 2% FP, 1% VFP, 20% VCS, 25% CS, 30% MS, 15% FS, 7% VFS.	0945	
8'10"				Wellsorted. (Gravels) - 50% basalt, qtz and qtzite. (Sand)-		
143 9 3/4"				20% basalt, 75% Si-rich: clear, gray, white, orange qtz/qtzite,		
				3% mica, 2% green met. Gravels and sands are angular to sub-rounded,		
				Dry color: 10YR 6/2. Moderate reaction to 10% HCL. Unconsolidated.		
				Similar to previous sample. Still see $CaCO_3$-cemented (weak) aggregates		
				Moisture and geologic samples taken.		
143'9 3/4" of 10"				Added 8'10" of 10"	0955	Welding casing
					1040	Drilling
	140'	D	Dry	SAND 1% MP, 3% FP, 1% VFP, 15% VCS, 25% CS, 30% MS, 20%	1120	
				FS, 5% VFS. Wellsorted. Gravels and sands are angular to		
				sub-rounded. (Gravels)- 85% basalt, 15% qtz/qtzite.		
				(Sand)- 20% basalt, 78% Si-rich: clear, gray, milky, orange		
				qtz/qtzite, chert. 2% mica. Dry color: 10YR 6/2 (light brownish		
				gray). Moderate reaction to 10% HCL. Unconsolidated. Similar		
				to previous. Still see $CaCO_3$ cemented (weak) aggregates. Moisture		
				and geologic samples taken.		

REMARKS:

S.S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-86)

DRILL LOG	By S.S. Teel	Rig B.E. Eon 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-24-88		Depth 140 To 145'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
143'9¾"	145'	D	Dry	SAND. 2%MP, 2%FP, 1%VFP, 15%VCS, 35%CS, 25%MS,	1200	
				15%FS, 5%VFS. Well sorted. (Gravels) 80% basalt, 20% qtz and		
				Si-rich. (Sand)- 20% basalt, 78% qtz, qtzite, chert,		
				2% mica. Gravels are angular to rounded, Sands are angular to		
				sub-rounded. Dry color: 10YR 6/2 (light brownish gray), Slight		
				to moderate reaction to 10% HCL. Unconsolidated. Similar to		
				previous. Moisture, hazardous waste, and geologic samples taken.		
					12-12:30	Lunch
143'9¾"	(end of	10")		Adding 8" casing. Total 10" casing = 143'9¾"	12:30	
				20'10", 20'3½", 18'11", 18'7¼", 19'11½", 18'6"		
					1730	End of day

REMARKS: Drilled 21'
D/B 145'

Steve Teel
3-24-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 2001 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-25-88		Depth 145 To 150'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
11'1¼" of 8"					0700	Driller arrives
				19'5", 11'3½", 9'8½"		welding casing
					0945	Began drilling
					1120	Note: samples would
	150'	D	Slightly Moist	SAND 1% FP, 10% VCS, 25% CS, 35% MS, 20% FS, 9% VFS.	1200	not stay in barrel so
				Moderately to well sorted. 15% basalt, 85% qtz and qtzite.		driller added ≈ 4 gal.
				Angular to sub-rounded. Dry color: 10YR 7/2 (light gray). Unconsolidated.		of water
				Slight to moderate reaction to 10% HCL. Similar to previous.		
				Note: no moisture sample taken because driller added water.	12-12:30	Lunch
	155'	D	Dry	SAND 1% MP, 2% FP, 1% VFP, 10% VCS, 40% CS, 25% MS,	13:10	
				15% FS, 6% VFS. Well sorted. (Gravels) 90% basalt, 10%		
				qtz/qtzite. (Sand) - 25% basalt, 75% qtz, qtzite, and chert		
				Dry color: 10YR 7/2 (light gray). Slight to moderate reaction to		
				10% HCL. Unconsolidated. Similar to previous. Moisture and		
				geologic samples taken. Gravels and sands are angular to		
				subrounded. See small (1 inch thick) silt layer in sample.		

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

B.E. 6.0W

DRILL LOG	By S. S. Teel	Rig 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-25-88		Depth 160' To 168'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
157'6¼"	160'	D	Dry	SAND 1% MP, 1% FP, 13% VCS, 35% CS, 30% MS, 15% FS, 5% VFS	1330	
8 3 / 165 9¼				Well sorted. (Gravels) - 70% basalt, 30% qtz and qtzite. (Sand) -		
7 7 / 172 4¼				15% basalt, 82% qtz, qtzite, granite, 3% mica. Gravels and		
				sands are angular to sub-rounded. Dry color: 10YR 7/2 (light gray).		
				Slight reaction to 10% HCL. Unconsolidated. Similar to previous.		
				No silt layers. Moisture & geologic samples taken		
				Added 8'3" of 8"	1337	Welding
					1400	Drilling
						- added ≈ 2 gal water
	165'	D	Dry	SAND 1% FP, 10% VCS, 35% CS, 35% MS, 14% FS, 5% VFS	1605	2" silty sand layer at
				Well sorted. 25% basalt, 75% qtz and qtzite. Angular to		≈ 163 and another
				sub-rounded. Dry color: 10YR 7/2 to 10YR 6/2 (light gray to		one at 164'
				light brownish gray). Very slight reaction to 10% HCL. Unconsolidated.		
				Similar to previous. Moisture and geologic samples taken		
						7 7
172'4¼" of 8'				Added 7'7" of 8"	1615	Welding
					1730	End of day

REMARKS: Drilled 23'
D/B 168'

Steve Teel
3-25-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S. Teel	Rig B.E. 60W 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-28-88		Depth 168 To 175'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
173'4¼"					0700	Drillers arrive
10 / 183.4¼	170'	D	Dry	SAND 20% VCS, 30% CS, 30% MS, 13% FS, 7% VFS.	0735	
				Well sorted, 20% basalt, 78% qtz, qtzite, and chert, 2%		
				mica. Angular to sub-rounded. Dry color: 10YR 7/2 to 10YR 6/2		
				(light gray to light brownish gray). Slight reaction to 10% HCL		
				Unconsolidated. Similar to previous. Moisture and geologic		
				samples taken.		
				Added 10' of 8"	0755	Welding casing
					0830	began drilling
	175'	D	Dry	SAND. 15% VCS, 20% CS, 30% MS, 20% FS, 10% VFS, 5% silt.	0905	
				Moderately to well sorted. 15% basalt, 80% qtz, qtzite, and chert,		
				5% mica. Angular to sub-rounded. Dry color: 10YR 7/2 to 10YR 6/2		
				(light gray to light brownish gray). No reaction to 10% HCL.		
				Unconsolidated. More fines/silt than previous. Moisture and		
				geologic samples taken.		

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. S. Teel	Rig B.E. 22-141100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-28-88		Depth 175' To 185		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
183'4½" 10 193'4½"	180'	D	Dry	SAND 10% VCS, 20% CS, 30% MS, 20% FS, 15% VFS, 5% silt	0940	
				20% basalt, 75% qtz, qtzite, and chert, 5% mica. Sands are		
				angular to subrounded with a few rounded grains. Dry color:		
				10YR 6/2 (light brownish gray). Slight reaction to 10% HCL.		
				Unconsolidated. Very similar to previous sample. Moisture and		
				geologic samples taken.		
				Added 10' of 8"	0950	Welding
					1030	Drilling
					1100	
	185'	D	Dry	SAND 15% VCS, 25% CS, 25% MS, 20% FS, 10% VFS, 5% silt.	1110	RPT coverage
				20% basalt, 75% qtz and qtzite with minor chert, 5% mica.		no counts above background
				Gen. angular to subrounded; some rounded. Dry color: 10YR 6/2		
				(light brownish gray). Moderate to strong reaction to 10% HCL.		
				Unconsolidated. Similar to previous sample. Weakly-cemented		
				($CaCO_3$) aggregates more noticable. Moisture and geologic samples		
				taken.		

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S.S Teel	Rig B.E. 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-28-88		Depth 185' To 195		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
19.3 4 1/4" 8 6 1/2 20 1' 10 3/4"	190'	D	Dry	SAND 2% FP, 15% VCS, 35% CS, 25% MS, 13% FS, 7% VFS,	11:40	
				3% silt. Moderately to well sorted. (Gravels) - 50% qtz and qtzite,		
				50% basalt. (Sand) - 25% basalt, 70% qtz and qtzite,		
				minor chert, 3% mica, 2% feldspar. Gravels and sands are		
				angular to sub-rounded. Dry color: 10YR 6/2 (light brownish		
				gray). Slight to moderate reaction with 10% HCL. Unconsolidated.		
				Similar to previous. Moisture and geologic samples taken.		
				Added 8' 6 1/2" of 8"	1250	Welding casing
					1330	Drilling
	195'	D	Dry	SAND 2% MP, 3% FP, 3% VCS, 15% CS, 30% MS, 25% FS, 12% VFS,	1350	
				10% silt. Moderately to well sorted. (Gravels) - 90% basalt,	1410	Stopped drilling to
				10% qtz and qtzite. (Sand) - 25% basalt, 74% qtz and qtzite,		help set pump in
				1% mica. Gravels and sands are angular to sub-rounded. Dry color:		well 299-E17-16
				2.5Y 6/2 (light brownish gray). Strong reaction to 10% HCL.	1440	Drilling
				Unconsolidated. More silt/VFS than previous. Increase in		
				$CaCO_3$ content. See abundant weak-$CaCO_3$-cemented aggregates.		
				Moisture and geologic samples taken.		

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By S.S. Teel	Rig B.E. 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-28-88		Depth 195 To 203'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
201' 10 3/4	200'	D	Dry	SAND 3% MP, 2% FP, 15% VCS, 25% CS, 20% MS, 15% FS, 10% VFS,	1522	
10				10% silt. Moderately sorted. (Gravels) - 80% basalt, 20% qtz,		See several darker
211' 10 3/4				qtzite, and granite (very weathered). (Sand) - 30% basalt, 69%		colored, SILTY SAND layers
				qtz and qtzite, 1% mica. Gravels and sands are angular to sub-		that are slight to moderately
				rounded. Dry color: 2.5Y 6/2 (light brownish gray). Moderate reaction		consolidated in core barrel
				to 10% HCL. Unconsolidated. Similar to previous sample. Moisture		sample at ≈ 202'.
				and geologic samples taken.		Layers appear to range
						from 2-6" thick and
						are seperated by sands.
						Same in core barrel from
						≈ 203.
				Added 10' of 8"	1620	Welding
					1700	Drilling
					1730	End of day
211' 10 3/4"						

REMARKS: DB 203
Ft 35

Steve Teel
3-28-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5 85)

9 2 1 2 6 4 0 6 7 8

1 of 1

DRILL LOG	By S.S. Teel	Rig B.C. 30-19100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-29-88		Depth 203 To 205		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
211' 10 3/4"					0700	Driller arrives
					0750	Having trouble keeping
						samples in barrel -
						added 4 gal water
	205	D	Slightly Moist	SAND 2% MP, 2% FP, 1% VFP, 15% VCS, 20% CS, 25% MS, 20%	0855	
				FS, 10% VFS, 5% silt. Moderately to well-sorted. (Gravels) -		
				80% basalt, 20% granite, qtz, and qtzite. (Sand) - 20% basalt,		
				79% qtz and qtzite, minor chert, 1% mica. Gravels are angular		
				to sub-angular. Sands are gen. angular to sub-angular with some sub-		
				rounded grains. Dry color: 10YR 6/2 (light brownish gray).		
				Moderate reaction to 10% HCL. Unconsolidated. Less silt than		
				previous. Moisture and geologic samples taken. Note: moisture		
				sample may be affected by addition of water earlier today.		

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 [illegible]

2 of 2

DRILL LOG	By S.S. Teel	Rig B.E. 20-19100 Mer.	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-29-88		Depth [illegible] To 210		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
211' 10¾	= 210	D	Dry	SAND 1% FP, 1% VFP, 30% VCS, 30% CS, 15% MS, 13% FS, 6% VFS	0920	
10 1				4% silt. Well sorted. (Gravels) - 80% basalt, 20% qtz and	0925	Welding
221' 11¾				qtzite. (Sand) - 35% basalt, 65% qtz, qtzite, and minor		
				chert. Trace mica. Gravels and sands are angular to sub-angular		
				with a few rounded grains. Dry color: 10YR 6/2 (light brownish gray)		
				Slight reaction to 10% HCl. Unconsolidated. Coarser than previous		
				as well as more basalt. Moisture and geologic samples taken.		
				Added 10' 1" of 8"	1000	Drilling
				Rig shut down until starter can be fixed.	1100	
				End of Day	1530	
221' 11¾						

REMARKS:

Ft 7'
DB 210'

Steve Teel
3-29-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

1 of 2

DRILL LOG	By: T Gilmore	Rig: Bucyrus Erie 88-14100	Well Number: 299 E17 17	Computer Number: NA	Project or Work Order No.
	Date: 3/30/88		Depth: 210' To 220'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
221' 11 3/4"				Starter for hole in hole being fixed	700	
10 231 11 3/4"					1130	Began drilling
	215'	D	Dry	SAND. 10% VCS, 30% CS, 30% MS, 15% FS, 10% VFS, 5% silt.	1150	
				Moderately to well sorted. 25% basalt, 74% qtz and qtzite, 1%		
				mica. Angular to rounded. Dry color: 10YR 7/2 to 10YR 6/2		
				(light gray to light brownish gray). Moderate reaction to 10% HCL		
				Unconsolidated. Similar to previous. Moisture and geologic samples	12-12:30	Lunch
				taken.		
	220'	D	Dry	SAND 1% FP, 1% VFP, 13% VCS, 30% CS, 25% MS, 15% FS, 8% VFS,	1300	
				7% silt. Well sorted. (Gravels) - 75% basalt, 20% qtz + qtzite,		
				5% mica. (Sand) - 30% basalt, 65% qtz and qtzite, 3% mica,		
				2% feldspar. Gravels are angular to sub-angular. Sands are angular		
				to sub-rounded. Dry color: 10YR 7/1 to 10YR 7/2 (light gray).		
				Moderate reaction to 10% HCL. Unconsolidated. Similar to previous.		
				Moisture and geologic samples taken		
				Added 10' of 8"	1305	Welding casing
231' 11 3/4"						

REMARKS:

S.T.

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By S. Teel	Rig B.E. 22-14100	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-30-88		Depth 225' To 230'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
231'11¾"					1330	Drilling
8 6½ / 240 6¼	225'	D	Dry	SAND 15% VCS, 30% CS, 20% MS, 15% FS, 10% VFS, 10% silt	1410	
				Moderately sorted. 35% basalt, 62% qtz and qtzite, 3% mica.		
				Angular to sub-rounded. Dry color: 2.5Y 7/2 (light gray).		
				Moderate reaction to 10% HCL. Unconsolidated. Similar to		
				previous. Moisture and geologic samples taken.		
	230'	D	Dry	GRAVELLY SAND 8% MP, 3% FP, 1% VFP, 10% VCS, 20% CS,	1445	
				20% MS, 13% FS, 13% VFS, 12% silt. Moderately sorted.		
				(Gravels) - 70% basalt, 30% qtz and qtzite. (Sand) -		
				30% basalt, 69% qtz and qtzite, 1% mica. Gravels are angular		
				to sub-rounded with a few rounded grains. Sands are angular to		
				sub-rounded. Dry color: 10YR 6/2 (light brownish gray). Strong		
				reaction to 10% HCL. Unconsolidated. Noticably more gravel		
				than previous and stronger acid reaction. Moisture and geologic		
				samples taken.		
				Added 8' 6½" of 8"	1500	Welding
					1524	Drilling
240 6¼	=				1530	End of

REMARKS:
Footage = 20'
D/B 230'

Steve Teel
3-30-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. Teel	Rig B.E. 22-14100 Olen	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-31-88		Depth 230 To 235'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
240'6¼"					0700	Driller arrives
9 5½ / 249 11¾						- drilling
	235'	D	Dry	GRAVELLY SAND 5% CP, 8% MP, 7% FP, 5% VFP, 17% VCS,	0800	
				20% CS, 20% MS, 10% FS, 8% silt. Moderately sorted. (Gravels)-		
				- 70% basalt, 30% qtz and qtzite. (Sand)- 35% basalt, 63%		
				clear, white, gray, & fe-stained qtz/qtzite; 2% mica. Gravels are		
				angular to rounded. Sands are angular to sub-rounded. Dry color:		
				10YR 6/2 (light brownish gray). Moderate to strong reaction to 10%		
				HCL. Unconsolidated. Comments: Noticable lithology change at 230'		
				continuing through 235' from SAND to a Slightly silty gravelly sand /		
				Gravelly Sand. Samples in the interval between 230' and 235' show		
				up to 25-30% gravel and up to 15 to 20% silt. Also, weakly-cemented		
				($CaCO_3$) aggregates are conspicuous. Reaction to 10% HCL is moderate-		
				-to-strong, to strong in samples in this interval compared to previous		
				samples which show moderate HCL reaction. Sorting is moderate for		
				this interval compared to moderate to well, or well, for samples before		
				230'.		
249'11¾"				Added 9'5½" of 8"	0845	Welding

REMARKS: Note: 230' sample should have been named a SLIGHTLY SILTY GRAVELLY SAND instead of a GRAVELLY SAND.

Steve Teel
3-31-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: S Teel	Rig: B.E. 22 M100 Olen	Well Number: 299 E17-17	Computer Number: NA-	Project or Work Order No.
	Date: 3-31-88		Depth: 235' To 245'		Subcontract No.: NA-

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
2-19" 11 3/4"					0910	Drilling
	240'	D	Dry	GRAVELLY SILTY SAND (20% gravel, 20% silt, 60% sand)	0930	
				3% CP, 10% MP, 5% FP, 2% VFP, 15% VCS, 15% CS, 10% MS, 10% FS,	0935	Added ≈ 2 qts of water
				10% VFS, 20% silt. Poorly to very poorly sorted. (Gravels)-	1000	Added 1/2 gal water
				65% basalt, 35% qtz, qtzite, and minor weathered granite.		
				(Sand) 35% basalt, 63% qtz and qtzite. Gravel and sands are		
				angular to rounded. Dry color: 10YR 6/2 (light brownish gray).		
				Strong reaction with 10% HCL. Unconsolidated. More silt than		
				previous. Still see $CaCO_3$-weakly-cemented aggregates.		
	245'	D	Dry	GRAVELLY SAND (25% gravel, 65% sand, 10% silt	1030	
				8% VCP, 5% MP, 7% FP, 5% VFP, 23% VCS, 17% CS, 10% MS,		
				8% FS, 7% VFS, 10% silt. Moderately to poorly sorted. (Gravels)-		
				65% basalt, 35% qtz, qtzite, and minor weathered granite.		
				(Sand)- 40% basalt, 59% qtz and qtzite, 1% mica. Gravels		
				and sands are angular to rounded. Dry color: 10YR 6/2 (light		
				brownish gray). Moderate to strong reaction to 10% HCL. Unconsolidated.		
				Similar to previous except less silt and coarser gravel portion.		

REMARKS:

Steve Teel
3-31-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5 85)

DRILL LOG	By: S. Teel	Rig: B.E. 22-14100 Olin	Well Number: 299-E17-17	Computer Number: NA	Project or Work Order No.
	Date: 3-31-88		Depth: 245 To 255		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
249' 11¾"				Added 10' of 8"	1100	Welding casing
10 / 259' 11¾"	250'	D	Dry	SLIGHTLY SILTY GRAVELLY SAND. (15% gravel, 73% sand, 12% silt	1135	RPT coverage at 1110 hrs.
				3% MP, 8% FP, 4% VFP, 23% VCS, 18% CS, 12% MS, 10% FS, 10%		No counts above background.
				VFS, 12% silt. Moderately sorted. (Gravels) - 60% basalt, 40%		
				qtz, qtzite, and minor granite. (Sand) - 40% basalt, 60% clear, white,		
				gray, pink, orange, qtz/qtzite; and granite. Gravels and sands are angular		
				to sub-rounded. Dry color: 10YR 6/1 to 10YR 6/2 (gray to light brownish		
				gray). Moderate reaction to 10% HCL. Unconsolidated. Very		
				similar to previous sample except less gravel. Moisture & geologic samples taken. Basalts frequently are iron-stained.	12-12:30	Lunch
	255'	D	Dry	SLIGHTLY SILTY GRAVELLY SAND (12% gravel, 75% sand, 13% silt).	1300	
				3% MP, 6% FP, 3% VFP, 30% VCS, 18% CS, 12% MS, 8% FS, 7% VFS,		
				13% silt. Moderately sorted. (Gravels) - 65% basalt, 35% qtz and		
				qtzite; minor granite. (Sand) - 40% basalt, 60% qtz and qtzite,		
				and weathered Si-rich igneous. Gravels and sands are angular to		
				rounded. Dry color: 10YR 6/2 to 10YR 5/2 (light grayish brown to		
				grayish brown). Moderate reaction to 10% HCL. Unconsolidated.		
				Similar to previous except slightly less gravel. Still see weakly-cemented		
259' 11¾"				($CaCO_3$) aggregates. Gravel grain sizes do not appear to be representative -		

REMARKS: - many grains appear to be broken. Moisture and geologic samples taken.

Steve Teel 3-31-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By: J. Teel	Rig: B.E. 22-14100 Olin	Well Number: 299-E17-17	Computer Number: NA	Project or Work Order No.
	Date: 3-31-88		Depth: 255' to 265'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
259' 11 3/4"				Added 10' of 8"	1335	Welding
10					1415	Drilling
269' 11 3/4"						
	260'	D	Dry	SLIGHTLY GRAVELLY SILTY SAND (10% gravel, 70% sand, 20% silt).	1425	
				2% MP, 5% FP, 3% VFP, 20% VCS, 15% CS, 10% MS, 10% FS, 15% VFS,		
				20% silt. Moderately sorted. (Gravels) 60% basalt, 40% qtz, qtzite,		
				and weathered Si-rich igneous. (Sand) - 40% basalt, 59% qtz and		
				qtzite, 1% mica. Gravels are angular to rounded. Sands are angular to		
				sub-rounded. Dry color: 10YR 6/2 (light brownish gray). Moderate		
				reaction to 10% HCL. Unconsolidated. More silt and less gravels than		
				previous. Don't see weakly-cemented ($CaCO_3$) aggregates. Moisture		
				and geologic samples taken. Many of the gravels appear to be broken but		
				sample is somewhat representative.		
	265'	D	Dry	GRAVELLY SILTY SAND (15% gravel, 65% sand, 20% silt)	1505	
				2% CP, 5% MP, 6% FP, 2% VFP, 15% VCS, 20% CS, 10% MS, 10% FS,	1510	RPT coverage
				10% FS, 20% silt. Moderately sorted. (Gravels) - 50% basalt,		No counts above background
				50% qtz, qtzite, and chert. (Sand) - 30% basalt, 69% qtz, qtzite, and		
				chert, 1% mica. Gravels and sands are angular to sub-rounded.		
				Dry color: 10YR 6/2 to 10YR 5/2 (light brownish gray to grayish brown)		

REMARKS:

Steve Teel
3-31-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By S. S. Teel	Rig B.E. 22-14100	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
	Date 3-31-88		Depth 265 To 267		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				(265' con't). Moderate reaction to 10% HCL. Unconsolidated.		
				More gravel than previous. See abundant weakly-cemented		
				($CaCO_3$) aggregates. Moisture and geologic samples taken		
					1530	End of day

REMARKS:
Ft 37'
DB 267
Casing 269' 11 3/4"

Steve Teel
3-31-88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

9 2 1 2 5 5 4 0 3 1 7

DRILL LOG	By O. Amos	Rig #4	Well Number 299-17-17	Computer Number	Project or Work Order No.
	Date 3-31-87		Depth 232' To 267'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
10'	235	D	Dry	Sand	warm up Rig	7:00	
9'6½"	240	D	"	"	Drilling	7:15	
10'	245	D	"	Sand + small gravel	welding	8:45	
	250	D	"	"	Drilling	9.10	
	255	D	"	"	welding	10:40	
	260	D	"	"	Drilling	11:15	
	265	D	"	"	welding	1 40	
					Drilling	2:10	
					Head home	3:30	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5 85)

9 2 1 2 6 4 0 5 1 8

DRILL LOG	By 3-30-88	Rig #4	Well Number 299-11-17	Computer Number	Project or Work Order No.
	Date 0.14 mos		Depth 212' To 232'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'	215	D	D	Sand Rig Fix	11 15	
8 6½"	220	D	"	" Drilling	11:30	
240'5"	225	D	"	" Lunch	12:00	
	230	D	"	" Drilling	12:30	
				welding	12:45	
				Drilling	1:30	
				welding	2:50	
				Drilling	3:15	
				Head home	3:30	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

9 2 1 2 6 5 4 0 5 1 9

DRILL LOG	By 3-28-95	Rig 4	Well Number 299-17-17	Computer Number	Project or Work Order No. 24545D
	Date C. Ames		Depth To 212'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'1"				Warm up Rig	7:00	
				Drilling	7:15	
				Welding	9:15	
				Go to Craig's Rig	10:00	
				CAME TO RIG DRILLED 2' AND		
				KILLED MOTOR ON RIG WENT TO RESTART		
				AND STARTER WAS OUT	11:00	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

9 2 1 2 5 4 0 5 2 0

DRILL LOG	By O. Ames	Rig #4	Well Number 299-17-17	Computer Number	Project or Work Order No.
	Date 3-28-88		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
10'	175	D	Dry	Sand	Safty meeting	7:00	
10'	180	"	"	"	Grease Rig	7:15	
8' 6½"	185	"	"	"	Drilling	7:30	
10'	190	"	"	"	Sample	7:40	
	195	"	"	"	welding	8:00	
					Drilling	8:25	
					Sample	8:40	
					Sample	9:05	
					welding	9:45	
					Drilling	10:24	
					Lunch	12:00	
					Drilling	12:30	
					welding	12:45	
					Drilling	1:25	
					Go and put Pump together	1:45	
					Drilling	2:25	
					welding	4:20	
					Drilling	5:00	

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _ Standing Water

A 6090 021 (5 85)

9 2 1 2 6 5 4 0 5 2 1

DRILL LOG	By: OLin Amos	Rig: #4	Well Number: 299-17-17	Computer Number	Project or Work Order No.
	Date: 3-24-88		Depth: 125' To 145'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
10'	125	D	Dry	Sand	Drilling	7:00	
8'10"	130	D	"	"	welding	7:30	
	135	"	"	"	Drilling	8:30	
	140	"	"	"	welding	10:00	
	145	"	"	"	Drilling	11:00	
					Lunch	12:00	
				4 20'10"	Start running 8"	12:30	
				20' 3 1/2"	,		
				18' 11"			
				18' 7 1/4"			
			48'4	19' 11 1/2"			
			"	18' 19' 5"			
				138'			
				4' 1/4"			
				136' 1/4"			

REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

B.206

9 2 1 2 5 4 0 5 1 2

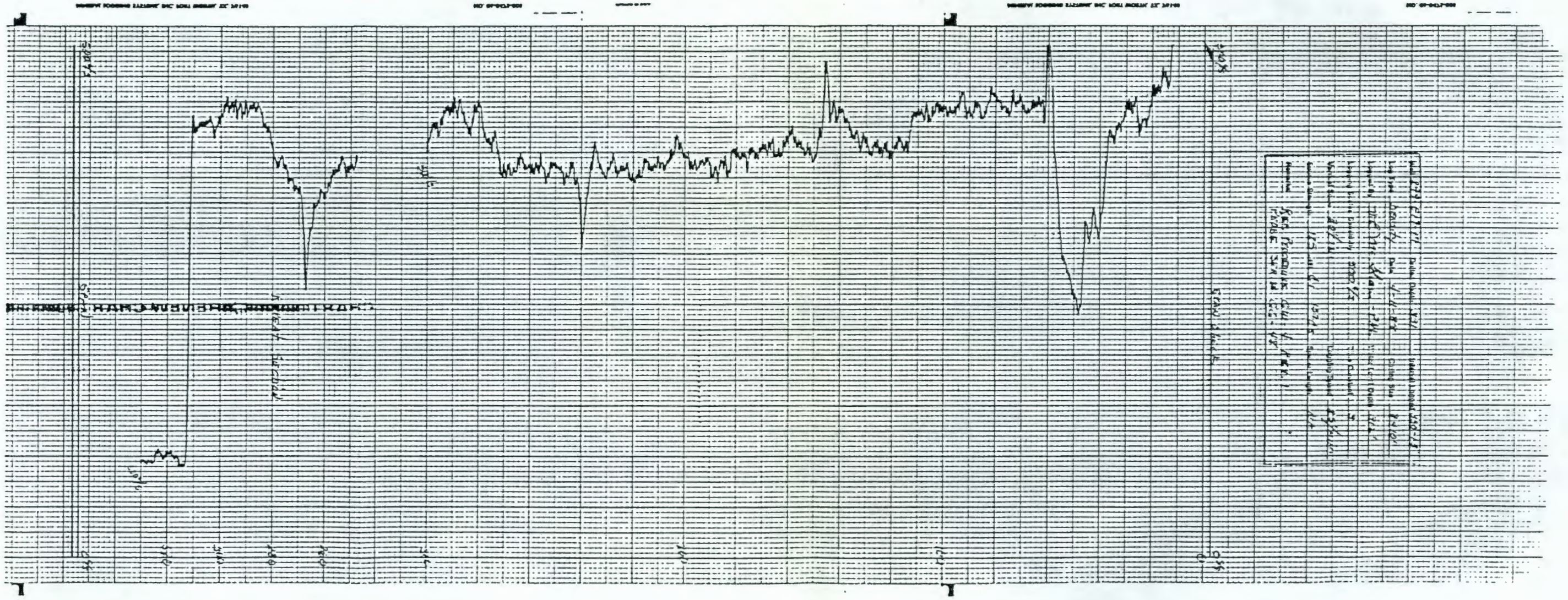
DRILL LOG	By Olin Ames	Rig #4	Well Number 299.17-17	Computer Number	Project or Work Order No.
	Date 3-23-88		Depth 8' To 125'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'	85	D	Dry	Sand		
9'10	90	D	"	"		
10'	95	D	"	"		
9'7½	100	D	"	"		
	105	D	"	"		
	110	D	"	"		
	115	D	"	"		
	120	D	"	"		

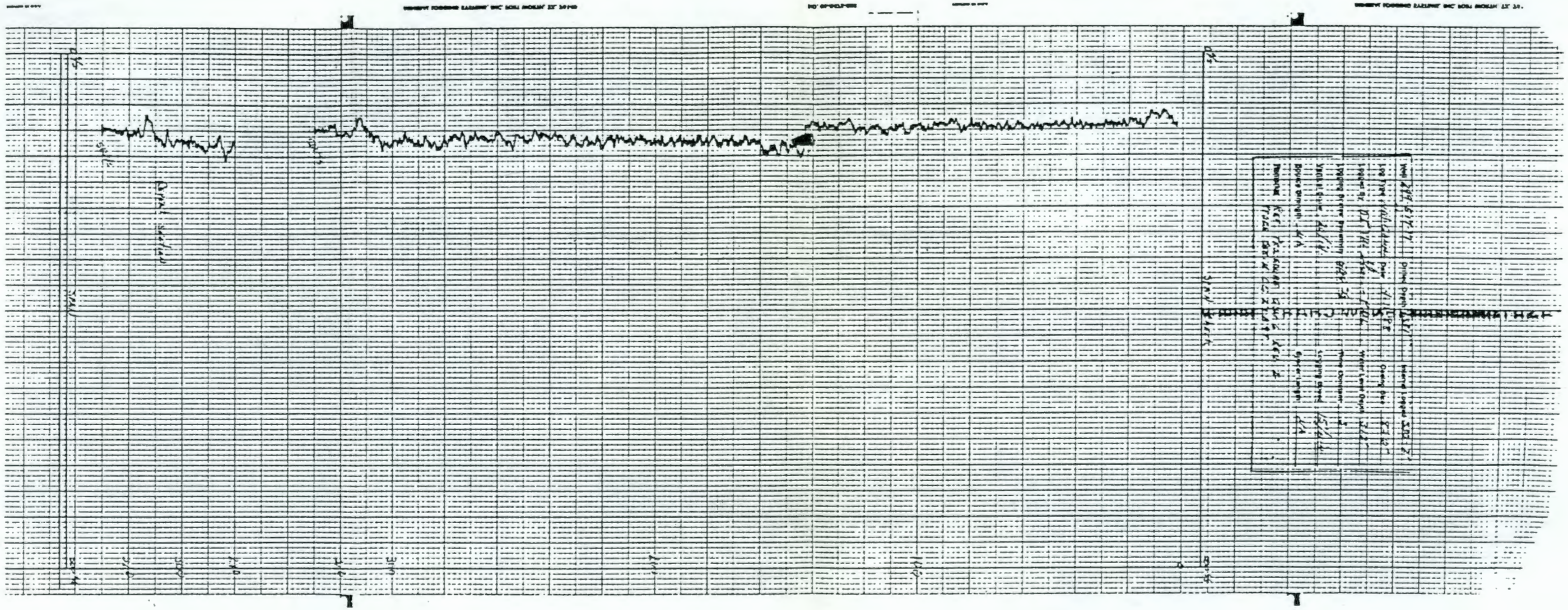
REMARKS:

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Standing Water

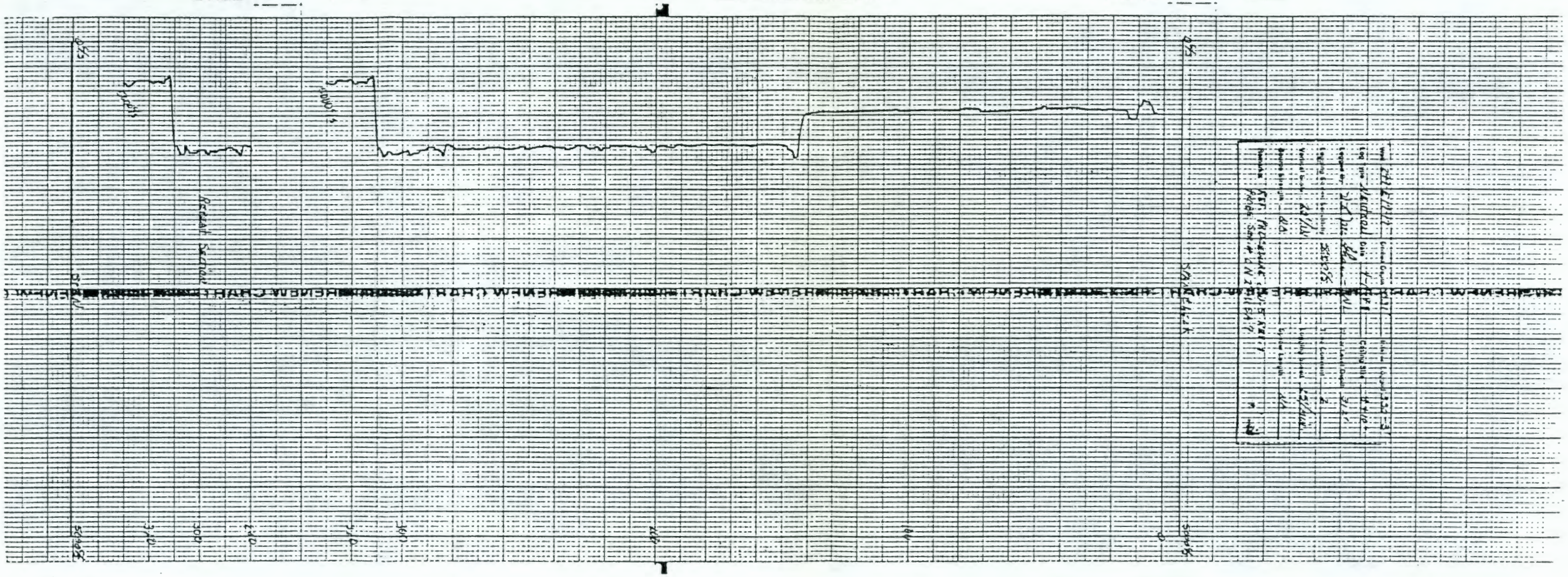
THIS PAGE INTENTIONALLY
LEFT BLANK



9 2 1 2 6 4 0 5 2 3



9 2 1 2 6 4 0 5 2 4



9 2 1 2 6 3 4 0 5 2 5

WELL 299-E17-18

9 2 1 2 6 4 0 5 2 6

THIS PAGE INTENTIONALLY
LEFT BLANK

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-18 Geologist Karen R. Oster Page 1 of 3

Reviewed by T. L. McGhan Date 7-13-88

Construction Data: Description	Construction Data: Diagram	Depth in Feet	Geologic/Hydrologic Data: Diagram Litho.	Geologic/Hydrologic Data: Lithologic Description	Drill Rate ft/hr
Concrete Pad		5'		SILTY SAND	
Cement Grout (19.0-1.5')		10'		GRAVELLY SILTY SAND	
		15'		" " "	
		20'		SLIGHTLY GRAVELLY SLIGHTLY SILTY SAND	
10" Temporary Carbon Steel		25'		SAND (MEDIUM-COARSE)	
Casing		30'		" " "	
(156'4 1/2" total)		35'		" " "	
8" Temporary Carbon		40'		" " "	
Steel Casing		45'		SLIGHTLY GRAVELLY SAND	
(334'7 1/2" total)		50'		SAND (COARSE)	
Factory-welded centralizers		55'		SLIGHTLY GRAVELLY SAND	
8-20 mesh granular bentonite		60'		SAND (MEDIUM-COARSE)	
seal (296'7"-19.0')		65'		" " "	
		70'		" " "	
		75'		SLIGHTLY SILTY SAND	
		80'		SAND (COARSE)	
4" Stainless Steel Casing		85'		" (MEDIUM-COARSE)	
(332.6'.total)		90'		" " "	
		95'		SLIGHTLY GRAVELLY SAND	
		100'		SAND (MEDIUM TO COARSE)	
		105'		" (MEDIUM)	
		110'		" (MEDIUM TO COARSE)	
		115'		" " "	
		120'		" " "	
		125'		" (MEDIUM)	

A-1800-186 (3/87)

9 2 1 2 6 4 0 5 2 7

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-18 Geologist Karen R. Oster Page 2 of 3

Reviewed by J. L. McKhann Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
156'4½" of 10" Carbon Steel Casing (Removed)		130'		SAND (MEDIUM TO COARSE)
		135'		" " "
		140'		" (FINE TO MEDIUM)
334'7½" of 8" Carbon Steel Casing (Removed)		145'		" (MEDIUM TO COARSE)
		150'		" " "
		155'		" " "
		160'		" " "
		165'		SLIGHTLY SILTY SAND
8-20 mesh granular bentonite seal (296'7"-19.0')		170'		SAND (MEDIUM)
		175'		" "
		180'		" (MEDIUM TO COARSE)
		185'		SLIGHTLY SILTY SAND
4" Stainless Steel Casing (329.25'- +.5')		190'		" " "
		195'		" " "
		200'		SAND (MEDIUM TO COARSE)
		205'		" " "
		210'		" " "
Factory-welded centralizers		215'		" "
		220'		" " "
		225'		SLIGHTLY SILTY SAND
		230'		SAND (MEDIUM TO COARSE)
		235'		SLIGHTLY GRAVELLY SAND
		240'		GRAVELLY SAND
		245'		
		250'		

A-1800-186 (3/87)

9 2 1 2 6 5 4 0 5 2 8

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-18 Geologist Karen R. Oster Page 3 of 3

Reviewed by D.L. McShane Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
8-20 mesh granular bentonite seal		255'		SLIGHTLY GRAVELLY SAND
		260'		SAND (COARSE TO VERY COARSE)
		265'		" " " "
8" Temporary Carbon Steel Casing		270'		" (MEDIUM TO COARSE)
		275'		SLIGHTLY SILTY SAND
4" Stainless Steel Casing		280'		SAND (COARSE)
		285'		SLIGHTLY GRAVELLY SANDY CLAYEY SILT Boulder rolled against casing @285' b.l.s.
Factory-welded Centralizers		290'		SLIGHTLY SILTY GRAVELLY SAND
		295'		SANDY GRAVEL
Bentonite Pellet Seal (301'5" - 296'7")		300'		" "
		305'		" "
10-30 Sand Pack (331'1" - 301'5")		310'		" "
20 Slot, 4" dia., stainless steel screen (329.25 - 308.65)		315'		" "
		320'		" "
20 slot, 8" telescoping, stainless steel screen (331.5 - 311.25")		325'		" "
		330'		GRAVELLY SAND

A-1800-186 (3/87)

9 2 1 2 6 1 0 5 2 9

DRILL LOG	By K.R. Oster	Rig Bucyrus Erie 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib.
	Date 3/28/88	22-14101	Depth 0' To 10'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Set-up rig on hole - it was not steam cleaned!		Driller is Len Cordon
				tools weren't steam cleaned either.	1300	started drilling
	4'-5'	D	Dry	SILTY SAND; 1% gravel, 59% sand, 40% silt.	1325	Sample/Core barrel
				1% v.f.p., 9% v.c.s., 15% c.s., 10% m.s., 10% f.s., 15% v.f.s., 40%		Drill rate =
				silt. Moderately to Poorly Sorted. Gravels are 80%		
				basalt, 20% quartz and are very angular to subangular.		
				Sands are 70% basalt, 20% quartz, 5% feldspar,		
				5% quartzite, and are very angular to subangular.		
				Dry Color is light olive gray (5Y 6/2). Very, Very Strong		
				reaction in 10% HCl. Unconsolidated. Geologic and		
				Moisture samples are representative.		
	9'-10'	D	Dry	GRAVELLY SILTY SAND; 15% gravel, 65% sand, 20% silt.	1400	Sample/Core barrel
				Trace v.c.p., Trace c.p., 1% m.p., 5% f.p., 9% v.f.p., 15% v.c.s.,		Drill rate =
				20% c.s., 10% m.s., 10% f.s., 10% v.f.s., 20% silt. Poorly to	1420	stop drilling
				Very Poorly Sorted. Gravels are 70% basalt, 10%		
				granite, 10% quartz, 5% quartzite, 5% metamorphics,		
				and are very angular to subrounded. Sands are		
				60% basalt, 20% quartz, 10% quartzite, 10% feldspar,		

REMARKS:

Karen R. Oster
3/28/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/28/88	22-14101	Depth 10' To 10'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				and Trace rock fragments and are very angular		
				to subrounded. Dry Color is light olivegray (5Y 6/2).		
				Very strong reaction in 10% HCl. Unconsolidated. similar		
				to previous sample with an increase in grain size,		
				decrease in basalt content and HCl reactivity.		
20'8" of 10"					1500	Add 20'8" of 10" Casing
				Total of 10" Carbon steel Casing = 20'8"		
					1505	Resume drilling
					1525	stop drilling
				Steam Clean—core barrel, hard tool, bailer, jars and	1630	Steam Cleaning
				back end of rig and mast.	1650	Resume drilling
					1725	Done for day

REMARKS: Total Depth = 10'
Total Drilled Today = 10'
Total 10" Casing = 20'8"

Karen R. Oster
3/28/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig Bz. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36BCrib
	Date 3/29/88	# 22-14101	Depth 10' To 20'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'8" of 10"				Having trouble keeping casing straight - some cobbles (1g x 5m.) are brought-up in the core barrel.	0700	started drilling
	14'-15'	D	Dry	GRAVELLY SILTY SAND; 15% gravel, 65% sand, 20% silt. 1% v.c.p., 1% c.p., 5% m.p., 8% f.p., 10% v.f.p., 15% v.c.s., 20% c.s., 10% m.s., 10% f.s., 10% v.f.s., 10% silt. Poorly to very Poorly sorted. Gravels are 70% basalt, 10% quartz, 10% quartzite, 5% caliche, 5% metamorphics and other lithologies, and are very angular to subrounded. Sands are 60% basalt, 20% quartz, 10% quartzite, 10% feldspar, Trace mica and are very angular to subangular. Dry Color is light olive gray (5Y 6/2). Very strong reaction in 10% HCl, Unconsolidated. Same as previous sample with the addition of caliche clasts to the gravels. Geologic and Moisture samples are representative.	0910	Sample/Core barrel Drill rate=
					0930	Add 2gals H_2O to hold sample in Core Barrel.
	19'-20'	D	Dry	SLIGHTLY GRAVELLY SLIGHTLY SILTY SAND; 10% gravel, 75% sand, 15% silt. Trace c.p., Trace m.p., 1% f.p., 9% v.f.p., 15% v.c.s., 20% c.s., 15% m.s., 15% f.s., 10% v.f.s., 15% silt. Poorly to Very Poorly Sorted. Gravels are 70% basalt, 10% quartz, 10% quartzite,	0955	Sample/Core barrel Drill rate=

REMARKS:

Karen R. Oster
3/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/29/88	# 22-14101	Depth 20' To 25'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				5% granite, 5% metamorphics and other lithologies, Trace caliche and are very angular to subangular. Sands are 60% basalt, 20% quartz, 10% quartzite, 10% feldspar, Trace mica, and are very angular to subangular. Dry Color is light olive gray (5Y 6/2). Strong reaction in 10% HCl. (Unconsolidated). Similar to previous sample except decrease in grain size, silt content, caliche content and HCl reactivity. Geologic and Moisture Samples are representative. ↳ (May have some added moisture from H_2O added @ 930)		
					1000	stop drilling
20'8" of 10" 10'6¼"					1030	Add 10'6¼" of 10" Casing
31'2¼" of 10"				Total of 10" Carbon Steel Casing = 31'2¼"		
					1125	Resume drilling
	24'-25'	D	Dry	SAND (COARSE TO MEDIUM); 1% gravel, 94% sand, 5% silt. 1% v.f.g., 9% v.c.s., 40% c.s., 30% m.s., 10% f.s., 5% v.f.s., 5% silt. Well to Moderately Sorted. Gravels are 40% basalt, 30% quartz, 10% quartzite, 10% granite, 10% metamorphics and other lithologies and are very angular to subangular. Sands are 60% basalt, 20% quartz, 10% quartzite, 10%	1135	Sample/Core barrel Drill rate =

REMARKS:

Karen R. Oster
3/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig B.E. 2220	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/29/88	# 22-14101	Depth 25' To 30'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				feldspar, Trace mica, and are very angular to subangular. Dry Color is light olive gray (5Y 6/2). Very Strong reaction in 10% HCl. Similar to previous sample with better sorting, less basalt and a stronger HCl reactivity. The Chemical sample was taken by scooping the soil into the square plastic jar from the bucket. Then the jar was taped, labled and put on ice. The Geologic, Moisture and Chemical Samples are representative.		
	29'-30'	D	Dry	SAND (COARSE TO MEDIUM); 2% gravel, 93% sand, 5% silt. Trace m.p., Trace f.p., 2% v.f.p., 8% v.c.s., 40% c.s., 30% m.s., 10% f.s., 5% v.f.s., 5% silt. Well to Moderately Sorted. Gravels are 80% basalt, 10% granite, 5% quartz, 5% quartzite, Trace caliche and are very angular to subangular. Sands are 50% basalt; 20% quartz, 10% quartzite, 10% feldspar, 5% clear quartz, 5% rock fragments (orange/green) - metamorphics and other lithologies, and are very angular to subangular. Dry Color is light gray (5Y 7/2).	1200 1235 1250	Sample/Core barrel Drill rate = Break for lunch Resume drilling Stop drilling

REMARKS:

Karen R. Oster
3/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib.
	Date 3/29/88	# 22-14101	Depth 30' To 35'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Strong reaction in 10% HCl. Unconsolidated. Similar to previous		
				sample with slight changes in grain size and lithologies,		
				lighter color and less reactivity in HCl. Geologic and Moisture		
				samples are representative.		
31' 2¼" of 10" 9' 7¼"					1305	Add 9' 7¼" of 10" Casing
40' 9½" of 10"				Total of 10" Carbon Steel Casing = 40' 9½"	1306	Add 1 gal H_2O
					1345	Resume drilling
	34'-35'	D	Dry	SAND (COARSE TO MEDIUM); 5% gravel, 88% sand 7% silt.	1405	Sample/Core barrel
				Trace m.p., Trace f.p., 5% v.f.p., 10% v.c.s., 30% c.s., 30% m.s.,		Drill rate =
				10% f.s., 8% v.f.s., 7% silt. Moderately to Poorly Sorted.		
				Gravels are 80% basalt, 10% quartz, 5% granite, 5%		
				quartzite, Trace caliche, and are very angular to		
				subangular. Sands are 50% basalt, 20% quartz, 10%		
				quartzite, 10% feldspar, 5% clear quartz, 4% rock fragments		
				(orange/green) - metamorphics and other lithologies, 1% mica,		
				and are very angular to subangular. Dry Color is light		
				gray (5Y 7/2). Very strong reaction in 10% HCl. Unconsolidated.		
				Similar to previous sample except less sorting and stronger		

REMARKS:

K.R. Oster
3/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/29/88	# 22-14101	Depth 35' To 110'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				reaction in HCl. Moisture sample could have added moisture from water added at 1306 but not much because sample is dry to touch + look. Geologic Sample is representative.		
	39'-40'	D	Dry	SAND (COARSE TO MEDIUM), 3% gravel, 95% sand, 2% silt Trace f.p., 3% v.f.p., 17% v.c.s., 40% c.s., 30% m.s., 5% f.s., 3% v.f.s., 2% silt. Well to Moderately Sorted. Gravels are 80% basalt, 10% quartz, 5% granite, 5% quartzite, and are very angular. Sands are 45% basalt, 20% quartz, 10% quartzite, 10% feldspar, 5% clear quartz, 5% mica, 5% rock fragments (orange/green) - metamorphics and other lithologies, and are very angular to subangular. Dry Color is light gray (5Y7/2) Strong reaction in 10% HCl. Unconsolidated. Similar to previous sample with better sorting, less basalt, and a weaker HCl reaction. Geologic and Moisture samples are representative.	1440 1445	Sample/Core barrel Drill rate = stop drilling
110' 9 1/3" of 10" 9' 7 3/4" 50' 5 1/4" of 10"				Total of 10" Carbon Steel Casing = 50' 5 1/4"	1455 1525	Add 9' 7 3/4" of 10" Casing Done for day.

REMARKS: Total Drilled Depth = 40' Total of 10" Casing = 50' 5 1/4"
Depth Drilled Today = 30'.

Karen R. Oster
3/29/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/30/88	#22-14101	Depth 40' To 45'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
50'5¼" of 10"					0700	Start drilling.
	44'-45	D	Dry	SLIGHTLY GRAVELLY SAND; 10% gravel, 88% sand, 2% silt.	0730	Sample/core barrel
				Trace m.p., 2% f.p., 8% v.f.p., 20% v.c.s., 40% c.s., 20% m.s., 5% f.s.,		Drill rate =
				3% v.f.s., 2% silt. Well to Moderately Sorted. Gravels are		
				80% basalt, 5% granite, 5% quartz, 5% quartzite, 5%		
				caliche (iron stained), and are very angular to subrounded.		
				Sands are 45% basalt, 20% quartz, 10% quartzite, 10%		
				feldspar, 5% clear quartz, 5% mica, 5% rock fragments		
				(orange/green) - metamorphic and other lithologies, and are		
				very angular to subrounded. Dry Color is light olive gray		
				(5Y 6/2). Moderate reaction in 10% HCl. Unconsolidated.		
				Thin 1" silty- v.f. sand lens @ 45' b.l.s., Similar to		
				previous sample with increasing grain size, darker		
				color and weaker HCl reaction. Chemical sample was		
				scooped into square plastic jar and then the		
				jar was taped with white tape, labled and put on ice.		
				Chemical, Moisture, and Geologic Samples are		
				representative.		

REMARKS:

Karen P. Oster
3/30/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

DRILL LOG	By K.R. Oster	Rig B.E.2210	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/30/88	22-14101	Depth 45' To 55'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	49'-50'	D	Dry	SAND (COARSE); Trace gravels, 98% sand, 2% silt.	0800	Sample/Core barrel
				Trace f.p., Trace v.f.p., 5% v.c.s., 65% c.s., 20% m.s., 5% f.s., 3% v.f.s.,		Drill rate =
				2% silt. Well Sorted. Gravels are 100% basalt and are sub-		
				angular. Sands are 40% basalt, 20% quartz, 10% quartzite,		
				10% feldspar, 5% clear quartz, 5% mica, 10% rock fragments		
				(orange (mostly green) - metamorphics and other lithologies, and are		
				very angular to subrounded. Dry Color is light gray (5Y 6/2).		
				Strong reaction in 10% HCl. Unconsolidated. Similar to		
				previous sample with a decrease in grain size, better sorting,		
				increase in HCl reactivity and less basalt. Geologic		
				and Moisture Samples are representative.		
50' 5¼" of 10"					0815	Add 9'5" of 10" Casing
9' 5"						
59' 10¼" of 10"				Total of 10" Carbon Steel Casing = 59' 10¼"		
					0855	Resume drilling
	54'-55'	D	Dry	SLIGHTLY GRAVELLY SAND; 10% gravel, 88% sand, 2% silt.	0920	Sample/Core Barrel
				Trace m.p., 2% f.p., 8% v.f.p., 15% v.c.s., 45% c.s., 20% m.s.,		Drill Rate =
				5% f.s., 3% v.f.s., 2% silt. Well to Moderately Sorted.		
				Gravels are 80% basalt, 5% granite, 5% quartz, 5%		

REMARKS:

Karen R. Oster
3/30/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

B.226

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/30/88	22-14101	Depth 55' To 60'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				quartzite, 5% caliche (iron stained), and are very angular to subrounded. Sands are 40% basalt, 20% quartz, 10% feldspar, 10% quartzite, 10% clear quartz, 5% mica, 5% rock fragments (orange/green) - metamorphics and other lithologies, and are very angular to subrounded. Dry Color is light olive gray (5Y 6/2) Moderate reaction in 10% HCl, Unconsolidated. Simular to previous sample with an increase in grain size, decrease in Sorting and HCl reactivity. Geologic and Moisture Samples are representative.		
	59'-60'	D	Dry	SAND (COARSE TO MEDIUM); 2% gravel, 95% sand, 3% silt. Trace m.p., Trace f.p., 2% v.f.p., 8% v.c.s., 40% c.s., 30% m.s., 12% f.s., 5% v.f.s., 3% silt. Well to Moderately Sorted. Gravels are 80% basalt, 10% quartz, 5% granite, 3% quartzite, 2% mica, and are very angular to subrounded. Sands are 40% Basalt, 20% quartz, 10% feldspar, 10% quartzite, 10% clear quartz 5% mica, 5% rock fragments (orange/green) - metamorphics and other lithologies, and are very angular to subrounded. Dry Color is light olive gray (5Y 6/2).	0945	Sample / Core barrel Drill rate=

REMARKS:

Kevin R. Oster
3/30/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By J.R. Oster	Rig B.E.2220	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 2116-A-36B-010
	Date 3/30/88	82-14101	Depth 10' To 65'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Very strong reaction in 10% HCl. Unconsolidated. Similar to		
				previous sample with a decrease in grain size and an		
				increase in HCl reactivity. Geologic and Moisture		
				Samples are representative.		
59'10¼" of 10"					0950	Add 8'11¾" of 10" Casing
8'11¾"						
68'10"				Total of 10" Carbon Steel Casing = 68'10"		
					1045	Resume drilling
					1110	stop drilling
					1115	Add ½ gal H_2O (let set)
					1135	Resume drilling
					1200	Lunch
					1235	Resume drilling
					1240	Add ¼ gal H_2O
	14'-65'	D	Dry	SAND, COARSE TO MEDIUM; 3% gravel, 95% sand, 2% silt.	1245	Sample/Core barrel
				Trace f.p., 3% v.f.p., 7% v.c.s., 35% c.s., 45% m.s., 5% f.s.,		Drill rate =
				3% v.f.s., 2% silt. Well sorted. Gravels are 80% basalt,		
				10% quartz, 5% granite, 3% quartzite, 2% mica, Trace		
				caliche, and are very angular to subangular. Sands		

REMARKS:

J.R. Oster
3/30/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E 220	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/30/88	22-14101	Depth 65' To 70'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				are 40% basalt, 20% quartz, 10% quartzite, 10% feldspar,		
				10% clear quartz, 5% mica, 5% rock fragments (orange/green)		
				- metamorphics and other lithologies and are very		
				angular to subrounded. Dry Color is light olive gray		
				(5Y 6/2). Very strong reaction in 10% HCl. Unconsolidated.		
				Chemical sample was scooped into square plastic		
				jar from bucket and then was sealed with white		
				tape, labled, and put on ice. Moisture sample		
				could have added moisture due to pouring water		
				down the hole to help retrieve core sample.		
				Geologic and chemical samples are representative.		
68' 10" of 10"					1315	All 10' 6¼" of 10" Casing
10' 6¼"						
79' 4¼" of 10"				Total of 10" Carbon Steel Casing = 79' 4¼"		
					1405	Resume drilling
	69'-70	D	Dry	SAND (COARSE TO MEDIUM); Trace gravel, 90% sand, 10% silt.	1410	Sample / Core barrel
				Trace v.f.p., 5% v.c.s., 30% c.s., 45% m.s., 5% f.s., 5% v.f.s.,		Drill rate =
				10% silt. Moderately Sorted. Gravels are 100% basalt		
				and very angular. Sands are 40% basalt, 20% quartz,		

REMARKS:

Karen R. Oster
3/30/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (5-85)

DRILL LOG	By K.P. Oster	Rig B.E. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib.
	Date 3/30/88	22-14101	Depth 70' To 75'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				10% quartzite, 10% feldspar, 10% clear quartz, 5% mica,		
				5% rock fragments (orange/green) - metamorphics and		
				other lithologies, and are very angular to subrounded.		
				Dry Color is light gray (5Y 7/2). Very strong reaction		
				in 10% HCl. Unconsolidated. Similar to previous		
				sample with a decrease in grain size and lighter color.		
				Geologic and Moisture samples are representative.		
	74'-75'	D	V. Slightly Damp.	SLIGHTLY SILTY SAND; Trace gravel, 75% sand, 15% silt, 10% clay	1450	Sample/Core barrel
				Trace v.f.p., 5% v.c.s., 5% c.s., 25% m.s., 30% f.s., 10% v.f.s.,		Drillrate =
				15% silt, 10% clay. Moderately Sorted. Gravels are 100%		
				basalt and are very angular. Sands are 30% basalt,		
				30% quartz, 10% quartzite, 10% feldspar, 10% clear quartz,		
				10% mica, 10% clay, Trace metamorphics and other		
				lithologies and are very angular to subrounded.		
				Dry Color is light olive gray (5Y 6/2) Strong reaction		
				in 10% HCl. Unconsolidated. Similar to previous sample		
				with a decrease in grain size, HCl reactivity, and basalt,		
				addition of clay, and darker color. Moisture is contained		

REMARKS:

Kevin P. Oster
3/30/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E. 2210	Well Number 699-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Ch10
	Date 3/30/88	# 22-14101	Depth 75' To 75'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				In thin layers of clay (~1mm thick) between the dry		
				sands. Geologic and Moisture samples are representative.		
					1725	Done for day

REMARKS: Total Drilled Depth = 75'
Total Drilled Today = 35'
Total of 10" Casing = 79' 4¼"

Karen R. Oster
3/30/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 299-A-36B Crib.
	Date 3/31/88	# 22-14101	Depth 75' To 80'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
79' 4¼" of 10"					0710	Start drilling
	79'-80'	D	Very Moist	SAND (COARSE); Trace gravel, 98% sand, 2% silt.	0715	Sample/Core barrel
	Driller added 3/4 gal			Trace v.f.p., 5% v.c.s., 50% c.s., 35% m.s., 5% f.s., 3% v.f.s., 2% silt.		Drill rate =
	on 3/30/88 and only			Well Sorted. Gravels are 80% basalt, 20% quartz and are	0720	stopped drilling
	took one barrel load			very angular. Sands are 35% basalt, 20% quartz, 10% quartzite,		
	out. This moisture			10% feldspar, 10% clear quartz, 5% mica, 10% rock fragments, (orange/		
	is probably what			mostly green) - metamorphics and other lithologies, and are very angular		
	remained in the			to subrounded. Dry Color is light olive gray (5Y 6/2). Moderate		
	hole.			reaction in 10% HCl. Unconsolidated. Similar to previous		
				sample with an increase in grain size, better sorting, decrease		
				in clay, silt, mica, and HCl reactivity. No Moisture sample		
				taken. Geologic sample is representative.		
79' 4¼" of 10"					0750	Add 9' 9¼" of 10" Casing
9' 9¼"						
89' 1½" of 10"				Total 10' Carbon Steel Casing = 89' 1½"		
					0850	Drive Casing
				Trouble getting sand to stay in core barrel.	0100	Resume drilling
					0910	Add 3/4 gal H_2O
					0915	Resume drilling

REMARKS:

Karen R. Oster
3/31/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000-021 (5-85)

DRILL LOG	By: K.R. Oster	Rig: B.E.22W	Well Number: 299-E17-18	Computer Number: N/A	Project or Work Order No.: 216-A-36B Crib
	Date: 3/31/88	# 22-14101	Depth: 80' To 85'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	84'-85'	D	Dry	SAND (COARSE TO MEDIUM); 1% gravel, 94% sand, 5% silt.	0920	Sample/Core Barrel
				1% v.f.g., 4% v.c.s., 35% c.s., 40% m.s., 10% f.s., 5% v.f.s., 5% silt.		Drill rate =
				Well to Moderately Sorted. Gravels are 50% basalt, 25%	0925	Drive Casing
				quartz, 15% quartzite, 10% caliche, and are very angular.	0930	Resume drilling
				Sands are 35% basalt, 20% quartz, 10% quartzite, 10% feldspar,	1005	Stopped drilling
				10% clear quartz, 5% mica, 10% rock fragments (orange/green)		
				- metamorphics and other lithologies and are very angular		
				to subrounded. Dry Color is light olive gray (5Y 6/2).		
				Moderate reaction in 10% HCl. Unconsolidated. Same as		
				previous sample with decreasing grain size. Moisture		
				sample may contain a little additional moisture from		
				water added by driller but doesn't appear to so I took one.		
				Geologic and Chemical Samples are representative.		
89' 1½" of 10"					1010	Add 10' 1½" of 10" Casing
10' 1½"						
99' 3" of 10"				Total of 10" Carbon Steel Casing = 99' 3"		
					1055	Drive Casing
					1100	Resumed drilling

REMARKS:

K.R. Oster
3/31/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A 6000 021 (6 85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B-Crib
	Date 3/31/88	# 22-14101	Depth 85' To 95'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	89'-90'	D	Dry	SAND (COARSE TO MEDIUM); 1% gravel, 94% sand, 5% silt.	1105	Sample/Core barrel
				1% v.f.p., 4% v.c.s., 40% c.s., 35% m.s., 10% f.s., 5% v.f.s., 5% silt.		Drill rate =
				Well to Moderately Sorted. Gravels are 75% basalt, 25% quartz	1115	Stop drilling
				and are very angular to subangular. Sands are 35% basalt,	1120	Drive Casing
				20% quartz, 10% quartzite, 10% feldspar, 10% clear quartz, 5%	1130	Add ½ gal H_2O
				mica, 10% rock fragments (orange/green) - metamorphics and	1140	Resume drilling
				other lithologies and are very angular to subrounded. Dry Color is light olive gray (5Y 6/2) Very	1145	Drive Casing
				Strong reaction in 10% HCl. Unconsolidated. Same as	1150	Resume drilling
				previous sample with slight decrease in grain size. Geologic	1200	Add ½ gal H_2O
				and Moisture samples are representative.		Lunch
					1230	Resume drilling
	94'-95'	D	Dry	SLIGHTLY GRAVELLY SAND; 10% gravel, 85% sand, 5% silt.	1245	Sample/Core barrel
				Trace m.p., 2% f.p., 8% v.f.p., 5% v.c.s., 35% c.s., 30% m.s., 10% f.s.,		Drill rate =
				5% v.f.s., 5% silt. Moderately Sorted. Gravels are 50%	1310	stopped drilling
				basalt, 30% quartz, 10% granite, 5% quartzite, 5% metamorphics		
				and other lithologies and are very angular to subangular.		
				Sands are 35% basalt, 20% quartz, 10% quartzite, 10%		
				feldspar, 10% clear quartz, 5% mica, 10% rock fragments (orange/green)		

REMARKS:

Karen R. Oster
3/31/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W # 22-14101	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/31/88		Depth 95' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				- metamorphics and other lithologies, and are very angular to subrounded. Dry Color is light gray (5Y 7/2). Very Strong reaction in 10% HCl. Unconsolidated. Similar to previous sample with increasing grain size and lighter color. Moisture sample may have some added moisture but was not visably moist so I took one. Geologic samples are representative.		
99'3" of 10" 8'6" 107'9" of 10"					1315	Add 8'6" of 10" Casing
				Total 10" Carbon Steel Casing = 107'9"		
					1340	Drive Casing
					1345	Add 1/2 gal H_2O Resume drilling
	99'-100' D		Moist	SAND (COARSE TO MEDIUM); 2% v.f.p., 93% sand, 5% silt.	1400	Sample / Core barrel
	Driller added H_2O.			Trace f.p., 2% v.f.p., 3% v.c.s., 20% c.s., 45% m.s., 15% f.s., 10% v.f.s.,		Drill rate =
				5% silt. Moderately Sorted. Gravels are 50% basalt,	1415	Stop drilling
				30% quartz, 10% granite, 10% quartzite, and are very	1425	Resume drilling
				angular to subangular. Sands are 35% basalt, 20% quartz,		
				10% quartzite, 10% feldspar, 10% clear quartz, 5% mica, 10%		
				rock fragments (orange/green) - metamorphics and other		

REMARKS:

Karl R. Oster
3/31/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (6-85)

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 291-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
	Date 3/31/88	# 22-14101	Depth 100' To 105'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				lithologies, and are very angular to subrounded. Dry Color is light gray (5Y 7/2). Very Strong reaction in 10% HCl. Unconsolidated. Similar to previous sample with decreasing grain size. Moisture sample not taken due to water added by driller. Geologic samples are representative.		
	104'-105'	D	Dry	SAND (MEDIUM); 2% gravel, 93% sand, 5% silt 2% v.f.p., 3% v.c.s., 15% c.s., 50% m.s., 15% f.s., 10% v.f.s., 5% silt. Moderately Sorted. Gravels are 50% basalt, 30% quartz, 10% quartzite, 5% granite, 5% metamorphics and other lithologies, and are very angular to subangular. Sands are 35% basalt, 20% quartz, 10% quartzite, 10% feldspar, 10% clear quartz, 10% mica, 5% rock fragments (orange/green) - metamorphics and other lithologies. Dry Color is light gray (5Y 7/2). Very Strong reaction in 10% HCl. Unconsolidated. Similar to previous sample with decrease in grain size, increase in mica. Chemical sample scooped from bucket into square plastic jar which is sealed with white tape,	1445 1510 1525	Sample/Core barrel Drill rate = stop drilling Clean up site/ ready to weld. Done for day

REMARKS:

Karen R. Oster
3/31/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5-85)

DRILL LOG	By K.R. Oster	Rig B.E.22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 216-A-36BCrib
	Date 3/31/88	# 22-14101	Depth 105' To 105'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				labled and put on ice. Geologic, Moisture, and		
				Chemical Samples are representative.		

REMARKS: Total Drilled Depth = 105'
Total Drilled Today = 30'
Total 10" Casing = 107'9"

Karen R. Oster
3/31/88

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000 021 (5 85)

9 2 1 2 6 0 4 0 5 5 0

DRILL LOG	By: R. L. Cordon	Rig: 14101	Well Number: 299-17-18	Computer Number	Project or Work Order No.: 245450
	Date: 3-31-88		Depth: 75 To 105		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
79-4 1/4					7AM	Start
+ 9-9 1/4	80	D	D	Sand & Silt Dry	7:30	Sample
= 89-1 1/2					7:40	WELDING
+ 10-1 1/2				HARD TIME PICKING CUTTINGS (SAND) Added 3 gallons	8:55	drilling
= 99.3	85	D	D	Sand & Silt Dry	9:30	Sample
+ 8-6					9:45	WELDING
= 107-9				Added 1/2 GALLON H2O	10:55	drilling
	90	D	D	Sand & Silt Dry	11:05	SAMPLE
					12:00	Lunch
				Added 1.5 Gal H2O	12:30	drilling
	95	D	D	Sand - Silt - Some Gravel	12:50	Sample
					12:55	WELDING
				Added 1/2 Gal H2O	1:45	drilling
	100	D	D	Sand - Silt, Some Gravel	1:00	Sample
	105	D	D	Sand & Silt	2:55	Sample
					3:20	READY TO WELD
						CLEANED UP AROUND RIG
					3:30	WENT HOME

REMARKS:

90 - 95 - 100 - 105 - 110 - 115

Lin Cordon

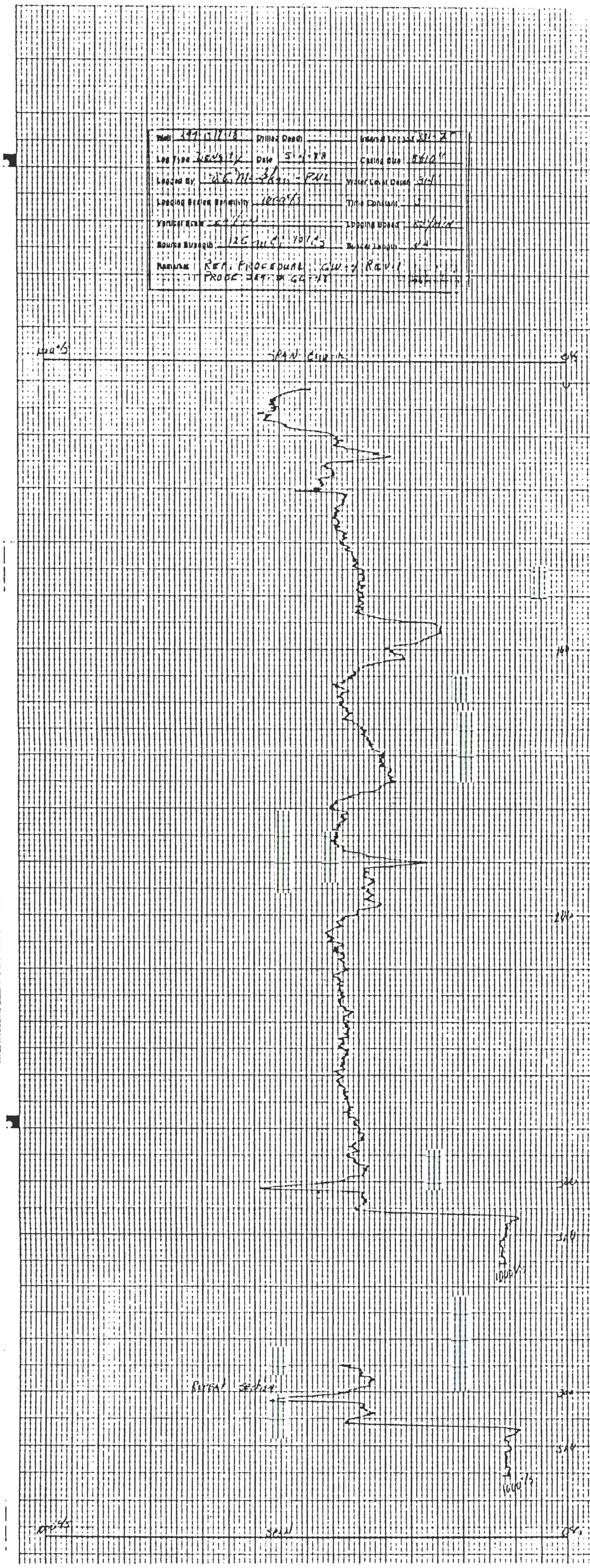
D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

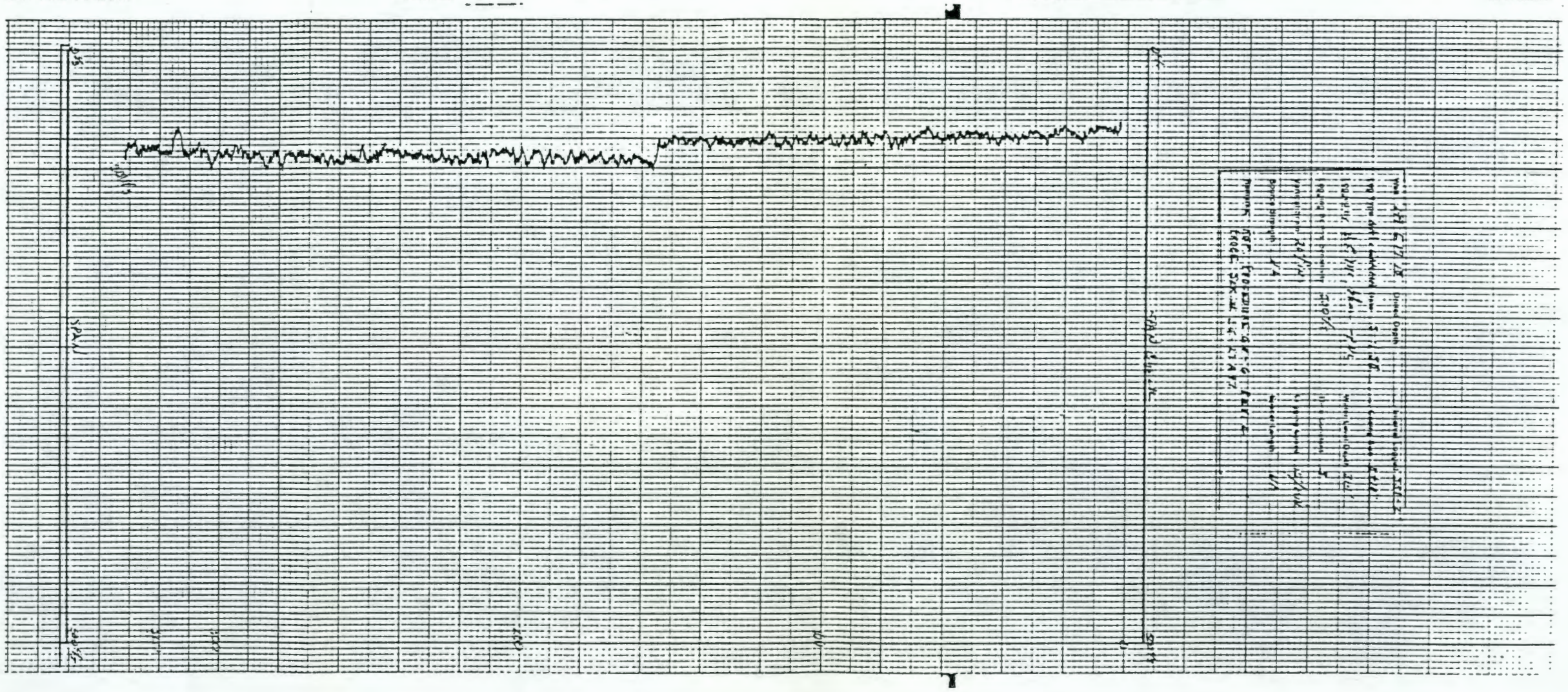
D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water

A-6000-021 (5-85)

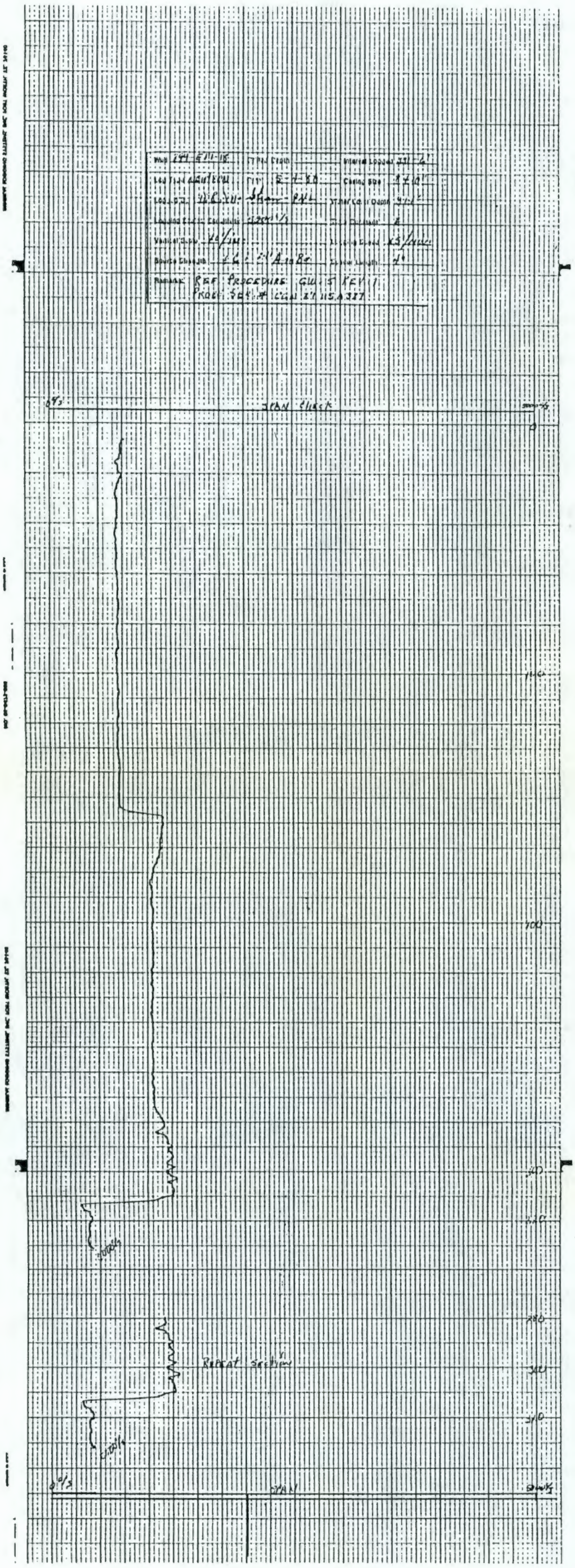
9 2 1 2 6 4 0 5 5 1



B.239



9 2 1 2 6 7 4 0 5 5 2


Repeat section
700
800
900
1000
1100
1200

DISTRIBUTION

No. of Copies	
	OFFSITE
2	DOE/Office of Scientific and Technical Information
	ONSITE
	DOE Richland Operations Office
	R. Izatt
	Westinghouse Hanford Company
	K. R. Fecht
10	Pacific Northwest Laboratory
	R. E. Brown
	T. J. Gilmore
	P. C. Hays
	S. P. Luttrell
	Publishing Coordination
	Technical Report Files (5)

THIS PAGE INTENTIONALLY
LEFT BLANK