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**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**

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Pacific Northwest Laboratory
Richland, Washington 99352

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-built 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.

APPENDIX A

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

APPENDIX A

WELL COMPLETION/INSPECTION REPORTS, AS-BUILT DIAGRAMS, DRILL LOGS, AND GEOPHYSICAL 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

WELL COMPLETION/INSPECTION REPORT																																							
Specification No. <u>W-014-C1</u> Rev. No. <u>0</u> Project <u>W-014</u> Location <u>1301-N Crib</u> Driller <u>Louis Watkins</u> Drilling Co. <u>Kaiser Drilling (KEH)</u> Geologist <u>Karen R. Oster</u>			Well No. <u>199-N-69</u> Temp. Well No. <u>N/A</u> Coordinates _____ Casing Elevation _____ Ground Elevation _____																																				
COMPLETION DATA Drilled Depth <u>104' b.l.s.</u> Compl Depth <u>100' b.l.s.</u> Date Started <u>4/29/88</u> Completed <u>6/7/88</u> Static Water Level/Date <u>67.5' b.l.s. / 5/11/88</u>			DRILLING METHOD Rotary Air <u>N/A</u> Mud <u>N/A</u> Cable Tool <u>D</u> <u>N/A</u> H <u>0'-104'</u> Drilling Fluid <u>100-N Drilling Supply Water</u> Other _____																																				
GEOPHYSICAL LOGGING <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sondes</th> <th>Interval</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>Density</td> <td><u>102'-2'</u></td> <td><u>5/17/88</u></td> </tr> <tr> <td>Neutron</td> <td><u>102'-4'</u></td> <td><u>5/17/88</u></td> </tr> <tr> <td>Nat. Gamma</td> <td><u>102'-3'</u></td> <td><u>5/17/88</u></td> </tr> </tbody> </table>		Sondes	Interval	Date	Density	<u>102'-2'</u>	<u>5/17/88</u>	Neutron	<u>102'-4'</u>	<u>5/17/88</u>	Nat. Gamma	<u>102'-3'</u>	<u>5/17/88</u>	PERFORATIONS <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Type</th> <th>Depth</th> <th>Schedule</th> </tr> </thead> <tbody> <tr> <td><u>N/A</u></td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> <tr> <td><u>N/A</u></td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> <tr> <td><u>N/A</u></td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> </tbody> </table>		Type	Depth	Schedule	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	AQUIFER TESTING Type <u>Step drawdown/Constant Discharge</u> Length of Test <u>5 hours</u> Volume Pumped <u>13,900 gallons</u> Drawdown <u>18.55'</u>											
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STRAIGHTNESS TEST Inspection Method <u>visual</u> Acceptance Criteria <u>Stainless Screen goes to bottom.</u> Accept <u>KRO</u> Reject _____ Performed by <u>Karen R. Oster</u> Date <u>5/20/88</u>			WELL PROTECTION Inspection Method <u>visual</u> Acceptance Criteria <u>4.2.10, 5.3.2</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Accept</th> <th>Reject</th> </tr> </thead> <tbody> <tr> <td>Protective Posts</td> <td><u>KRO</u></td> <td>_____</td> </tr> <tr> <td>Locks</td> <td><u>KRO</u></td> <td>_____</td> </tr> <tr> <td>Performed by <u>Karen R. Oster</u></td> <td>Date <u>6/3/88</u></td> <td></td> </tr> </tbody> </table>				Accept	Reject	Protective Posts	<u>KRO</u>	_____	Locks	<u>KRO</u>	_____	Performed by <u>Karen R. Oster</u>	Date <u>6/3/88</u>																							
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OTHER (check if performed) (mark N/A if not applicable) <u>N/A</u> Well Abandonment <u>N/A</u> Downhole TV Inspection <u>KRO</u> Complete As-Built Diagram, <u>KRO</u> Well Development Driller's/Geologist's Logs Performed by <u>Karen R. Oster</u> Date <u>6/7/88</u>																																							

KR. Lark 7/12/88 J.L. Matheson 7-13-88

AS-BUILT DIAGRAM

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

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

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
20' 6" of 12" Carbon Steel Surface Pipe (Removed)		5'		SILTY SANDY GRAVEL
		10'		SANDY GRAVEL
		15'		" "
105' 6 3/4" of 10" Carbon Steel Casing (Removed)		20'		GRAVELLY SAND
		25'		SANDY GRAVEL
		30'		GRAVELLY SAND
92.5' of 6" Stainless Steel (304) Casing		35'		
		40'		
		45'		SANDY GRAVEL (CONTACT 46.5' b.i.s.)
		50'		SILTY SANDY GRAVEL
		55'		SILTY SANDY GRAVEL
		60'		" "
		65'		" "
		70'		SILTY SANDY GRAVEL
		75'		Static H ₂ O level @ 67.5' b.i.s., 5/13/85
		80'		
		85'		
		90'		SANDY GRAVEL
		95'		SANDY GRAVEL
10' 2 1/2" of 6" Stainless Steel (304) 10 slot Screen		100'		SANDY GRAVEL
		105'		SANDY GRAVEL
Completion Depth = 100' b.i.s.				Static H ₂ O level @ 67.5' b.i.s., 5/13/85
Completion Symbols				
• Artificial Sand Pack				
XX Bentonite Pellet Seal				
SS Bentonite Slurry Seal				
XXX Cement Grout Seal				

Drill
Rate
ft/hr

1.5'

1.19'

4.29'

6'

2.61'

4.43'

4.84'

3.52'

2.17'

3.94'

3.66'

3.9'

4.42'

4.17'

4.29'

3.57'

3.9'

3'

3.26'

3.26'

3.26'

BOREHOLE NO. 111-A-61																										
DEPTH	NAME	GRAVEL			SAND					FINES		SORTING	FRAMEWORK			MATRIX				DRY COLOR	HCl REACTION	CONSOLIDATION	DRILL METHOD	DRILL RATE	NAT. GAMMA	COMMENT
		% BRUIER	% COBBLE	% PEBBLE	% VC SAND	% C SAND	% M SAND	% F SAND	% VF SAND	% SILT (E)	% CLAY (C)		% BASALT	OTHER MAJOR LITHOLOGIES	ROUNDNESS	% BASALT	OTHER MAJOR LITHOLOGIES	ROUNDNESS								
4'-5'	ZSG	-	-	35	10	10	15	10	10	10	-	P-V.P.	25	2.0	VA-SF	10	0.0	VA-SR	5Y 5/2	VSL	U	H	1.5'			
9'-10	SG	-	-	40	10	10	20	15	3	2	-	P-V.P.	20	3.0	VA-SF	25	2.0	VA-SR	5Y 6/4	ST	U	H	1.1'			
14'-15	SG	-	-	30	10	10	20	20	8	2	-	P	25	3	VA-SF	25	2.0	VA-SR	5Y 5/2	ST	U	H	4.5'			
19'-20	BS	-	-	20	10	15	20	20	13	2	-	P	80	VA-SF	40	2.0	VA-SR	5Y 4/2	VST	U	H	6'				
24'-25	SG	-	-	25	15	10	10	15	11	4	-	P-V.P.	95	3	VA-SR	25	2.0	VA-SR	5Y 4/2	M	U	H	2.61			
27'-30	BS	-	-	25	10	15	25	15	5	5	-	P	95	3	VA-SR	25	2.0	VA-SR	5Y 5/2	SL	U	H	4.48			
34'-35	BS	-	-	25	10	15	20	15	10	5	-	P-V.P.	90	3.0	VA-SR	35	2.0	VA-SR	5Y 5/2	SL	U	H	4.84			
37'-40	BS	-	-	25	10	15	20	15	10	5	-	P-V.P.	80	0.0	VA-SA	25	2.0	VA-SR	5Y 5/2	H	U	H	6.52			
41'-45	SG	-	-	35	10	15	15	10	10	5	-	V.P.	35	3.0	VA-SF	40	2.0	VA-SR	2.5Y 7/2	VST	C	H	2.35			
47'-50	ZSG	-	-	35	15	15	15	5	5	10	-	V.P.	35	3.0	VA-SF	25	2.0	VA-SR	2.5Y 7/2	VVST	C	H	2.94			
54'-55	ZBS	-	-	20	10	20	15	15	10	10	-	P	30	3.0	VA-SF	30	2.0	VA-SR	2.5Y 7/2	VVST	C	H	6.00			
57'-60	ZBS	-	-	20	5	10	25	20	10	10	-	P-V.P.	40	3.0	VA-SF	30	2.0	VA-SR	2.5Y 7/2	ST	M	H	5.9'			
61'-65	ZSG	-	-	30	10	10	20	10	10	10	-	P-V.P.	35	2.0	VA-SF	35	2.0	VA-SR	2.5Y 7/2	VSL	SC	H	4.43			
69'-70	ZSG	-	-	30	10	15	15	10	10	10	-	P-V.P.	35	2.0	VA-SF	35	2.0	VA-SR	2.5Y 7/2	VSL	SC	H	4.14			
74'-75	ZSG	-	-	35	10	15	10	10	10	10	-	V.P.	25	3.0	VA-SF	30	2.0	VA-SR	2.5Y 7/2	No	U	H	4.29			
79'-80	ZSG	-	-	55	10	10	10	5	5	5	-	P-V.P.	25	3.0	VA-SF	25	2.0	VA-SR	2.5Y 7/2	No	U	H	3.34			
81'-85	SG	-	-	35	10	15	20	10	5	5	-	P	35	3.0	VA-SR	30	2.0	VA-SR	2.5Y 7/2	VSL	SC	H	3.9'			
87'-90	BS	-	-	5	5	10	20	20	10	30	T	M-P	35	3.0	VA-SF	30	2.0	VA-SR	2.5Y 7/2	No	SC	H	3'			
94'-95	ZBS	-	-	20	10	10	15	15	10	18	2	P-V.P.	35	3.0	VA-SF	25	2.0	VA-SR	2.5Y 7/2	M	SC	H	3.26			
99'-100	ZSG	-	-	35	10	10	10	10	10	10	5	V.P.	35	3.0	VA-SA	25	2.0	VA-SR	2.5Y 7/2	M	SC	H	1.92			
103'	Clay	-	-	2	2	2	1	1	1	1	90	V.W.	80	2.0	VA-SA	50	2.0	VA-SR	2.5Y 7/2	ST	SC	H	2.09			

GPO 596-313

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DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
			Date <i>4/29/88</i>	# <i>22-14102</i>	Depth <i>0' To 4'</i>		Subcontract No. <i>N/A</i>
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 cleaned at 200-E Area.		0700	Completed set-up.
				Dug down 2' with shovel for starter hole.		0830	Started digging starter hole with shovel
10' 6" of 12"				Total of 12" Carbon Steel Casing = 10' 6"		0910	Add 10' 6" of 12" Casing
						0915	Started drilling
							Add 7 gals H ₂ O
						0936	Add 2.5 gals H ₂ O
						0948	Add 2 gals H ₂ O
						0953	Add 2 gals H ₂ O
						1005	Add 2 gals H ₂ O
						1010	Bail Well
						1012	Resume drilling
							Add 2 gals H ₂ O
						1035	Drive Casing
						1043	Resume drilling
							Add 2 gals H ₂ O
REMARKS:							<i>Karen P. Oster</i> <i>4/29/88</i>

2 of 3

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 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 ₂ O
					1100	Add 1 gal H ₂ O
					1110	Add 2 gals H ₂ O
	4'-5'	H	Wet	SILTY SANDY GRAVEL; 35% gravel, 55% sand, 10% silt.	1125	using davy barker 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 ₂ O
				to subrounded. Sands are 90% basalt, 5% quartz, 5%	1310	Add 2 gals H ₂ O
				quartzite, trace other lithologies and are very angular	1318	Add 2 gals H ₂ O
				to subrounded. Wet Color is dark olive gray (5Y 3/2).	1325	Add 4 gals H ₂ O
				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 ₂ O
				but may not contain the larger size pebbles.	1402	Bail Well
					1406	Resume drilling
						Add 3 gals H ₂ O
					1425	Bail Well.
REMARKS:						K.P. 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)

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 <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
		Date <i>5/2/88</i>	# <i>22-14102</i>	Depth <i>7.5' To 9.5'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
<i>10' 6"</i>	<i>of 12"</i>				<i>0750</i>	<i>Grease rig.</i>
					<i>0805</i>	<i>start drilling</i>
					<i>0813</i>	<i>Add 5 gals H₂O</i>
					<i>0826</i>	<i>Drive Casing</i>
					<i>0830</i>	<i>Bailed Well</i>
					<i>0835</i>	<i>Resume drilling</i>
						<i>Add 3 gals H₂O</i>
					<i>0850</i>	<i>Bailed Well</i>
					<i>0856</i>	<i>Add 4 gals H₂O</i>
<i>10' 6"</i>	<i>of 12"</i>				<i>0900</i>	<i>Add 10' of 12" Casing</i>
<i>20' 6"</i>	<i>of 12"</i>			<i>Total 12" Carbon Steel Casing = 20' 6"</i>		
					<i>1028</i>	<i>Drive Casing</i>
					<i>1030</i>	<i>Resume drilling</i>
					<i>1040</i>	<i>Add 2 gals H₂O</i>
					<i>1050</i>	<i>Add 2 gals H₂O</i>
					<i>1058</i>	<i>Add 2 gals H₂O</i>
					<i>1106</i>	<i>Add 2 gals H₂O</i>
					<i>1115</i>	<i>Add 2 gals H₂O</i>
REMARKS:						<i>James F. Oster</i> <i>5/2/88</i>

D - Drive Barrel H - 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. 220	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 ₂ O
					1140	Drive Casing
					1145	Break for lunch
					1250	Drive Casing
9'-10'	H	Wet		SANDY GRAVEL; 40% gravel, 58% sand, 2% silt.	1300	using dirt bailer 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 ₂ O
				5% metamorphics and other lithologies, and are very	1320	Add 2 gals H ₂ O
				angular to subrounded. thin coatings of caliche are	1335	Add 2 gals H ₂ O
				found on ~5% of the gravels. Sands are 85% basalt,	1344	Add 2 gals H ₂ O
				5% quartzite, 5% quartz, 5% other sands, and are	1350	Add 2 gals H ₂ O
				very angular to subrounded. Wet Color is dark olive	1400	Add 2 gals H ₂ O
				gray (5Y 3/2). Dry Color is gray (5Y 4/1). Strong	1408	Add 2 gals H ₂ O
				reaction in 10% HCl. Unconsolidated. No detectable	1415	Add 1 gal H ₂ O
				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 <i>J.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
		Date <i>5/3/88</i>	# <i>22-14102</i>	Depth <i>19' To 20'</i>		Subcontract No. <i>N/A</i>
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.e.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 ₂ O
				other lithologies, and are very angular to subrounded with	0820	Add 2 gals H ₂ O
				thin caliche coatings on <5% of the gravels. Sands are	0830	Add 2 gals H ₂ O
				70% basalt, 15% quartzite, 10% quartz, 5% other lithologies	0840	steam rising - Nothing detectable with 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.H.	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 ₂ O
					0910	Add 2 gals H ₂ O
					0927	Add 2 gals H ₂ O
					0940	Bailed Well
REMARKS:						<i>Jaren P. Oster</i> <i>5/3/88</i>

DRILL LOG			By <i>I.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N-Crib</i>
			Date <i>5/3/88</i>	# <i>22-14102</i>	Depth <i>20' To 24'</i>		Subcontract No. <i>N/A</i>
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 ₂ O
						1000	Add 2 gals H ₂ O
						1005	Cutting on bit.
						1115	Set 20' 4 3/4" of 10" Casing
							Add 9' 4" of 10" Casing
						1140	Lunch
						1255	Resume Welding
						1400	Resume drilling
						1402	Add 4 gals H ₂ O
						1404	Bailed Well
						1412	Resume drilling
						1429	Add 2 gals H ₂ O
						1437	Add 1 gal H ₂ O
						1440	Drive Casing
						1445	Resume drilling
							Add 1 gal H ₂ O
						1450	Drive Casing
REMARKS:							<i>Karen P. Oster</i> <i>5/3/88</i>

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N-Crib</i>
		Date <i>5/3/88</i>	# <i>22-14102</i>	Depth <i>24' To 28'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	<i>24'-25'</i>	<i>H</i>	<i>Wet.</i>	<i>SANDY GRAVEL; 35% gravel, 61% sand, 4% silt.</i>	<i>1455</i>	<i>Using dart bar for Bailed Well</i>
				<i>Trace c.p., 5% m.p., 10% f.p., 20% v.f.p., 15% v.c.s., 10% c.s.,</i>		<i>Drill rate = 2.61'/hr.</i>
				<i>10% m.s., 15% f.s., 11% v.f.s., 4% silt. Poorly to Very Poorly</i>	<i>1500</i>	<i>Resume drilling</i>
				<i>Sorted. Gravels are 95% basalt, 4% granite, 1%</i>		<i>Add 4 gals H₂O</i>
				<i>other lithologies and are very angular to subrounded.</i>	<i>1505</i>	<i>Add 2 gals H₂O</i>
				<i>Sands are 85% basalt, 5% quartzite, 5% quartz,</i>	<i>1508</i>	<i>Drive Casing</i>
				<i>5% other sands, and are very angular to subrounded.</i>	<i>1515</i>	<i>Add 3 gals H₂O</i>
				<i>Wet Color is dark olive gray (5Y 3/2). Dry Color is</i>	<i>1520</i>	<i>Started changing bits</i>
				<i>light olive gray (5Y 6/2). Moderate reaction in 10% HCl.</i>	<i>1525</i>	<i>DONE for day.</i>
				<i>Unconsolidated. No radiation detectable with G.M.</i>		
				<i>Similar to previous sample with an increase in grain</i>		
				<i>size and basalt, decrease in HCl reactivity and darker</i>		
				<i>color. Geologic samples are representative.</i>		
REMARKS: <i>Total Drilled Depth = 28'</i> <i>Total Drilled Today = 9'</i> <i>Total 10" Casing = 29' 8 3/4"</i> <i>Total H₂O Added = 37 gallons</i> <div style="text-align: right;"><i>Karl P. Oster</i> <i>5/3/88</i></div>						

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>8.E.22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301 - N Crib</i>
			Date <i>5/4/88</i>	# <i>22-14102</i>	Depth <i>28' to 29'</i>		Subcontract No. <i>N/A</i>
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
							habbit.
<i>29' 8 3/4" of 10"</i>						1100	Add 10' of 10" casing
<i>10'</i>							
<i>39' 8 3/4" of 10"</i>				<i>Total 10" Carbon Steel Casing = 39' 8 3/4"</i>			
						1133	Add 4 gals H ₂ O
							Resume drilling
						1140	Lunal
						1250	Resume drilling
						1308	Add 2 gals H ₂ O
						1314	Drive Casing
						1323	Resume drilling
						1340	Bail Well
						1344	Resume drilling
						1351	Drive Casing
						1355	Resume drilling
						1358	Add 2 gals H ₂ O
REMARKS:							
<i>Karen P. Oster</i> <i>5/4/88</i>							

DRILL LOG		By <i>J.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Cr16</i>
		Date <i>5/4/88</i>	# <i>22-14102</i>	Depth <i>29' To 30'</i>	Subcontract No.	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	<i>29'-30'</i>	<i>H</i>	<i>Wet</i>	<i>GRAVELLY SAND; 25% gravel, 70% sand, 5% silt.</i>	<i>1402</i>	<i>using dart bailer Bailed Well</i>
				<i>10% v.c.p., 4% c.p., 5% m.p., 5% f.p., 10% v.f.p., 10% v.c.s.,</i>		<i>Drill rate = 4.48/hr</i>
				<i>15% c.s., 25% m.s., 15% f.s., 5% v.f.s., 5% silt. Poorly</i>	<i>1405</i>	<i>Drive Casing</i>
				<i>Sorted. Gravels are 95% basalt, 4% granite, 1% other lithologies, and are very angular to subrounded.</i>	<i>1410</i>	<i>Resume drilling</i>
				<i>Sands are 85% basalt, 5% quartzite, 5% quartz,</i>	<i>1424</i>	<i>Add 2 gals H₂O</i>
				<i>5% other sands, and are very angular to subrounded.</i>	<i>1426</i>	<i>Bail Well</i>
				<i>Wet Color is dark olive gray (5Y 3/2). Dry Color is</i>	<i>1430</i>	<i>Resume drilling</i>
				<i>olive gray (5Y 5/2). Slight reaction in 10% HCl.</i>	<i>1435</i>	<i>Drive Casing</i>
				<i>Unconsolidated. No radiation detectable with G.M.</i>	<i>1444</i>	<i>Resume drilling</i>
				<i>Very similar to previous sample with better sorting,</i>		<i>Add 2 gals H₂O</i>
				<i>lighter dry color and less reaction in 10% HCl.</i>	<i>1450</i>	<i>Drive Casing</i>
				<i>Geologic samples are representative.</i>	<i>1453</i>	<i>Resume drilling</i>
					<i>1457</i>	<i>Bail Well</i>
					<i>1502</i>	<i>Resume drilling</i>
					<i>1505</i>	<i>Add 2 gals H₂O</i>
					<i>1510</i>	<i>Add 2 gals H₂O</i>
					<i>1516</i>	<i>Drive Casing</i>
REMARKS:						
<i>J.R. Oster</i> <i>5/4/88</i>						

D - Drive Barrel H - 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)

D - Drive Barrel H - 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)

ORILL LOG		By	Rig	Well Number	Computer Number	Project or Work Order No.
		Date	#	Depth		Subcontract No.
		K.R. Oster	B.E. 220	199-N-69	N/A	1301-N-Crib
		5/5/88	#22-14102	34' To 35'		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 barker 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 = 484'/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 ₂ O
				Sands are 85% basalt, 5% quartz, 5% quartzite, 5%	0834	Add 1 gal H ₂ O
				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 ₂ O
				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"					0900	Add 9' 2 3/4" of 10" Casing
9' 2 3/4"						
49' 1 1/2" of 10"				Total of 10" Carbon Steel Casing = 49' 1 1/2"		
REMARKS:						
Jared P. Oster 5/5/88						

DRILL LOG		By <i>J.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N-Crib</i>
		Date <i>5/5/88</i>	# <i>22-14102</i>	Depth <i>35' To 40'</i>		Subcontract No. <i>N/A</i>
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 ₂ O
					1000	Drive Casing
					1014	Bail Well
					1020	Resume drilling
						Add 3 gals H ₂ O
					1029	Drive Casing
					1033	Resume drilling
					1040	Drive Casing
	39'-40'	H	Wet	GRAVELLY SAND; 85% gravel, 70% sand, 5% silt.	1045	Using dart bit, later 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 ₂ O
				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 ₂ O
				and are very angular to subrounded. Wet Color is dark	1105	Drive Casing
REMARKS:						<i>John R. Oster</i> <i>5/5/88</i>

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N-Crib</i>
			Date <i>5/5/88</i>	# <i>22-14/02</i>	Depth <i>40' to 43'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				olive gray (SY 3 1/2). Dry Color is olive gray (SY 5 1/2).		1109	Resume drilling
				Moderate reaction in 10% HCl. No radiation detectable			Add 2 gals H ₂ O
				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 2 gals H ₂ O
						1132	Drive Casing
						1133	Stop for Lunch
						1255	Resume drilling
							Add 2 gals H ₂ O
						1302	Drive Casing
						1304	Bail Well
						1310	Resume drilling
							Add 1 gal H ₂ O
						1320	Add 2 gals H ₂ O
						1330	Drive Casing
						1333	Resume drilling
						1339	Drive Casing
						1341	Resume drilling
REMARKS:							
<i>Karen R. Oster</i> <i>5/5/88</i>							

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DRILL LOG		By <i>K.P. Oster</i>	Rig <i>B.E. 2260</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N-Crib</i>
		Date <i>5/5/88</i>	# <i>22-14102</i>	Depth <i>43' To 45'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time
						Drilling Comments
						Add 2 gals H ₂ O
						1347 Add 1 gal H ₂ O
						1350 Drive Casing
						1354 Resume drilling
						Add 2 gals H ₂ O
						1400 Bailed Well
						1408 Resumed drilling
						Add 2 gals H ₂ O
						1413 Drive Casing
						1415 Resume drilling
				Ringold Contact @ 42' b.i.s.		Add 1 gal H ₂ O
	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 = 283'/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 ₂ O
				very angular to subrounded. Sands are 40% basalt, 20%	1500	Ready to Weld.
				quartzite, 15% quartz, 10% feldspar, 5% caliche, 10% other sands,		
REMARKS:						<i>Karen P. Oster</i> <i>5/5/88</i>

D - Drive Barrel H - 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)

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
			Date <i>5/6/88</i>	# <i>22-14/02</i>	Depth <i>47' To 49'</i>	Subcontract No. <i>N/A</i>	
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 ₂ O
						0830	Bail Well
						0835	Resume drilling
						0839	Add 1 gal H ₂ O
						0845	Drive Casing
						0849	Resume drilling
						0851	Add 2 gals H ₂ O
						0901	Add 2 gals H ₂ O
						0904	Add 1 gal H ₂ O
						0910	Drive Casing
						0925	Bail Well
						0930	Resume drilling
						0932	Add 2 gals H ₂ O
						0938	Drive Casing
						0942	Resume drilling
						0948	Add 1 gal H ₂ O
REMARKS:							
<i>Karen P. Oster</i> <i>5/6/88</i>							

DRILL LOG		By F. 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 ₂ O
				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 ₂ O
				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 ₂ O
				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 ₂ O
					1057	Drive Casing
				Measures 250-300 counts/Wet on G.M.	1110	Bail Well
					1115	Drive Casing
					1118	Resume drilling
REMARKS:						
<div style="text-align: right;"> F. Oster 5/6/88 </div>						

3 of 4

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 54' 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
	54'-55'	H	Wet	SLIGHTLY SILTY GRAVELLY SAND (RINGOLD); 20% gravel, 70% sand, 10% silt. Trace c.p., 5% m.p., 5% f.p., 10% v.f.p., 10% v.c.s., 20% c.s., 15% m.s., 15% f.s., 10% v.f.s., 10% silt.	1123	Add 3 gals H ₂ O Using Bartlett Batted We'll
				Poorly Sorted. Gravels are 30% basalt, 20% granite, 20% quartz, 15% quartzite, 10% metamorphics and other lithologies, and are very angular to subrounded.	1128	Drill rate = 60.60/hr.
				Sands are 30% basalt, 20% quartzite, 20% quartz, 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.	1300	Lunch
					1315	Cutting pipe.
					1330	Resume drilling Add 2 gals H ₂ O Beveling casing
54' 1 1/2" of 10"						
10'						
69' 1 1/2" of 10"				Total of 10" Carbon Steel Casing = 69' 1 1/2"	1345	Add 10' of 10" Casing
					1420	Drive Casing. Kalen F. Oster 5/6/88
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)

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DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
		Date <i>5/6/88</i>	* <i>82-14102</i>	Depth <i>55' To 59'</i>		Subcontract No. <i>N/A</i>
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 ₂ O
					1430	Bail Well
					1439	Resume drilling
						Add 5 gals H ₂ O
					1446	Drive Casing
					1452	Resume drilling
					1458	Add 3 gals H ₂ O
					1506	Bailed Well
					1514	Resume drilling
					1516	Add 2 gals H ₂ O
					1523	Drive Casing
					1530	Done for day
REMARKS:						<i>Karen P. Oster</i> <i>5/6/88</i>

D - Drive Barrel H - 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.24

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 5/9/88	# 22-14102	Depth 59' 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
						0755	Start drilling
							Add 3 gals H ₂ O
	59'-60'	H	Wet	(2 IN GOLD) 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 ₂ O
				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 4/1). Dry Color is light brownish gray (2.5Y 6/2).			Add 2 gals H ₂ O
				Strong reaction in 10% HCl. Moderately Consolidated, 500 ^{psi}		0923	Add 1 gal H ₂ O
				when wet detectable with G.H. 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 ₂ O
				color. Geologic Samples are representative.		0940	Add 2 gals H ₂ O
						0945	Drive Casing
						0947	Resume drilling
REMARKS:							Karen F. 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

AS 5000 001 10 001

DRILL LOG				By <i>F.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
				Date <i>5/9/88</i>	# <i>22-14102</i>	Depth <i>60' To 65'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time	Drilling Comments
								Add 5 gals H ₂ O
							0955	Bail Well
						Driller thinks he's in water @ ~ 64' b.i.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., 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% granite, 15% metamorphics and other lithologies and are very angular to subrounded. Sands are 35% basalt, 20% quartzite, 10% quartz, 15% feldspar, 20% other sands and are very angular to subrounded. Wet			1044	Add 2 gals H ₂ O
				Color is dark grayish brown (2.5Y 4/2). Dry Color is light gray (2.5Y 7/2). Very slight reaction in 10% HCl. Slightly Consolidated. 1000 counts/min radiation detectable with G.M. Similar to previous sample with an increase in grain size, lighter color, less HCl reaction, and less			1050	Add 2 gals H ₂ O
							1053	Bail Well
							1100	Resume drilling
								Prepare to Weld
								(Wait for P.H. to find out if fresh air is needed for welding and cutting.)
							1140	Lunch
REMARKS:								

F.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 (5-85)

DRILL LOG			By <i>A.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
			Date <i>5/10/88</i>	# <i>22-14102</i>	Depth <i>67' To 70'</i>	Subcontract No. <i>N/A</i>	
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
<i>69' 1 1/2" of 10"</i>						900	Add 10' of 10" Casing
<i>10'</i>							
<i>79' 1 1/2" of 10"</i>				<i>Total of 10" Carbon Steel Casing = 79' 1 1/2"</i>			
						0940	Drive Casing
						0955	Resume drilling
							Add 3 gals H ₂ O
						1005	Drive Casing
						1010	Resume drilling
						1015	Bail Well
						1025	Resume drilling
							Add 4 gals H ₂ O
						1055	Drive Casing
<i>6A-70'</i>	<i>H</i>	<i>Wet</i>		<i>SILTY SAND & GRAVEL (RINGOLD); 30% gravel, 60% sand, 10% silt</i>		1100	using dart bailed Bail Well
				<i>4% a.p., 6% m.p., 10% of.p., 10% v.f.p., 10% v.c.s., 15% c.s., 15%</i>			Drill rate = 4.17'/hr.
				<i>m.s., 10% of.s., 10% v.f.s., 10% silt. Poorly to Very Poorly</i>		1110	Resume drilling
				<i>Sorted. Gravels are 35% basalt, 20% quartzite, 20%</i>			Add 2 gals H ₂ O
REMARKS:							<i>John F. Oster</i> <i>5/10/88</i>

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 224</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Cr 6</i>
			Date <i>5/10/88</i>	# <i>22-14102</i>	Depth <i>70' To 75'</i>	Subcontract No. <i>N/A</i>	
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 ₂ O
				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 ₂ O
				(2.54 7/2). Very slight reaction in 10% HCl, slightly		1315	Bail Well
				Consolidated 500 counts/min radiation detectable		1320	Resume drilling
				With G.H. 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:							
<i>Karen R. Oster</i> <i>5/10/88</i>							

Karen P. Osta
5/10/88

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 016
			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 (PINKOIL); 55% gravel, 40% sand, 5% silt. 1018			using dart bailer Bailed Well
				5% o.p., 15% m.p., 15% f.p., 20% v.f.p., 10% v.c.s., 10% c.s., 10% m.s., 5% f.s., 5% v.f.s., 5% silt. Poorly to Very Poorly			Drill rate = 3.37/hr.
				Sorted. Gravels are 25% basalt, 25% quartzite, 20% granite,		1019	Drive Casing
				15% quartz, 15% metamorphics and other lithologies, and		1023	Resume drilling
				are very angular to subrounded. Sands are 25% basalt		1037	Bail Well
				20% quartzite, 15% quartz, 15% feldspar, 10% clear quartz,		1040	Resume drilling
				5% mica, 10% other sands, and are very angular		1100	Drive Casing
				to subrounded. Wet Color is grayish brown (2.5Y 5/2).		1105	Resume drilling
				Dry Color is light gray (2.5Y 7/2). No reaction in 10% HCl.		1130	Drive Casing
				Unconsolidated. 100-150 counts/min. radiation detectable		1135	Lunch
						1300	Resume drilling
REMARKS: K.R. Oster 5/11/88							

2013

DRILL LOG			By K.R. Oster	Rig B.E. 2240	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Cr 16
			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. Trace v.c.p., 2% c.p., 5% m.p., 13% f.p., 15% v.f.p., 10% v.c.s., 15% c.s., 20% m.s., 10% f.s., 5% v.f.s., 5% silt. Poorly Sorted. 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.		1318	Using dart bailer Bailed Well
						1320	Drill rate = 39'/hr. Resume drilling

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)

D - Drive Barrel H - 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 <i>R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-NCrib</i>
				Date <i>5/12/88</i>	# <i>22-14102</i>	Depth <i>88' To 90'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time	Drilling Comments
				<i>D/W = 74.5' b.l.s (PNL 200'e-TAPE #11053)</i>			<i>0815</i>	<i>May Not be Equilibrated.</i>
							<i>0825</i>	<i>Start drilling</i>
							<i>0840</i>	<i>Drive Casing</i>
							<i>0853</i>	<i>Resume drilling</i>
							<i>0900</i>	<i>Bail Well</i>
							<i>0910</i>	<i>Resume drilling</i>
	<i>89'90'</i>	<i>H</i>	<i>Wet</i>	<i>SLIGHTLY GRAVELLY SAND (RINGOLD); 5% gravel, 45% sand, 30% silt, 20% f.s., 10% v.f.s., 5% v.c.s., 10% c.s., 20% m.s., 20% f.s., 10% v.f.s., 30% silt, Trace clay. Moderately to Poorly Sorted. 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% mica, 5% clear quartz, 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). No reaction in 10% HCl, slightly consolidated. 100 counts/min radiation detectable with G.M. Similar</i>			<i>0938</i>	<i>Bail Well</i>
								<i>Drill rate = 3'/hr.</i>
							<i>0940</i>	<i>Drive Casing</i>
							<i>0945</i>	<i>Resume drilling</i>
							<i>1005</i>	<i>Bail Well</i>
							<i>1011</i>	<i>Resume drilling</i>
							<i>1030</i>	<i>Drive Casing</i>
							<i>1034</i>	<i>Bail Well</i>
							<i>1038</i>	<i>Resume drilling</i>
							<i>1119</i>	<i>Drive Casing</i>
							<i>1123</i>	<i>Resume drilling</i>
							<i>1135</i>	<i>Lunch</i>
REMARKS: <i>Karen R. Oster</i> <i>5/12/88</i>								

Tomorrow Add 9' 7/4"

2 of 2

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
			Date <i>5/12/88</i>	# <i>22-14102</i>	Depth <i>90' To 98'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				toprevious 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 barrel 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 = 3.26/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% quartz		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 Work
				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:							
<i>Karen F. Oster</i> <i>5/12/88</i>							

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

A-6000-021 (8-85)

A.35

DRILL LOG			By <i>A.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
			Date <i>5/13/88</i>	# <i>22-14102</i>	Depth <i>98' To 100'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				<i>D/W = 67.5' b.i.s. (PNL 200'E-TAPE #11053)</i>		<i>0815</i>	
						<i>0820</i>	<i>Prepare to Weld</i>
<i>100' 1/2" of 10"</i>						<i>0825</i>	<i>Add 9' 7 1/4" of 10" Casing</i>
<i>9' 7 1/4"</i>							
<i>109' 7 3/4" of 10"</i>				<i>Total of 10" Carbon Steel Casing = 109' 7 3/4"</i>			
						<i>0915</i>	<i>Drive Casing</i>
						<i>0930</i>	<i>Resume drilling</i>
						<i>0936</i>	<i>Bail Well</i>
						<i>0940</i>	<i>Resume drilling</i>
						<i>1005</i>	<i>Drive Casing</i>
						<i>1015</i>	<i>Mark Cable</i>
						<i>1022</i>	<i>Resume drilling</i>
	<i>99'-100'</i>	<i>H</i>	<i>Wet</i>	<i>SILTY SANDY GRAVEL (RINGOLD); 35% gravel, 50% sand, 10% silt, 5% clay</i>		<i>1020</i>	<i>Using dart bails Bailed Well</i>
				<i>Trace c.p., 8% m.p., 7% f.p., 20% v.f.p., 10% v.c.s., 10% c.s., 10% m.s.,</i>			<i>Drill rate = 1.92/hr.</i>
				<i>10% f.s., 10% v.f.s., 10% silt, 5% clay. Very Poorly Sorted Gravels</i>		<i>1105</i>	<i>Resume drilling</i>
				<i>are 35% basalt, 20% granite, 20% quartzite, 15% quartz,</i>		<i>1120</i>	<i>Drive Casing</i>
				<i>10% metamorphics and other lithologies, and are very angular</i>		<i>1125</i>	<i>Resume drilling</i>
				<i>to subangular. Sands are 35% basalt, 15% quartzite, 15%</i>		<i>1135</i>	<i>Lunch</i>
				<i>quartz, 15% feldspar, 5% mica, 5% char quartz, 10% other sands</i>		<i>1300</i>	<i>Resume drilling</i>
REMARKS:							<i>See R. 056, 5/13/88</i>

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Cr. 6</i>
			Date <i>5/13/88</i>	# <i>22-14102</i>	Depth <i>100' To 103'</i>	Subcontract No. <i>N/A</i>	
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 grayish brown (2.5Y 4/2). Dry Color is light gray (2.5Y 7/2). Moderate reaction in 10% HCl. Slightly Consolidated. 100 counts		1312	Bail Well
				radiation detectable on G.M., Similar to previous sample with an increase in grain size. Geologic Samples are representative.		1316	Resume drilling.
						1340	Drive Casing
						1345	Resume drilling
							Add 5 gals H ₂ O
						1355	Bailed Well.
				Clay layer starts at 101' b.i.s. (seals off H ₂ O).		1400	Resume drilling.
							Add 6 gals H ₂ O
	103'	H	Wet	Clay; 2% gravel, 7% sand, 1% silt, 90% Clay. 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% silt, 90% Clay. Very Well Sorted. Gravels are 80% basalt, 5% quartz, 5% quartzite, 10% other lithologies and are 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		1415	using soft bailer Bailed Well
							Drill rate = 2.09'/hr.
						1420	Resume drilling.
						1435	Stop drilling.
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-8000-021 (5-85)

1041

[illegible]

D - 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)

A.39

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>8.E.22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
			Date <i>5/17/88</i>	# <i>22-14102</i>	Depth <i>104' To 100'</i>	Subcontract No. <i>N/A</i>	
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.i.s., Neutron; 102'-4' b.i.s., Natural			
				Gamma; 102'-3' b.i.s.,		1420	Done logging
				Measure $\frac{D}{B}$ = 103' b.i.s. (PNL STEEL TAPE # L200-01).		1420	
				Pour $\frac{1}{2}$ bag (100 lbses) 20-40 U.S. SIEVE SIZE Colorado		1430	
				Silica Sand in Well. Measured $\frac{D}{B}$ Top of Sand @			
				100' b.i.s. (PNL STEEL TAPE # L200-01).			
						1440	Started Pulling 10".
				Pulled Casing back to 101' 5 1/2' b.i.s. and stopped		1500	stop pulling 10"
				pulling casing to go pull pump at 199-N-67.			
REMARKS:				<i>Karen R. Oster</i> <i>5/17/88</i>			

DRILL LOG		By I.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 Sand in Well. Measured $\frac{D}{B}$ Top of Sand at 99' 11" b.l.s. (PNL STEEL TAPE # L200-01).	0905	Stopped Pulling Casing
					0915	Started Pulling Casing
				Casing is pulled back to 100' b.l.s.	1015	Cut off Puller Top
105' 6" $\frac{3}{4}$ " of 10"				Measured $\frac{D}{B}$ Top of Sand @ 95.5' b.l.s. (PNL STEEL TAPE # L200-01). As the casing pulled above the clay the water came in and caused the sand to heave 4.5' into the hole. Try bailing it out.	1030	Cut off 3' of 10" casing (Indicates clay starts @ 100' 3" b.l.s. instead of 101')
102' 6" $\frac{3}{4}$ " of 10"				Measured $\frac{D}{B}$ @ 97' b.l.s. (PNL STEEL TAPE # L200-01).	1035	Bailing Well
					1040	
					1045	Drive Casing back
					1050	Bailing Well
					1055	Prepare to Well again
					1100	Weld on Puller Top
					1140	Stop for Lunch
REMARKS:						Done - R. Oster 5/19/88

DRILL LOG		By <i>A.R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Crib</i>
		Date <i>5/19/88</i>	# <i>22-14102</i>	Depth <i>100' To 100'</i>	Subcontract No. <i>N/A</i>	
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	Putting on bit.
					1325	Start drilling.
					1337	Bail Well
				Paired 1 1/8 bags (100 lbs ea) 20-40 U.S. sieve size	1350	
				Colorado Silica Sand in hole measured 1/8 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' 2 1/2" 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:						<i>Kevin P. Oster</i> <i>5/19/88</i>

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Cn6</i>
		Date <i>5/20/88</i>	# <i>22-14102</i>	Depth <i>100' To 100'</i>		Subcontract No. <i>N/A</i>
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 1 1/4 bags (100 lbs ea) 20-40 U.S. sieve size Colorado	1355	
				Silica Sand in annulus. Pulled casing back to 96' b.i.s.		
				Measured ⁹ /8 Top of Sand Pack @ 94' b.i.s. (PUL STEEL TAPE # 6200-01)		
				Cut casing off @ 100' weld.	1400	
					1420	Weld on Puller top.
				Poured 1 1/4 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 1 1/4 bags (100 lbs ea) 20-40 U.S. sieve size Colorado	1525	
				Silica Sand in annulus.	1530	Done for day.
REMARKS:						
<i>Karen R. Oster</i> <i>5/20/88</i>						

DRILL LOG		By <i>J.R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>199-N-69</i>	Computer Number	Project or Work Order No. <i>1301-N Cr16</i>
		Date <i>5/23/88</i>	# <i>22-14102</i>	Depth <i>100' To 100'</i>	<i>N/A</i>	Subcontract No. <i>N/A</i>
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 1 1/2 bags (100 lbs ea) 20-40 U.S. sieve size Colorado Silica Sand in annulus. Pulled 10" Casing back to 87' b.l.s. Measured D/B of 20-40 Sand Pack @ 85' b.l.s. (PNL STEEL TAPE # L200-01)	0910	Artificial Sand Pack (20-40) = 104' - 85' b.l.s.
				Poured 3 bags (100 lbs ea) 40 mesh U.S. sieve size Colorado Silica Sand in annulus. Pulled 10" Casing back to 79' b.l.s. Measured D/B Top of 40 mesh Sand Pack @ 78.5' b.l.s. (PNL STEEL TAPE # L200-01)	1130	Lunch
				Poured 2 buckets (50 lbs ea) 1/2" Volclay tablets in annulus. Measured D/B Top of Bentonite Pellets @ 63' b.l.s. (PNL STEEL TAPE # L200-01). Possible bridging of pellets at the top of the water table.	1330	Bentonite Pellet Seal = 78.5' - 76' b.l.s.
				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:						
<i>J.R. Oster</i> <i>5/23/88</i>						

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N-Crib</i>
			Date <i>5/24/88</i>	# <i>22-14102</i>	Depth <i>100' to 100'</i>		Subcontract No. <i>N/A</i>
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 pellets into a slurry and get rid of the pellet bridge		1100	Add 15 gals H ₂ O
						1135	Lunch
				Continued blowing air in hole; moving the tremie pipe around the annulus to breakup the pellets		1250	
				Measured P/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 in hole with air. Will add more slurry and pull back tomorrow, to see if it will go down.		1515	Add 5 gals H ₂ O
						1530	Done for day
REMARKS:							
<i>Karen R. Oster</i> <i>5/24/88</i>							

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-Ncrib
		Date 5/25/88	# 22-14100	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 / $\frac{1}{8}$ " Top Bentonite @ 70'	6.15 (PNL STEEL TAPE #L200-01)	
				Started mixing bentonite grout (45 gals H ₂ O to 1 bag bentonite crumbles) (50 lbs ea). Cement mixer does not mix bentonite slurry very well.	1250	
				Poured a total of 2.5 bags (50 lbs ea) Bentonite Crumbles mixed with 40 gals H ₂ O into annulus.	1410	
				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 $\frac{1}{8}$ " Top of Bentonite Slurry @ 50' b.l.s. (PNL STEEL TAPE #L200-01).	1525	Done for day.
				Weld showing is the 79' 1 1/2" Weld.		
REMARKS:						Karl R. Oster 5/25/88

DRILL LOG			By A.R. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N-Crib
			Date 5/26/88	# 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 $\frac{1}{8}$ " Top of Bentonite Slurry at 47' b.l.s. (PNL STEEL TAPE #L200-C)		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' 56" b.l.s. Measured $\frac{1}{8}$ " Top of Bentonite at 50' b.l.s. (PNL STEEL TAPE #L200-01).		1410	
				Cut off 10" casing (69' 1 1/2" weld is just above the top of 12" casing)		1430	Continue pulling 10" casing
				Measured $\frac{1}{8}$ " 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 $\frac{1}{8}$ " Top of Bentonite @ 65' 9" of Bentonite Slurry = 2' of Slurry inside pipe.			
REMARKS:							
A.R. Oster 5/26/88							

104/

DRILL LOG		By F.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 = 46' 2" b.i.s. (PNL E-TAPE # 11053)	0750	Trying to blow bentonite slurry off inside of 10" casing.
				Measured D/B Top of Bentonite Slurry @ 46' 9" b.i.s. (PNL STEEL TAPE # L200-01). Casing is at 47' 9" b.i.s.	0955	Bentonite Slurry Seal = 76' 46.75' b.i.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.i.s. The crumbles have bridged.	1045	
				Add 25 gals H ₂ O and set in tremie pipe to mix Crumbles into a slurry.	1100	
				Pumping air into hole.	1130	Lunch
				Goto Felix's to help him.	1250	
					1500	Done here for day
REMARKS:						F.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 (5-85)

1 of 1

DRILL LOG				By <i>K.R. Oster</i>	Rig <i>B.E. 3210</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N Cr 16</i>
				Date <i>5/31/88</i>	# <i>22-14102</i>	Depth <i>100' To 100'</i>		Subcontract No. <i>N/A</i>
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	
				Used 30 gals H ₂ O and 1/2 bag (100 lbs ea) Big Horn Bentonite (powdered), and poured in annulus			1130	
				(hose blew off grout pump so pouring it down instead)			1140	Lunch
				Mixed 25 gals H ₂ O and 1/2 bag (100 lbs ea) Big Horn powdered Bentonite and pumped into annulus			1300	Mixing grout again
				Measured 1/8" Top of Bentonite Slurry @ 30' b.l.s. (PNC STEEL TAPE # L200-01).			1330	
							1340	Start pulling 10" casing
				Next well exposed should be 59' 1 1/2".			1415	Cut off 10" casing
				Measured 1/8" Top of Bentonite Slurry @ 44' b.l.s. (PNC STEEL TAPE # L200-01)			1440	
				Mixed 5 gals H ₂ O and 1/4 bag (100 lbs ea) Big Horn Powdered Bentonite			1445	Mixing grout
				and pumped into the annulus.			1520	Welding on puller top
							1530	Done for day
REMARKS:								
<i>Karen P. Oster</i> <i>5/31/88</i>								

D - Drive Barrel H - 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.50

1 of 2

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-69</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1307-N Crib</i>
			Date <i>6/1/88</i>	# <i>22-14102</i>	Depth <i>100' To 100'</i>	Subcontract No. <i>N/A</i>	
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 $\frac{1}{8}$ " Top of Bentonite Slurry @ 22' b.l.s. (PNL STEEL TAPE #1000-01)		0835	
						0840	Started pulling casing
				Cutting 10" Casing @ the 59' $1\frac{1}{2}$ " Weld.		0855	Cutting off 10" Casing
				Unable to measure to top of slurry due to a "donut" of thicker bentonite that is built up at 15' b.l.s. - So will blow holes in it with the air compressor.		0908	Set tremie pipe
						0915	Turn on air compressor
							Add 5 gals H ₂ O
						1000	Continue blowing air.
				Measured $\frac{1}{8}$ " Top of Bentonite Slurry at 23' b.l.s. (PNL STEEL TAPE #1000-01)		1045	Stopped blowing air
						1100	Weld puller top
						1110	Pulling 10" Casing
				Cut Casing @ 49' $1\frac{1}{2}$ " Weld.		1120	Cutting 10" Casing
						1133	Lunch
						1310	Weld puller top.
				Used 25 gals H ₂ O and $\frac{1}{2}$ bag (100 lbs) Powdered Bighorn Bentonite to mix slurry and pumped into annulus		1330	
REMARKS:							<i>K.R. Oster</i> <i>6/1/88</i>

D - 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 X.P. Oster	Rig B.E. 22W	Well Number 199-N-69	Computer Number N/A	Project or Work Order No. 1301-N Cr16
			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	
				1/8" Top of Bentonite Slurry @ 19' b.l.s. (PNC 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 ₂ O 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 1/8" Top of Bentonite Slurry at 21' b.l.s. (PNC 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 ₂ O 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
REMARKS:			Pulled 12" Casing back to 6' b.l.s. Measured 1/8" Top of Cement Grout		1530	Done for day.	
			at 5.56' b.l.s. (PNC STEEL TAPE # L200-01).			X.P. Oster 6/2/88	

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 Cr. b
		Date 6/3/88	# 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	Cut off 12" casing
				Measured 1/8 Top of Cement Grout Seal @ 5' b.i.s. (PNL STEEL	0830	
				TAPE # L200-01)	0840	Mixing Cement Grout
				Mixed 25 gals H ₂ O and 4 bags (4 1/2 ea) Portland Cement		
				and 2 scoops Buttered Bentonite into a grout and pumped		
				into well. Measured 1/8 Top of Cement Grout @ 2' b.i.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 tephlon bailer took samples for analysis	1100	Took water samples
				by U.S. Testing.	1120	(for lock) welding tab on casing
					1130	Lunch
					1250	Start cleaning rig
					1440	Getting rig checked out
					1530	Done for day
REMARKS:						
Karen P. Oster 6/3/88						

Well 122-N-6-9	Drilled Depth	Interval Logged 102'-2"
Log Type Density	Date 5-17-88	Casing Size 10-1/2"
Logged By J. L. MacArthur - PNL	Water Level Depth 99'	
Logging Service Sensitivity 1000 CPS	Conductor 3	
Vertical Scale 20'/IN	Logging Speed 15'/MIN	
Source Strength 115 mCi	137Cs	Source Length NA
Remarks	REF. PROLOG DUKER GM-4 REV. 1 PROBE SERIAL # GC-48

Well	159	N-69	Drilled Depth	217' 0"	Interval Logged	202' 0" - 217' 0"
Log Type	WELL LOGGING DATA			217' 0" - 217' 0"	Cased Bore	10' 0" - 12' 0"
Logged By	W. M. [Signature]			Water Level Depth	217'	
Logging System	5000 ft			Time Constant	3	
Vertical Scale	20' / in			Logging Speed	15' / MIN	
Source Strength	100 ft			Spacer Length	N/A	
Remarks	REF. PROCEEDURE C.W. & REV. 2 FROM SER. # 100-27447					

SPAD CHECK

REPEAT SECTION

STAN

N. 2A

ANNUAL REPORT 1954-55

1954-55

WELL	179-N-69	Drilled Depth	Interval Logged	10' 2' 3'	
Log Type	Neutral	DATE	5-17-78	Casing Size	10 1/2"
Logged By	J.R. McNamee	Witter Level Depth	9.7'		
Logging Scale	500053	Core Constant	2		
Vertical Scale	20'/in	Logging Speed	25'/min		
Source Strength	3 Ci	44' Barbed	Spacelength	4"	
Remarks	REF: PROCEEDING CATW-5 REV. 1 PROBE SER. # JCN 2745A329				

00/3 SPAN CHECK 500053

REPEAT SECTION

00/3 SPAN 500053

WELL 199-N-70

WELL COMPLETION/INSPECTION REPORT

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

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

DRILLING METHOD

Rotary Air N/A Mud N/A
 Cable Tool 0 N/A H ✓
 Drilling Fluid 100-N DRILL SUPPLY WATER
 Other N/A

COMPLETION DATA

Drilled Depth 104.39' Compl Depth 99.08'
 Date Started 4/19/88 Completed 6/1/88
 Static Water Level/Date 58.95' / 6/1/88

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	<u>SMC</u>	
Temporary Materials	<u>SMC</u>	
Permanent Materials	<u>SMC</u>	
Performed by <u>S. M. GOODWIN</u>	Date <u>4/13/88</u>	

MATERIAL STORAGE/PACKING

Inspection Method VISUAL
 Acceptance Criteria SECT. 7.3

	Accept	Reject
Material Handling/Storage	<u>SMC</u>	
Material Packing	<u>SMC</u>	
Performed by <u>S. M. GOODWIN</u>	Date <u>4/13/88</u>	

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 PUL 300" L300-67 Accept SMC 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	<u>NONE</u>	<u>SMC</u>	
Additives	<u>NONE</u>	<u>SMC</u>	
Performed by <u>S. M. GOODWIN</u>	Date <u>4/13/88</u>		

CASING

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

Inspection Method VISUAL
 Acceptance Criteria SECT. 4.1
 M&TE/ID N/A Accept SMC 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
<u>20-40 SLOE SAND</u>	<u>104.29' - 93.4'</u>	<u>9100 LB. RAGS</u>	<u>SMC</u>	
<u>1/2" DEN. PELLETS</u>	<u>93.4' - 78.4'</u>	<u>45 GALL. RAGS</u>	<u>SMC</u>	
<u>GRAVULAR BENT.</u>	<u>78.4' - 13.35'</u>	<u>35 SLOE RAGS</u>	<u>SMC</u>	
<u>CEMENT GRout</u>	<u>13.35' - 1.95'</u>	<u>40 44 LB. RAGS</u>	<u>SMC</u>	

M&TE/ID PUL STEEL TAPE # L300-07
 Performed by S. M. GOODWIN Date 6/1/88

WELL PROTECTION

Inspection Method VISUAL
 Acceptance Criteria 4.2.10

	Accept	Reject
Protective Posts	<u>SMC</u>	
Locks	<u>SMC</u>	
Performed by <u>S. S. TEEL</u>	Date <u>6/1/88</u>	

STRAIGHTNESS TEST

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

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

N/A Well Abandonment N/A Downhole TV Inspection SMC Complete As-Built Diagram,
SMC Well Development
 Performed by _____ Date _____

DR Dall 7/12/88 J.L. Mathan 7-13-88

AS-BUILT DIAGRAM

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

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

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill Rate ft/min
Description	Diagram		Diagram Litho.	Lithologic Description	
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 W.L. 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'		"	5.33'
		104'		GRAVELLY SILT (CLAY)	15.15'
COMPLETION DEPTH = 99.08' B.L.S.				DILLED DEPTH = 104.39' B.L.S.	

COMPLETION SYMBOLS:

XX BENTONITE PELLET SEAL
" ARTIFICIAL SAND PACK
ZZ BENTONITE SLURRY

// GRANULAR BENTONITE
X CEMENT GROUT

A-1800-186 (3/87)

DRILL LOG			By S. M. Goodwin	Rig BUCKRUS ERIE 22W #684-1951	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	
				+ DRIVER IS CRAIG WALMSLEY			
						0710	WELDING ON TOOL
						0735	DRILLING
				RPT SURVEYING SITE; 100 COUNTS / MINUTES		0915	WORKING ON TOOL
							STRONG
						0940	CONCRETE MIX
							DECREASED
				DRILLING SLOW; COBBLES 3' BELOW SURFACE		0950	PREPARING TO
10' of	12" CS			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 5 GALLONS DRILL H ₂ O (0730 - 1100)		1055	DRILLING
						1114	WELDING EARS
						1120	DRILLING
						1130	DRIVING CASING
REMARKS:							

A. M. Goodwin 18 APR. 1988

ORILL 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 APR 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 ₂ O 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% VFI, 10% VCS, 12%			PART 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:							
<p style="text-align: right;">Alan M. Goodwin 18 APR. 1988</p>							

DRILL LOG		By S. M. GOODWIN	Rig BE 22us	Well Number 199-N-70	Computer Number N/A	Project or Work Order No.
		Date 16 APRIL 1988	#68K-19151	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 EARLS
				PULLED UP CASING ~2'; STILL HAVING PROBLEMS	1515	
				KEEPING CASING STRAIGHT.	1520	RIG STOPPED; SMELLS
						LIKE BURNED WIRES.
				ADDED 10 GALLONS SANCE 1100	1530	QUIT FOR DAY
REMARKS:						
TOTAL DRILL SUPPLY H ₂ O = 30 GALLONS						
Alan M. Goodwin: 16 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 BUCHUS EAGE 22W #68K-19151	Well Number 199-N-70 Depth ~7' To ~8.5'	Computer Number N/A	Project or Work Order No. W014 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 WALMSLEY. WAITING FOR RIG REPAIR.		0700	TRIED TO START RIG; ELECTRICAL PROBLEMS
						0740	RIG RUNNING
				PULLED BACK CASING TO GET IT STRAIGHT IN THE OPEN HOLE.		0745	
				NO DETECTABLE CONTAMINATION		0750	HOOKING UP COME ALONG
						0755	RPT ARRIVED
						0800	DRILLING
				STILL HAVING PROBLEMS KEEPING CASING STRAIGHT; CABLES ROLL IN FROM SIDES + HANG UP CASING.		0830	DRIVING CASING
						0845	DRILLING
						0915	DRIVING CASING
						0917	DRILLING
						0940	DRIVING CASING
				SLOW DRILLING; BREAKING THROUGH COBBLES		0943	DRILLING
						0950	WELDING FARS ON 12"
				CASING APPEARS STRAIGHT + STATIONARY		1000	DRIVING CASING
				SEDIMENTS CONTAIN MORE GRAVEL; 10 GALLONS		1005	BAILING WELL
				H ₂ O ADDED SINCE 0700. NO CONTAMINATION/RPT.		1010	DRILLING
						1030	DRIVING CASING

REMARKS:

Alan H. H. H. 19-MAR-1989

D - Drive Barrel H - 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. WD14
			Date 19 APRIL 1988	#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' of 12" C.S.						1035	DRILLING
				PREPARING TO WELD 12" CASING, BEVELING EDGE		1055	STOPPED DRILLING
						1115	WELDING 12" C.S.
10'				ADDSD 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 FAR ON
							12" TO HOOK CAME ALONG
				PULLING BACK ON CASING w/ RIG TO TRY TO MAKE		1245	PULLING CASING
				STRAIGHT; STILL PROBLEMS w/ COBBLES PINCHING		1247	DRIVING CASING
						1250	DRILLING
						1300	PULL & DRIVE
						1305	DRILLING; HOOKED
							UP CAME ALONG
						1320	DRIVING CASING
						1325	DRILLING
						1330	DRIVING CASING
						1335	DRILLING
REMARKS:							
<p style="text-align: right;">Alan H. Tol 19-APRIL-1988</p>							

D - Drive Barrel H - 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"	12' 0"			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 ₂ O SINCE 1000	1430	QUIT FOR DAY
				TOTAL H ₂ O = 20 GALLONS		
REMARKS:						
TOTAL DRILL SUPPLY H ₂ O ADDED = 20 GALLONS						
<div style="text-align: right;"> <i>Alan H. Goodwin</i> 19-April-1988 </div>						

D - Drive Barrel H - 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. Goodman	Rig BUCEYUS EATE 22W #6BK-1915	Well Number 199-N-70 Depth ~8.5' to ~85'	Computer Number N/A	Project or Work Order No. W014 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 ARRIVED AT SITE; DALLER IS CRAIG	0700	BUILDING UP
				WALMSLEY	0800	HARD TOOL
				RPT. APPROVED & SURVEYED; NO DET. CONTAMINATION	0915	FINISHED WELDING
					0920	PLACING CASING
				SHOVELING SURFACE FINES & PLACING THEM BETWEEN	0925	DRILLING
				CASING (OUTSIDE) & OPEN HOLE TO HELP STABILIZE		
				CASING. FILLED TO APPROX. 1' FROM GROUND SURFACE.		
				TALKED W/ JOHN KELLER; REQUESTED THAT TANKS	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:						

Alan H. Pool 20 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. W-014
			Date 20 APR 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"	at 12'					1131	EAR BRAKE 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
				BALLED ANGRY GRAY - SIZED CHIPS OF BASALT;		1310	DRILLING
				ASSUME DRILL IS BREAKING THROUGH BASALT BOULDER		1330	DRIVING CASING
						1335	DRILLING
						1400	DRIVING CASING
				30 GALLONS DRILL SUPPLY H ₂ O ADDED SINCE 0700		1405	DRILLING
	9-10'	H	W	SILTY SANDY GRAVEL: 60% GRAVEL, 35% SAND,		1435	SAMPLED W/ DRY
				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:							
<p style="text-align: right;">John M. Smith 20 APRIL 1985</p>							

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 FRAGS. (GRANITES & QUARTZITE); VA TO A.	1450	DRIVING CASING
				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 10/2 (LT. OLIVE GRAY). SLIGHT RX TO HEL.	1455	DRILLING
				FORMATION UNCONSOLIDATED, BUT DRILLING DIFFICULT DUE TO COBBLES & BOULDERS. 4X GRAVELS, 1/2 THE SAND, 1 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	SHOT DOWN RIG
					1530	DONE FOR DAY
REMARKS:						
<p style="text-align: right;">After H. Hook 20 APR. 1988</p>						

D - Drive Barrel H - 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 BUCHARS ERIE 22W #6BK-1915	Well Number 199-N-70 Depth 10' To ~12'	Computer Number N/A	Project or Work Order No. W-014 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 ARRANG AT SITE; DRILLER IS CRAIG WALMSLEY.		0700	COVERING BENTONITE w/ TAAP
						0710	SEPARATING RIG
						0730	DRILLING
						0740	DRIVING CASING
				PULLING BACK ON CASING; TRYING TO DRILL OUT BOULDER BEFORE DRIVING CASING		0745	PULLING 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 STILL SLOW. DEPTH ~12'. NO RPT SURVEY.		0955	BAILING WELL
						1005	DRILLING
						1020	REMOVING EAR FROM 12'
						1025	DRIVING CASING
REMARKS:							
<div style="text-align: right;"> <i>Shawn M. Goodwin</i> 21 Apr. 1985 </div>							

D - Drive Barrel H - 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	#68K-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	WELONIC BAR AT 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:							
<p style="text-align: right;">Shawn M. Goodwin 22 APR 1988</p>							

DRILL LOG		By S. M. Goodman	Rig BE 22W	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 22 April 1966	# 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% GRANITE, 5% QUARTZITE; VA TO SR. SANDS ARE 70% BASALTIC, 20% QUARTZ + FELDSPAR, 10% RX FRAGS, VA TO SR. WET COLOR IS SY 3/1 (VERY DARK GRAY); DRY COLOR IS SY 6/1 (LT GRAY TO GRAY). SLIGHT RX TO HEL. UNCONSOLIDATED, BUT SLOW DRILLING. MORE SAND & SILT THAN LAST SAMPLES; GRAVELS SLIGHTLY MORE ROUNDED. SLIGHT CLIN CHANGE. REPRESENTATIVE SAMPLE WOULD CONTAIN COBBLES. NO RPT SURVEY		
					1420	DRAINING 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 FLUID 1420						
<div style="text-align: right;"> <i>Shirley Ann</i> 21 APR 1966 </div>						

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

A-6000-021 (5-65)

DRILL LOG			By S. M. GOODWIN	Rig BUCYRUS EAGE 22W #68K-1915	Well Number 199-N-70 Depth ~16 To ~18.5	Computer Number N/A	Project or Work Order No. W-014 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"	12'	C.S.		GEOLOGIST ARRIVED AT SITE; DAILER IS CRAIG WALMSLEY.		0700	PREPARING TO WELD
						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' 11"	12" C.S.					0825	PLACING DRIVE CHAMPS
						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 DOWN & FULL OF BASALT FRAGMENTS		1250	BAILED WELL
				25 GALLONS OF H ₂ O ADDED SINCE 0700		1255	DRILLING
				CASING WON'T DRIVE DOWN		1410	DRIVING CASING
				USED 5 GALLONS DRILL H ₂ O		1420	DRILLING
				WATCHING PAINT MARK ON CABLE; HASN'T MOVED		1515	DRILLING
				APPARENTLY SINCE 1000. BOULDER!?		1530	QUIT FOR DAY
				WILL QUIT DRILLING AT SITE UNTIL FURTHER NOTES.		1535	
REMARKS: TOTAL OF 30 GALLONS OF DRILL SUPPLY FLUID. NO RPT TODAY Alan H. York 22 APR. 1966							

D - Drive Barrel H - 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 BUCHANAN EATE WDL #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 WALMSLEY. LARGE RIG SET UP OVER HOLE.	0700	WORKING ON TOOL 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 BARREL; 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.
10' 8"				ADDED 8' 4" OF 12" C.S. CASING	1045	FINISHED WELDING
8' 4"				TOTAL 12" CARBON STEEL = 29'	1055	DRILLING
29' c.s.	12" C.S.				1130	DRILLING CASING
REMARKS:						
<p style="text-align: right;">Alan M. Goodwin 29 APRIL 1988</p>						

D - 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 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 29 APRIL 1985	# 22-14103	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
				BATTED GRAVELS & COBBLES (VA TO WR);		1145	BATTING 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 FALS ON 10"
21' 1" of 10" C.S.				ADDED 21' 1" of 10" CARBID STEEL CASING		1455	WELDING ON DANG SHG
						1510	HOOKEING UP COME ALONG
						1512	DRILLING
						1525	SHUT DOWN RIG
						1530	DONE FOR DAY
REMARKS: ADDED 20 GALLONS of DRILL SUPPLY H ₂ O. No RPT TODAY.							
<div style="text-align: right;"> <i>Shawn H. Goodwin</i> 29 APRIL 1985 </div>							

A.77

DRILL LOG			By S. M. Goodwin	Rig BUCHAK FAIR 60L #22-14102	Well Number 199-N-70 Depth ~19' TO 20'	Computer Number N/A	Project or Work Order No. W-014 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"	N 10"	C.S.		GEOLOGIST ARRIVED AT SITE; DRILLER IS CRAIG WALMSLEY.		0700	
				DART BAILER; GRAVELS + COBBLES.		0720	DRILLING
						0730	BAILING WELL
						0732	WELDING GRAS
						0745	CUTTING 10" CASING
						0820	WELDING 10"
21' 1"	N 10"			ADDED 10' 0" OF 10" CASING STEEL CASING		0915	FINISHED WELDING
10' 0"				TOTAL 10" CASING = 31' 1"		0930	DRILLING
31' 1"	N 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, 10% SILT, 10% MP, 15% FP, 15% VFP, 15% VCS, 15% CS, 10% MS, 5% FS, 5% VFS, 10% SILT. VP SORTED.		1100	SAMPLED w/ DART BAILER
				GRAVELS ARE 75% BASALT, 15% GRANITIC, 10% QUARTZ + FELDSPAR; VA TO WR. SANDS ARE 70% BASALT,		1105	DRILLING
REMARKS:							

Shawn H. Moor 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	# 22-14103	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% RE. FRAGS, VA TO WR. SLIGHT RX. TO HCL. WET COLOR IS SY 4/1 (DARK GRAY); DRY COLOR IS SY 6/1 (LT. GRAY TO GRAY). UNCONSOLIDATED, BUT SLOW DRILLING. SLIGHT DECREASE IN GRAVELS + INCREASE IN SANDS SINCE LAST SAMPLE. NO RPT SURVEY. REPRESENTATIVE SAMPLES WOULD CONTAIN MORE GRAVELS + SOME COBBLES. 15 GALLONS OF H ₂ O ADDED THIS MORNING		1140	ADDING H ₂ O
						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:							
Shan M. Neal 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)

D - Drive Barrel H - 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 BUCEPUS FAIR 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 CRAZY	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
				LENNY 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:						
<p style="text-align: right;"> 3 MAY 1988 </p>						

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 BOULDER'S DOWN HOLE PRIOR		1305	DRILLING
				TO DRILLING TO GET BIT DRILLING STRAIGHT.		1340	WELDING ON BIT
						1400	DRILLING
						1430	BAILED WELL
						1435	WELDING BAR at 10"
				REMOVING 10" CASING FROM HOLE & WILL WELD ON MORE		1440	PULLING 10"
				12"; TOOL NEEDS TO BE LARGER TO BREAK THROUGH		1445	DRIVE SHAFT 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 H₂O
1 RPT SURVEY; < DETECTABLE CONTAMINATION.

Sham H. J. 3 MAY 1988

DRILL LOG		By S. M. GOODWIN	Rig BUCKRUS EAK 60L #22-14183	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 4 MAY 1986		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 WALSHLEY	0700	WORKING ON TOOL STRING
					0745	DRILLING
				NEW DRILLER; FELIX MURPHY REPLACED CRAIG.	0800	WORKING ON RIG
					0825	WELDING EARL 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	BAILING 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. + 8' 4 3/4"				IN HOLE MUST EQUAL 20' 7 1/4"		
29' of 12" C.S.				TOTAL 12" CASING = 29'	1120	FINISHED WELDING
					1140	DRILLING
				BAILED CRUSHED BASALT & BASALT CHIPS	1200	BAILING WELL
REMARKS:						
<div style="text-align: right;"> 4 MAY 1986 </div>						

ORILL 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 1968	#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 DRIVER		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 1420 TODAY.							
NO RPT VISIT							
<div style="text-align: right;"> 4 MAY 1968 </div>							

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

A-6000 021 (5-65)

DRILL LOG			By S. M. Goodwin	Rig BUCKEY FAIR 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 APPEARED; DRILLER IS FELIX MURPHY		0700	SERVICING RIG
						0730	SURVEYING SITUATION
						0750	DRILLING
				BAILED GRAVEL + BANKS COBBLES		0810	BAILED WELL
				BAILED VA TO WR GRAVELS		0815	DRILLING
29' 0"				CUT OFF 7' 1 1/4" OF 12" CASING YESTERDAY;		0840	BAILED WELL
7' 1 1/4"				TOTAL 12" CASING = 21' 10 3/4"		0845	DRILLING
21' 10 3/4"						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% GRANITE, 10% QUARTZ;			
				VA TO SR. SANDS ARE 70% BASALT, 20% QUARTZ +			
				FELDSPAR, 10% RX. FRAGMENTS, VA TO SR. WET COLOR			
				IS SV 4/1 (DRL. GRAY). DRY COLOR IS SV 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:							
<div style="text-align: right;"> <i>Shawn M. Smith</i> 5 MAY 1986 </div>							

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"	10"	C.S.		TOTAL 10" CARGAL STEEL CASING = 31'1"	1040	ADDING 10" TO HOLE
				PROBLEMS GETTING CASING DOWN 12"; DANE	1105	GRINDING DANE
				SHOE EDGES NEED GRINDING TO EASE DOWN HOLE		SHOE
				GETTING CASING SITUATED IN 12"	1115	WELDING BAR 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 DANE SHOE	1515	SHUT DOWN RIG
					1530	DONE FOR DAY
REMARKS:						
ADDED 25 GALLONS OF DRILL SUPPLY H ₂ O						
NO RPT SURVEY TODAY						
Alan M. Hood: 5 MAY 1986						

DRILL LOG		By S.M. Goodwin	Rig Buckus EAF 602	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 6 MAY 1988	# 21-14103	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"	or 10"	C.S.		DRILLER IS FELIX MURPHY	0700	SERVICING RIG
				BUILDING UP BIT TO IMPROVE DRILLING	0750	WORKING ON BIT
					0915	PLACING DENE CLAMPS
					0925	DRIVING CASING
				BAILED BLOCKS & ROUNDED GRAVELS, COARSE SAND	0950	BAILED WELL
					0955	DRILLING
					1015	DRIVING CASING
					1020	BAILING WELL
					1025	DRILLING
31' 1"				CUTTING 2" OF 10" CASING IN HOLE	1045	PREPARING TO WELD
2"				TOTAL IN HOLE = 30' 11" or 10"		
30' 11"	or 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:						

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

A-5000-021 (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	Log # 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% SILT. 2% VCP, 3% CP, 10% MP, 15% FP, 20% VFP, 15% VFS, 10% CS, 10% MS, 5% FS, 5% VFS, 5% SILT. VERY POORLY SORTED.		1415	BAILED w/ DART
				GRAVELS ARE 60% BASALT, 20% GRANITIC, 20% META. (QUARTZITE & GNEISS), VA TO WR. SANDS ARE 100% BASALT, 30% QUARTZ & PLAG., 10% RX FRAGS; VA TO SR.		1430	DRIVING CASING
				WET COLOR IS SY 4 1/2 (OLIVE GRAY). DRY COLOR IS SY 6 1/2 (LT. OLIVE GRAY). NO RX. TO HCL. UNCONSOLIDATED, BUT SLOW DRILLING. COARSER THAN LAST SAMPLE & LESS BASALT. NO RPT SURVEY. SAMPLE FAIRLY REPRESENTATIVE; STILL BREAKING THROUGH COBBLES.		1440	DRILLING
						1450	DRIVING CASING
						1500	DRILLING
						1510	DRIVING CASING
						1520	SHUT DOWN RIG
						1530	DONE FOR DAY
REMARKS: USED 20 GALLONS OF DRILL H ₂ O NO RPT SURVEY TODAY <div style="text-align: right;"> 6 MAY 1988 </div>							

DRILL LOG			By S. H. Goodwin	Rig BOCEPUS FAIR 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 9 MAY 1988	#22-14103	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		0710	DRILLING
				BAILED ROUNDED & ANGULAR GRAVELS		0740	BAILING WELL
						0745	DRILLING
						0810	DRIVING CASING
						0815	DRILLING
						0820	DRIVING CASING
				BAILED ROUNDED & ANGULAR GRAVELS		0825	BAILED WELL
						0830	DRILLING
	34-35'	H	W	SANDY GRAVEL: 45% GRAVEL, 50% SAND, 5% SILT. 5% CP, 10% MP, 15% FP, 15% VFP, 15% VCB, 15% CF, 10% MS, 5% FS, 5% VFS, 5% SILT. VERY POORLY SORTED. GRAVELS ARE 60% BASALT, 20% GRANITES, 20% QUARTZITE; VA TO WR. SANDS ARE 50% BASALT, 35% QUARTZ & PLAGIOCLASE, 15% RX FRAGS; VA TO SR. WET COLOR IS SY 4 1/2 (OLIVE GRAY) DAY COLOR IS SY 6 1/2 (LT. OLIVE GRAY). NO RX. TO HCL. UNCONSOLIDATED. SLIGHT DECREASE IN GRAVEL		0850	SAMPLED W/ DART BAILER
						0855	DRIVING CASING
						0900	DRILLING
						0920	DRIVING CASING
						0930	DRILLING
REMARKS:							
<div style="text-align: right;"> 9 MAY 1988 </div>							

DRILL LOG		By S. M. GROOMIN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 9 MAY 1986	#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 + FLAG. NO RPT SURVEY.		
					0940	DRIVING CASING
				BROKEN GRAVELS + COARSE SANDS	0945	BAILED WELL
					0948	DRILLING
				DRAINING 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 COUL. IS 2.5 Y		
				5/2 (GRAYISH GR.); DRY COUL. IS 2.5 Y 7/2 (LT.		
				GRAY). DRILLER SAYS RINGOLD DRIES HARDER		
				IN OREN 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:						
<div style="text-align: right;"> <i>Shall 1/1. Moe</i> 9 MAY 1986 </div>						

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	WEIDING ON BIT
						1300	DRIVING CASING
				DRILLING EASIER IN RINGOLD FM.		1310	DRILLING
	39-40'	H	W	SILTY SANDY GRAVEL: 40% GRAVEL, 52% SAND, 8% SILT. 10% MP, 15% FP, 15% VFP, 10% VCS, 12% CS, 10% MS, 10% FS, 10% VFS, 8% SILT. VERY POORLY SORTED. GRAVELS ARE 30% BASALT, 25% GRANITES, 30% QUARTZITE, 15% 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 (DARK GRAYSH GRN). DRY COLOR IS 2.5 Y 6/2 TO 7/3 (LT. GRAY TO LT. GRAYSH 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'.		1415	SAMPLED w/ DART BARREL
						1420	DRILLING
						1445	DRIVING CASING
						1450	DRILLING
						1505	DRIVING CASING
REMARKS:							
<div style="text-align: right;">Shen H. J. 9 MAY 1988</div>							

D - Drive Barrel H - 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-8000-021 (5-85)

Alan M. Ford 10 MAY 1966

A-6000-021 (5-85)

DRILL LOG		By S. M. GRODWIN	Rig BE 602	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 10 MAY 1968	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/ DNET
				12% SILT. 5% MP, 10% FP, 15% VFP, 12% VCS,		BAILED
				16% CS, 10% MS, 16% FS, 10% VFS, 12% SILT.	1145	DRILLING
				GRAVELS ARE 30% BASALT, 30% GRANITE,	1200	STOPPED FOR LUNCH
				30% QUARTZITE, 10% OTHER META. (MASTLY	1230	END LUNCH
				GREENS), VA TO SR. SANDS ARE 60% QUARTZ	1240	DRILLING
				+ PLAG., 30% BASALT, 10% RX FRAGS +		
				MICAS (BIOTITE + MUSCOVITE); VA TO SR.		
				WET COLOR IS 2.5 Y 4/2 (DARK GRAYISH BROWN), DRY		
				COLOR IS 2.5 Y 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: MATERIALS SIMILAR TO 50'						

Shaw-Hill 10 MAY 1968

D - Drive Barrel H - 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-8000-021 (5-85)

[illegible]

DRILL LOG			By S. M. Goodman	Rig BE 60C	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
				BATLED SIMILAR MATERIALS AT 57'		0930	BATLED WELL
						0935	DRILLING
						1010	PLACING CLAMPS
						1015	DETENTING CASING
	59-60'	H	W	SILTY SANDY GRAVEL: 35% GRAVEL, 55% SAND, 10% SILT. 5% CP, 8% MP, 10% FP, 12% VFP, 10% VCS, 15% CS, 15% MS, 8% FS, 1% VFS, 10% SILT. VERY POORLY SORTED. GRAVELS ARE 30% BASALT, 30% GRANITE, 30% QUARTZITE, 10% OTHER (GNEISS, SOME EITONE); VA TO SR. SANDS ARE 30% BASALT, 60% QUARTZ + PLAG., 10% RX FRAGS; VA TO SA. WET COLOR IS 2.5Y 5/2 (GRAYISH BROWN); 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 ₂ O AT ~60'		1020	SAMPLED W/ DART
							BATLED
						1025	PREPARING TO WELD
						1045	RPT SURVEY;
							NOTHING DETECTABLE
						1050	WELDING 10"
REMARKS: H ₂ O AT ~60'; UNCONFINED AQUIFER							
<div style="text-align: right;"> <i>Shawn M. Good</i> 11 MAY 1988 </div>							

DRILL LOG		By S. M. GROOMEN	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-614
		Date 11 MAY 1986	# 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 1/4" 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	DRAINING CASING
70' 9" or 10"				4' OR OPSI HOLE; DRILLING CASING AT 61.5 -	1150	STOPPED FOR LUNCH
				62' - FORMATION CHANGE?	1225	END LUNCH
					1230	DRILLING
				FILLING RIG W/ CAL GAS	1250 - 1300	STOPPED DRILLING
				BAILER MATERIAL APPEARS FINER THAN 60'	1300	BAILING WELL
					1305	DRAINING CASING
					1310	DRILLING
61 1/2'		H	W	SILTY SANDY GRAVEL: 35% GRAVEL, 50% SAND,	1320	SAMPLED W/
				15% SILT, 5% MI, 10% FP, 15% VFP, 5% VCS,		DART BAILER
				10% CS, 15% MS, 10% FS, 10% VFS, 15% SILT.	1325	DRAINING CASING
				VERY POORLY SORTED. GRAVELS ARE 30% BASALT,	1335	DRILLING
				25% GRANITES, 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 (WETTER BAN), DRY COLOR IS 2.5Y 7/2		
REMARKS:						
Shen Shi. Houl						

D - Drive Barrel H - 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. Goddard	Rig BS 602	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 11 May 1988	A 22-141.3	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	DRAWING
				UNCONSOLIDATED. EASIER DRILLING THAN LAST		
				SAMPLE; MORE SILT & FINE SANDS, MORE		
				VARIOUS GRAVELS. NOT ABLE TO KEEP AT MUCH		
				OPEN HOLE (~1-2'). RPT SURVEY; <DET.		
70' 9" or 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" or 10" C.S.					1500	WELDING 10" C.S.
* 10' 4 1/4"				FINISHED WELD; ADDSD 10' 4 1/4" or 10"	1520	
81' 1 1/4" or 10"				TOTAL 10" CARBID STEEL = 81' 1 1/4"	1524	SHUT DOWN RIG
					1530	END OF DAY
REMARKS: USED 30 GALLONS DRILL SUPPLY H ₂ O						
HOT H ₂ O AT ~60'						
Alan M. Pool 11 MAY 1988						

DRILL LOG			By S. M. GOODWIN	Rig BUCEPUS EATE 60L # 22-14103	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 12 MAY 1966		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" x 11"				GEOLOGIST ARRIVED; DRILLER IS FELIX MURPHY		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" x CROWN STEEL CASING		1015	FINISHED WELD
						1025	DRAINING CASING
						1030	DRAINING
						1050	DRAINING 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	DRAINING CASING
				VERY POORLY SORTED. GRAVELS ARE 30% BASALT,		1110	DRAINING
				35% QUARTZITE, 25% GRANITE, 10% OTHER (MICA			
				+ SANDSTONE); VA TO R. SANDS ARE 40% BASALT,			
				50% QUARTZ + PLAG., 10% RX FRAGS (GRANITE, MICA);			
				VA TO SR. WET COLOR IS 2.5 Y 4/2 (DARK GRAYISH			
				BRN); DRY COLOR IS 2.5 Y 7/2 (LT. GRAY)			
REMARKS:							
<div style="text-align: right;"> <i>Sho - M. Goodwin</i> 12 MAY 1966 </div>							

DRILL LOG			By S. M. Goodman	Rig BE 60C	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 12 MAY 1986	# 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 UNCONSOLIDATED & EASY DRILLING. LESS GRAVEL & SILT, MORE SAND; SANDS WERE COARSER. SAMPLES REPRESENTATIVE; NO RPT SURVEY.			
				BAILED COARSE GRAVELS & SANDS; DRILLER SAYS SANDS ARE HEAVING & PUSHING CASING BACK UP HOLS. PUSHED UP CASING ~6'		1200	BAILED WELL
				PUL STEEL TAKE # 630-07 (300')		1205	LUNCH
				HELD @ 74' - 1.47' = 72.53' - 7.8' if 10"		1235	END LUNCH
				STICK UP = 64.73'; SEEMS LOW - THOUGHT IT WOULD BE ~60'. WILL TAKE TOMORROW IN A.M. H ₂ O LEVEL IN N-39 = ~59.2'		1240	H ₂ O LEVEL
						1255	DRAINING CASING
						1300	DETUNING
	74-75'	H	W	SILTY SANDY GRAVEL: 40% GRAVEL, 50% SAND, 10% SILT. 5% MF, 15% FP, 20% VFP, 15% VCS, 15% CS, 10% MS, 5% FS, 5% VFS, 10% SILT. GRAVELS ARE 40% BASALT, 20% QUARTZITE, 20% GRANITE, 10% OTHER META.; VA TO R. SANDS ARE 50% BASALT, 4%.		1320	BAILING WELL
							w/DRAT BAILER
						1325	DRILLING
REMARKS:							

Shawn H. Seal 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-5000-021 (5-85)

DRILL LOG				By	Rig	Well Number	Computer Number	Project or Work Order No.	
Total Casing	Depth	Drill Method	Wet/Dry Sample	S. M. Goodwin	# 22-14103	199-N-70	N/A	W-014	
				Date		Depth		Subcontract No.	
				12 Mar 1988		75' to ~78.5'		N/A	
				LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.					
	74.75'	H	W	(Cont.) Gravel & Pile, 10% R. Frag.; VA TO					No RPT Survey
				SR. Very Poorly Sorted, Wet Gravel IS 2.5Y					
				4/2 (Det. Grain Size). Dry Gravel IS 2.5Y 7/2 (1/2 grain).					
				Moderate R. TO 10% Hbl. Gravel Not Heavy;					
				UNIT IS NOW Slightly Consolidated. Rbl					
				TO 15% 1' at OPEN Hbl. N/A AS MUCH					
				Hbl AS UNIT Gravel; Foundation NOT AS OPEN.					
				Gravel Gravel; More Gravel & Less Sand.					
				Gravel & Gravel Sand; Similar TO UNIT					1350 Barco well
				Gravel. Casing Hbl BEEN DURING THROUGH					1400 Building up RT
									1430 Drilling
				Casing DURING Hbl					1445 Drilling Casing
									1450 Drilling
				No Detectable Contamination					1455 RPT Surveyed
									1515 Drilling Casing
									1520 Shut Down Rig
									1530 End of Day
REMARKS:									

After Mr. Paul. 12 Mar 1988

DRILL LOG		By S. M. Goodman	Rig BUCEXUS FAIR 601 #22-14103	Well Number 199-N-70 Depth ~78.5' to 80'	Computer Number N/A	Project or Work Order No. W-014 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 ARRANGED; DRILLER IS FELIX MURPHY	0700	SERVISING RFG
				PNL STEEL TARE # L300-D7 (300')	0720	H ₂ O LEVEL
				HELD @ 66' - 1.74' CUT - 2.83' STACKUP = 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	BATLED W/ DART
				10% SILT, 5% CP, 10% MP, 20% FP, 20% VFP,		BATLER
				5% VCS, 5% CS, 15% MS, 5% FS, 5% VFS, 10% SILT,	0835	PREPARING TO WELD
				VERY POORLY SORTED. GRAVELS ARE 30% BASALT,		
				35% QUARTZITE, 25% GRANITE, 10% OTHER		
				(MICA, JO. & SED, GREEN RX (EPIDOTE?)), VA TO R.		
				SANDS ARE 25% BASALT, 65% QUAZT & PLAG,		
				10% RE. FRAGS (MICA, ETC), VA TO SR. WET		
				COLOR IS 2.5Y 4/2 (DAR. GRAYISH BAN). 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 PENN OPEN HOLE; ~4.5'		
				ABEND OF CASING. NO RPT SURVEY.		
REMARKS:						
<div style="text-align: right;"> <i>Shen 1/2 Shen</i> 13 MAY 1988 </div>						

D - Drive Barrel H - 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. Grogan	Rig BE 600	Well Number 191-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.			Drilling Comments
81' 1/4" of 10"				ADDED 10' 1/4" OF 10" CARBON STEEL CASING			FRESH WELDING
10' 1/4"				TOTAL 10" = 91' 1/2"			DRAWING CASING
91' 1/2" of 10" c.s.				DRAWING SLOW; MAY BE IN CASCES			DRAWING
				CASING DRAWING HARD			DRAWING CASING
84-85' H				SILTY SANDY GRAVEL: 55% GRAVEL, 35% SAND,			SAMPLED W/ OAR
				10% SILT. TANG CP, 10% MP, 20% FL, 25% VES			BAILED
				8% VES, 7% CS, 10% MS, 5% FS, 5% VES, 10% SILT. VERY POORLY SORTED. GRAVELS ARE 30% BASALT, 30% GRANITE, 30% QUARTZITE, 10% OTHER (MOSTLY META - GNEISS, SOME EPOXY).			DRAWING
				VA TO R. SANDS ARE 30% BASALT, 60% QUARTZ + PLAGIOCLASE, 10% RX. FRAGS; VA TO SR. WET COLOR IS 2.5 Y 4/2 (DARK GRAYISH BROWN); DRY COLOR IS 2.5 Y 7/2 (LT. GRAY).			
				SLIGHT RX TO 10% HCL. SLIGHT CONSOLIDATION, DRAWING IS SLOW THROUGH GRAVELS. STOPPING TO LAST SAMPLE. NO RPT SURVEY. 25' OF ORGS HOLE.			
							1200 LUNCH
REMARKS:							

Shel. Hk. Ford 13 MAY 1988

DRILL LOG		By S. M. Goodman	Rig B5 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, Catclaws, Etc.	Time	Drilling Comments
					1230	END LUNCH
					1235	DRILLING
				DRILLING HARD; ~5' OF OPEN HOLE	1310	DRILLING CASING
					1320	WEIRDING ON BIT
				DRILLING SLOW; GRAVELS & COBBLES	1345	DRILLING
					1425	DRILLING CASING
	89-90'	H	W	SILTY SANDY GRAVEL: 50% GRAVEL, 40% SAND, 10% SILT, 5% CP, 10% MP, 15% FP, 20% VFP, 10% VCS, 10% CS, 10% MS, 5% FS, 5% VFS, 10% SILT. VERY POORLY SORTED. GRAVELS ARE 30% BASALT, 30% GRANITE, 30% QUARTZITE, 10% OTHER META; VA TO SR. SANDS ARE 25% BASALT, 65% QUARTZ & PLAG. 10% PX. FRAGS; VA TO SR. WET COLOR IS 2.5Y 4/2 (Dk. GRAYISH BRN.); DRY COLOR IS 2.5Y 7/2 (LT. GRAY). STRONG PX. TO HEL. SLIGHT CONSOLIDATION. LESS GRAVEL THAN LAST SAMPLE; SIMILAR MINERALOGY. NO RT SURVEY.	1435	SAMPLED W/ DIRT BARREL
					1440	DRILLING
					1500	RPT SURVEY;
						NO DET. CONTAM.
					1515	DRILLING CASING
					1525	SHUT DOWN RIG
					1530	END OF DAY
REMARKS: RIT SURVEY; NO DETECTABLE CONTAMINATION.						
<div style="text-align: right;"> 13 MAY 1988 </div>						

DRILL LOG		By S. M. Goodwin	Rig BUCHANS SALE 606 #22-14103	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 16 MAY 1986		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' 0" H ₂ O				STATIC H ₂ O LEVEL: HEAD @ 66' (PWL 300')	0715	H ₂ O LEVEL
2.18' CUT				STEEL TAPE # (300-07) - 2.18' CUT - 2.9'	0725	PASAPING TO WELD
69.82'				CASING STICKUP = 60.92' D/W	0815	WELDING 10"
2.90' STICK UP				ADDED 10' 1/4" # 10" CASING	0900	FINISHED WELD
60.92' H ₂ O LEVEL				TOTAL 10" CARBON STEEL = 101' 13/4"	0910	DRIVING CASING
91' 1 1/2" # 10"					0920	DRILLING
10' 1/4"					0940	WORKING ON RIG
101' 1 1/4"					0950	DRILLING
					1000	DRIVING CASING
94-95'	H	W		SILTY SANDY GRAVEL: 55% GRAVEL, 35% SAND,	1015	SAMPLED W/ DMT
				10% SILT, 5% CP, 10% MP, 20% FP, 20% VFP,		BARREL
				5% VCS, 5% CS, 10% MS, 10% FS, 5% VFS, 10%	1020	DRILLING
				SILT, VERY POORLY SORTED. GRAVELS ARE 35%	1030	DRILLER TO 100W
				BASALT, 30% QUARTZITE, 25% GRANITE, 10%	1045	DRILLING
				OTHER META & SED. (GNEISS, S.S.); VA TO SE.		
				SANDS ARE 30% BASALT, 60% QUARTZ + PLUG,		
				10% PY. FRAGS. (MOSTLY Biotite & Muscovite IN)		
REMARKS:						

Alan H. Mac 13 MAY 1986

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 16 MAY 1968	#22-14103	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 (DR. GRAYISH BROWN). 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 SAMPLE.			1145	BAILED WELL
				10' 20 SLOT S.S. SCREEN; NO THREADS ON END TO MATE WITH S.S. 6' CASING. SHOULD BE 10 SLOT SCREEN W/ THREADS. CHECKED SILT & SAND; WE HAVE 10-20 SLOT BAGS, SHOULD BE 20-40 SLOT.			1150	SCREEN DELIVERED
							1200	LUNCH BREAK
							1230	END LUNCH
							1245	DRIVING CASING
							1255	DRILLING
				DRIVING HARD & DRILLING SLOW; DETAILER THINKS WE ARE IN BOULDER. ALSO COARSE GRAVELS.			1315	DRIVING CASING
				10' 10 SLOT SCREEN W/ THREADS DELIVERED.			1325	DRILLING
							1410	BAILED WELL
							1415	PREPARING TO WELD
REMARKS:								
<div style="text-align: right;"> 16 MAY 1968 </div>								

[illegible]

DRILL LOG			By S. M. GOODWIN	Rig BUCYRUS EATE 600 L #22-14103	Well Number 199-N-70 Depth ~97' to 100'	Computer Number N/A	Project or Work Order No. W-014 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	SEATING 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, 15% SILT & CLAY. TRACE CP, 10% MP, 20% FP, 20% VFP, 5% VCS, 5% CS, 10% MS, 10% FS, 5% VFS, 15% SILT & CLAY. VERY POORLY SORTED. GRAVELS ARE 40% BASALT, 25% GRANITES, 25% QUARTZITE, 10% OTHER META; VA TO SR. SANDS ARE 35% BASALT, 55% QUARTZ & PLAG., 10% RX. FRAGS (GRANITES, MICA); VA TO SR. WET COLOR IS 2.5 Y 4/2 (DARK GRAY-BLW). DRY COLOR IS 2.5 Y 7/2 (LT GRAY.) MODERATE RE. TO 10% HCL. SLIGHT CONSOLIDATION. DRILLING IS EASIER; NOW OUT OF BOUNDS & AT TOP OF CLAYS. SOME CLUMPS		0915	SAMPLED w/ DART
							BAILER
						0920	DESLING
						0930	STANDBY
REMARKS:							
17 MAY 1988							

A.109

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 1986	# 22-141.3	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
	99.10"	H	W	(CONT.) OF BROWNISH CLAY WERE PRESENT IN SAMPLE. MORE FINES & LESS GRAVEL THAN LAST SAMPLE.	0950	CUTTING OFF 10"
						CASING
116' 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 DETAIL A LITTLE MORE & CLEAN OUT WELL TO BOTTOM OF CASING	1005	BAIL W/ DART 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 WITH TAPE	1030	BAILED WELL
				ANOTHER D/B AFTER BAILING WELL.	1050	DRILLING
					1055	BAILED WELL
104'		H	W	GRAVELLY SILT: (CLAY) 15% GRAVEL, 10% SAND, 75% SILT & CLAY. 3% NP, 6% FP, 6% VFP, 3% VES, 2% CS, 2% MS, 3% FS & VFS, 75% SILT, POORLY SORTED. GRAVELS ARE 40% BASALT, 25% GRANITES, 25% QUARTZITE, 10% OTHER META;	1100	DRILLING
					1110	BAILED WELL
REMARKS:						
<div style="text-align: right;"> <i>Shan H. Hurd</i> 17 MAY 1986 </div>						

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

A 6000-021 (15-R5)

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 17 MAY 1966	# 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
	104'	H	W	(CONT.) VA TO A. SANDS ARE 35% BASALT, 55% QUARTZ + PLAG., 10% RX. FRAGS (GRANITE + MICAS, VA TO SA). WET COLOR IS 2.5Y 4/4 (OLIVE BROWN) DRY COLOR IS 2.5Y 7/4 (PALE YELLOW). SLIGHT RX. TO 10% HEL.		1115	STRAIGHTNESS TEST; 11' BATHEN W/9" DIA. DOWN HOLE. NO PROBLEMS.
				EASY DRILLING IN CLAYS.			
103.82'				PUL 500' STEEL TUBE # L500-02. HELD @		1120	DEPTH TO BOTTOM
2.05'				103.82' - 2.05' STICKY (10" CASING) + 2.62'		1130	STAND BY
101.77'				IF TUBE = 104.39' D/B. STILL HARD TO DETERMINE D/B DUE TO STICKY SECS.			
2.62'				AT BOTTOM.			
104.39' D/B				WELL LOGGED FOR NAT. Y, NEUTRON, & DENSITY.		1230	GEOPHYSICAL LOG
				USING 100N DRILL SUPPLY FLUID TO BAINGE LEVEL UP TO ~50'; DRILLER WANTS H ₂ O ADDED TO PREVENT SCREEN FROM MOVING UP WHEN WE START TO PULL BACK CASING		1300	END GEO. LOG
						1305	ADDING H ₂ O TO HOLE
REMARKS:							
<div style="text-align: right;"> <i>Shaw M. Goodwin</i> 17 MAY 1966 </div>							

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 (5-65)

A.111

DRILL LOG			By S. M. Goodman	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 17 MAY 1986	# 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:							
<div style="text-align: right;"> <i>Sham Am Jank</i> 17 MAY 1986 </div>							

DRILL LOG		By S. H. GORDON	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 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 STEVE CALMADO	0830	ADDED SAND
				SILTY SAND IN 10" CASING. D/B TO TIP OF	0900	NEED TOOLS AT
				SAND = 100'. WELL COMPLETE AT THIS DEPTH		WELL N-69
				(PUL 310' STEEL TAPE # L300-07)	0930	PROBLEMS W/ TITRADS 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		
70' TOTAL 6"				AT TOP		
(INCLUDES 10' OF 6" SCREEN)				1 19' 11 3/4" SCH. 10S S.S. 6" CASING		
				1 20' SCH. 10S S.S. 6" CASING W/ CENTRALIZERS		
				AT TOP		
REMARKS:						
<div style="text-align: right;"> <i>Shun M. J...</i> 18 MAY 1988 </div>						

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 18 MAY 1986	# 22-14102	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 SUT SCH. 3/4 SCREEN + 92' of			
				SCH. 10S 6" S.S. CASING)			
				ADDED 3 100 LB. BAGS OF 20-40 U.S. SIEVES		1330	ADDING SAND
				CALIFORNIA SILICA SAND. D/B TO TOP OF SAND		1350	WEIGHING PULPER
				= 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:							
<div style="text-align: right;"> 18 MAY 1986 </div>							

DRILL LOG		By S. M. Goodwin	Rig BUCHANS EAST 60L #22-14103	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-011
		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	SERVING 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' (PNC TIME # L300-07).	0825	DATILSK TO N-69
						TO PICK UP BARREL
				ATTACHING BARREL TO 6" CASING TO PULL BACK .85'	0850	INSTALLING BARREL
				D/B OF STAINLESS SCREEN = 100'. WILL DO ANOTHER	0900	PULLED STAINLESS
				SHORT PULL 1 MEASURE D/B TO TOP OF SAND		UP.
				= 93.3'	0915	PREPARING TO WELD
						PULLING NEAR
					0925	FINISHED WELD
					0930	PULLING 10"
104' 4 1/2" of 10"				REMOVED 2' 8" of 10"; 10" TOTAL = 99' 8 1/2"	1000	CUTTING 10"
4' 8"				SCREEN STILL AT 100'; ADDING 3 BAGS OF	1030	ADDING SAND
99' 8 1/2" of 10"				SAND. D/B TO TOP OF SAND = 84.4'	1040	D/B TO SAND
					1045	PREPARING TO WELD
					1110	PULLING 10"
REMARKS:						
<div style="text-align: right;"> 19 MAY 1986 </div>						

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 1966	BZ-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
99'8 1/2"	10"					1145	LUNCH
4'4"				PULLED 4'4" OF 10" ; TOTAL 10" = 95'4 1/2"		1215	CUTTING 10"
95'4 1/2"	10"			D/B OF STAINLESS = 99.7' ; D/B TO TOP OF SAND = 87.65'		1230	D/B W/ PNL TAPE
				ADD 2 10 LB. BAGS OF 20-40 MESH SILICA SAND ; D/B TO TOP OF SAND = 80.60'		1245	ADDING SAND
						1255	FINISHING CUTTING
							10" OF PULLER
						1300	PREPARING TO WELD
95'4 1/2"	10"					1320	PULLING 10"
4'6"				CUT OFF 4'6" OF 10" CASING ; TOTAL 10" = 90'8 1/2"		1350	
90'8 1/2"				D/B TO TOP OF SAND = 82.55' ; D/B TO BOTTOM OF STAINLESS = 99.65'		1400	
						1410	CUTTING OFF 10"
							ON PULLER
						1420	PREPARING TO WELD
						1450	PULLING 10"
				PULLED 4'2" ; 10" CASING IN HOLE = 84'6 1/2"		1510	
				D/B TO TOP OF SAND = 83.4'		1515	
				WILL START WITH PELLETS TOMORROW		1530	DONE FOR DAY
REMARKS:							
<div style="text-align: right;"> <i>Shirley M. Goodwin</i> 19 MAY 1966 </div>							

pg 1 of 3

DRILL LOG			By M.A. Channess	Rig B.E. 604	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. 117-014
			Date May 20, 1988	Log Number 112-14103	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' 6 1/2" of casing in hole, top of sand at 83.4'			
				D/W - hold point 66.8', water on tape at 5.51' - 2.3' stickup			steel tape is +3 1/4"
				D/W = 59.3' below ground		7:30	
				Added 4 ^{sq ft} buckets of vclay pellets, tagged top at 58'-23" = 55.7'			66.8
				has bridged on top of water, can punch thru,			-5.5 wet
				measure at 75.7' - 2.3' = 73.4' below ground.			61.3
				Will try to pull back casing so that plug does not			-2.3 stickup
				form in bottom of casing and then see about having			59.0
				water truck and tremie pipe w/ holes brought out			+1.2 on tape
				to clean out the little plug.			59.3
							80.5
							-1.75
							78.75
				Pulled casing back 21.5' ^{1.75'} , casing + puller head stickup = 7			
				D/W was 80.2' + 1.3 (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 or the water			
				falling in, or a plug on the bottom of the casing			
REMARKS:							

MA Channess 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-8000-021 (6-85)

A.117

DRILL LOG			By N.A. Chamness	Rig B.E. 604	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 5/20/88	#22-14103	Depth ~79' To 74'5 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
				Stickup including puller head is 9'3 1/2" (~9.3'), DB pellets 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.		9:00	
				Pulled back total of 5'3" since adding bentonite pellets, stickup is 10'11 1/2" (~11'), DB is 83.35' - 11' = 72.35'. Pellets staying in place.		9:15	pulled back 5'3"
				Stickup is 9'7" (~9.6'), DB is 81.6' + .3' = 81.9' - 9.6' = 72.3' ^(tape) ^{'below'} top of pellets; pulled back another 4' ^(+ tape) , DB = 76.4' - 2.1' = 72.3' below ground surface. Bottom of casing at 81'1 1/4" - 6'8" = 74'5 1/4" below ground surface.		10:35	
				D/W - hold @ 63' - 2.35' = 60.65' - 2.05' = 58.6' from ground surface. Added 1 50lb bag Envirogel 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. Man. direction). Will try to pull & push the casing to break it loose.		12:00	
REMARKS:							

N.A. Chamness 5/20/88

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 74'5 1/4" to 73'5 1/4"	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
				DB after pulling back 1' $62.8' + 2.3 = 63.1' - 6.4' = 56.7'$ below 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.		1:15	6'4 1/2" stickup $\approx 6.4'$
				There is still $\sim 1.3'$ of overlap between the bottom of the casing and the top of the bentonite pellets.			
				Then there is $\sim 14'$ of water, and $\sim 2'$ of bentonite crumbles on top of the water or just above. I'd suggest using a bentonite slurry to the top of the water table instead of the crumbles.			Bottom of casing - 73'5 1/4"
							Top of pellets - 72.3'
							Depth to water - 58.6'
							Depth to crumbles - 56.7'
				Might want to measure the water level Mon morning. My measurement inside the s.s. well is 2' different from yours, I think.			
REMARKS:							
M.A. Chamness 5/20/88							

DRILL LOG			By S. M. Goodman	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" to 73'5"14"	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.		Time	Drilling Comments
				DRILLER IS FELIX MURPHY		0700	ON STANDBY;
				D/B TO TOP OF CRUMBLES = 56.18'			BRIDGED CRUMBLES
				(PNC STEEL TUBE # L300-07)		1000	TREMBLE PIPE 1
							AIR COMPRESSOR
							DELIVERED
						1045	USING AIR TO BLOW
							CRUMBLES DOWN
							HOLE
				D/B TO TOP OF CRUMBLES = ~46'; CRUMBLES		1105	
				MOVED DOWN HOLE ~10' w/ AIR		1115	ADDING CRUMBLES
				ADDED 1 50 LB. BAG OF ENVIRAGEL BENEATH CRUMBLES		1120	
				D/B TO TOP OF CRUMBLES = ~54.4'. BRIDGED		1125	USING AIR 1
				WHEN HIT H ₂ O; USING AIR TO BLOW DOWN			TREMBLE PIPE
				D/B TO TOP OF CRUMBLES = 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'; PAVED ~2'		1145	
				w/ AIR.		1200	LUNCH
REMARKS:							
<p style="text-align: right;">Alan W. ... 23 May 1986</p>							

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 23 MAY 1988	# 22-14103	Depth 73' 5/4" to 71' 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 AT 10"; BENTONITE PLUG IS COMING		1330	CUTTING OFF PULLER
73' 5/4" = 10' 2.5				UP W/ CASING			
2' 4"				CUT OFF 2' 4" OF 10" CASING; TOTAL 10"		1335	REMOVED 10"
71' 1/4" = 10'				CASING = 71' 1/4". REASSEMBLING TREMIE.		1348	USING AIR
				D/B TO TOP OF CRUMBLES = 50.15'. ESTHER		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 ₂ O TO
				W/ TREMIE PIPE & AIR			ANNULUS
				ADDED 15 GALLONS OF H ₂ O TO GRANULES DOWN		1500	USING TREMIE &
				ANNULUS TO BREAK UP BENTONITE PLUG.			AIR
				D/B TO TOP OF GRANULE SWARM = 47.45		1520	D/B
REMARKS:							
<i>Shawn M. Goodwin</i> 23 MAY 1988							

Shan H... 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)

DRILL LOG		By S.M. GOODWIN	Rig BE 60C	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-011
		Date 24 MAY 1988	# 22-14103	Depth 71' 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
				DRILLER IS FELIX MURPHY; ADDED 15 GALLONS OF H ₂ O DOWN ANNULUS.	0700	USING TREMIE
						PIPE & AIR DOWN
						HOLE
				STATIC H ₂ O D/W IN N-39 = 59.55'	0730	
					0740	REMOVING TREMIE
				D/B TO TOP OF BENTONITE = 47.95'	0800	
				(PUL STEEL TYPE # L300-07-300')	0805	WEIGHING PULVER
				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"
				PIPE IS GETTING STUCK ON CASING SLIGHTLY		
71' 1/4"				ABOVE ACTUAL D/B.	0900	CUTTING 10"
5' 3"				REMOVED 5' 3" OF 10" CASING; TOTAL 10" CASING	0910	D/B
65' 10 1/4" OF 10"				= 65' 10 1/4". D/B TO TOP OF BENTONITE =	0915	INSTALLING TREMIE
				47.95'; EITHER BENTONITE IS COMING UP OR	0950	USING AIR & TREMIE;
				PIPE IS STICKING. WE WILL ADD H ₂ O & AIR		ADDED 15 GAL. H ₂ O
				W/ TREMIE. BENTONITE SLURRY IS VERY THICK.		
				D/B TO BENTONITE = 44.55'; DROPPED 1.2' SINCE	1005	D/B
REMARKS:						

John M. Goodwin 24 MAY 1988

DRILL LOG			By S. M. Grooms	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 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 TROMPE & 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.			
				DRIVING CASING w/ AIR & TROMPE.		1040	
				D/B = 43.65'; 21' ABOVE LAST D/B. AIR MUST		1045	
				HAVE BLOWN MANGEL UP PIPE & IS CAUSING PROBLEMS			
				w/ TROMPE.			
				ABLE TO GET D/B OF 44.55'; PUNCHED PAST		1050	
				SOME STICKY CASING		1100	ADDED 30 GAL. H ₂ O
						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:							
Shirley M. Moe 24 May 1988							

DRILL LOG		By S. M. Goodman	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. WJ-014
		Date 24 MAY 1986	# 22-14103	Depth 65' 10 1/4" 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 TREMPER
				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" or 10"
65' 10 1/4" or 10"				D/B = 49.14'; SLURRY ~.78' IN THIS, PROBABLY	1320	D/B
6' 6"				DUE TO STICKY TAPE.	1330	ADDING CRUMBLES
59' 4 1/4" or 10"				D/B AFTER 1 BAG OF CRUMBLES = 49.14' - SAME	1335	ADDING CRUMBLES
				AS BEFORE ADDING BAG. TAPE MUST HAVE		
				BEEN STUCK IN SIDES EARLIER (ENVELOPE -		
				GET SO LB BAG OF BEATING CRUMBLES		
				ADDED 5 MORE BAGS OF CRUMBLES; TOTAL OF	1350	
59' 4 1/4" or 10"				4 ADDED TODAY. D/B TO TOP OF CRUMBLES	1355	PREPARING TO PULL 10"
11' 5 1/4"				= 33.72'	1410	PULLING 10"
47' 11"				REMOVED 11' 5 1/4" x 10"; TOTAL 10" = 47' 11"	1430	CUTTING 10"
				D/B TO TOP OF CRUMBLES = 49.28'; WE NOW HAVE	1435	O/B
REMARKS:						
<p style="text-align: right;">Steve H. Paul - 24 MAY 1986</p>						

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

4 5000.071 (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)

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 25 May 1988	# 22-14103	Depth ~39' To 33'3/4"	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				DRILLER IS FELIX MURPHY; LATE START TODAY		1050	
				DUE TO TRAINING CLASS.		1055	WORKING ON RIG
47'11"	10"					1215	LUNCH
6'8 1/2"				REMOVED 8'8 1/2" OF 10" CASING; TOTAL 10"		1245	PREPARING TO
39'2 1/2"	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
				FLEX-GE CRUMBLES. D/B TO TOP OF BEN-		1325	PREPARING TO WELD
				TONITE CRUMBLES = 13.47' (PUL 300' STEEL			PULLER ON 10"
				TAPES # 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' PULL.		1430	CUTTING 10" FROM
REMARKS:							PULLER HEAD
							Alan M. Smith 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-8000-021 (5-85)

Shaw Mr. Jodi 25 MAY 1988

A-6000-021 (5-85)

DRILL LOG			By S. M. Goodnight	Rig BE 60C	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 26 MAY 1966	Y 22-14103	Depth ~29' TO 26' 2 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
				DRILLER IS FELIX MURPHY		0930	SERVICING RIG
34' 5 1/4"	10"			REMOVED 4' 11" OF 10" CASING; TOTAL 10"		0950	CUTTING 10"
4' 1"				CASING REMAINING = 29' 6 1/4"			
29' 6 1/4"	10"			D/B TO TOP OF BENTONITE CRUMBLES = 13.55';		1010	D/B
				CRUMBLES DRILLED .75' W/ 4' 11" PULL		1020	WELDING PULLER
							HEAD
29' 6 1/4"						1045	SITE VISITING
3' 1 3/4"						1100	PULLING 10"
26' 4 1/2"				REMOVED 3' 13/4" OF 10"; TOTAL 10" CASING =		1115	CUTTING 10"
				26' 4 1/2"			
				D/B TO TOP OF CRUMBLES = 13.63; CRUMBLES		1120	D/B
				FELL ONLY .08' W/ 3' 1 3/4" 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:							
<div style="text-align: right;"> <i>Alan H. Smith</i> 26 MAY 1966 </div>							

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

A 6000-021 (5.65)

D - Drive Barrel H - 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)

DRILL LOG			By S. M. Goodwin	Rig BE 602	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 27 MAY 1983	H-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'; LAST		1130	D/B
				1' w/ 2' PULL. WILL ADD MORE GROUT.			
				BOTTOM N. 12" = 17' 10 3/4"			
						1140	ADDING GROUT
				D/B TO TOP OF GROUT = 9.73'		1150	D/B
				PULSED 12" 5' 4"		1155	PULLING 12"
						1200	CUTTING 12"
REMARKS:							
<div style="text-align: right;"> 27 MAY 1983 </div>							

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

A 6000-021 (8-85)

DRILL LOG		By S. M. Goodyear	Rig BE 600	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 27 MAY 1988	U22-14103	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, Calcite, Etc.	Time	Drilling Comments
12' 10 3/4" of 12" C.S.	7' 9 3/4"			REMAINED 7' 9 3/4" OF 12" CASING; TOTAL 12"	1205	
				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' 4" OF		
				OVERLAY W/ CASING + CEMENT.	1210	WELDING SALS
					1230	LUNCH
				WORKING ON GROUT PUMP	1300	END LUNCH
				STATIC H ₂ O IN N-39 = 59.41'; PNL GSECL	1315	
				THIS # 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 GRABING UP TO 1/2'		
				W/ EACH BATCH. EACH BATCH = 2 BAGS CEMENT		
				+ 10-12 GALLONS OF H ₂ O. WE HAVE USED 16		
				94 LB. BAGS OF TYPE 1 + 11 PORTLAND CEMENT +		
				2 50 LB. BAGS OF GUNNED-GEL GRANULES FOR		
REMARKS:						
<p style="text-align: right;">Shan Han 27 MAY 1988</p>						

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _____ Standing Water A-6000 921 (5 85)

DRILL LOG			By S. M. Goodwin	Rig BE 60L	Well Number 199-N-72	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			
				.5' OVER THE WEEKEND. DID NOT LEAVE			
				CASING IN CEMENT DUE TO DRYING			
				OVER THE WEEKEND. (PUL STEEL TAPE #L300-01)			
				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 BACKFILL.			
						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 14 LB. BAGS OF TYPE I & II PORT-			GROUT IN HOLE HAS
				LAND CEMENT + 10-12 GALLONS OF H ₂ O; + 2			DROPPED TO 0715
				SHOVELS OF WY0-BEN GRIND-DEE CRUMBLES)			D/B
				D/B = 11.03'; CONTINUES TO GO INTO FORMATION.		1000	D/B
REMARKS:							
<p style="text-align: right;">Shirley M. Ford - 31 MAY 1988</p>							

D - 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. Goodman	Rig RE 60 C	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
		Date 31 MAY 1968	# 22-14103	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
				TABE IS STILL BELOW 12" ; PULSED CASING	1005	PULLING 12"
				3" TO TOP & FACE UP TABE D/B OF 12" = 11' 4 1/4"	1010	TABE OUT
				NEW MIXER WAS DELIVERED & OLD GROUT	1015	MIXING GROUT
				PUMP DELIVERED TO LOUIS		
				D/B TO TOP OF CASING GROUT = 10.67' AFTER 1	1030	D/B
				BATCH. 1 BATCH IN NEW MIXER = 4 BAGS	1035	MIXING GROUT
				CONCRETE + 20-24 GALLONS H ₂ O		
				D/B TO TOP OF CASING GROUT = 10.5' ; 1 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 CASING 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' ; DRIFFED 1.55' SINCE BEFORE LUNCH.	1230	D/B
					1232	PULLING 12"
REMARKS:						

Alan H. Smith 31 MAY 1968

DRILL LOG			By S. M. Goodman	Rig BE 60L	Well Number 199-N-70	Computer Number N/A	Project or Work Order No. W-014
			Date 31 MAY 1988	U 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;
				GRAUT = 7.55', SAME AS LAST D/B. DID			MIXING GRAUT
				NOT LOSE ANY TO FORMATION W/ 1.65'		1250	ADDED GRAUT 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 GRAUT = 6.52'		1405	ADDING GRAUT;
							ADDED ~ 1/4 BATCH
							TO GROUND SURFACE
						1410	WELDING EARS
						1420	PULLING 12"
				D/B TO TOP OF CEMENT GRAUT = 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. THIS 1411), ~70 GALLONS H ₂ O, & 3 50 LB. BAGS OF W/4-BAG ENVIRONMENTAL CEMENT TODAY.							
John H. [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-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 31 MAY 1988	# 22-14103	Depth 5' 4 1/2" 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
						1455	REMAINING 6" S.S.
							WELL CAP
				D/W (STATIC H ₂ O LEVEL) = 58.81' (PNU TAPE # L300-07 300')		1500	D/W
				D/B w/ 6" STAINLESS STEEL = 91.05'; 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:							
Shawhan, Ark 31 MAY 1988							

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 1 JUNE 1965	# 22-14103	Depth 3' 4 1/2" 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
				DRILLER IS FELIX MURPHY	0700	
				STATIC D/W = 58.85' (PUL STEEL TUBE L300-07)	0710	D/W
				D/B TO TOP OF CEMENT GRout (AFTER DRYING & EXPANDING) = 1.45'	0715	D/B
				PULLING 12" CASING FREE OF CEMENT GRout;	0720	PULLING 12"
				3' 4 1/2" OF 12" REMAINS IN GROUND. 12" WILL BE REMOVED WHEN CONCRETE PAD IS POURED.		
				BAILING WELL W/ DIRT BAILER TO DEVELOP;	0730	BAILING WELL
				BAILER HOLD ~10 GALLONS OF H ₂ O. BAILING ~1.5 x / MINUTE (30 GALLONS / MINUTE). H ₂ O LOOKS FAIRLY CLEAR.		
				H ₂ O LOOKS GOOD & AS CLEAR AS IT WILL GET W/O PUMPING.	0800	FINISHED BAILING
				D/B TO BOTTOM OF 6" S.S. = 99.08'	0805	D/B
					0840	H ₂ O SAMPLES TAKEN
				GEOLOGIST LEFT DRILL SITE.	0900	DRILLER BREAKING DOWN RIG
REMARKS:						

Shirley M. Smith 1 JUNE 1965

Well: 199 N-70	Drilled Depth:	Interval Logged: 103'-2-
Log Type: Density	Date: 5-17-88	Coring Size: 10 3/4" x 24"
Logged By: T.H. McShane - PNL	Water Level Depth: 101'	
Logging System: Sensitivity	Time Log Count: 3	
Vertical Scale: 20' / 1"	Logging Speed: 25' / MIN	
Source Strength: 185 mCi	Spacings: 13" / 63"	
Remarks: REPAIR PROLOGATION CIP - 4 REV. 1		
PROG. SERIAL: 60-48

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D. C. 20250
FOOTNOTES:
1. This drawing is a reproduction of a drawing made by the
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Washington, D. C. 20250.
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Washington, D. C. 20250.

Well 194-N-70 Drilled Depth 143-3'
 Log Type CAT-CAVANA Date 5-17-98 Casing Size 10 5/8"
 Logging By J. L. McPherson PHT Well Log Depth 101'
 Logging Scale Sensitivity 500% Vertical Scale 3 Constant 3
 Vertical Scale 20"/in. Logging Speed 15"/min
 Source String MA Source Label MA
 Remarks RET. PROCEDURE CAVANA 6 REV. 2
 PROBE SER # 4427A-11

SPAN Check

500%

REPEAT section

SPAN

500%

40143

1915-16 MOUNTAIN LION AND WOLF HUNTING IN THE MOUNTAINS

1915-16 MOUNTAIN LION AND WOLF HUNTING IN THE MOUNTAINS

1915-16 MOUNTAIN LION AND WOLF HUNTING IN THE MOUNTAINS

Well No.	103	Drilled Depth	103'
Log Type	NEUTRON	Date	5-7-97
Logged By	W. J. McNamee	Casing Size	10 3/4"
Logging Service	5000's	Wire Line Depth	101'
Vertical Scale	20 ft	Time Content	1"
Source Strength	2 Ci	Logging Speed	25 ft/min
Remarks	REF. PROCEDURE GW-5 REV. 1 PROBE SERIAL # 27151327		

SPALL CHECK

REPEAT SECTION

SPALL CHECK

APPENDIX B

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

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.

WELL 299-E17-14

AS-BUILT DIAGRAM

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

Reviewed by J. L. McElhan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
14 1/8" of 10" Carbon Steel		5		SANDY SILT
Casing (Removed)		10		SAND (C.-M.)
Cement Grout (20'-15')		15		SLIGHTLY GRAVELLY SAND
33 5/8" of 8" Carbon Steel		20		SAND (C.-M.)
Casing (Removed)		25		" (M.)
		30		" (C.-M.)
Granular Bentonite (20'-20')		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		"

AS-BUILT DIAGRAM

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

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

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

AS-BUILT DIAGRAM

Well Number 299 E17 14 Geologist Gilmore Page 3 of 3

Reviewed by W.L. McShan 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 seal (298-20')		280		
		285		SILTY SAND
		290		SILT Interbedded w/ Sand 295-300'
Bentonite Pellet Seal (301-298')		295		SANDY SILTY SAND
		300		
10-20 mesh sand pack (333-301')		305		
		310		SANDY GRAVEL
20' 7 1/2" long, 4" dia., 20 slot stainless steel screen		315		SILTY SANDY GRAVEL
		320		SANDY GRAVEL
20' long, 8" telescoping screen: (321' 5 3/4" to 311' 7 3/4")		325		
Upper 10' is 30 slot and lower 10' is 10 slot.		330		Top 20' 333'

DRILL LOG			By T. Gilmore	Rig Bucyrus Erie	Well Number 279 E 12 14	Computer Number AA	Project or Work Order No. 210-A-368 Cnt
			Date 3/22/88	22-A02	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 stream cleaning		1300	
				Drilling		1705	
	5'	D	moist	SANDY SILT. 30% v.f.s., 70% silt, very well sorted, 50% B&T, 50% silica-rich, round-subround, unaltered in HCl, unconsolidated - slight consolidation. Ant: 601 smpl		1715	Drill rate =
	0'	D	moist	SAND, 5% gravel, 90% sand, 5% silt. 10% m.p., 10% 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 25% basalt, 10% granite, 5% quartzite and other metamorphics, and 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 weathering in top 10' to 15' of hole. Unconsolidated. Intermediate in grain size from sand to silt. Nostrils and geologic samples taken.		1730	Drill rate =
REMARKS: Ft 10' DB 10' <div style="text-align: right;">Karen R. Oster 3/22/88</div>							

B.4

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 224</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B Crib</i>
			Date <i>3/23/88</i>	<i>22-14102</i>	Depth <i>10' To 20'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
							<i>Driller is Louis Watkins</i>
						<i>0700</i>	<i>started drilling.</i>
<i>19' 10 3/4" of 10"</i>				<i>Total 10" Carbon Steel Casing = 19' 10 3/4"</i>		<i>0745</i>	<i>Add 19' 10 3/4" of 10" Casing</i>
	<i>15'</i>	<i>D</i>	<i>Hoist</i>	<i>SLIGHTLY GRAVELLY SAND; 10% gravel, 85% sand, 5% silt.</i> <i>Trace c.p., 10% m.p., 2% f.p., 7% v.f.p., 10% v.c.s., 35% c.s., 25% m.s., 10% f.s., 5% v.f.s., 5% silt. Moderately</i> <i>Sorted. Gravels are 15% basalt, 10% granite, 5% quartzite,</i> <i>5% caliche, 5% metamorphics and other lithologies, and are</i> <i>very angular to subangular. Sands are 50% basalt, 20%</i> <i>clear quartz, 10% feldspar, 10% quartzite, 5% rock</i> <i>fragments (red/orange), 5% mica, and are very angular</i> <i>to subangular. Dry Color is light gray (5Y 7/2). Strong</i> <i>reaction in 10% HCl. slightly consolidated. Less sorting</i> <i>and basalt than previous sample. Contains caliche</i> <i>and some sand lumps cemented with CaCO_3 and rust stains</i> <i>Geologic and moisture samples are representative.</i>		<i>0900</i>	<i>Sample / Core barrel</i> <i>Drill rate =</i>
	<i>19'-20'</i>	<i>D</i>	<i>Very Hoist</i>	<i>SAND (coarse); 5% gravel, 90% sand, 5% silt.</i> <i>Trace m.p., 1% f.p., 4% v.f.p., 15% v.c.s., 30% c.s., 25% m.s., 10% f.s.,</i>		<i>0920</i>	<i>Sample / Core barrel</i> <i>Drill rate =</i>
REMARKS:							
<i>K.R. Oster</i> <i>3/23/88</i>							

D - Drive Barrel H - 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)

2018

DRILL LOG		By A.R. Oster	Rig B.E. 22W	Well Number 299-E.17-14	Computer Number N/A	Project or Work Order No. 216-A-368 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 visible 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:						
Karl P. Oster 3/23/88						

B.6

D - Drive Barrel H - 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 8

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>210-A-368 Crib</i>
		Date <i>3/23/88</i>	<i>22-14102</i>	Depth <i>25' To 30'</i>	Subcontract No. <i>N/A</i>	
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 4/2). 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	Hoist	SAND (MEDIUM TO COARSE). Trace gravel, 99% sand, 1% silt. Trace v.c.p., 5% v.c.s., 10% c.s., 30% m.e., 3% f.s., 10% v.f.s., 1% silt. Very well sorted Well sorted. Gravels are 100% basalt and are very angular. Sands are 40% basalt, 30% quartz, 10% basalt 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"				1100	Add 9' 11 1/2" of 10" Casing
	+ 9' 11 1/2"					
	29' 10 1/4"			Total 10" Carbon Steel Casing = 27' 10 1/4"	1140	Resume drilling
REMARKS: <i>K.R. Oster</i> <i>3/23/88</i>						

D - Drive Barrel H - 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 <i>A.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B Crib</i>
			Date <i>3/23/88</i>	<i>22-14102</i>	Depth <i>30' To 40'</i>		Subcontract No. <i>N/A</i>
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., 1% v.f.s., 1% silt. Very well 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.			Drill rate =
	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. Very well Well Sorted. Gravels are 60% basalt, 40%			Drill rate =
REMARKS:							
<i>Karen R. Oster</i> <i>3/23/88</i>							

DRILL LOG			By <u>K.R. Oster</u>	Rig <u>B.E. 22W</u>	Well Number <u>299-E17-14</u>	Computer Number <u>N/A</u>	Project or Work Order No. <u>210-A-30B Crib</u>
			Date <u>3/23/88</u>	<u>82-14102</u>	Depth <u>40' To 45'</u>		Subcontract No. <u>N/A</u>
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., 10% silt. Well Sorted 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							

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-368 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	Hoist	SLIGHTLY GRAVELLY SAND; 8% gravel, 91% sand 1% silt. Trace m.p., 1% f.p., 7% v.f.p., 15% v.c.s., 40% c.s., 30% m.s., 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, 50% 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.		1450	Sample Core barrel Drill rate =
39' 9 1/4" of 10"							
9' 3 1/2"							
49' 0 3/4" of 10"				Total of 10" Carbon Steel Casing = 49' 0 3/4"		1500	Add 9' 3 1/2" of 10" Casing
						1550	Drive Casing
						1555	Resume drilling
REMARKS:							
Karl 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-368 Crib
		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 P. Oster 3/23/88						

[illegible]

DRILL LOG			By <i>A.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B Crib</i>
			Date <i>3/24/88</i>	<i>22-14102</i>	Depth <i>60' to 65'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
	<i>58' 7 3/4" of 10"</i>					<i>0720</i>	<i>Started drilling</i>
						<i>0735</i>	<i>Stopped drilling</i>
						<i>0820</i>	<i>Resumed drilling</i>
	<i>64'-65'</i>	<i>D</i>	<i>Slightly Moist</i>	<i>SLIGHTLY GRAVELLY SAND; 10% gravel, 89% sand, 1% silt.</i>		<i>0830</i>	<i>Sample/ Core barrel</i>
				<i>1% m.p., 1% f.p., 8% v.f.p., 15% v.c.s., 40% c.s., 30% m.s., 3% f.s.,</i>			<i>Drill rate =</i>
				<i>10% v.f.s., 1% silt. Well to Moderately Sorted. Gravels are</i>		<i>0910</i>	<i>Stopped drilling</i>
				<i>70% basalt, 15% granite, 5% quartz, 5% feldspar, 5%</i>		<i>0920</i>	<i>Resumed drilling</i>
				<i>rock fragments, Trace caliche, and are very angular to</i>			
				<i>subrounded. Sands are: 40% basalt, 20% quartz, 10% quartzite,</i>			
				<i>10% feldspar, 5% clear quartz, 5% mica, 10% rock fragments</i>			
				<i>(orange/green), and are very angular to subrounded. Dry</i>			
				<i>Color is light gray (SY 7/2). Slight reaction in 10% HCl.</i>			
				<i>Unconsolidated. Similar to previous sample except increase</i>			
				<i>in grain size, mica content; decrease in basalt content,</i>			
				<i>HCl reactivity, contains a few caliche chips in gravel.</i>			
				<i>Geologic, Moisture and chemical samples are</i>			
				<i>representative.</i>			
REMARKS:							
<i>for A.R. Oster</i> <i>3/24/88</i>							

D - Drive Barrel H - 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)

ORILL LOG		By <i>K.R. Oster</i>	R# <i>B.E. 22W</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>214-A-368 Crib</i>
		Date <i>3/24/88</i>	<i>22-14102</i>	Depth <i>65' To 70'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	<i>69'-70'</i>	<i>D</i>	<i>Hoist</i>	<i>SAND (MEDIUM); 17% gravel, 98% sand, 1% silt.</i>	<i>0925</i>	<i>Sample / Cure barrel</i>
				<i>17% v.f.p., 2% v.c.s., 20% c.s., 70% m.s., 5% f.s., 1% v.f.s., 1% silt.</i>		<i>Drill rate =</i>
				<i>Well Sorted. Gravel are 70% basalt, 20% quartz, 10% 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.</i>	<i>0935</i>	<i>Stopped drilling</i>
<i>58' 7 3/4" of 10"</i>					<i>0945</i>	<i>Add 9' 7" of 10" Casing</i>
<i>9' 1"</i>						
<i>68' 2 3/4" of 10"</i>				<i>Total 10" Carbon Steel Casing = 68' 2 3/4"</i>		
					<i>1020</i>	<i>Drive Casing</i>
					<i>1025</i>	<i>Resumed drilling</i>
					<i>1030</i>	<i>Stopped drilling</i>
					<i>1035</i>	<i>Resumed drilling</i>
REMARKS:						
<i>Karen R. Oster</i> <i>3/24/88</i>						

DRILL LOG		By <i>A.P. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-368 Crib</i>
		Date <i>3/24/88</i>	<i>32-14102</i>	Depth <i>70' To 80'</i>		Subcontract No. <i>N/A</i>
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, 98% sand, 2% silt. 2% v.f.p., 2% v.c.s., 25% c.s., 40% m.s., 7% f.s., 2% v.f.s., 2% silt. Well to Moderately Sorted. Gravels are 70% basalt, 20% quartz, 10% quartzite, and are very angular to 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.	1055	Sample/Core barrel Drill rate =
					1110	Stopped drilling
					1115	Resumed Drilling
	79'-80'	D	Moist	SAND (MEDIUM); 1% gravel, 98% sand, 1% silt. 1% v.f.p., 1% v.c.s., 20% c.s., 45% m.s., 10% f.s., 2% v.f.s., 1% silt. 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).	1120	Sample/Core barrel Drill rate =
REMARKS:						
<i>A.P. Oster</i> <i>3/24/88</i>						

D - Drive Barrel H - 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)

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DRILL LOG			By K. R. Oster	Rig B.E. 22.0	Well Number 22-17-14	Computer Number N/A	Project or Work Order No. 216-A-36B Crib
			Date 3/24/88	22-17-102	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.			
68' 2 1/4" of 10"						1135	Add 10' 3 1/2" of 10" Casing
10' 3 1/2"							
78' 6 1/4" of 10"				Total of 10" Carbon Steel Casing = 78' 6 1/4"			
						1300	Lunch
						1230	Resume drilling
	84'-85'	D	Hoist	SAND (MEDIUM); 1% gravel, 98% sand, 1% silt. 1% v.f.p., 10% v.c.s., 30% c.s., 55% m.s., 2% f.s., 1% v.f.s., 1% silt. 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.		1310	Sample / Core barrel Drill rate =
REMARKS:							
<div style="text-align: right;"> K. R. Oster 3/24/88 </div>							

D - Drive Barrel H - 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.16

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 2260</i>	Well Number <i>219-217-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B C.16</i>
			Date <i>3/24/88</i>	<i>23-14102</i>	Depth <i>85' to 95'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
<i>78' 6 3/4" of 10"</i>						<i>1315</i>	<i>Add 7' 9" of 10" Casing</i>
<i>7' 9"</i>							
<i>86' 3 1/4" of 10"</i>				<i>Total of 10" Carbon Steel Casing = 86' 3 1/4"</i>			
						<i>1350</i>	<i>Drive Casing</i>
						<i>1355</i>	<i>Resume drilling</i>
	<i>84'-90'</i>	<i>D</i>	<i>Slightly Moist</i>	<i>SAND (MEDIUM); Trace gravel, 98% sand, 2% silt.</i> <i>Trace v.f.p., 5% v.c.s., 30% c.s., 55% m.s., 5% f.s., 3% v.f.s.,</i> <i>2% silt. Well Sorted. Gravels are 90% basalt, 10% quartz,</i> <i>and are very angular. Sands are 35% basalt, 25%</i> <i>quartz, 10% quartzite, 10% feldspar, 10% clear quartz, 10%</i> <i>rock fragments (orange/green), Trace mica, and are</i> <i>very angular to subangular. Dry, Color is light gray</i> <i>(5Y 7/2). Strong reaction in 10% HCl. Unconsolidated.</i> <i>same as previous sample except decrease in grain size.</i> <i>Geologic and Moisture samples are representative.</i>		<i>1420</i>	<i>Sample / Core barrel</i> <i>Drill rate =</i>
	<i>91'-95'</i>	<i>D</i>	<i>Moist</i>	<i>SAND (COARSE TO MEDIUM) 5% gravel, 13% sand, 2% silt.</i> <i>Trace f.p., 5% v.f.p., 5% v.c.s., 40% c.s., 40% m.s., 5%</i> <i>f.s., 3% v.f.s., 2% silt. Well Sorted. Gravels are 70%</i> <i>basalt, 20% quartz, 5% feldspar, 5% rock fragments, and</i>		<i>1440</i>	<i>Sample / Core barrel</i> <i>Drill rate =</i>
REMARKS:							

K.R. Oster
3/24/88

1545
29' - 100'

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DRILL LOG			By A. R. Oster	Rig B.E. 2210	Well Number 299-217-14	Computer Number N/A	Project or Work Order No. 215-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% black 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' 3/4" of 10"	9'					1445	Add 9' of 10" Casing
95' 3/4" of 10"				Total of Carbon Steel Casing = 95' 3/4"			
						1525	Drive Casing
						1530	Resume drilling
				The H-Nu with the 11.7 probe was used in hole and it reads ~30 ppm. Drilled Depth = 97'		1535	Used H-Nu in casing.
	99'-100'	D	Slightly Moist	SAND (COARSE TO MEDIUM). 4% gravel, 94% sand, 2% silt. Trace f.p., 4% v.f.p., 5% v.c.s., 35% o.c.s., 45% m.s., 5% f.s., 4% v.f.s., 2% silt. Well to Moderately Sorted. Gravels are 70% basalt, 15% quartz, 10% quartzite, 5% feldspar and are		1545	Sample / Core barrel
							Drill rate =
						1600	Stop drilling
REMARKS:							
<div style="text-align: right;"> Haven R. Oster 3/24/88 </div>							

B.18

DRILL LOG			By K.R. Oster	Rig B.E. 22W	Well Number 297 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' 3 1/4" of 10"						1610	Add 9' 6" of 10" Casing
9' 6"						1645	Resume drilling
104' 9 1/4"				Total of 10" Carbon Steel Casing = 104' 9 1/4"		1650	stop drilling Used dräger tube
				Using Ammonia dräger tube - reads 30 ppm w/ 5 pumps			
				Measured inside hole, ^{Ammonia} Drilled Depth = 101'			
						1700	Resume drilling
				Used dräger tube at drillers position - no reading ^{Ammonia}		1705	stop drilling Dräger tube
				Used dräger tube inside hole reads 730 ppm w/ 5 pumps ^{Ammonia}			
				Drilled Depth = 103'		1715	Pick-up
						1730	Done for day
REMARKS: Total Footage Today = 43' Total Casing = 104' 9 1/4" K.R. Oster Depth to Bottom = 103' 3/24/88							

DRILL LOG			By <i>A.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-363 Crib</i>
			Date <i>3/25/88</i>	<i>22-14102</i>	Depth <i>103' To 105'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
	104' 9 1/4" of 10"			None detectable at drillers station, < 2 ppm 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, 1% v.f.p., 4% v.c.s., 40% d.c.s., 45% m.s., 5% f.s., 3% v.f.s., 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 representative.		0815	Sample/core barrel Drill rate =
				None @ drillers station; < 2 ppm @ top of hole.		0830	Dräger: Ammonia
REMARKS: <i>After R. Oster</i> <i>3/25/88</i>							

DRILL LOG		By <i>J. R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-368 Crib</i>
		Date <i>3/25/88</i>	<i>22-14102</i>	Depth <i>105' To 110'</i>		Subcontract No. <i>N/A</i>
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. Trace ves, cs, ms, 25% of s, 50% of f.v., 25% silt, Well to 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.	0835	Silty Sandy Layer. 4"-5" thick.
	109'-110'	D	Moist	SAND (COARSE TO MEDIUM); 2% gravel, 96% sand, 2% silt. 2% v.f.p, 8% v.c.s, 40% c.s., 35% m.s., 10% of s, 3% of f.v., 2% silt. 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.	0850	Sample / Core barrel Drill rate =
REMARKS:				<i>None detected over casing though.</i> <i>J. R. Oster</i> <i>3/25/88</i>		

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' 9 1/4" of 10"					0910	Add 9' 7 1/2" of 10" Casing
9' 7 1/2"						
114' 4 3/4" of 10"				Total 10" Carbon Steel Casing = 114' 4 3/4"		
					1000	Drive Casing
					1005	Resume drilling
114'-115'	D	Moist		SAND (COARSE TO MEDIUM); 2% gravel, 96% sand, 2% silt. 2% v.f.p., 8% v.c.s., 45% c.s., 30% m.s., 10% f.s., 3% r.f.s., 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 7/6). 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.	1045	Sample / Core barrel Drill rate =
114' 4 3/4" of 10"						
9' 5"					1120	Add 9' 5" of 10" Casing
123' 9 3/4" of 10"				Total 10" Carbon Steel Casing = 123' 9 3/4"		
REMARKS:						
K.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

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>210-A-36B-Crib</i>
			Date <i>3/25/88</i>	<i>32-14102</i>	Depth <i>115' To 125'</i>	Subcontract No. <i>N/A</i>	
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); 10% gravel, 97% sand, 2% silt. 10% v.f.p., 9% v.c.s., 35% c.s., 40% m.s., 10% f.s., 3% v.f.s., 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.		1450	Sample / Core barrel Drill rate =
	124'-125'	D	Very Moist	SAND (MEDIUM); Trace gravel, 98% sand, 2% silt. Trace v.f.p., 5% v.c.s., 20% c.s., 60% m.s., 10% f.s., 3% v.f.s., 2% silt.		1520	Sample / Core barrel Drill rate =
REMARKS:							
<i>Karen R. Oster</i> <i>3/25/88</i>							

D - Drive Barrel H - 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)

1600
90-14

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DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>899-E/7-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B Crib.</i>
		Date <i>3/25/88</i>	<i>22-14102</i>	Depth <i>125' To 130'</i>	Subcontract No. <i>N/A</i>	
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 (5Y7/2). 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% quartz 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 (5Y6/2). Very strong reaction in 10% HCl. Unconsolidated. Similar to previous sample,	1545	Sample / Core barrel Drill rate =
REMARKS:						
<i>Karen R. Oster</i> <i>3/25/88</i>						

B.24

D - Drive Barrel H - 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. 22W	Well Number 799-E17-14	Computer Number N/A	Project or Work Order No. 216-A-368 Crib
		Date 3/25/88	82-14102	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. 1% v.f.p., 4% v.c.s., 35% c.s., 45% m.s., 10% f.s., 3% ov.f.s., 2% salt. 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.	1615	Sample / Core barrel Drill rate =
123' 9 3/4" of 10"	9' 8 3/4"				1620	Add 9' 8 3/4" of 10" Casing
133' 6 1/2"				Total 10" Casing = 133' 6 1/2"	1655	Drive Casing
					1700	Resume drilling.
REMARKS:						Karen P. Oster 3/25/88

DRILL LOG		By <i>A.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-368 Crib</i>
		Date <i>3/28/88</i>	<i>22-14/02</i>	Depth <i>140' To 145'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	139'-140'	D	Hoist	SAND (MEDIUM); 1% gravel, 96% sand, 3% silt.	(1725)	Description of Sample
	133' 6 1/2" 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, 85% 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	Hoist	SAND (MEDIUM); 1% gravel, 97% sand, 2% silt.	0815	Sample/Corer barrel
				Trace f.p., 10% 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:				<i>Karen R. Oster</i> <i>3/28/88</i>		

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>299-E17-14</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B Crib</i>
		Date <i>3/28/88</i>	<i>22-14102</i>	Depth <i>150' To 150'</i>	Subcontract No. <i>N/A</i>	
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.		
<i>141' 8 1/2" of 10"</i>					<i>1030</i>	<i>Add 6' 3" of 10" Casing</i>
<i>6' 3"</i>						
<i>147' 11 1/2" of 10"</i>				<i>Total of 10" Carbon Steel Casing = 147' 11 1/2"</i>		
					<i>1130</i>	<i>Change to smaller Cor. barrel</i>
					<i>1200</i>	<i>Lunch</i>
					<i>1230</i>	<i>Measure 8" Casings</i>
<i>20' 6" of 8"</i>					<i>1300</i>	<i>Start running 8" Casing</i>
<i>+ 19' 9 1/4"</i>						
<i>40' 3 1/4" of 8"</i>						
<i>+ 19' 5 1/4"</i>						
<i>59' 8 1/4" of 8"</i>						
<i>+ 19' 7 1/4"</i>						
<i>79' 4" of 8"</i>						
<i>+ 19' 1 1/2"</i>						
<i>98' 8 1/2" of 8"</i>						
<i>+ 20' 2 1/4"</i>						
<i>118' 10 3/4" of 8"</i>				<i>Total of 8" Carbon Steel Casing = 118' 10 3/4"</i>		
					<i>1725</i>	<i>Done for day</i>
REMARKS: <i>Drilled Depth = 150'</i>				<i>Total 10" Casing = 141' 8 1/2"</i>	<i>Karen R. Oster</i>	
<i>Total Drilled Today = 10'</i>				<i>Total 8" Casing = 118' 10 3/4"</i>	<i>3/28/88</i>	

DRILL LOG		By J.R. 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 = 1/2 pump
20' 1"				Dräger tube: If n=5 then $\frac{1}{5} \times 300 = 60$ ppm; but N=1/2 so		pegged it.
138' 11 3/4"				Ammonia = > 300 ppm - WHC Respiratory personnel		
19' 8"				were notified and Poly test tube was used with	0735	
158' 7 3/4"				Negative results.		
				WHC Resp. Protection personnel tested with Dräger	0750	
				tube and got Ammonia = 400 ppm over well head		
				Driller will be on fresh air while welding; Ammonia = 5 ppm		
				~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 personnel tested with Dräger tube and	1245	
				found ammonia concentrations between 80 and 120 ppm 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:						
<div style="text-align: right;"> 3/29/88 </div>						

DRILL LOG		By S.S. Teel	Rig E.E. 22-VI	Well Number 299-E17-14	Computer Number NA	Project or Work Order No.
		Date 3-29-88	22-14162	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. Moderately to well sorted. 20% basalt, 80% qtz and gtzite, 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.	1355	
	160'	D	Moist	SAND 12% MP, 12% FP and VFP, 10% VCS, 25% CS, 35% MS, 16% FS, 10% VFS, 4% silt. Mod. to well sorted (Gravel) - 80% basalt, 20% qtz and gtzite. (Sand) - 20% basalt, 78% qtz and gtzite, 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.	1420	
	165'	D	Moist	SAND 15% VCS, 25% CS, 25% MS, 20% FS, 10% VFS, 5% silt. Moderately to well sorted. 20% basalt, 78% qtz and gtzite, 2% mica. Angular to sub-rounded. Dry color: 10YR 6/2 (light brownish gray). Moderate reaction to 10% HCL. Unconsolidated. Similar to previous. Moisture and geologic samples taken.	1435	
					1450	Welding
					1530	End of day
REMARKS: D/B 165' footage = 15' Alled 9' 4" of 8" S.S. 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 (5-65)

1 of 5

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 165' To 175'		Subcontract No. NA
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caticha, 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. Very well sorted. 20% basalt, 78% qtz and qtzite, 2% mica. Angular to sub-rounded. Dry color: 10YR 7/2 (light brownish gray). Moderate reaction to 10% HCL. Unconsolidated. Coarser than previous sample. Moisture and geologic samples taken.	0845	No ammonia smell at borehole
	175'	D	Moist	SAND 22% MP, 22% FP, 20% VCS, 35% CS, 20% MS, 12% FS, 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 7/2 (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"	0900	
					0905	Welding
178' 2 1/2"						

REMARKS:

JL

D - Drive Barrel H - 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' 2 1/2"				WHC Resp. protection personnel arrive and check ammonia concentration with dräger tube. No ammonia detected either between the 8" and 10" casing or at the 8" casing.	0945	
					0955	Drilling
	180'	D	Moist	SAND 2% FP, 1% VFP, 25% VCS, 30% CS, 20% MS, 12% FS, 5% VFS, 55% silt, well sorted. (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.	1025	
	185'	D	Moist	SAND 2% FP, 1% VFP, 20% VCS, 35% CS, 20% MS, 12% FS, 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.	1040	
REMARKS:						

DRILL LOG			By C. 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 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
178' 2 1/2"				Added 9' of 8" casing		1045	Welding
9						1115	Drilling
187' 2 1/2"							
	190'	D	Moist	SLIGHTLY GRAVELLY SAND 2% Cp, 2% Mp, 3% Fp, 3% VFP, 10% UCS, 30% CS, 30% MS, 20% FS, 10% UFS, Moderate-poor sort, predom sand w/ an occasional Cp that seems out of place, 35% Basalt, 65% Silica-rich (predom chgtz w/ gtzite, Tr mica, chlt, Tr granites, abundant orange Fe staining grains) Subangular-Gravels: 50% Basalt 5% Si-rich, round-subround, low sphericity, Dry color SPK 6/5 (brownish gray), Slight reaction in HCl, Unconsolidated, More gravels than previous		1800	Lunch
				Geology: Moisture samples taken		1230	Drilling
	195'	D	Moist	SAND 5% UCS, 15% CS, 40% MS, 25% FS, 10% UFS, 5% Silt Moderate Sorting, 35% Basalt, 65% Silica-rich (predom chgtz, some vel-orange to wht gtzite, Tr mica, abundant Fe stain) Subangular, Moderate to strong rxn in HCl, Abundant Caliche cement, often associated w/ thin (1/4 in) silt layers, slight consolidation very similar to previous, Geol & moisture samples taken		1240	
REMARKS:							

4/5

DRILL LOG		By T Gilman	Rig Ducpus Inc	Well Number 299 E17 14	Computer Number NA	Project or Work Order No.
		Date 3/30/88	Drill #2 A102	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
18' 8 3/4"				Welding 8' 8 3/4" at 8"	1255	Welding
195' 11 1/4"				195' 11 1/4" Total	1330	Drilling
	200'	D	Moist	SAND 20% UFS, 8% UCS, 15% CS, 35% MS, 25% FS, 10% UFS, 5% Silt, Moderate sort 45% Basalt, 60% Silica-rich (predom clegtz, Tr mica, occ gtzite, less Fe sta) Subangular, Dry color STR % (brngy). Moderate rxn in HCl, some CaCO ₃ cementing w/ associated silt layers, predominantly unconsolidated, occ slightly consolidated, less CaCO ₃ and Fe sta than previous sample Geology: Moisture samples Taken	1405	less Fe sta
	205	D	Moist	SAND 15% UCS, 30% CS, 25% MS, 20% FS, 10% UFS, well sort, 35% Basalt, 65% Silica-rich, (predom clegtz, w/gtzite, cement,) Subangular to subround, moderate to occ strong rxn in HCl, Tr poorly developed caliche, Dry color STR % (brngy) slight to unconsolidated, sample contains more CaCO ₃ w/ caliche layer Geology: moisture sample taken	1425	poorly developed caliche
					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 (5-85)

B.35

D - Drive Barrel H - 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)

15/4

DRILL LOG		By T.G. Moore	Rig 8400-100	Well Number 215-151	Computer Number VA	Project or Work Order No.
		Date 3/31/88	30-100	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' 11" to 208"				Gravelly & sandy siltstone	500	
210'	D	Moist	Moist	<p>SAND 3% Fp, 7% VFP, 25% UCS, 30% CS, 15% FS, 15% UFS, 50% silt, moderate sort, 55% Basalt, 45% Silica (partially glassy), moderate to coarse grained, subangular to subrounded, (Darker sometimes called "black sand"), subangular to subrounded, Dex color 10YR 4/2 (dk grayish brown), moderate exposure, thin, in "silt/clay" layers w/ Caliche nodules (partially glassy), nodules with a thin (1-2 cm) silt layer, slightly coarse grained to microparticulate, Higher percentage Basalt, coarser grained than previous sample. Geology and weathering similar to</p>	750	
215'	D	Moist	Moist	<p>SAND 2% Fp, 3% VFP, 25% UCS, 35% CS, 15% FS, 15% UFS, 25% silt, moderate sort, 50% Basalt, 50% Silica (partially glassy), "Salt & pepper" appearance, moderate to coarse grained, Dex color 10YR 4/2 (dk grayish brown), moderate exposure, thin, in of silt/clay, nodules (partially glassy), moderate to coarse grained, Similar to previous sample. Geology and weathering similar to</p>	815	
REMARKS:						

1/6

264

DRILL LOG		By T. Gullone	Rig Bucyrus Erie	Well Number 299 E17 14	Computer Number N/A	Project or Work Order No.
		Date 3/31/88	22 14102	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
204' 11"						
213' 2"				welding 8' 4" 213' 4" Total	815	welding
					850	Drilling
					900	Repairing Rig
					930	Drilling
	220'	D	moist	SAND 25% VCS, 35% CS, 25% MS, 12% FS, 5% VFS, well sorted, 55% Basalt and 45% Silica-rich (predom clv gtz w/ some gtzite) most notable is Basalt vs chv gtz gives a "Salt & Pepper" appearance, quartz is subround, basalt subangular to angular, slight rxn in HCl, unconsolidated, similar to previous sample Geology: Moisture sample Taken	1010	
213' 2"					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, well-moderately sorted, 50% Basalt, 50% Silica-rich (the majority is clv gtz, w/ some gtzites, clts, micas, grn under artthous & silty) "Salt & pepper" appearance, Dry, color 10PR 5/2 (gy tan, moderate rxn in HCl, unconsolidated, very similar to previous sample Geology: moisture samples taken	1140	
REMARKS:						

B.38

384

DRILL LOG		By T. Colburn	Rig Bucvis 15F-2	Well Number 299 E17 14	Computer Number NA	Project or Work Order No.
		Date 5/31/88	22-Mica	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% VC, 25% C, 35% M, 15% F, 10% VF, 5% Silt, nominally sorted, 45% Basalt, 25% Silica-rich (quartz, w/ chrt, malces, and glauconite) "Salt & pepper" appearance, Dry color 10R 5/2 (grayish brown) Basalt is subangular, qtz is subround, Strong rxn in HCl, abundant layers of Calc. cementing, poorly developed caliche, some silt associated w/ Calc. cementing, slightly consolidated, Sample has much more Calc. cementing than previous sample. Geology and Moisture samples taken.	1155	
	225' 2" 9' 10 3/4"				1200	Lunch
	233' 3/4"			Welding 9' 10 3/4" d 8" 233' 3/4" Total	1230	Welding
				Before welding Driller caught a strong smell of ammonia, The ammonia pegged the photoionizer (11.7ev on 20 scale), Driller advised to go in for air.		Ammonia
				Respiratory protection monitors called - they are all busy, Driller will stay on fresh air.		
				Ammonia Believed to be right on top of Calc. layer.	1345	Drilling
REMARKS:						

JD

74'4

DRILL LOG			By T Gilmore	Rig B.E. 22-A102	Well Number 299 E17.4	Computer Number NA	Project or Work Order No.
			Date 5/31/88		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 25% Basalt, 75% Silica-rich, majority of Silica-rich is clear qtz, subangular, Dry color 10YR 6/2 (beige), Slight rxn in HCl, unconsolidated, less basalt and CaCO ₃ than Previous sample (No grains) Gravel and moisture samples taken		1430	No distinct lithology changes
	240	D	Moist	SILTY SAND 15% VCS, 25% CS, 30% MS, 10% FS, 10% VFS, 10% Silt, 30% Basalt, 70% Silica-rich, (predom clear qtz, some mica, qtz, and silt, subangular-subround, Dry color 10YK 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 sample Gravel and moisture samples taken		1445	
233 2/10	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							
5/31/88 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)

B.40

10P1

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small MC - Moss Cover C - C

1. A 2

DRILL LOG			By Watkins	Rig #1	Well Number 247-E12-14	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
19103		DB				7:00	start
9'11 1/2	15'	DB	D	Coarse sand clay gravel		7:45	installed casing
9'11	20	DB	D	coarse sand clay		8:00	sample 15'
9'3 1/2	25	DB	D	coarse sand		8:20	sample 20'
561 45' 12 3/4	30	DB	D	coarse sand 11" richest clutch of chase tools		8:30	shut down
49 3/4	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	11 11		10:35	sample 30
	55					10:45	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'
						2:15	sample 45'
REMARKS:						235	sample 50'
Line 30' 60' 70'						3	

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

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

4 5000 531 (5 25)

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							
58' 3/4"	65'	DB	D	Coarse sand & small gravel			7:00
58' 7/8"	70	DB	D	" "			7:30
9' 7"	75	DB	D	Coarse sand silt			8:15
10' 3 1/2"	80	DB	D	" "			8:30
7' 9"	85	DB	D	fine sand coarse sand silt			9:10
9'	90	DB	D	" " "			9:20
9' 6"	95	DB	D	" " "			9:25
	100	DB	D	" " "			9:55
							10:20
							10:55
104' 9 1/2"							11:20
							11:25
							12:00
							12:30
							1:10
							1:15
							1:50
							2:20

REMARKS:

B.44

C

B.45

A-6000-021 (5-85)

DRILL LOG				By <u>L. Watkins</u>	Rig <u>#1</u>	Well Number <u>299 E 17 14</u>	Computer Number	Project or Work Order No. <u>245450</u>
				Date <u>3 25 88</u>		Depth <u>107</u> To <u>140</u>		Subcontract No.
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time	Drilling Comments
104 9/16	105	DB	D	coarse sand silt			7:00	start Rig
97 1/2	110	DB	D	" " "			7:10	drilling
114 3/4	115	DB	D	" " "			7:35	weld core barrel
95	120	DB	D	" " "			8:00	drilling
123 9/16	125	DB	D	coarse medium sand silt			8:15	sample 105'
98 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
							12:30	work on Rig
							2:00	sample 120'
							2:15	sample 125'
							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

C

B.47

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

1095

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 1/2'	145'	DB	D	sand - medium & silt	7:10	start Rig
8 1/2"	150'	DB	D			safety meeting
141 8 1/2'						measure cable
6 3"					7:50	start drilling
147 11 1/2'	total 8" casing				8:15	sample 145'
					8:25	weld casing
8" casing					9:00	shut down for mechanic to put on new governor & regulator
20' 6"					9:35	drilling
19 9 1/4'					10:20	sample 150'
19 5 1/2'					10:30	weld casing
19 7 1/4'					11:30	change Core Barrel
19 4 1/2'					12:00	Lunch
20' 2 1/2"					12:50	run 8" casing
118' 10 3/4"	8" casing installed today				5:30	go home
REMARKS:						

B.48

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small MC - Mud Core C - C B - Bit

C

D - Drive Barrel H - 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.49

1-6

DRILL LOG				By L. Wall	Rig #1	Well Number 299-EL-14	Computer Number 245450	Project or Work Order No.
				Date 3-27-80		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' 10"	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' 17"	Total						8:00	well casing
							8:15	Rig down
							8:50	working for other Rig
							9:00	well casing for other Rig
							9:30	Pick up caps
							10:00	well casing
							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:								

8.50

D - Drive Barrel H - 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)

1-7

DRILL LOG			By <i>L Watkins</i>	Rig <i>#1</i>	Well Number <i>299-E17-14</i>	Computer Number	Project or Work Order No. <i>245450</i>
			Date <i>3 30 88</i>		Depth <i>165 To 205</i>	Subcontract No.	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
<i>167 1/4</i>	<i>170</i>	<i>DB</i>	<i>D</i>	<i>Coarse sand</i>		<i>7:00</i>	<i>start log & grease</i>
<i>102 3/4</i>	<i>175</i>	<i>DB</i>	<i>D</i>	<i>" "</i>		<i>7:15</i>	<i>weld casing</i>
<i>178 1/2</i>	<i>180</i>	<i>DB</i>	<i>D</i>	<i>" "</i>		<i>7:50</i>	<i>drilling</i>
<i>9</i>	<i>185</i>	<i>DB</i>	<i>D</i>	<i>" "</i>		<i>8:45</i>	<i>sample 170'</i>
<i>187 1/2</i>	<i>190</i>	<i>DB</i>	<i>D</i>	<i>Coarse sand large gravel</i>		<i>9:05</i>	<i>weld casing</i>
<i>88 3/4</i>	<i>195</i>	<i>DB</i>	<i>D</i>	<i>" " "</i>		<i>10:25</i>	<i>sample 180'</i>
<i>96 1/4</i>	<i>200</i>	<i>DB</i>	<i>D</i>	<i>Coarse sand caliche gravel</i>		<i>10:40</i>	<i>sample 185'</i>
<i>81 1/4</i>	<i>205</i>	<i>DB</i>	<i>D</i>	<i>Coarse sand gravel</i>		<i>10:45</i>	<i>weld casing</i>
<i>200 1/4</i>						<i>11:15</i>	<i>drilling</i>
<i>200 1/4</i>						<i>11:50</i>	<i>sample 190'</i>
<i>204 1/2</i>						<i>12:00</i>	<i>Lunch</i>
						<i>12:30</i>	<i>drilling 195'</i>
						<i>12:40</i>	<i>sample 200'</i>
						<i>12:55</i>	<i>weld casing</i>
						<i>1:30</i>	<i>drilling</i>
						<i>2:05</i>	<i>sample 200'</i>
						<i>2:25</i>	<i>sample 205'</i>
						<i>2:30</i>	<i>weld casing</i>
REMARKS:							<i>330 gal home</i>

D - Drive Barrel H - 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.51

1-8

DRILL LOG				By <u>L. Watkins</u>	Rig <u>#1</u>	Well Number <u>299-E12-14</u>	Computer Number <u>245450</u>	Project or Work Order No.
				Date <u>3/23/88</u>		Depth <u>205 To 240</u>	<u>245</u>	Subcontract No.
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time	Drilling Comments
204' 1/4	210	DB	D	coarse sand			7:00	start rig
8' 1/4	215	DB	D	coarse sand			7:50	sample 210'
10'	220	DB	D	" "			8:15	sample 215'
223' 3/4	225	DB	D	" "			8:30	weld casing
9' 10"	230	DB	D	" "			8:50	drilling
233' 1/4	235	DB	D	" "			9:10	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 DNF
REMARKS:								3:30 go home

B.52

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

Well	100-100-00	Driller	Smith	Interval	100-100-00
Log Type	Geological	Drill	100-100-00	Coring	100-100-00
Logged by	100-100-00	Drill	100-100-00	Well	100-100-00
Logging Series	100-100-00	Drill	100-100-00	Time	100-100-00
Vertical Scale	100-100-00	Drill	100-100-00	Logging	100-100-00
Horizontal Scale	100-100-00	Drill	100-100-00	Space	100-100-00
Remarks	100-100-00

22.8

Well 411-11	Drill Depth	Interval Logged 300' - 1
Log Type 411-11	Core 1-1-1	Coring Date 11/1/11
Log Date 11/1/11	Log Time 11:11	Well Log Date 11/1/11
Logging Service Company 11/1/11	Log Location	Log Location
Well Log 11/1/11	Log Date 11/1/11	Log Time 11:11
Log Type 411-11	Core 1-1-1	Coring Date 11/1/11
Log Date 11/1/11	Log Time 11:11	Well Log Date 11/1/11
Logging Service Company 11/1/11	Log Location	Log Location
Well Log 11/1/11	Log Date 11/1/11	Log Time 11:11
Log Type 411-11	Core 1-1-1	Coring Date 11/1/11
Log Date 11/1/11	Log Time 11:11	Well Log Date 11/1/11
Logging Service Company 11/1/11	Log Location	Log Location
Well Log 11/1/11	Log Date 11/1/11	Log Time 11:11

WELL 299-E17-15

AS-BUILT DIAGRAM

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

Reviewed by V.C. McShane 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 (19.4-29.8')		30		SAND
		35		SAND
4" dia. Stainless Steel Casing		40		SAND
(46" to)		45		
8" Temporary Carbon Steel		50		
Casing (Removed)		55		
10" Temporary Carbon Steel		60		
Casing (Removed)		65		
		70		
		75		
		80		
		85		
Cardboarders		90		
		95		
		100		SLIGHTLY GRAVELLY SAND
		105		SAND
Casing joints		110		
		115		
		120		SAND
		125		
		130		

AS-BUILT DIAGRAM

Well Number 299-617-15 Geologist Teel Page 2 of 3

Reviewed by V.L. Mc Shan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
10" Carbon Steel Casings (removed)		135		SAND
8" Carbon Steel Casings (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		"

154

DRILL LOG			By T. Gilmore	Rig Burgess Eric	Well Number E99 E17 15	Computer Number 111	Project or Work Order No.
			Date 3/24/88	32-14103	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
				Drilling		1140	Steam cleaning - however apparatus is clean (tools also look clean)
	5'	D	moist	SILTY SAND 5%CS, 25%BS, 30%FS, 20%VFS, 20%Silt, well sorted, 60% Basalt, 40% Silica-rich (mixture of qtz, granite, chrt, gneiss) subangular, Dry color 2.5K 1/2 (Hbony), strong rxn in HCl, slight consolidation		1145	
	10'	D	moist	SLIGHTLY GRAVELLY SAND 1%CP, 2%MP, 22%FP, 10%VFP, 10%BS, 15%CS, 5%MS, 10%FS, 25%VFS, 20%Silt. poorly sorted, 60% Basalt, 40% Silica- rich, subangular, Dry color 2.5K 3/4 (Hbony), strong rxn in HCl, unconsolidated, more granular than previous sample		1155	
20' 3" OF 10'							
REMARKS: jsb							

D - Drive Barrel H - 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)

[Signature]

3 of 4

DRILL LOG		By 357ae/	Rig B.E. how 20-11103	Well Number 277-01-15	Computer Number NA	Project or Work Order No.
		Date 3-24-88	Log Lenny	Depth 20' 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
	25'	D	Moist	SAND 1% FP, 1% VFP, 10% UCS, 30% CS, 35% MS, 15% FS, 8% VFS, Well sorted. (Gravels) - 80% basalt, 20% Si-rich. (Sand) - 20% basalt, 80% gte 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).	1430	
	30'	D	Moist	SAND 2% FP, 1% VFP, 10% UCS, 30% CS, 25% MS, 20% FS, 12% VFS, Med. well sorted. (Gravels) - 80% basalt, 20% gte + Si-rich. (Sand) - 20% basalt, 80% gte + gteite. Gravels and sands are angular to sub rounded. Dry color 10YR 7/2 (light gray). Moderate reaction to 10% HCL. Moisture + Geologic samples taken.	1440	
	35'	D	Moist	SAND 5% UCS, 10% CS, 40% MS, 30% FS, 15% VFS. Well sorted. 20% basalt, 80% gte, gteite, 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.	1450	
REMARKS:						

B.64

[illegible]

D - 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)

DRILL LOG			By AIRHART	Rig BULYRUS ERIC	Well Number 299-E17-15	Computer Number NA	Project or Work Order No.
			Date 3-25-88	22-14103	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% VCS, 30% CS, 20% MS, 5% 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 (2-5% silt); slight var. w/ 10% HCL - appears to be a few caliche grains which ref.; unconsolidated.		07:30	
49'11" of 10" casing						07:45	welding 5'7" 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 30% VCS, 30% MS, 10% FS, 5% VFS, 4% silt - med 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		10:30	
REMARKS:							

B.66

2 of 4

DRILL LOG			By AIRHART	Rig Bryus Eric	Well Number 289-E17-15	Computer Number NA	Project or Work Order No.
			Date 3-25-88	22-14103	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 2.5TB/2; slight ran. 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% VCS, 3% silt - mod. sorted; (gravel) angular-to-subangular clasts composed of 70% basalt 30% si-rich (lignous, qtzite) - trace clay rip-ups (sand) subangular-to- subrounded grains, 40% basalt 60% qtz-rich (cl. qtz, f-spar, qtzite) - dry color light brownish gray 2.5TB/2; slight-to-no ran. 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% VCS, 4% silt - mod.-to-well sorted; (gravel) 60% basalt to qtz-rich - the coarse pebble is subrounded		13:00	
REMARKS:							

DRILL LOG			By AIRHAAT	Rig Bucyrus Erie	Well Number 299-E17-15	Computer Number NA	Project or Work Order No.
			Date 3-25-88	22-14103	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 (clv. qtz, quartz) - dry color light brownish gray 2 ST 1/2 ; slight rxn. w/ 10% HCl ; unconsolidated.			
70' 1 1/2" of 10" casing						13:15	welding 9' 11 1/2" of 10" casing
70'							60' 2" + 9' 11 1/2" = 70' 1 1/2"
						14:00	drilling
65'	D	Moist		SAND 5% UEP, 10% UCS, 30% CS, 35% MS, 15% FS, 10% VFS, 5% Silt, Moderate-well sort, 50% Basalt, 50% Silica-rich (predom. clv. qtz), abundant crng Fe stain on grains, subangular, Dry color 2 ST 1/2 (1 lb bag), strong to moderate rxn. w/ HCl, some prev. developed caliche layers, abundant CaCO ₃ cementing, unconsolidated, more CaCO ₃ than previous sample		14:45	See series of thin (average 1" thick) silt layers separated by thin sand layers from ~ 62-63'
79' 3 1/2"				Welding 9' 2" of 10" 79' 3 1/2"		15:15	
REMARKS:							

B.68

DRILL LOG		By Teel/Gilmore	Rig B.E.	Well Number 299-E17-15	Computer Number NA	Project or Work Order No.
		Date 3-25-88	22-14103	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
79' 3 1/2"	70'	D	Moist	SAND 20% FP, 15% VCS, 25% CS, 30% MS, 20% FS, 8% VFS Moderately to well sorted. (Gravel) - 70% basalt, 30% gk/gtite. (Sand) - 40% basalt, 60% gk, gtite. Gravel and sands are angular to subangular. Dry color 2.5Y 6/2 (H brown gray). Moderate reaction to 10% HCL. Unconsolidated. Similar to previous. See CaCO ₃ cemented (weak) aggregates. Moisture, geologic, and hazardous waste sample taken.	16:30	
	75'	D	Moist	SAND 10% VCS, 20% CS, 35% MS, 25% FS, 10% VFS. Moderately - Well sorted. 20% basalt, 80% gk/gtite. angular to subangular. Dry color 2.5Y 6/2 (H brown gray). Moderate reaction to 10% HCL. Unconsolidated. Similar to previous.	17:05	
					1730	End of day
79' 3 1/2"						

REMARKS: DIB 75'
drilled 35'

Steve Teel
3-25-88

B.69

DRILL LOG		By S.S. Teel	Rig R.E.	Well Number 299-617-15	Computer Number A/A	Project or Work Order No.
		Date 3-28-88	22-14103	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' 3 1/2"					0700	Drillers arrive
8' 4"					0745	Welding casing
87' 7 1/2"				Added 8' 4" of 10"	0830	Began drilling
	80'	D	Slightly Moist	SAND 30% VCS, 35% CS, 20% MS, 10% FS, 5% VFS. Well sorted. 25% basalt, 70% gtz, gtzite, 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. <u>Hazardous waste sample collection procedure</u> : Fill plastic pint jar with sample. Seal lid with white tape. Fill out and attach sample label and sample seal to bottle including: sample number, date, time, and initials of collector. Place bottle in ice chest with ice.	0835	Note: QA procedures for hazardous sampling currently being written, until such time, procedure used is described in sample description
	85'	D	Moist	SAND 32% VFP, 22% VCS, 42% CS, 20% FS, 52% VFS, 10% silt, Moderate sorting, 35% Basalt, 65% Silica rock, (predom clv gtz, occasional gtz and chert) Subangular to subrounded. Dry color 2.5YR 7/2 (light gray) slight rxn in HCL, occasional small clots cemented w/ silt, Unconsolidated to slightly consolidated similar to previous	1000	
REMARKS:						

254

B.71

DRILL LOG			By T. H. Moore	Rig Burgess Eie	Well Number 277 E17 15	Computer Number 114	Project or Work Order No.
			Date 3/28/88	22 - 14103	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' 7 1/2" of 10"						
	97' 8" of 10"			Welding 10' 1/2" of 10" 97' 8" Total		1020	
							RPT coverage
	90'	D	Slightly Moist	SAND 10%VCs, 20%CS, 40%MS, 15%FS, 10%VES, 5%Silt, well-sorted, 30% Basalt, 70% Silica-rich, (predom cle qtz, w/ occasional grite, chert), subangular, Dry color a STR 4- (brn 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:							

384

DRILL LOG		By T. Gilmore	Rig BE	Well Number 299 E 17 15	Computer Number NA	Project or Work Order No.
		Date 3/28/88	32-14103	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% VF, 12% VC, 20% S, 35% MS, 20% BS, 10% FES, well-sorted, 35% Basalt, 65% Silica-rich (probable clg) ^{Abnt Fe str} Subangular, Dry color 25% R (brn), slight rxn in HCl, no sand clots, much less silt; Calag cement than previous, No consolidation, Sample similar to previous otherwise, Geol. moist; H ₂ O sample taken, the procedure as above	1310	
	97' 8" at 10'			No Ammonia smell around Rig	1310	
	97' 8" at 10'			Welding 9' 7 1/2" at 10'	1340	
	107' 3 1/2"			Drilling	1450	
						RPT coverage
	100'	D	Moist	SLIGHTLY GRAVELLY SAND 2% MP, 3% Fp, 10% VF, 10% VC, 15% S, 25% MS, 20% BS, 15% FES, Moderate sort, 40% Basalt, 60% Silica-rich (probable clg) abundant avg Fe staining on grains, Subangular, Dry color 5% R (brn), Moderate rxn in HCl, some Calag cementing, not as much as previous, unconsolidated, very similar to previous, Geol. moist; H ₂ O sample taken procedure A.A	1500	Ammonia in samples
				Ammonia smell from samples not from bore hole		
REMARKS:						

B.72

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DRILL LOG			By T Gilmore	Rig Bucyrus Erie	Well Number 299 E17 15	Computer Number NA	Project or Work Order No.
			Date 3/28/88	22-14103	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 any from borehole		1410	
	105'	D	moist	SAND 5% UCS, 10% SS, 40% MS, 25% FS, 20% VFS, well sorted, 40% Basalt, 60% Si-rich (predom elongate) abundant Fe staining on grains, subangular, Dry color: 5YR 6/2 (brn gr), moderate rxn in HCl, occasional "sand clots" w/ white Fe staining on grains, unconsolidated, better sorted w/ more color cement than previous sample; Geology, moisture: Hazardous sample taken. Haz sample procedure N/A		1540	
	107' 3/4 75						
	114' 5 1/2"			Welding 7' 2" at 10" 114' 5 1/2" total		1545	SiH/VF sand at ~109'
	110'	D	moist	Sand 20% MS, 40% FS, 20% VFS, 20% Silt, well sorted, 40% Basalt, 40% Silica rich, SiH/very fine sand layer approx 109' thin, ~1/2" thick, subangular, Dry color: 5YR 6/2 (brn gr), slight rxn in HCl, slightly consolidated, very fine well sorted sands and silts, may be confining layer of ammonia as in other wells, notes well developed		1715	not well developed
				Great moisture, Haz samples taken, Haz sample procedure N/A		1730	RPT coverage End of Day
REMARKS: F+ 34' Casing 114' 5 1/2" 3/28/88 JB							
D/B 114'							

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DRILL LOG			By T Gilmore	Rig Burgess Env	Well Number 277 E17 15	Computer Number NA	Project or Work Order No.
			Date 3/27/88	22-14123	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 and at the well; the well is showing this morning likely due to a low pressure system.			
				Wed. June 15. Hauler to Reservoir south of the well to drill the hole; Drilling on shore until it can be drilled.		530	
				With the help of the well log, 1000 ppm ammonia measured at wellhead, Driller logs on Veshaire when welding		550	1000 ppm Ammonia
11'		D	First	(FNU) 3% tp, 3% VF, 10% S, 15% C, 40% M, 20% F, 10% VF, moderate well sorted, 40% Basalt, 60% Silica-rich (granulite), in glass, abundant Fe staining (Fe 3+), some iron, moderate rxn in HCl, some caliche cementing material, unconsolidated, very similar to previous sample, Gravelly, massive, 1/2" grains mostly tabular; 1/2" - 1" gravel immediately placed in a pint plastic jar, taped, labeled and placed in ice chest (with date time and depth indicated).		730	
REMARKS:							

JLB

25/4

DRILL LOG		By T. Gilmore	Rig Pinnus Erie	Well Number 277 E 12 15	Computer Number VA	Project or Work Order No.
		Date 3/27/68	22-14107	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 diller is not trained on air system; another diller will be required to weld on casing when is trained, waiting	930	
124' 5 1/2"				Well to 10' 7 1/2" at 10" 134' 1" Total	940	
10' 2 1/2"						
134' 1"						
	120'	D	Moist	SAND 50% VFP, 5% UCS, 10% CS, 35% MS, 30% FS, 15% VFS well to moderate sort, 35% Basalt, 65% Sil-matrix (incl. p. an. slt gtz), w/ gtzite, ch. + Fe stn gtz (orig.) Subangular, Dry color SPR 1/2 (brngy), No rxn to HCl, no to very slight consolidation, sample is very similar to previous sample, less Calichean pieces, still contains Fe staining as previous. Genlog, moisture and Hazards samples taken, Haz soil procedure as above	1110	
	125'	D	Moist	SAND 50% UCS, 15% CS, 10% MS, 30% FS, 10% VFS well sort, 35% Basalt, 65% Sil-matrix (p. an. slt gtz), Subangular to subround, Dry color SPR 1/2 (brngy), No rxn to HCl, No consol. Sample very similar to previous, smallest amount of sample. Genlog, moisture and Hazards samples taken, Haz soil procedure as above	1130	

REMARKS:

JB

B.75

3 of 4

DRILL LOG			By T Gilmore	Rig Burgess Erie	Well Number 277 E 17 15	Computer Number N/A	Project or Work Order No.
			Date 3/29/88	20-1413	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, 20%VS well sorted 35% Basalt, 65% Silica - mica (D. from Qtz, also glite, ch. Fe staining) subangular to subround, Dry color SPR 9/2 (tan gy), Norm in HCL, no consolidation, very similar to previous sample Strong ammonia smell. Geology, moisture, hazardous samples taken, Haz sample procedure as above		1155	RPT arrived 1120
131' 1"				Wetting 10' 8" at 10" 144' 9" total		1200	WHL Prop by name
				WHL Respiratory came, could not detect ammonia around lure etc because of casing stickup, Driller will continue to wear a mask. Respiratory monitor will be back in morning		1257	
	135	D	moist	SAND 5%UCS, 10%CS, 35%MS, 30%FS, 20%VS well sorted 35% Basalt, 65% Silica - mica (primarily clgite) subangular, some micas Dry color 2.5 PR 4/2 (tan gy), Norm in HCL, no consolidation, very similar to previous. Geology, moisture - Haz sample taken Haz sample procedure as above		1350	
REMARKS: <div style="text-align: center;">16</div>							

B.76

B.77

[illegible]

182

ORILL LOG			By T Gilmore	Rig Bucyrus Erie	Well Number 227 E17 13	Computer Number 111A	Project or Work Order No.
			Date 3/30/88	22-1403	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	
				1/2 ammonia smell around well - waiting on WHC Respiratory monitor			
	145'	D	Moist	SAND 15%UCS, 35%CS, 30%MIS, 10%FS, 5%VFS, 50% Silt, well sorted		730	
				40% Basalt, 60% Silica (granular at 2, w/ quartz, granular)			
				Temics, Fe sils, Trigonites Subangular, Dry color RPR 5/2			
				(grayish brown) moderate to strong rxn in HCL, CaCO ₃ cement			
				associated w/ silt layers; silt layer in sample not as thick,			
				as to slight consolidation in CaCO ₃ cement layers			
				Geology, moisture and Hazards sample taken. Hazards			
				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 Tally and corrected casing to 147 1/2"			
				All 10" used 20-3, 20-4, 9-3, 9-11/2, 9-2, 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: JLB							

B.79

[illegible]

[illegible]

D - 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)

B.80

DRILL LOG			By C. WANSLEY	Rig 22-14-103	Well Number 299-17-15	Computer Number	Project or Work Order No. 245450
			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
				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 1/4"						
	+ 18-1					3:30	WANT HOME
	114-1 1/4"						
	+ 18-7 3/4"						
	132-8 1/2"						
	+ 17-1 1/2"						
	150-8 1/2"						
	- 2-3"						
	148-5 1/2"						
REMARKS:							

DRILL LOG		By J. Wamsley	Rig 22-14-103	Well Number 299-17-15 140	Computer Number To 146	Project or Work Order No. 245950
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time
140 10 1/2				STARTED DRILLING FINISH PUTTING		7:00
+ 62	TOTAL			DOWN 10" STRING OF PIPE AT		
147 1/2	10"			146'. BROKE DOWN 10" CORE BARREL		
8"				TO PUT 8" ON AND STARTED RUNNING		
19 1/4				8" STRING OF PIPE. WAS NO 8" DRIVE		9:35
2 19 1/4				SHOE SO HARD TO CUT ONE OFF OF OLD		
3 19 1/4				PIECE OF PIPE AND WELD ON TO FIRST		
4 20 1/2				JOINT OF 8" PIPE.		12:00
5 39 5/8						
6 19 2 1/4						3:30
7 58 7 3/4						WENT HOME
8 18-8						
9 79 3 3/4						
REMARKS:						

B.82

DRILL LOG			By SC WAMSLEY	Rig 22-14103	Well Number 299-17-15	Computer Number	Project or Work Order No. 245450
Total Casing	Depth	Drill Method	Date 3/29/88	Depth 113'	To		Subcontract No.
		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'-7 1/2"			OLIN Took over			10:00	Finish welding
34'-1 1/2"			Drilling			11:00	
6'-9"						12:00	
140'-10 1/2"			welding			12:30	
			Drilling			1:00	
			welding			2:15	
			Drilling			3:00	
REMARKS:							

B.83

[illegible]

DRILL LOG		By L. H. HINSELY	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 NEXT JOINT OF PIPE		
+ 49'-11"				PIPE		
+ 9'-3"				STARTED DRILLING		SAND
58'-2"				TOOK SAMPLE 45' FINE SAND	7:30	DRIVE BARREL
+ 9'-11 1/2"				TOOK SAMPLE 50' FINE SAND	10:30	" "
69'-1 1/2"				WELDED ON NEXT JOINT OF PIPE		
+ 9'-2"				STARTED DRILLING AGAIN		
78'-3 1/2"				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 JOINT OF PIPE		
				PIPE		" "
				TOOK SAMPLE 75' FINE SAND	5:30	WENT HOME
REMARKS:						

DRILL LOG			By C. W. WISLEY	Rig 22-14103	Well Number 299-17-15	Computer Number	Project or Work Order No. 245450
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
20' 3"	20' 1"			<p>CRANK TO RTG AT 3:30 HAD TO FAIR UP WRENCHES TO FIT SQUARES. THEN WELDED ON 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'</p>		3:30	STARTED
						5:30	FINISHED
<p>REMARKS:</p>							

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

WELL 299-E17-16

AS-BUILT DIAGRAM

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

Reviewed by J. 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'-15')		10		"
		15		"
10" Temporary Casing Steel casing		20		"
133' total		25		"
		30		"
8" Temporary Casing Steel casing		35		"
336' 5 1/2" total		40		SAND coarse to med. grain, silty
		45		"
4"-dia. Stainless Steel casing		50		"
		55		"
		60		"
8-20 mesh granular bentonite seal		65		"
(300.5'-19.5')		70		"
		75		"
		80		"
		85		"
		90		"
		95		"
		100		"
		105		SILT at 105'-107'
		110		SAND
		115		"
		120		"
		125		"

Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299 E17 16Geologist T GilmorePage 2 of 3Reviewed by W.H. Mc ShanDate 7-13-85

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
10" dia. temporary carbon steel casing		135		"
		140		"
8" dia. temporary carbon steel casing		145		"
		150		"
8-50 mesh granular bentonite seal		155		"
		160		SAND Gravel, etc.
		165		"
		170		"
4" dia. stainless steel casing		175		"
		180		"
		185		"
		190		"
		195		"
		200		" Thin Carbonaceous layers
		205		"
		210		" Thin silty layers w/ Carbonaceous
		215		"
		220		"
		225		"
		230		"
		235		" layered (in situ) poorly developed calcareous
		240		GRAVELY SAND @ 235'
		245		SANDY GRAVEL @ 245'
		250		"
		255		"
		260		"

A-1800-186 (3/87)

AS-BUILT DIAGRAM

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

Reviewed by V. L. Mc Gowan 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		GRAVELLY SAND
Bentonite Pellet Seal (305-300.5')		290		SAT We have reached 300.5 ft. 19.5' seal
10-20 Sand Filter pack (331-305')		295		" 10-20 mesh Sand 305-331'
20 slot, 4" dia., stainless steel screen (329.8 to 309.1)		300		SAND
8" 30 slot Take-out Screen		305		SANDY GRAVEL
(2) 10' we have together 309'-329'		310		"
		315		"
		320		"
10-30 Coarse Silica Sand 2'		325		SAND
Natural fill 5'		330		SANDY GRAVEL
	335	GRAVELLY SAND		
		337' To Bottom		

17154

DRILL LOG			By <i>Gilman</i>	Rig <i>Bicyrus Inc</i>	Well Number <i>219 E12-11</i>	Computer Number <i>NA</i>	Project or Work Order No.
			Date <i>3/10/88</i>	<i>22-111</i> <i>Wash Bit</i>	Depth <i>0 To 15'</i>	Subcontract No.	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				<i>Analysts on location</i>		<i>6:45</i>	
	<i>5'</i>	<i>D</i>	<i>Dry</i>	<i>SAND 28% VEP, 13% CS, 2% MS, 5% FS, 4% Silt, 10% UFS, 12% Silt; Fair</i> <i>sort; 6% BSET, 4% Silica-rich, (Silica, medium grt), qtz grains</i> <i>are subangular occasionally frosted, contain? Basalt grains are</i> <i>subangular to subrounded. Dry color: MYR 5/3. Slight reaction HCL,</i> <i>slight to unconsolidated. Moisture & geology sample taken.</i>		<i>8:15</i>	
	<i>15' 5 1/2" of 10"</i>			<i>Add 10" casing. 15' 5 1/2"</i>			
	<i>10'</i>	<i>D</i>	<i>Dry</i>	<i>SAND, ^{TRACE MP} 17% VEP, 29% VCS, 2% CS, 10% MS, 35% FS,</i> <i>35% UFS, 15% silt. Well sorted. 60% Basalt, 40% qtz,</i> <i>gravels are angular to rounded; sand - angular to subrounded.</i> <i>Dry color: 10YR 5/3 (brown). Moderate reaction w/ 10% HCL.</i> <i>Unconsolidated. Moisture & Geology sample taken.</i> <i>Similar to previous sample</i>		<i>9:30</i>	
	<i>15'</i>	<i>D</i>	<i>Dry</i>	<i>SAND 10% VEP, 25% VCS, 25% CS, 15% MS, 10% FS, 10% UFS, 5% Silt,</i> <i>Fair well sort, 70% Basalt, 30% Silica-rich, (medium to coarse grt)</i> <i>angular to subangular, grains have moderate reaction.</i>		<i>10:05</i>	
REMARKS:							
						<i>KENNI S. Gilman</i> <i>3-10-88</i>	

B.96

B.97

D - Drive Barrel H - 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 Gillman/Tee	Rig Biphasic	Well Number 27 E 17-16	Computer Number A11	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, Calcite, Etc.		Time	Drilling Comments
	25' 11" of 10"			carbonate cement, unconsolidated coarse sand/flow pipes			
10 11				sample			
36 10"				Added 10' 11" of 10" casing			
	30'	D	Dry	SAND < 1% F and VFP, 5% VCS, 15% CS, 25% ME, 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		1453	Moist zone at 34'
	35	D	Moist	SAND 4% Fp, 4% VFP, 30% VCS, 20% CS, 20% ME, 17% FS, 6% VFS, 5% silt. Moderate to well-sorted, 30% Basalt, 70% Si-rich (granitic), Subangular to sub-rounded, Moderate to fine grained, Thyrac 10YR 6/2 (yellow) and tan. Unconsolidated. Coarse grained sandstone, previous		1510	Samples very moist
REMARKS:							
[Signature] KUN AT 3-10-88							

B.98

B.99

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____ Standing Water A 6000 Q21 (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

2/4

DRILL LOG			By G. L. Moore / Teel	Rig Bucyrus Erie	Well Number 299 E 17 16	Computer Number NA	Project or Work Order No.
			Date 3/11/88	62-1410 Wash. - 311	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	<p>SAND 18% AP, 3% FP, 30% VFP, 15% VC, 30% CS, 30% MS, 10% FS, 8% SS, 11:05</p> <p>Well-sorted, 65% quartz, 35% silica-rich, sands are angular to subangular, gravels are subangular to occasionally round, Dry Color 10YR 6/2 (lt brn gray), Moderate rxn to HCl, some cementation of grains (forming sand clods), may possibly be lignified in subsurface, but none seen in sample, overall sample is unconsolidated, moisture content appears to have increased, Similar to previous sample. Moisture, Geol., and Haz waste samples collected.</p>			
	55'	D	Moist	<p>SAND 3% FP, 22% VFP, 10% VC, 25% CS, 40% MS, 10% FS, 11:45</p> <p>10% VFS and silt. Well sorted. Gravel: 85% basalt, 15% gtz and Si-rich. Sand: 60% basalt, 40% gtz and Si-rich. Gravels and sands are angular to sub-rounded. Dry color: 10YR 6/2 (lt brn gray). See CaCO₃ cemented clods in gravel portion. Unconsolidated. Slight to moderate reaction to 10% HCl. Similar to previous, Moisture, Geol., and Haz waste samples collected.</p>			
REMARKS:							

B.101

3 of 4

DRILL LOG		By Gilmore + Teel	Rig B.E. 22-1410 Wash 1517	Well Number 299-E17-16 Depth 60 To 65	Computer Number	Project or Work Order No.
		Date 3-11-88				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% UCS, 30% CS, 35% MS, 25% FS	11:55	
54' 8 1/2"	of 10"			11% VFS and silt. Well sorted. Gravel: 70% CaCO ₃ -rich		
9' 7 1/2"				sandy/silty "clogs", 30% qtz. Sand: 55% basalt, 40% qtz and		
64' 4"	of 10"			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 brn gray). Moderate to slight HCL reaction.		
				Unconsolidated. Similar to previous except for mica. Moisture, Geol. and Haz Waste samples taken.		
				Added 9' 7 1/2" of 10"	12:00	Adding casing
					12:50	Began drilling
	65'	D	Moist	SAND 1% FP and VFP, 5% UCS, 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:						

B.102

4 of 4

DRILL LOG		By Teel/Gilmore	Rig B.E.	Well Number 299-E17-16	Computer Number NA	Project or Work Order No.
		Date 3-11-88	22-1410 Wash 15:17 LEV:3	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% VFS and 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 showed up, nothing above knee ground	14:35	
	75'	D	Moist	SAND 3% FP, 2% VFP, 30% VCS, 30% CS, 20% MS, 14% FS, 11% VFS, 10% 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 sub-round, Sands are angular to sub-angular. Moderate		
				rxn to HCL. Dry Color 6.5YR 6/2 (H gray), unconsolidated. Very similar		
				to previous. Slightly more coarse and better sorted		
				Moisture, Haz waste, Geology sample taken		
REMARKS: 64' casing 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)

B.103

103

ORILL LOG		By G. Impre / Teel	Rig B.E. 22-1410 Wash 1517 Louis	Well Number 299-E17-16 Depth 80' To 85'	Computer Number NA	Project or Work Order No.
		Date 3-14-88				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 7/4"				Added 9' 7/4" of 10"		welding casing
81 3/4"						
	80'	D	Moist	SAND 1% Fp, 8% VFP, 2% UCS, 25% CS, 30% MS, 25% FS, 5% VFS, well sorted, Gravels 70% Basalt, 30% Silica-rich, Sands 50% Basalt, 50% Silica-rich (pale to light gray, to green translucent gray, yellowish, brown), Gravels subangular, sands subangular to angular. Dry color 10YR 5/2 (yellow), Moderate rxn in HCl, some sand clasts w/ CaCO ₃ cement, unusual, very similar to previous samples.	835	
	85'	D	Moist	SAND 5% CP, 5% MP, 1% FP, 1% VFP, 15% UCS, 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) - Dry color, Moderate reaction to 10% HCL. Unconsolidated.	902	
	81' 3/4"			Note: presence of MP and CP. Coarser than previous		
REMARKS: Jar samples from 0-60' feet were checked with GMA and PAM before delivery to lab. No errors. 3/11/88 above background. Moisture samples from 0-75' also delivered to lab on 3/11/88. S.T.						

B.104

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

A 6000-021 (5 R5)

24/3

DRILL LOG		By Gilline/Teel	Rig BE 22-HD Wash 1517 10's	Well Number 299 E 17-16 Depth 85' To 90'	Computer Number 241	Project or Work Order 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% ZFS, 10% well sorted Sands 60% BSF, 40% Si-rich incl. about cl. gts, subangular to Angular, Drycolor 10R 6/10 g/l, slight & moderate rxn in HCl, unconsolidated, Sample is very well sorted, better sorted than previous sample. no pebbles	925	
81 3/4" 9' 7"	at 10"			Welding 9' 7" of 10" added. 90' 10 1/4" of 10" total	930	
90' 10 1/4"	at 10"			Ammonia smell detected at borehole, photo ionizer (HNU) meter "pegged" out. Drilling on standby until HEHF monitor, and Radiation protection Tech. (RPT) can check borehole	950	
				RPT did not find any radiation	1045	
				Used of 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.						

B.105

343

DRILL LOG			By <i>Galum / Teal</i>	Rig <i>Burgess 100</i>	Well Number <i>279 E 17 16</i>	Computer Number <i>01A</i>	Project or Work Order No.
			Date <i>3/14/88</i>	Depth <i>90' To</i>	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 started up to test for ammonia & contamination		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 2 nd check showed ammonia concentrations over 1000ppm (detector tube). The OVA (calibrated for methane) showed a maximum of 5ppm of an unknown organic vapor.			
				HEHF and Westinghouse Respiratory Protection will be out in the morning to monitor.			
				RPT arrives. CM shows no readings above background		15:15	
				Released moisture and geologic samples			
90' 10 1/4" of 10"						15:25	End of day
REMARKS: <i>D/B 90'</i> <i>Footage - 15'</i> <i>Steve Teal</i> <i>3-14-88</i>							

U - Drive Barrel H - 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.106

145

DRILL LOG			By T. Gilmore	Rig Augus Ene 22-1410 wash 1517	Well Number 899 E17 16 Depth 90' To 90'	Computer Number NA	Project or Work Order No.
			Date 3/15/88			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" at 90'				Geologist: Driller: locate - Check well head w/ photo ionizer - no detectable ammonia there is no ammonia smell around well checked well w/ poly test detector tube; Tube showed a brown to green discoloration ~ 5mm long; due to engine on Rig? or Trace of ammonia gas detectable		655	
				Drilling After first drive barrel recovery, ammonia could be smelled in the sediments, smell still not very strong		720	
				Well head checked w/ photo ionizer, no detection at well head, there was a slight detection however in the sediments Believed high pressure washing system pushing ammonia & chlorine vapors into formation		740	
				Respiratory Protection Monitor started up found 3 ppm ammonia coming from sediments, none from well head, will be kept in all areas -		755	
REMARKS: 2/26							

D - Drive Barrel H - 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.107

245

DRILL LOG		By T. G. Moore	Rig BE. 20-10	Well Number 2-11 E 17 1-	Computer Number 124	Project or Work Order No.
		Date 3/15/88	Core No. 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	<p>SAUD, 8% UCS, 32% CS, 30% MS, 53% FS, 15% VFS, well sorted,</p> <p>60% BSLT, 40% Si-rich, particles clear quartz, Temnias,</p> <p>subangular to angular, Dry color 10R 6/2, slight to</p> <p>Moderate rxn in HCl, some sand "clasts", Caliche cement,</p> <p>unconsolidated very similar to previous sample</p>	755	
	100'	D	Moist	<p>SAUD, 20% CS, 30% MS, 30% FS, 20% VFS, very well sorted,</p> <p>60% BSLT, 40% Si-rich, particles clear quartz, Temnias, more</p> <p>dist. micaceous than previous, subangular to angular,</p> <p>Dry color 10R 6/2 (lighter), some sand clasts, SI - mixed</p> <p>rxn in HCl, unconsol. very similar to previous</p> <p>Slightly less micaceous than previous</p>	805	
96' 10 3/4"	8' 3"			Welding 8' 3" of 10" 99' 1 1/4" of 10" total	830	
99' 1 1/4"				HEHF showed up, and are phasing detectors on Rig and Diller for ammonia exposure	835	
REMARKS:						

B.108

3/5

DRILL LOG			By T. G. Moore	Rig BE	Well Number 099 E17 16	Computer Number NH	Project or Work Order No.
			Date 3/15/88	32-15-12 G. 15.1 15.2	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	<p>SAND 5%UCS, 15%CS, 25%MS, 30%FS, 20%VF, 5%Silt, well-sorted</p> <p>50% Basalt, 50% Si-rich (pred qtz, rd. org. clst, Fe-stn on qtz)</p> <p>Subangular-angular, 10R 1/2 (g/y brn), Mod ex in HCl, sand/silt "clods" have strong ex in HCl, Unconsol - slight consol</p> <p>In silt layers (thin, not thick) more silt than previous, at 107' silt layer occurs, appears several feet thick</p> <p>SILT at 107' - intact core of silt showed thinly laminated bedding; 201 = 2.0 cm thick, nearly uniform sz, some grading</p>		945	
	110'	D	Moist	<p>SAND 1%UF, 9%UCS, 25%CS, 30%MS, 15%FS, 15%VF, 5%Silt</p> <p>med-well sort</p> <p>50% Basalt, 50% Si-rich (pred qtz, lost some micas, have Fe-stn)</p> <p>silt "clods", subangular-angular, Dry color 10R 1/2,</p> <p>Slight to Mod ex in HCl, Unconsol, occasionally consolidated w/ silt/caliche, much less micas than previous, more silty</p>		1005	
99 1/4	99 1/4						
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)

B.109

40/5

DRILL LOG		By T Gilmore	Rig BE 22-1410	Well Number 291 E17 16	Computer Number N/A	Project or Work Order No.
		Date 3/15/88	Wash 15-17	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
108 1/2'				RPT showed up	1115	
	115'	D	Moist	SAND 10% VEP, 15% UCS, 20% CS, 20% MS, 20% FS, 15% VFS Moderate-well sorted, 60% BS&T, 40% Si-rich (predom cl. gtz, Tr. micas, little Fe stain on gtz) Dry color 10R 1/2 (gy brown), Moderate rxn in HCl, unconsol, one small cobble taken from core barrel, over all coarse sample, more pebbles, less silt	1125	Coarser ↓
	120'	D	Moist	SAND 5% VEP, 10% UCS, 20% CS, 35% MS, 15% FS, 15% VFS Moderate-well sorted, 60% BS&T, 40% Si-rich (predom cl. gtz) Dry color 10R 1/2 (gy brown) Moderate rxn in HCl, unconsolidated Some sand "clots" w/ Calcium Carbonate cements. Sample is very similar to previous	1140	Same
	125'	D	Moist	SAND, 2% VEP, 3% UCS, 10% CS, 30% MS, 30% FS, 25% VFS well sorted, 60% BS&T, 40% Si-rich (predom gtz Tr. micas, Tr. Fe stain) Dry color 10R 1/2 gy brown Moderate rxn in HCl, unconsol, some sand "clots" w/ CaCO ₃ cement, Finer grained than previous	1200	finer ↓
REMARKS: 725						

D - Drive Barrel H - 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

5/5

DRILL LOG		By T. Gilmore	Rig BE 22-1412	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
		Date 3/15/88	Wash 1517	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 3/4"				Welding 9' 11 3/4" at 10" 117' 11 3/4" Total	1255	
117' 11 3/4"				Respiratory Protection monitor did not find detectable amounts of ammonia at well head	1255	
	130'	D	Moist	SAND 1% Mp, 1% Fp, 3% VEF, 10% VCS, 5% CS, 30% AB, 25% FB, 15% VFS Moderate - well sorted, 60% BSLT, 40% Si-rich (predom. cl. - wht qtz, Truncas, rd-ang. Felspar on qtz, chrt) Subangular - angular, Dry Color 2.5K 3/4 (gy brn), Moderate rxn to HCl, unconsolidated, coarse grained than previous sample	1420	(coarser)
117' 11 3/4"						Too much open hole
8' 7"						Sand casing in
126' 4 3/4"				Welding 8' 7" at 10" 126' 4 3/4" Total	1450	
				End of Day	1530	
REMARKS: casing 126' 4 3/4" at 10" Footage 42' 3/15/88 T. Gilmore TD 130'						

D - Drive Barrel H - 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.111

123

DRILL LOG		By T. G. Jones	Rig BL 22 1410	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
		Date 5/16/88	Wash 1517	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" at 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';	715	
				no detectable amounts		
	135	D	Moist	SAND 1% FP, 1% VF, 3% CS, 5% CS, 35% MS, 35% FS, 20% VE, well sorted, 40% BSET, 60% Si-rich, (greenish-white) subangular - subround, Dry color 2.5K 3/4 (yellow), Moderate rxn in HCl, acc. sandified w/ CaCO ₃ cement (very similar to previous sample (few wires)	720	
	140	D	Moist	SAND 5% CS, 30% MS, 35% FS, 25% VE, 5% Silt, very well sorted, 40% BSET, 60% Si-rich, (pinkish-white) subangular to subround, Dry color 2.5K 3/4 (yellow) moderate rxn in HCl, some sand "clods" cemented w/ CaCO ₃ , unconsolidated, few wires - 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)

B.112

283

DRILL LOG			By T. G. Moore	Rig Bugsy's 82-1410 Wgt. 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
				Respiratory Protection Monitor slaved up, found no detectable ammonia		750	
126' 4 1/4"							
133' 0"				Welding 6' 7 1/4" dia 133' 0" Total		755	
	145'	D	Moist	SAND, 2% Fp, 5% VFP, 8% KS, 35% C, 30% MS, 15% FS, 5% VFS, well sorted, 40% BSET, 60% Si-rich (predom. slt gtz, Tr. micas, some Fe stn), subangular, pebbles are subround, Dry color 25K 1/2 (Hbrngy), slight rxn in HCl, <u>no</u> sand "clods" overall coarser grained, less micas, less CaCO ₃		850	
	150'	D	Moist	SAND 1% VFP, 0% KS, 5% C, 25% MS, 25% FS, 20% VFS, 4% silt well sorted, 40% BSET, 60% Si-rich (predom. slt gtz, few micas) subangular, Dry color 25K 1/2 (Hbrngy), Moderate rxn in HCl, some sand "clods" w/ CaCO ₃ & silt cement, (mod. strong rxn in HCl), Unconsol, Finer grained than previous, more CaCO ₃ & silt		910	
REMARKS: 136							

B.113

D - Drive Barrel H - 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)

343

[illegible]

D - Drive Barrel H - 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.114

183

DRILL LOG			By T Gilmore	Rig Bryant Eric 22-160	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 well head			
				Welding 8" casing string		705	
151' 6 1/2" of 8"				18-2 3/4, 20-8 1/2, 19-8, 17-3 1/4, 18-9 1/4, 19-3 1/4, 19-4, 18-3 8" casing added			
				Drilling		1050	
155'	D	moist		SAND 25%CS, 40%MS, 25%FS, 10%VES, very well sorted, 35% Basalt, 65% Silica-rich (predom. clg & 2, Tr. mica, subangular, Dry color 2.5K 1/2 (gy. brn), slight rxn in HCl, unconsolidated, more mica, better sorted and less rxn in HCl than previous sample (No sand "clods")		1105	
160'	D	moist		SAND 38%VEP, 7%VES, 10%CS, 35%MS, 25%FS, 20%VES, well sorted, 40%BSLT, 60%Si-rich, (predom. clg & 2, Tr. mica, orange-rd chrt.) Dry color 2.5K 1/2 (gy. brn), moderate rxn		1120	
REMARKS:							
<p style="text-align: right;"> Reviewed by J. K. H. H. H. 3-17-88 </p>							

D - Drive Barrel H - 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.115

243

DRILL LOG		By T Gilmore	Rig Buehns Erie 92-1410	Well Number 999 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 "clots" have strong rxn in HCl, appear to have CaCO ₃ cementing, generally unreacted, sample is slightly coarser grained and has more CaCO ₃ than previous sample		CaCO ₃ rich
151'-6 1/2"						
163'-8" at 8"				Welding 16' 1 1/2" at 8" 163'-8" Total	11:50	
165'	D	moist		SAND 5% UCS, 25% CS, 35% MS, 25% FS, 10% VFS, well sorted, 40% BSIT, 60% silica-rich, (predom clg qtz, Tr mica, occ wnt qtzite) angular to sub angular, Dry color 2.5K 1/2 (gy low), moderate to strong rxn in HCl, abundant sand "clots" w/ CaCO ₃ cement, unconsolidated to slightly consolidated very similar to previous	14:00	CaCO ₃ rich
170	D	moist		SAND 1% VEP, 24% UCS, 30% CS, 35% MS, 10% FS, 10% VFS, well sorted, 35% BSIT, 65% Si-rich, (predom qtz, more wnt quartzites, few micas) subangular to angular, Dry color 2.5K 1/2 (gy low), strong rxn in HCl, abundant sand "clots" w/ CaCO ₃ cement,	14:15	CaCO ₃ rich coarser grained qtzite
REMARKS:						

16
Reviewed by JH 3-17-88

B.116

3/3

DRILL LOG		By T. Gilmore	Rig Bryans Eric 20-1410	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
		Date 3/17/87		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" to 8" 173' 6 1/4"	1430	
173' 6 1/4"						
	175'	D	moist	SAND 5% UCS, 20% CS, 40% MS, 25% FS, 10% VFS, very well sorted, 40% BSLT, 60% Si-rich (predom. chert, often w/ Fe stain, occ. ring-banded, abnt wht glauk) subangular, dry color 2.5R 2.5 (yellow), moderate earthy HCl, unconsolidated, less CaCO ₃ , finer grained, better sorted than previous sample	1520	
				End of Day	1530	
REMARKS: Ft 25' DB 175' 3/17/87 T. Gilmore Casing 173' 6 1/4"						

B.117

4/6

DRILL LOG		By T. Gailmore	Rig Ducous Eric	Well Number 299 F17 16	Computer Number 6H	Project or Work Order No.
		Date 3/15/88	22-10-10	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' 6 1/4" at 8"				Geologist's Bill of location	700	
	180'	D	Moist	SAND 10% VC, 19% CS, 40% MS, 30% FS, 1% VFS, very well sorted, 50% Basalt, 50% Silica-rich (predom. clg gtz, some wht gtzite, Fe stg gtz, i. clt) subangular to sub-round, Dry color 2.5Y 7/2 (brown), "Salt & pepper" appearance w/ ltk ltk i. clg gtz, slight to moderate ex. in HCl, very few sand "clods", unconsolidated, less CaCO ₃ and better sorted than previous. (and i. moist sample taken)	720	M. Sand, no CaCO ₃
173' 6 1/4" 9 1/4"						
182' 10 1/4"				Welding 9' 4 1/4" at 8" 182' 10 1/4"	725	
	185'	D	moist	SAND 5% CS, 55% MS, 35% FS, 5% VFS, very well sorted, 40% Basalt, 60% Silica-rich (predom. clg gtz, Fe mica, wht gtzite Fe stg gtz, avg clt i. a gray translucent rock) subangular to subangular, Dry color 2.5Y 7/2 (yellow), moderate to strong ex. in HCl, sand "clods" w/ CaCO ₃ cement, more CaCO ₃ than previous. Unconsolidated (and i. moist sample taken)	810	
REMARKS:						

✓

286

DRILL LOG			By T Gilmore	Rig BE 22-H40	Well Number JY 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, 35% FS, 5% VFS, very well sorted, 50% BSlt, 50% Silica-rich, (predom clg gtz, few micas, abnt org Fe stn gtz), subround to subangular, Dry color 2.5R 6/2 (brn gy), "salt & pepper" app. rock w/ Bk lss clg gtz, moderate rxn in HCl, some sand "clods" w/ CaCO ₃ cement, unusual, very similar to previous. Geol: Moist sample taken		820	
185' 10 1/2" 9' 11"	195' 9 1/2" of 8"			Welding 9' 11" of 8" 192 9 1/2" of 8" total		825	
				Hole cased in ~10'			
	195'	D	Moist	SAND 1% VEP, 4% VCS, 10% CS, 45% MS, 30% FS, 10% VFS well sorted, 35% Basalt, 65% Si-rich (predom clg gtz, acc wht glau, org Fe stn gtz, very fine micas, no salt, no pyrite, rare) subangular, Dry color 2.5R 6/2 (brn gy), slight to moderate rxn in HCl, not as well cemented as previous, more solidified, similar to previous sample. Geol: Moist sample 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)

B.119

346

DRILL LOG		By T. Gilmore	Rig Bucyrus Fr's	Well Number 299 E 17 10	Computer Number NA	Project or Work Order No.
		Date 3/18/89	Drill 30-1910	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% VEP, 30% UCS, 30% CS, 25% MS, 15% FS, 5% VFS well sorted, 35% BSLT, 65% Silica-rich, (Predom clgtz, occ wht gtzite, avg-yel clt, Festig tzt), Subangular, Dry color 25% (brngy), 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 Good moist sample taken	1045	Coarser gr Calcrete layering
195' 9 1/2"						
200' 9 1/2" d 8"				Welding 8' 0" d 8" 200' 9 1/2" Total		
				RPT showed up	1100	
	205'	D	Moist	SAND 10% VEP, 15% UCS, 35% CS, 25% FS, 5% VFS well sorted, 50% BSLT, 50% Silica-rich, (Predom clgtz and wht gtzite, occ clt) Subangular, Dry Color 25% (Brngy), "Salt and Pepper" appearance w/ blk BSLT & wht clgtz & gtzite Above blk BSLT in		
REMARKS:						

VJ

486

DRILL LOG		By T. Co. Luma	Rig Bucpros Eric	Well Number 299 EIT 16	Computer Number N/A	Project or Work Order No.
		Date 3/18/88	2. 1412	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 sand clots or layers of poorly developed caliche, unconsolidated sample is coarser grained than previous sample moist: Good sample		
				Checked for gamma - none detected	1250	
				used photo-ionizer, occasional deflection on meter, no consistent reading		
300' 9 1/2"						
8' 4 1/2"						
209' 2"				Welding 8' 4 1/2" of 8" 209' 2" Total	1300	
	210	D	Moist	SAND, 2% Fp, 3% VFp, 10% VCS, 15% CS, 30% MS, 25% FS, 10% VFS, 5% Silt, well sorted, 40% BSCT, 60% Sil ca - in (predom. calc. gtz, some wht gtzite), subangular, Dry color 2.5R 5/6 (py. brn), moderate to strong rxn in HCl, some sand clots w/ CaCO ₃ cement unconsolidated, coarser grained than previous sample, and contains silt, some silt may form thin layers in subsurface moist: Good sample	1350	Silt
REMARKS:						

76

D - Drive Barrel H - 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.121

546

DRILL LOG		By T.G. [signature]	Rig Buzgus Etc	Well Number 299 E1716	Computer Number 119	Project or Work Order No.
		Date 3/18/88	32-1410	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% BSIT, 50% silica-rich, (predom. drg. and wht. qtzite), Dry color 2.5Y 6/2 (brn), moderate to strong rxn in HCl, some CaCO ₃ cemented sand "clots", fragments of a slight to moderately consolidated silt layer, generally sand is unconsolidated. Sample has more silt than previous sample. Geol: Moist Smp	1410	Silt layer Silt Caliche 2.5Y 6/2 Loose Sand
	9' 3/4"					
	218' 5/4"			Welding 9' 3/4" to 218' 5/4" Total	1415	
	220'	D	moist	SAND 3% VFP, 30% VCS, 30% CS, 25% MS, 15% FS, 10% VFS, well sorted 50% BSIT, 50% silica-rich, (predom. drg. & wht. qtzite) subangular, Dry color 2.5Y 6/2 (brn), moderate rxn in HCl, some CaCO ₃ cement, generally unconsolidated, very similar to previous without the silt. Geol: moist Smp	1500	
REMARKS:						

JLB

D - Drive Barrel H - 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.123

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Vary 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-H40 (Kaiser)	Well Number 299 E17 16 Depth 225' To 235'	Computer Number NA	Project or Work Order No. Kaiser
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
218' 5/4"	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. peduncle gtz, Tr. wht gtzite, gran. trans. rock?, abut. avg. Fe stn) Subangular, Dry color 2.5K 1/2 (brn. gy), moderate to occ. strong rxn in HCl. Core barrel sample is layered w/ ~ 5cm thick CaCO ₃ cemented layers (mod. developed caliche) often topped w/ a thin (<1cm) layer of silt, unconsolidated, similar to previous sample	720	Silt layers w/ caliche
218' 5/4"	9 9			Moisture: Geol. sample		
228' 0 1/4"				Wetting 9' 9" of 8" 228' 2 1/4" Total	740	
	235'	D	moist	GRAVELY SAND 2% MP, 5% FP, 8% VFP, 20% VCS, 30% CS, 15% MS, 8% FS, 7% VFS, 5% Silt, moderate - poor sort, 50% BSST, 50% Silica-rich (peduncle gtz w/ wht gtzite, gran. trans. rock?, Fe stn on gtz similar to previous micrology), Subangular, Dry color 10PR 5/1 gray, slight to moderate rxn in HCl, unconsolidated	850	Silt layers w/ caliche, gravel <u>Lith Change</u>
REMARKS: 2005						

D - Drive Barrel H - 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.124

282

DRILL LOG			By T Gilmore	Rig BE 22-1410 KO'SW	Well Number 299 E17 16 Depth 235' to 240'	Computer Number 1/A	Project or Work Order No.
			Date 3/21/88			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 calcite in sample also. Sample showed an increase in CaCO ₃ and is coarser grained than previous sample Fe staining also increased at 232', abundant silt/calcrete layers, Moist; Geol. Supt Well log 9' 1" at 8" 237' 3/4" total		905	
238' 3/4" 9' 1"	237' 3/4" at 8"						
	240'	D	Moist	SLIGHTLY GRAVELLY SAND 29% sp, 2% Fp, 6% UP, 20% VC, 30% CS, 20% MS, 5% FS, 7% ES, 5% Silt, Moderate - pres sorting, 40% Basalt, 50% Silica-rich (predom clg & w/ wht, pink granite, gen metamorphic, abundant Fe st.) Dry color 10R 5/1 (gy), moderate to strong v. in a HCl, abundant pieces of dk brn silt; very thin hard layers associated w/ CaCO ₃ cemented sands, basalt gravels are low sphericity, subangular, slightly consolidated Similar to previous Geol. moisture sup.		1010	dk brn silt layer assoc w/ CaCO ₃ , slightly consolidated
237' 3/4" 9' 8 1/2"	246' 11 1/2"			Welding 9' 5 1/2" at 8" 246' 11 1/2"		1030	
				John Keller of Kaiser shut rgs down for Day; Westinghouse and the State Dept of Ecology are in discussion		1250	
REMARKS: DB 244' Casing 246' 11 1/2" F+ 19'							

John Gilmore

10/5

DRILL LOG		By T. Gilmore	Rig Bucyrus Erie	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
		Date 3/22/88	22-1410	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' 11 1/2"				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, 15% MS, 10% FS, 10% VFS, 5% Silt, Moderate-poor sorting, 55% Basalt, 45% silica-rich, (predom. cl. & 2, ac. wht. gtz. & abundant Fe stn), 51% (gy. brn), Malate to strong rxn in HCl, slightly consolidated, similar to previous sample. Moist (Good Snds) - After lith change at ~235' the color changed slightly and material consistent from 16 to 20 to a brgy (difficult to match on soil color charts) sorting decreased; silt & gravel fractions increased, and sample was slightly more consolidated. Change may be the Ringold / Harford contact	1030	
				Driller having more trouble keeping sample in Core barrel		
REMARKS: 26						

D - Drive Barrel 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)

B.126

285

DRILL LOG			By T Gilmore	Rig Bucyrus Erie	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
			Date 3/22/88	Age 22-1910	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	GRAVELLY SAND 1% Sp, 4% Mp, 10% Fp, 10% Vp, 15% VCS, 20% CS, 15% MS, 10% FS, 10% VES, 5% Silt, poor-moderate sort, 50% Basalt, 50% Silica-rich (predom clv gtz, w/ wht gtzites i about Fe Stn), Subangular to Subround, Gravela predom subround w/ moderate sphericity, Dry color - 5Y 4/2 (g/brn) (not exact color match, and more colors), Moderate to strong rxn in HCl, Sample shows layering of wht casing cementing Silt i Fe Stn commonly associated w/ cementing (poorly developed), layering is ~ 6cm thick usually, slightly consolidated, similar to previous, layering is more apparent than previous sample Moist i Good sample			1125
	255'	D	Moist	SLIGHTLY GRAVELLY SAND 2% Mp, 3% Fp, 5% Vp, 15% VCS, 20% CS, 15% MS, 10% FS, 10% VES, 5% Silt, moderate - poor sort, 50% BSCT, 50% Silica rich (predom clv gtz, w/ wht gtzites, Fe Stn), Subangular to Subangular, moderate rxn in HCl, slightly consolidated, similar to previous sample, fine grained w/ less caliche layering apparent, Good i moist sample to some			1200
REMARKS: <div style="text-align: center;">✓</div>							

B.127

385

DRILL LOG			By T Gilman	Rig BE	Well Number 277 E 12 16	Computer Number NA	Project or Work Order No.
			Date 3/22/88	22-1910	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 in air picked up the slightest reflection as the sun scale and was not steady, samples did not show any deformation. Odor was not ammonia and was not identifiable by driller checked well w/ poly test detector tube, nothing detected well is "blowing", low pressure system likely in area		1200	
246' 11 1/2 9 3/4	256' 2 3/4			Welding 9' 3/4 at 8" 256' 2 3/4		1300	
	260'	D	Moist	GRAVELY SAND 1% Mp, 7% Fp, 12% VEP, 30% VCS, 25% CS, 15% MS, 8% FS, 2% VES, 5% Silt, Moderate-poor sort, 70% Basalt, 60% Silica-rich, (predom gtz; glzite in sand fractions, some avg-yel Fe stain on grains, some gtz grains show traces of blk amphibole, parts of granites?) Gravels are predom basalts, and subround, Sands are sub angular, Dry color 5R 6/2 (yellow), moderate to strong rxn in HCl, CaCO ₃ cement shows up as white matrix in thin-bedded layers, associated w/ Fe sil and silt layer, slightly consolidated, similar to previous sample Moist; Good sample		1400	
REMARKS:							

B.128

485

DRILL LOG		By T Gilmore	Rig Bogus Etc	Well Number 299 E17 16	Computer Number AH	Project or Work Order No.
		Date 3/22/88	32-1410	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
260' 2 3/4"	9 1/2"			Welding 9' 1 1/2" at 8' 265' 4 1/4" Total	1440	
265' 4 1/4"						
	265'	D	Moist	SLIGHTLY GRAVELLY 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 gtz), Gravels predom Basalt, abundant Fe stn, sand clots 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 SPR 1/2 (gy br) moist: geol 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 gtz w/ gtzite) abt yel-ang-brn Fe stn on grains and oxides on grains as previous, subangular, moderate to strong rxn in HCl, abt 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)

ORILL LOG		By T Gilmore	Rig BE	Well Number 299 E17 16	Computer Number NH	Project or Work Order No.
		Date 3/22/88	33-140	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
365' 4 1/2"	9' 10 1/2"			Welding 8' 10 1/2" at 8" 274' 2 3/4" Total	1610	
274' 2 3/4"						
	275'	D	Moist	SAND 20%AKS, 20%KS, 30%MS, 15%FS, 10%VFS, 5%SiH, Moderate-well sort, 50%BSLT, 50%Si-rich, subangular, 5PR 1/2 (brgy), moderate rxn in HCl, slight consolidation, very similar to previous moist & Cool Snpls	1725	
				End of Day	1735	RPT came 1730
REMARKS:						
Ft 35' DB 275 3/22/88 John Gilmore casing 274' 2 3/4"						

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

184

DRILL LOG			By T Gilmore	Rig Bucyrus Erie	Well Number 299 E12 16	Computer Number NA	Project or Work Order No.
			Date 3/23/88	22 - H101	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"	274'	D	Moist	Geol: Driller on location - Drilling		655 700	Lith change at 26' finer grained
	280'	D	Moist	SAND 38 VCS, 12 BCs, 10% FS, 25% FS, 15% VFS, 5% Silt, Moderate well sorted, 40% Basalt, 60% Silica-rich (which 15% clg & 15% white quartz, 50% iron staining, 5% quartz 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 sample		730	
284' 2 3/4"	282' 5 1/2"			Welding 8' 2 3/4" d 8" 882' 5 1/2" Total		745	
	285'	D	Moist	GRAVELY SAND 1% small cobble, 7% Cp, 7% Mp, 10% Fp, 15% VFP, 10% BCs, 10% FS, 7% VFS, 5% Silt, poorly sorted, Gravels are 60% Basalt, 40% Silica-rich, (incl diorites), Sands 40% Basalt, 60% Silica rich (predom clg & w/pt & mica, mica) Gravels are subround - round (av. moderate sphericity) (flat), Sands are subangular, Dry color 2.5YR 5/2 (grayish brown), moderate		925	283 Gravels hit sandw/ C-M pebbles 1' Silt/Clay layer at 286'
REMARKS: JB							

B.131

264

DRILL LOG			By T Gilmore	Rig Bugurus Erie	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
			Date 3/23/88	29-1401	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 smpl			11th 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: gravel/sand
				Alternating layers of silt/clay and gravelly sand ~ 1'-2' thick each 285-			
				Silt at 288 has layers 1mm thick, are alternating light colors appear to be rhythmites, (flow related) other layers 1-2cm thick w/ fine sand interbeds and fining upward into silts and clays, (small Bouma sequences?) one thin layer at 289 has medium-coarse pebbles in it			
	290'	D	moist	SAID 12%Mp, 32%Fp, 52%Vp, 52%US, 10%G, 35%MS, 25%FS, 10%US, 52%Silt, Moderate sort, predom MS, 50% HSET, 50% silica-rich, Gravels are subround, sands subangular, Dry color YR 4/2		1025	
REMARKS:							

U - Drive Barrel H - 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.132

38/4

DRILL LOG		By T. Gilmore	Rig Bucyrus Erie	Well Number 199 E17 16	Computer Number NA	Project or Work Order No.
		Date 3/23/68	32-14/01	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 run in HCL, slight consolidation, lost most of the silt and is back to sand moist; Good sample		
282' 5 1/8"	282' 3/4"					RPT came 1055
290' 6 1/4"				Welding 8' 3/4" of 8" 290' 6 1/4" Total	1040	
	295'	D	Moist	SLIGHTLY GRAVELLY SAND 22% Gp, 32% Ep, 10% VFp, 20% MS, 25% CS, 20% MS, 10% FS, 5% VFS, 52% S:1:1 poor-moderate sand, Gravels are 60% BSLT, 40% Si-rich (incl chit) Sands are 40% BSLT and 60% Silica-rich (predom slt & gtz 12/9 tite, chit and micas) Dry color 5PR 1/2 (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 sample	1140	Silt ~ 1/2" thick w/ interbedded gravels
290' 6 1/4"						
298' 4 1/4"				Welding 7' 10" of 8" 298' 4 1/4" Total	1240	lunch 1200 - 1230
REMARKS: 76						

D - Drive Barrel H - 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)

464

DRILL LOG		By T. Gilmore	Rig Bucyrus Erie	Well Number 299 E17 16	Computer Number 114	Project or Work Order No.
		Date 3/23/88	22-14101	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 12% Fp, 10% VFp, 82% KS, 10% CS, 40% MS, 20% FS, 15% UFS, 5% Silt Moderate - well sort, Sands are 40% BS&T, 60% Silica-rich, (predom. clv gtz), subangular, Dry color SPR 6/2 (yellow), Moderate to strong rxn in HCl, layers of CaCO ₃ cemented Sands (approx 5mm thick) CaCO ₃ cement is associated (capped) by a very thin layer of dk brown silt, slightly consolidated, better sorted, and less silt in matrix. Geol's moist sample	1340	Thin Silt/Calcs layers
208' 4 1/4"	7" 3/4"			Welding 7' 1 3/4" at 8" 306' 3" Total	1420	
306' 3"				Trouble getting sample in core barrel		RPT showed up 1500
	305'	D	moist	SANDY GRAVEL 7% Cp, 8% Mp, 10% Fp, 10% VFp, 10% UFS, 10% CS, 20% MS, 10% FS, 10% UFS, 5% Silt, poor sort, Gravels are 35% BS&T, 65% Si-rich (incl gtzite, ch + diorite), Sands are 30% BS&T and 65% Silica-rich (predom. clv gtz) Gravels are round to sub-round, Sands are subangular, Dry color SPR 6/2 (brown), Moderate rxn in HCl, Sample coarser and poorer sorted than previous sample. Geol's moist sample	1630	
					1730	RPT came 1730 End of Day
REMARKS: Ft 30' casing 306' 3" DB 305 T. Gilmore 5/23/88						

B.134

18 1/2

DRILL LOG			By T. Gilmore	Rig Dacynus Eric	Well Number 299 E17 16	Computer Number NA	Project or Work Order No.
			Date 3/24/88	22-14101	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 Changing drive barrel to hard Tool & helping set rig up on E17-15		700	unable to verify hard tool has been steamcleaned, visually it looks clean
313' 9 1/2" of 8"				Welding 7' 6 1/2" of 8" 313' 9 1/2" Total		1005	
				Drilling		1135	Add 10 gal water
310'	H	116t		SANDY GRAVEL 20% Fp, 20% VF, 10% CS, 15% VC, 15% Silt, 5% FS, 2% VFS, 5% Silt, poor-moderate sort, Gravels: 60% Basalt, 40% Silica-rich (in decr % gtzite, gneissitic, 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, Slight consolidation, not a representative sample, Gravel sup/ltas		1310	Note: Switch to Hard Tool Add 10 gal water
313' 9 1/2" 7-5							
321' 2 1/2"				Welding 7-5 321' 2 1/2" Total		1400	
REMARKS: JLB 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)

242

DRILL LOG		By T. Gilmore	Rig B.F.	Well Number 299 E 17 1/2	Computer Number AH	Project or Work Order No.
		Date 3/24/88	Job 23-PR01	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% AP, 12% FP, 2% VFP, 15% VCS, 15% CS, 5% M, 10% FS, 10% VFS, 5% Silt. poor sort, Gravel: 60% Basalt, 40% Silica-rich, (10% pt granite, 10% wet granite, 10% granite, 10% metamorphic), fragmented, Sands: 60% Basalt, 50% silica-rich, (clastic product) subangular, Wet SPR 3/4, Dry SPR 1/2, Moderate rxn in HCl, slight consolidation, Sample has more gravel than previous sample - End sample taken	1510	
321' 2 1/2"	5' 11"			Wetting 5' 11" at 8" 327' 1 1/2" Total	1605	Hit water surface 321'
327' 1 1/2"						
	320'	H	Wet	SLIGHTLY GRAVELLY SAND 6% FP, 9% VFP, 15% VCS, 35% CS, 20% M, 10% FS, 10% VFS, 5% Silt, Moderate sort, Gravel: 35% Basalt, 15% Silica-rich (20% pt granite, 20% gte, 20% granite metamorphic, 5% other) fragmented, Sands: 60% Basalt, 40% Silica-rich, (granitic clastic), subangular, Wet color SPR 3/4, Dry color SPR 1/2, Slight rxn in HCl, slightly consolidated, more sand than previous sample	1655	
REMARKS: 74 14' DB 322						
Casing 327' 1 1/2"						
Z. Gilmore 3/24/88						

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

A 6000 021 (5 85)

43

DRILL LOG		By T. G. Moore	Rig Burgess Eric	Well Number 299 E 17 16	Computer Number NA	Project or Work Order No.
		Date 3/25/88	12-14101	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 1/2				Geologist and Driller on location	655	
94				Check water level; approx 312.5'; the steel tape used to measure casing is muddy; the reading may not be actual static, but well is believed to be fairly good off		
326 5/8						
				Drilling	705	
				Welding	715	
				Added 4" of 8"		
	325'	H	Wet	SAND 17% FP, 18% VFP, 15% WFS, 33% CS, 35% MS, 10% FS, 5% VFS Well sorted. (Gravels) - 50% basalt, 50% quartzite and qtz. (Sand) - 85% basalt, 74% clear, milky, yellow, orange, gray qtz/quartzite, 12% biotite. Gravels are angular to rounded. Sands are subangular to rounded. Wet color: SY 2/1 (very dark gray). Dry color: SY 2/2 (light gray). No reaction to 10% HCL. Slightly consolidated. Less gravels than previous sample. Geologic sample taken.	0920	
REMARKS:						

B.137

2 of 3

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% gtz, gtzite, chert, and Si-rich igneous. (Sand)- 35% basalt, 65% gtz, gtzite, and chert. Gravels are angular to sub-angular. Sands are angular to sub-angular. Wet color: 5Y 7/1 (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, gtz, gtzite and chert. (Sand) 40% basalt, 60% gtz, gtzite, 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 (light gray). 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:							

B.138

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

A-6000-027 (5-88)

3/3

DRILL LOG			By T Gilmore	Rig BE	Well Number 399 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 1/2 sack 10-30 California Silica Sand			
				Depth to bottom 329'		1405	
				Welding (2) 10' 3/8" 8" telescoping stainless steel screens; Screen is different from specifications, but OK'd by PUL & Westinghouse.			
				Welder is certified in stainless steel (ret. John Keller at base)			inspection
				One screen in original plastic wrap; the other has been steam cleaned (ret. John Keller). Visually it looks clean.			
				Screen set -- Depth to Bottom 329'		1605	
				Pulled casing to expose screen -- Exposed 12' (pulled back to 312' of casing in ground)			
REMARKS: TD 337 Casing pulled to 314' weld 3/25/88 T Gilmore Screen at 329'							

B.139

DRILL LOG			By <i>T Gilmore</i>	Rig <i>Bacpus Erie</i>	Well Number <i>299 E17 16</i>	Computer Number <i>NA</i>	Project or Work Order No.
			Date <i>3/25/88</i>	<i>22 - H101</i>	Depth <i>TD</i> 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 vial		750	
				prepared sample containers filled up and placed in ice chest			
				Samples are delivered to USTesting w/ Chain of custody forms			
				Geophysically logging well; Gamma, Neutron, & Density logs		~840	
				Done logging		~1030	
				Teaming Rig down and moving to well E17-18			
				Pump overrides, waiting on Crane to place in hole		1230	
				End of Day		1730	
REMARKS: <i>3/25/88 T Gilmore</i>							

D - Drive Barrel H - 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

Date

3/29/85

Rig

Burgess Entz
14101 (Maurice Jr.)

Walt Number

299 E17 16

Depth

TD To

Computer Number

NA

Project or Work Order No.

Subcontract No. _____

**Total
Casing**

Depth

Drill Method

Wet/Dry
Sample

LITHOLOGIC DESCRIPTION
% Each Grain Size, Color, Roundness, Caliche, Etc.

Time

Drilling Comments

42 hp pump just ordered has too large a diameter to fit in well w/ measuring equipment. Need to go to a smaller pump. Presently looking for alternative pump.

727

Found a 30hp to fit in well
Whiting to set pump and discharge line
End of Day

1430

REMARKS:

3/27/88

Belmont

B.141

B.142

D - Drive Barrel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _____ Standing Water A-6000 (27) (5-85)

131

[illegible]

B.143

D - Drive Barrel 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 RL Carden	Rig #13	Well Number 299 17-16	Computer Number	Project or Work Order No.
Total Casing	Depth	Drill Method	Date 3-28-88		Depth 329'6" To 329'6"		Subcontract No.
			Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time *	Drilling Comments
				TOTAL 8" Casing (315' H") IN Hole		6:53	START
				TOOK OFF BIT PUT ON JARS GETTING		7 AM	Safety Meeting
				READY TO MOVE.		7:15	Baling well
						8:45	Logging well
						10:45	Moving Rig
						12:00	Moved off this hole
							See Logbook
REMARKS:							

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

DRILL LOG		By R. L. Cordon	Rig #3	Well Number 299-17-16	Computer Number	Project or Work Order No.
		Date 8-25-88		Depth 328 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		" 1/2" GRAVEL	10:20	Sample
335	H	W		SAND & " "	11:30	Sample
335.6'				SAND & GRAVEL	11:35	drilling & pulling
				PULLED 3' 9" CASING 337 - 3' 9" = (333.3')	12:00	LUNCH
				WELDED TWO 10' SCREENS TOGETHER	12:40	PULL CASING
				SCREEN BOTTOM AT 329.6" (GEOLOGIST OKAY)	TO SET SCREEN	
				PULLED 17' 4" (-17.4) → 315.11 CASING	4 pm	SET SCREEN
				(315.11') TOTAL LEFT IN HOLE	PULLING CASING	
					5:30	Shut down
						Jim Cordon
MARKS: 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)

DRILL LOG		By	Rig	Well Number	Computer Number	Project or Work Order No.
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
+ 7-6 1/2					730	HELP ON BOLT
= 314-3 1/2					12AM	WELD CASING
+ 7-5				CHANGED TO HARD TOOLS	1040	HELP ON BOLT
= 321-8 1/2					1130	DRILLING
+ 5-1 1/2					12:00	LUNCH
= 327-8					1430	DRIVING
	310	H	W	Sand & Gravel	1:05	SAMPLE
	"				1:10	WELDING
					1:55	DRILLING
	315	H	W	Sand & Gravel	3:00	SAMPLE
				HOT WATER @ 313 TO 317 APPROX.	4:00	WELDING
					4:40	DRILLING
	320	H	W	Sand	5:00	SAMPLE
					5:30	SHUT DOWN
						Jim Gordon
MARKS: 320' - 325 - 330						

DRILL LOG			By R. L. Gordon	Rig # 3	Well Number 299-17-16	Computer Number	Project or Work Order No.
			Date 3-23-88		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
274.75						6:56	Start Rig
+ 8-2 1/2	280	D	D	SAND		7:25	Sample
- 282-10 1/2						7:50	Welding
+ 8-3 1/4						8:40	Drilling
= 290-11 1/4	285	D	D	Sand & Gravel		9:25	Sample
+ 7-10	289			CLAY			
298-9 1/4	290	D	D	Sandy Clay		10:20	Sample
+ 7-11 3/4				Changed to Sand & Gravel (293')		10:25	Welding
= 306-9						11:10	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 & Helped
						3:30	Drilling
	305	D	D	Sand & Gravel		4:30	Sample
To much GRAVEL Cannot pick with Barrel							
MARKS: 185' - 290 - 295 - 300 - 305 - 310 - 315							

DRILL LOG		By <i>RL Cordon</i>	Rig <i>#3</i>	Well Number <i>299-17-14</i>	Computer Number	Project or Work Order No.
		Date <i>3-10-88</i>		Depth <i>243</i> To <i>275</i>		Subcontract No.
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
<i>147 1 1/4</i>					<i>7AM</i>	<i>Put drill line on rig</i>
<i>19-5 1/4</i>					<i>9:30</i>	<i>start drilling</i>
<i>256-8</i>	<i>245</i>	<i>D</i>	<i>D</i>	<i>Sand & Gravel (Hard to keep in barrel)</i>	<i>10:30</i>	<i>Sample</i>
<i>19-1 1/2</i>	<i>250</i>	<i>D</i>	<i>D</i>	<i>" " " " "</i>	<i>11:25</i>	<i>"</i>
<i>265-4 1/2</i>	<i>255</i>	<i>D</i>	<i>D</i>	<i>" " " " "</i>	<i>12:00</i>	<i>" + LUNCH</i>
<i>18-10 1/2</i>					<i>12:30</i>	<i>Welding</i>
<i>274-7 1/4</i>	<i>260</i>	<i>D</i>	<i>D</i>	<i>" " " " "</i>	<i>1:15</i>	<i>Drilling</i>
	<i>265</i>	<i>D</i>	<i>D</i>	<i>"</i>	<i>2:05</i>	<i>Sample</i>
	<i>270</i>	<i>D</i>	<i>D</i>	<i>"</i>	<i>3:50</i>	<i>- "</i>
					<i>3:55</i>	<i>Sample</i>
					<i>4:20</i>	<i>welding</i>
					<i>4:42</i>	<i>Drilling</i>
	<i>275</i>	<i>D</i>	<i>D</i>	<i>SAND</i>	<i>5:25</i>	<i>Sample</i>
					<i>5:30</i>	<i>Shut down</i>
						<i>Landon Cordon</i>
MARKS:						
<i>Mark 255-260-265+270-275-280-285</i>						

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

4 8000 031 15 001

DRILL LOG			By RL Cordon	Rig #3	Well Number 299-17-16	Computer Number	Project or Work Order No.
			Date 3-21-88		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
218-8 1/2						7:14 AM	START
+ 9-9	230	D	D	DAMP SAND		7:20	SAMPLE
228-5 1/2	235	D	D			7:25	WELDING
+ 9-1				STARTED INTO GRAVEL AT 234'		8:15	DRILLING
237-6 1/2	235	D	D	SAND & GRAVEL		8:50	SAMPLE
+ 9-8 1/4						9:05	WELDING
247-2 3/4						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 8000 021 (5-8-81)

L. Watkins

DRILL LOG		By R. H. Cordery	Rig 7T 3	Well Number 299-17-14	Computer Number	Project or Work Order No.
		Date 5-18-83		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
173.05					6:56	START Rig
+ 9-4 1/4	180	D	D	DAMP SAND	7:15	SAMPLE
= 183-2 1/4					7:20	Welding
= 183-2 1/4					7:35	drilling
+ 9-11	185	D	D	DAMP SAND	8:10	Sample
+ 8'	190	D	D	" " 8:21	8:21	sample
= 190-0				to 190-0 8:25	8:25	weld casing
= 201-13	200	D	D	Loose damp sand 8:20	8:58	drilling
84-1						
201-4	195	D	D	DAMP SAND	10:20	sample
+ 9-3 1/4	200	D	D	LOOSE DAMP SAND	10:40	sample
= 218-8 1/2					10:45	weld casing
					11:20	drilling
	205	D	D	damp sand	12:00	sample
					12:30	weld casing
					1:25	drilling
	210	D	D	damp sand coarse	1:48	sample
	215	D	D	" " "	2:10	sample
	220	D	D	" " "	2:25	sample
REMARKS:	225	D	D	" " "	3:00	sample
CABLEWORK 180'-185'-190'-195'-200'-205' 210' 215' 220' 225'-230'						
325 West Hays London, Colorado						

B.151

C - Coarse **F - Fine** **VF - Very Fine** **S - Sanding Water**

DRILL LOG

By RH Condon
Date 3-15-88

Rig # 3

Well Number 299-17-16
Depth 90 To 130

Computer Number

Project or Work Order No.

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					6:55	START
	95	D	D	WET SAND - AMMONIA ODOUR	7:35	SAMPLE
	100	D	D	" " " "	8:05	SAMPLE
+ 8' 5"					8:10	putting on pump
= 99-11 1/4					8:20	welding casing
					9:15	DRIVE CASING
					9:25	drilling
	105	D	D	WET SAND - AMMONIA ODOUR	9:44	Sample
+ 9-11 1/4	110	D	D	" " " "	10:05	Sample
= 109-1 1/4					10:25	welding casing
					11:05	drilling
	115	D	D	Sand with couple pieces GRAVEL	11:20	Sample
+ 9-11 1/4	120	D	D	damp sand	11:45	Sample
= 118-11 3/4	125	D	D	" " " "	12:00	Sample
+ 8' 7"					12:25	drilling
= 127-6 3/4					12:35	welding casing
					1:20	drilling
	130	D	D	damp sand	2:20	Sample
					2:30	welding
					3:15	DRIVE CASING
					3:30	shot 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

92 Cordor

DRILL LOG			By L E Watkins	Rig # 3	Well Number 299-17-16	Computer Number	Project or Work Order No.
			Date 3-14-88		Depth 76' To 90'		Subcontract No.
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
71 1/2	50	DB	D	Coarse sand fine licks		7:00	start
97 1/4	85	DB	D	" "		7:15	weld casing
81 3/4	90	DB	D	" "		8:55	sample 80'
8' 7"						8:02	sample 85'
90-100'						9:25	sample 90'
						9:30	we shut down
				found ammonia ammonia in well - wait for fresh air			
						11:30	wait for air
						12:00	LUNCH
						1:00	UNLOADED AIR TANK put on MASA
							WELDED CASING
						2:00	put casing down
				Need to use fresh air supply		2:20	drilling
				NEW FORMATION AT 90'		2:40	MONITORING
						3:20	CLEAN UP
						3:30	shut down
REMARKS:						3:40	went home
Mark 100'							Robert Cordor

B-154

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 #3-224	Well Number 249-17-16	Computer Number	Project or Work Order No.
			Date 11/88		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' 0"	45	DB	D	damp sand coarse		7:00	start
8' 11 1/4"	50	DB	D	" " "		7:10	weld casing
8' 10 3/4"	55	DB	D	" " "		8:45	drilling
9' 7 1/2"	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 55'
Casing Total						11:45	sample 55'
21' 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 line 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		3:30	go home
REMARKS: measure							

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.L. Gordon	Rig E-2	Well Number 299-17-16	Computer Number	Project or Work Order No.
		Date 3/10/58		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
	0			0-5' Sandy clay	7 AM	start
						Welding DRIVE BAR
	5'	D	D	Sand & damp	7:15	Sample
	10'	D	D	Sand & fine gravel	9:20	Sample
15 5/8	15'	D	D	1" L " "	10:08	Sample
10 3/4	20	D	D	Fine Sand will not stay in barrel	10:45	Sample
25-11					12:50	Welding Casing
10-11					11:35	Drilling
36-10					12:00	Work
					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 Under Casing NO SHOE ON 12" CASING-						

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

[illegible]

WELL 299-E17-17

Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E17-17 Geologist AIRHART / TEEL / Gilmore Page 1 of 3Reviewed by J.L. McLean 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 steel casing 143'9 3/4"		10		SLIGHTLY GRAVELLY SAND
total		15		SANDY SILT
		20		SAND
		25		"
8" dia temporary carbon steel casing 336'5 1/2" total		30		"
		35		"
		40		"
8-20 mesh granular (399.1'-195')		45		"
bentonite seal		50		"
		55		"
4" dia. stainless steel casing		60		"
		65		"
centralizers		70		"
		75		"
		80		"
		85		"
Casing joint		90		"
		95		"
		100		"
		105		"
		110		"
		115		"
		120		"
		125		"
		130		"

A-1500-186 (3/87)

AS-BUILT DIAGRAM

Well Number 299-E17-17 Geologist Airhart/Teel/Gilmore Page 2 of 3

Reviewed by V.L. McLean 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

B.166

[illegible]

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

A 6000 021 (b 8b)

DRILL LOG		By AIRHART	Rig BUCKING BRUE	Well Number 299 E17 17	Computer Number NA	Project or Work Order No.
		Date 3-17-88	22H100	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, 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 cl qtz, rut, ta. mica); mod.-poorly sorted; strong rxn. w/ 10% HCl; unconsolidated. Dry color 2.5Y 6/2 (lt. brownish gray)	0850	
					0930	Added 10' of 10" carbon steel casing w/out drive shoe.
					0930-1045	changing to 8" drive barrel.
REMARKS:						

Reviewed by *[Signature]* 3/17/88 S.P.A. Hunt

DRILL LOG			By AIRHART	Rig BULKUSEIE	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
			Date 3-17-88	22-14100	Depth 5' To 10'	Subcontract No. NA	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time
Drilling Comments							
10' 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
	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 - med. sorted - (gravels) 80% basalt, 20% gts. clasts ang. to subrounded - small amount of caliche on surfaces (sand) 50% basalt, 50% gts-rich calc. gts., fsp., chrt., - grains dom. angular - dry color 2.5Y 6/2 (lt. brownish gray - caliche grains red strongly - unconsolidated - NOTE: grayish-white ashgy fine seds. evident in sample.			11:20
REMARKS:							
NOTE: May be drilling in disturbed seds. No sagebrush indicates possible back-fill area. Reviewed by [signature] 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 (5-85)

DRILL LOG			By AIRHART	Rig BULLTRUS ERIE	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
			Date 3-17-88	Depth 22-14100	Depth 10' To 15'	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' 8 1/2" of 10" casing
18' 9 1/2"	of 10" casing						10' 1" + 8' 8 1/2" = 18' 9 1/2"
						13:40	Driller having problems w/ core-barrel hitching on inside of pipe -
				Coarser gravels (MP-CP) noted @ ~12'-13'. Seds. remain sand, however.		14:30	
	15'	D	DRY	SANDY SILT: 3% gravel, 37% sand, 60% silt: 3% VFP, 10% VCS, 10% LS, 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 (cl. qtz., f-spars) angular-to-subangular - dry color 25Y 7/2 light gray - caliche grains ret. w/ 10% HCL - med. rxn. - unconsolidated.		14:50	
				NOTE: Finer & Drier than prev. sample.			
						15:30	Shut Down
REMARKS:							
S.P. Achert 3/17							

DRILL LOG			By AIRHART	Rig BUKROS 5RE	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
			Date 3-18-88	22 14100	Depth 15' To 16'	Subcontract No. NA	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
18'9 1/2"	of 10" casing					0700	DRILLER ARRIVED
				Driller continues to have problems drive barreling in this interval. Sediment is fine grained and dry. Either the barrel hitches against casing or the seds drop out.		0920	
				Sediment too dry - added ~ 5 gals H ₂ O		0935	
				Added ~ 3 gals H ₂ O		1000	
				Cutting off ~ 1.5' of drive barrel		1040	
				Added ~ 1 gal. H ₂ O		1045	
						1053	John Titus - WHC
							RPT - surveyed
							spoil w/ PAM -
							nothing detected
28'4"	of 10" casing					1200	Adding 9'6 1/2" of 10" casing.
							18'9 1/2" + 9'6 1/2" = 28'4"
REMARKS:							
SPH 3/14							

DRILL LOG		By AIRHART	Rig BRYAN ERIG	Well Number 200-E17-17	Computer Number NA	Project or Work Order No.
		Date 3-18-00	22-14100	Depth 10' To 26'		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, 10% CS, 40% MS, 30% FS, 12% VFS - mod.-to-well sorted, (gravel) angular to subrounded clasts composed of 70% basalt, 30% quartz (sand) angular to subangular grains composed of 30% basalt 70% si-rich (incl. chr. qtz, fsp, quartz, mica) - dry color 2.5Y6/2 light brownish gray - mod rxn w/ 10% HCl, unconsolidated <u>NOTE</u> : slightly compacted clasts of sand w/ CaCO ₃ matrix; less basalt in sand fraction - Took moisture sample (have been failing to note: moisture samples taken on all previous samples)	13:35	
	25'	D	Dry	SAND: 1% VFP, 99% sand: 1% VFP, 10% VCS, 25% CS, 40% MS, 15% FS, 9% VFS - mod.-to-well sorted (gravel) no Δ in gravel fraction (sand) angular-to-subangular, 30% basalt, 70% si-rich (incl. chr. qtz, fsp, chr, less mica) dry color 2.5Y6/2 light brownish gray - mod rxn w/ 10% HCl, unconsolidated.	14:25 15:15	Added ~1 gal H ₂ O. RPT coverage - scanned w/ PGW - nothing detected
REMARKS:				Took moisture sample; sediment cont. sample		

S.P.A. - 3/18

DRILL LOG			By S.S. Teel	Rig K.E. 60W	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
			Date 3-21-88	22-14100 (casing)	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
9'5 1/2"							- measuring-in
37'9 1/2"							welding casing
				Added 9'5 1/2" of 10"			
						0910	Begin drilling
	30'	D	Dry	SAND 1% MP, 1% FP, 1% VFP, 7% VCS, 35% CS, 30% 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.		0940	
	35'	D	Dry	SAND 5% FP, 3% VFP, 25% VCS, 30% CS, 25% MS, 7% FS, 5% VFS, well sorted. (Gravels) 70% basalt, 30% qtz and Si-rich including granite and gneiss. (Sand) - 60% basalt, 40% qtz, gneiss, and minor chert. Tracemica. 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. Moisture and geologic samples taken.		1025	
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)

1 of 5

DRILL LOG			By S.S. Teel	Rig B.E. 60W	Well Number 299-617 17	Computer Number NA	Project or Work Order No.
			Date 3-22-88	Open / Close 22-14100	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
10' 3 3/4"							
58' 1 3/4"	45'	D	Dry	SAND 15% MP, 22% FP, 25% VFP, 25% VCS, 25% CS, 25% MS, 15% FS, 5% VFS. Mod - well sorted. (Gravels) - 70% basalt, 30% qtz and Si-rich. (Sand) - 59% basalt; 40% clear, white, and yellow qtz/qltite; minor chert; 1% mica. Gravels are angular to sub-rounded. Sands are angular to sub-rounded. Dry color: 10YR 9/2 (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' 3 3/4" of 10"			8:55
							9:40
	50'	D	Dry	SAND 19% FP, 19% 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/qltite, trace mica. Gravels are angular to sub-rounded.			10:05
58' 1 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)

B.174

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DRILL LOG			By S.S. Teel	Rig BE 60W	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
			Date 3-22-88	22-11100	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' 1"				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% VEP, 25% VCS, 30% CS, 25% MS, 10% FS, 5% VES. Well sorted. (Gravels) - 65% basalt, 35% qtz/si-rich including white qtzite, chert, granite. (Sand) - 60% basalt, 40% white, clear, + yellow qtz/qltzite, 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.		10:35	
				RPT arrives with GM. No counts above background		11:00	
				Added 8' 7" of 10"		11:10	Welding casing
						11:45	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 22-11100 Olvera	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 3/4"	60'	D	Dry	SAND 1% MP, 3% FP, 1% VFP, 20% UCS, 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 4/2 (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.	13:07	
	65'	D	Dry	SAND 2% MP, 2% FP, 1% VFP, 10% UCS, 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 4/2 (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.	13:40	
76' 3 3/4"				Added 9' 6 1/2" at 10'	14:00	Welding casing
REMARKS: S.T.						

DRILL LOG			By S.S. Teel	Rig B.E. 60W 22-19100 Olen	Well Number 299-E17-17 Depth 65' To 75'	Computer Number NA	Project or Work Order No. NA
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
76' 3/4"						14:45	Began drilling
85' 9 3/4"	70'	D	Slightly Moist	SAND 39% FP, 10% VCS, 15% CS, 25% MS, 25% FS, 15% VFS 8% silt, well sorted (Gravels) - 80% basalt, 20% qtz/qtzite and chert (Sand) - 35% basalt, 65% qtz/qtzite, chert, and trace mica. 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		15:20	Slightly moist starting at $\approx$ 67' - Also slightly finer grained!
	75'	D	Slightly Moist	SAND 17% VFP, 14% VCS, 15% CS, 30% MS, 25% FS, 15% VFS. 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' 6 1/2" of 10"		15:50	
						16:15	Welding casing
						16:50	Began drilling
85' 9 3/4"							
REMARKS: S.T.							

DRILL LOG		By S.S. Teel	Rig B.E. 60W	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
		Date 3-22-88	22-14100 Clen	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/qltite and Si-rich. Gravel and sand 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						

1 of 5

DRILL LOG		By S.S. Teel	Rig B.E. 60W	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
		Date 3-23-88	22-14100 Olen	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' 9 3/4"	of 10'				0700	Driller arrives
70 95' 9 3/4"	85'	D	Dry	SAND 2% FP, 15% VCS, 25% CS, 35% MS, 18% FS, 5% VFS. Well sorted. (Gravels) - 80% basalt, 20% glc 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.	0723	
	90'	D	Dry	SAND 2% MP, 2% FP, 1% VFP, 15% VCS, 25% CS, 30% MS, 20% FS, 5% VFS. Well sorted. (Gravels) - 80% basalt, 20% qtz/Si-rich including gray, milky, and orange qtzite, and mica. (Sand) - 30% basalt, 69% gray, clear, milky, and brown glc/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.	0745 0755	Welding casing
95' 9 3/4"				Added 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 (5-85)

DRILL LOG		By S.S. Teel	Rig B.E. 60W 22 14100 OK	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"	0 to 10"				0835	Begin drilling
910 105' 7 3/4"	95'	D	Dry	SAND 19% MP, 3% FP, 1% VFP, 25% VCS, 30% CS, 25% MS, 10% FS, 5% VFS. Moderately to well sorted. (Gravels) - 80% basalt, 20% gtz, gtzite, and Si-rich. (Sand) - 40% basalt, 60% chert, gray, brown, milky gtz/gtzite, trace mica. Gravel 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	holding
					1100	RPT coverage -
	100'	D	Dry	SAND 20% CP, 1% MP, 1% FP, 25% VCS, 30% CS, 26% MS, 10% FS, 5% VFS. Well sorted. (Gravels) 80% basalt, 20% gtz, gtzite, chert and granite. (Sand) - 30% basalt, 70% gtz, gtzite, chert and other Si-rich. Gravel 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 pebbles. Still see "clumps". Moisture and geologic samples taken.	1145	no counts above background.
105' 7 3/4"						

REMARKS:
S.S.T.

B.180

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

DRILL LOG		By S.S. Teel	Rig B.E. 60W 22-14100	Well Number 291-E17-17	Computer Number NA	Project or Work Order No.
		Date 3-23-88	Open	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% UCS, 25% CS, 30% MS, 25% FS. Well sorted. (Gravel) - 80% basalt, 20% gtz and gtzite. (Sand) - 30% basalt, 70% gtz, gtzite, 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.	1432	
9' 3 1/2"				RPT coverage. No counts above background.	1505	
124' 11 1/4"						
	115'	D	Dry	SAND 1% MP, 2% FP, 25% UCS, 32% CS, 25% MS, 10% FS, 5% VFS. Well sorted. (Gravel) - 60% basalt, 40% gtz and gtzite. (Sand) - 30% basalt, 70% clear, white, orange, gray, gtz/gtzite. 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.	1535	
					1540	Welding casing
124' 11 3/4"				Added 9' 3 1/2" of 10"		
REMARKS: S.S.T.						

[illegible]

DRILL LOG		By S.S. Teal	Rig B.E. 60W	Well Number 299 - E17-17	Computer Number NA	Project or Work Order No.
		Date 3-24-88	Olev.	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					0725	
134' 11 3/4"	125'	D	Dry	SAND 17% FP, 5% VCS, 20% CS, 41% MS, 25% FS, 9% VFS Very well to well-sorted, 20% basalt, 78% qtz/Si-rich including: clear, white, gray, orange qtz/gtite, 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, 55% CS, 20% MS, 10% FS, 7% VFS Well sorted, (Gravels) - 70% basalt, 30% qtz/gtite. (Sand) - 30% basalt, 60% Si-rich including: milky, clear, gray, orange gtite and qtz, 5% green mt., 3% mica, 2% feldspar. Gravels are angular to subrounded. Sands are angular to subangular. Dry color: 10YR 6/2 (light brownish gray). Reaction to 10% HCL. Unconsolidated. Coarser than previous. Still see a few CaCO ₃ -cemented aggregates.	0915	
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 Q21 (5-85)

DRILL LOG		By S.S. Teel	Rig E.C. EOW 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' 9 3/4"	145'	D	Dry	SAND. 20% MP, 20% FP, 10% VFP, 15% UCS, 35% CS, 25% MS, 15% FS, 5% VFS. Well sorted. (Gravels) 80% basalt, 20% gtz and Si-rich. (Sand) - 20% basalt, 78% gtz, quartzite, chert, 2% mica. Gravels are angular to rounded. Sands are angular to sub-rounded. Dry color: 10YR 7/2 (light brownish gray). Slight to moderate reaction to 10% HCL. Unconsolidated. Similar to previous. Moisture, hazardous waste, and geologic samples taken.		1200
						12-12:30 Lunch
143' 9 3/4"	(end of 10')			Adding 8" casing. Total 10' casing = 143' 9 3/4"		12 30
				20' 10", 20' 3 1/2", 18' 11", 18' 7 1/4", 15' 11 1/2", 18' 6"		
						1730 End of day
REMARKS: Drilled 21' p/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-C17-17 Depth 145 To 150'	Computer Number NA	Project or Work Order No.
		Date 3-25-88				Subcontract No. NA
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
117' 1/4	of 8"				0700	Driller arrives
				19' 5", 11' 3 1/2", 9' 8 1/2"		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. Moderately to well sorted. 15% basalt, 85% gtz and gtzite. Angular to sub-rounded. Dry color: 10YR 7/2 (light gray). Unconsolidated. Slight to moderate reaction to 10% HCl. Similar to previous. Note: no moisture sample taken because driller added water.	1200	not stay in barrel so driller added $\approx$ 4 gal. of water
	155'	D	Dry	SAND 1% MP, 2% FP, 19% VFP, 10% VCS, 40% CS, 25% MS, 15% FS, 6% VFS. Well sorted. (Gravels) 90% basalt, 10% gtz/gtzite. (Sand) - 25% basalt, 75% gtz, gtzite, 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.	12-12:30 13:10	Lunch
REMARKS: S.T.						

ORILL LOG		By S. S. Teel	Rig 22-11100 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' 6 1/4"	160'	D	Dry	SAND 1% MP, 1% FP, 13% VCS, 35% CS, 30% MS, 15% FS, 5% VFS	1330	
8 3/4"				Well sorted. (Gravels) - 70% basalt, 30% qtz and gteite. (Sand) -		
165' 9 1/4"				15% basalt, 82% qtz, gteite, granite, 3% mica. Gravels and		
7 7/8"				sands are angular to sub-rounded. Dry color: 10YR 7/2 (light gray).		
172' 4 1/4"				Slight reaction to 10% HCL. Unconsolidated. Similar to previous.		
				No silt layers. Moisture & geologic samples taken		
				Added 8' 3" of 8"	1332	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 gteite. Angular to		~ 163 and another
				sub-rounded. Dry color: 10YR 7/2 to 10YR 6 1/2 (light gray to		one at 164'
				light brownish gray). Very slight reaction to 10% HCL. Unconsolidated.		
				Similar to previous. Moisture and geologic samples taken		
						27
172' 4 1/4"	of 8"			Added 7' 7" of 8"	1615	Welding
REMARKS:					1730	End of day
Drilled 23'				Steve Teel		
D/B 168'				3-25-88		

1 of 4

DRILL LOG		By S. S. Teel	Rig B.E. 60W 22-11100 Olen	Well Number 299-E17-17 Depth 168 To 175'	Computer Number NA	Project or Work Order No.
		Date 3-28-88				Subcontract No. NA
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
173' 4 1/4"					0700	Drillers arrive
10 183' 4 1/4"	170'	D	Dry	SAND 20% UCS, 30% CS, 30% MS, 13% FS, 7% VFS. 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.	0735	
				Added 10' of 8"	0755	Welding casing
					0830	began drilling
	175'	D	Dry	SAND 15% UCS, 20% CS, 30% MS, 20% FS, 10% VFS, 5% siH. 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.	0905	
REMARKS:						
S.T.						

B.189

ORILL LOG			By S. S. Teel	Rig B.E. 22-14100	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
			Date 3-28-88	Open	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 1/2'	180'	D	Dry	SAND 10% VCS, 20% CS, 30% MS, 20% FS, 15% VFS, 5% silt 20% basalt, 75% qtz, quartzite and chert, 5% mica. Sands are angular to subrounded with a few rounded grains. Dry color: 10YR 4/2 (light brownish gray). Slight reaction to 10% HCL. Unconsolidated. Very similar to previous sample. Moisture and geologic samples taken. Added 10' of 8"		0940	
10						0950	Welling
193 1/4'						1030	Drilling
						1100	
	185'	D	Dry	SAND 15% VCS, 25% CS, 25% MS, 20% FS, 10% VFS, 5% silt. 20% basalt, 75% qtz and quartzite with minor chert, 5% mica. Gen. angular to subrounded; some rounded. Dry color: 10YR 4/2 (light brownish gray). Moderate to strong reaction to 10% HCL. Unconsolidated. Similar to previous sample. Weakly-carbonated (CaCO ₃) aggregates more noticeable. Moisture and geologic samples taken.		1110	RPT coverage no counts above background
REMARKS: S.S.							

DRILL LOG			By S.S. Teel	Rig B.E.	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
			Date 3-28-88	22-14100 Open	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
193 1/4" 8 6 1/2" 20 1 10 1/2"	190'	D	Dry	SAND 2% FP, 15% VCS, 35% CS, 25% MS, 13% FS, 7% VFS, 3% silt. Moderately to well sorted. (Gravels) - 50% gtz and gtzite, 50% basalt. (Sand) - 25% basalt, 70% gtz and gtzite, 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"		11:40	
						12:50	Welding casing
						13:30	Drilling
	195'	D	Dry	SAND 2% MP, 3% FP, 3% VCS, 15% CS, 30% MS, 25% FS, 12% VFS, 10% silt. Moderately to well sorted. (Gravels) - 90% basalt, 10% gtz and gtzite. (Sand) - 25% basalt, 74% gtz and gtzite, 1% mica. Gravels and sands are angular to sub-rounded. Dry color: 2.5Y 6/2 (light brownish gray). Strong reaction to 10% HCL. Unconsolidated. More silt/VFS than previous. Increase in CaCO ₃ content. See abundant weak-CaCO ₃ -cemented aggregates. Moisture and geologic samples taken.		13:50	
						14:10	Stopped drilling to help set pump in well 299-E17-16
						14:40	Drilling
REMARKS: S.T.							

D - Drive Barrel H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _____ Standing Water 4.6000 B21 (5.85)

S.T.

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DRILL LOG		By S.E. Teel	Rig B.E. 20-11100 C/O	Well Number 299-111-17	Computer Number NA	Project or Work Order No.
		Date 3-29-88		Depth 205 To 210		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
211' 10 3/4"	210	D	Dry	SAND 1% FP, 1% VFP, 30% UCS, 30% CS, 15% MS, 13% FS, 1% VFS	0920	
211' 11 3/4"				4% silt. Well sorted. (Gravels) - 80% basalt, 20% qtz and	0925	Well log
				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 5/2 (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' 11 3/4"						

REMARKS:
Ft 7'
DB 210'

Steve Teel
3-29-88

ORILL LOG			By T. Gilmore	Rig Bucyrus Erie	Well Number 299 E17 17	Computer Number NA	Project or Work Order No.
			Date 3/30/88	22-14100	Depth 810' 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"				Structure for King is 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 taken.		12-12:30	Lunch
	220'	D	Dry	SAND 1% FP, 1% VFP, 13% VCS, 30% CS, 25% MS, 15% FS, 8% VFS, 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.		1300	
				Added 10' of 8"		1305	Welding casing
231' 11 3/4"							
REMARKS: S.F.							

DRILL LOG			By S. Teel	Rig B.E.	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' 11 3/4"						1330	Drilling
8' 6 1/2"	225'	D	Dry	SAND 15% VCS, 30% CS, 20% MS, 15% FS, 10% VFS, 10% silt. Moderately sorted. 35% basalt, 62% qtz and qtzite, 3% mica. Angular to sub-rounded. Dry color: 2.5 Y 7/2 (light gray). Moderate reaction to 10% HCL. Unconsolidated. Similar to previous. Moisture and geologic samples taken.		1410	
240' 6 1/4"	230'	D	Dry	GRAVELLY SAND 8% MP, 3% FP, 1% VFP, 10% VCS, 20% CS, 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: 10 YR 6/2 (light brownish gray). Strong reaction to 10% HCL. Unconsolidated. Noticeably more gravel than previous and stronger acid reaction. Moisture and geologic samples taken.		1445	
				Added 8' 6 1/2" of 8"		1500	Welding
						1524	Drilling
240' 6 1/4"						1530	End of
REMARKS: Footage = 20' D/B 230' Steve Teel 3-30-88							

DRILL LOG			By S. Teel	Rig B.E.	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
			Date 3-31-88	22-14100 Olen	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' 6 1/4"						0700	Driller arrives
9' 5 1/4"							- Drilling
249' 11 3/4"	235'	D	Dry	GRAVELLY SAND 5% CP, 8% MP, 7% FP, 5% VFP, 17% VCS, 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: 10R 6 1/2 (light brownish gray). Moderate to strong reaction to 10% HCL. Unconsolidated. Comments: Noticeable 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'.		0800	
249' 11 3/4"				Added 9' 5 1/2" of 8"		0845	Welding
REMARKS: Note: 230' sample should have been named a SLIGHTLY SILTY GRAVELLY SAND instead of a GRAVELLY SAND. <div style="text-align: right;">S. Teel 3-31-88</div>							

D - Drive Barrel H - 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)

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DRILL LOG		By C. Teel	Rig B.E.	Well Number 299 E17-17	Computer Number NA	Project or Work Order No.
		Date 3-31-88	20 H100 Open	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
249' 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 qt. 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.	Well Number 299-E17-17	Computer Number NA	Project or Work Order No.
		Date 3-31-88	22-11100 Olin	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' 11 3/4"				Added 10' of 8"	1100	Welding casing
259' 11 3/4"	250'	D	Dry	SLIGHTLY SILTY GRAVELLY SAND. (15% gravel, 73% sand, 12% silt 3% MP, 8% FP, 4% VFP, 23% VCS, 18% CS, 12% MS, 10% FS, 10% 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.	1135	RPT coverage at 1110 hrs. No counts above background.
	255'	D	Dry	SLIGHTLY SILTY GRAVELLY SAND (12% gravel, 75% sand, 13% silt). 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 (CaO ₃) aggregates. Gravel grain sizes do not appear to be representative - many grains appear to be broken. Moisture and geologic samples taken.	12-12:30 1300	Lunch
259' 11 3/4"						

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

A 6000 021 (5 REV)

DRILL LOG			By S. Teel	Rig B.E. 22-14100 Olin	Well Number 294-E17-17 Depth 255' to 265'	Computer Number NA	Project or Work Order No.
			Date 3-31-88				Subcontract No. NA
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
254' 11 3/4"				Added 10' of 8"		1335	Welding
10 264' 11 3/4"						1415	Drilling
	260'	D	Dry	SLIGHTLY GRAVELLY SILTY SAND (10% gravel, 70% sand, 20% silt). 2% MP, 5% FP, 3% VFP, 20% UCS, 15% CS, 10% MS, 10% FS, 15% VFS, 20% silt. Moderately sorted. (Gravels) 60% basalt, 40% gtz, gteite, and weathered Si-rich igneous. (Sand) - 40% basalt, 59% gtz and gtzite, 1% mica. Gravels are angular to rounded. Sands are angular to sub-rounded. Dry color: 10YR 4/2 (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.		1425	
	265'	D	Dry	GRAVELLY SILTY SAND (15% gravel, 65% sand, 20% silt) 2% CP, 5% MP, 6% FP, 2% VFP, 15% UCS, 20% CS, 10% MS, 10% FS, 10% VFS, 20% silt. Moderately sorted. (Gravels) - 50% basalt, 50% gtz, gteite, and chert. (Sand) - 30% basalt, 69% gtz, gteite, and chert, 1% mica. Gravels and sands are angular to sub-rounded. Dry color: 10YR 4/2 to 11YR 5/2 (light brownish gray to grayish brown)		1505	
						1510	RPT coverage No counts above background
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 (6-85)

[illegible]

[illegible]

[illegible]

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 O. Ames	Rig #4	Well Number 299-17-17	Computer Number	Project or Work Order No.
			Date 3-28-98		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	Safety meeting	7:00	
10'	180	"	"	"	Grease Rig	7:15	
8' 6 1/2'	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

100
73
543

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	7:00	
8' 10"	130	D	"	"	7:30	
	135	"	"	"	8:30	
	140	"	"	"	10:00	
	145	"	"	"	11:00	
				Lunch	12:00	
				20' 10"	12:20	
				20' 3 1/2"		
				18' 11"		
				18' 7 1/4"		
		4 1/4"		19' 11 1/2"		
		"		19' 5"		
				132'		
				4' 4"		
				176' 1/4"		
REMARKS:						

B.206

D - Drive Barrel H - 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)

[illegible]

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

Well	277-17	Driller	Drill	Interval	250-27
Log No.	200157	Date	4-11-84	Coring No.	8401
Logged by	JAC	Time	11:00 AM	Time Cor. Done	11:45
Logging Lines	Drillability	2002 1/2		Content	S
Vertical Scale	200/1			Calibration	250/1
Scale Length	125	100	100	100	100
Remarks	80% PRODUCTION 600-4.8 100% PRODUCTION 600-4.8

0.000

Well	2424-1/2	Unit	Quartz	Interval	Logwell	350-3
Log Type	NEUTRON	Date	4-1-78	Coring Site	4910	
Logged by	J. J. J.	Logwell	350-3	Logwell Depth	312'	
Logging Section	5000'	Logwell	350-3	Logwell Depth	312'	
Vertical Scale	20'/in	Logwell	350-3	Logwell Depth	312'	
Depth	350-3	Logwell	350-3	Logwell Depth	312'	
Remarks	REF. PRODUCTION					
	FIVE SECT. 21

WELL 299-E17-18

AS-BUILT DIAGRAM

Well Number 299-E17-18 Geologist Loren R. Oster Page 1 of 3

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

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill Rate ft/hr
Description	Diagram		Diagram Litho.	Lithologic Description	
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 Casing		25'		SAND (MEDIUM-COARSE)	
(156' 4 1/2" total)		30'		" " "	
8" Temporary Carbon Steel Casing		35'		" " "	
(334' 7 1/2" total)		40'		" " "	
Factory-welded centralizers		45'		SLIGHTLY GRAVELLY SAND	
8-20 mesh granular bentonite seal (296' 7" - 19.0')		50'		SAND (COARSE)	
		55'		SLIGHTLY GRAVELLY SAND	
		60'		SAND (MEDIUM-COARSE)	
		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)	

AS-BUILT DIAGRAM

Well Number 299-E17-18 Geologist Karen R. Oster Page 2 of 3

Reviewed by J. L. McShan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
156' 4 1/2" of 10" Carbon Steel Casing (Removed)	[Diagram: 10" Carbon Steel Casing (Removed)]	130'	[Diagram: Sand (Medium to Coarse)]	SAND (MEDIUM TO COARSE)
		135'		" " "
	[Diagram: 8" Carbon Steel Casing (Removed)]	140'	[Diagram: Sand (Medium to Coarse)]	" (FINE TO MEDIUM)
334' 7 1/2" of 8" Carbon Steel Casing (Removed)		145'		" (MEDIUM TO COARSE)
	[Diagram: 8" Carbon Steel Casing (Removed)]	150'	[Diagram: Sand (Medium to Coarse)]	" " "
		155'		" " "
	[Diagram: 8" Carbon Steel Casing (Removed)]	160'	[Diagram: Sand (Medium to Coarse)]	" " "
		165'		SLIGHTLY SILTY SAND
8-20 mesh granular bentonite seal (296' 7" - 19.0')	[Diagram: 8-20 mesh granular bentonite seal (296' 7" - 19.0')]	170'	[Diagram: Sand (Medium to Coarse)]	SAND (MEDIUM)
		175'		" "
	[Diagram: 8-20 mesh granular bentonite seal (296' 7" - 19.0')]	180'	[Diagram: Sand (Medium to Coarse)]	" (MEDIUM TO COARSE)
		185'		SLIGHTLY SILTY SAND
4" Stainless Steel Casing (329.25' - 4.5')	[Diagram: 4" Stainless Steel Casing (329.25' - 4.5')]	190'	[Diagram: Sand (Medium to Coarse)]	" " "
		195'		" " "
	[Diagram: 4" Stainless Steel Casing (329.25' - 4.5')]	200'	[Diagram: Sand (Medium to Coarse)]	SAND (MEDIUM TO COARSE)
		205'		" " "
	[Diagram: 4" Stainless Steel Casing (329.25' - 4.5')]	210'	[Diagram: Sand (Medium to Coarse)]	" " "
		215'		" " "
Factory-welded centralizers	[Diagram: Factory-welded centralizers]	220'	[Diagram: Sand (Medium to Coarse)]	" " "
		225'		SLIGHTLY SILTY SAND
	[Diagram: Factory-welded centralizers]	230'	[Diagram: Sand (Medium to Coarse)]	SAND (MEDIUM TO COARSE)
		235'		SLIGHTLY SILTY SAND
	[Diagram: Factory-welded centralizers]	240'	[Diagram: Sand (Medium to Coarse)]	GRAVELLY SAND
		245'		" " "
	[Diagram: Factory-welded centralizers]	250'		" " "

AS-BUILT DIAGRAM

Well Number 999-E17-18 Geologist Loren F. Oster Page 3 of 3

Reviewed by J.L. McShan Date 7-13-88

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
8-20 mesh granular bentonite		255'		SLIGHTLY GRAVELLY SAND
Seal		260'		SAND (COARSE TO VERY COARSE)
		265'		" " " "
8" Temporary Carbon Steel Casing		270'		" (MEDIUM TO COARSE)
Casing		275'		SLIGHTLY SILTY SAND
4" Stainless Steel Casing		280'		SAND (COARSE)
		285'		SLIGHTLY GRAVELLY SANDY CLAYEY SILT
Factory-welded Centralizers		290'		Builder rolled against casing 285' to 290'
		295'		SLIGHTLY SILTY GRAVELLY SAND
Bentonite Pellet Seal (301.5" - 296.7")		300'		SANDY GRAVEL
		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

DRILL LOG			By <u>K.R. Oster</u>	Rig <u>Bucyrus Erie 22W</u>	Well Number <u>299-E17-1B</u>	Computer Number <u>N/A</u>	Project or Work Order No. <u>216-A-36B Crib</u>
			Date <u>3/28/88</u>	<u>22-14101</u>	Depth <u>0' To 10'</u>		Subcontract No. <u>N/A</u>
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% silt. Moderately to Poorly Sorted. Gravels are 80% basalt, 20% quartz and are very angular to subangular.			Drill rate =
				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., 10% m.p., 5% f.p., 9% v.f.p., 15% v.c.s., 20% c.s., 10% m.s., 10% f.s., 10% v.f.s., 20% silt. Poorly to 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,		1420	stop drilling
REMARKS:							
K.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 <i>J.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>299-E17-18</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-368 Cr. 6</i>
			Date <i>3/28/88</i>	<i>22-14/01</i>	Depth <i>10'</i> To <i>10'</i>		Subcontract No. <i>N/A</i>
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 4/2). 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 back end of rig and mast.		1630	Steam cleaning
						1650	Resume drilling
						1725	Done for day
REMARKS: Total Depth = 10' Total 10" Casing = 20' 8" <i>J.R. Oster</i> Total Drilled Today = 10' <i>3/28/88</i>							

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 <i>K.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>299-E17-18</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>210-A-36Bcrib</i>
			Date <i>3/29/88</i>	# <i>22-14101</i>	Depth <i>10' To 20'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
<i>20' 8"</i>	<i>- F 10"</i>			<i>Having trouble keeping casing straight - some cobbles (1/2 x 3/4 in.) are brought up in the core barrel.</i>		<i>0700</i>	<i>started drilling</i>
	<i>14' 15'</i>	<i>D</i>	<i>Dry</i>	<i>GRAVELLY SILTY SAND; 15% gravel, 45% 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 40% basalt, 20% quartz, 10% quartzite, 10% feldspar, Trace mica and are very angular to subangular. Dry Color is light olive gray (5Y 4/2). 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.</i>		<i>0910</i>	<i>Sample / Core barrel / Drill rate =</i>
	<i>19' 20'</i>	<i>D</i>	<i>Dry</i>	<i>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,</i>		<i>0955</i>	<i>Sample / Core barrel / Drill rate =</i>
REMARKS:							
<i>K.R. Oster 3/29/88</i>							

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 <u>K.R. Oster</u>	Rig <u>B.E. 220</u>	Well Number <u>299-E17-18</u>	Computer Number <u>N/A</u>	Project or Work Order No. <u>216-A-36B Crib</u>
			Date <u>3/29/88</u>	# <u>32-14101</u>	Depth <u>20' To 25'</u>		Subcontract No. <u>N/A</u>
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, (11) consolidated. 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 ₂ O added @ 930)			
20' 8" of 10"						1000	stop drilling
10' 6 1/4"						1030	Add 10' 6 1/4" of 10" casing
31' 2 1/4" of 10"				Total of 10" Carbon Steel Casing = 31' 2 1/4"			
						1125	Resume drilling
	24'-25'	D	Dry	SAND (COARSE TO MEDIUM); 1% gravel, 94% sand, 5% silt. 1% v.f.p., 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:							
<div style="text-align: right;">Kalen R. Oster 3/29/88</div>							

DRILL LOG		By K. R. Oster	Rig B.E. 220	Well Number 299-E17-1B	Computer Number N/A	Project or Work Order No. 210-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, labeled 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	Sample/Core barrel Drill rate =
					1235	Break for lunch
					1250	Resume drilling Stop drilling
REMARKS:						
Karen R. Oster 3/29/88						

ORILL LOG			By K.R. Oster	Rig B.E. 220	Well Number 277-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' 2 1/4" of 10"						1305	Add 9' 7 1/4" of 10" Casing
9' 7 1/4"						1306	Add 1 gal H ₂ O
40' 9 1/2" of 10"				Total of 10" Carbon Steel Casing = 40' 9 1/2"		1345	Resume drilling
	34'-35'	D	Dry	SAND (COARSE TO MEDIUM); 5% gravel, 88% sand 7% silt. Trace m.p., Trace f.p., 5% v.f.p., 10% v.c.s., 30% c.s., 30% m.s., 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, 30% 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		1405	Sample/Core barrel Drill rate =
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 _____ Sampling Water

DRILL LOG			By <i>A.R. Oster</i>	Rig <i>B.E 22W</i>	Well Number <i>279-E17-18</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A36B Cr.6</i>
			Date <i>3/29/88</i>	# <i>32-14101</i>	Depth <i>35' To 110'</i>		Subcontract No. <i>N/A</i>
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 (5Y 7/2). 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	Sample/Corr barrel
						1445	Drill rate = stop drilling
	110' 9 1/8" of 10"					1455	Add 9' 7 3/4" of 10" casing
	50' 5 1/4" of 10"			Total of 10" Carbon Steel Casing = 50' 5 1/4"		1525	Done for day.
REMARKS: Total Drilled Depth = 40' Total of 10" Casing = 50' 5 1/4" Depth Drilled Today = 30'							
<i>For ver. R. Oster</i> <i>3/29/88</i>							

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>297-E17-18</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B Crib</i>
		Date <i>3/30/88</i>	# <i>22-14101</i>	Depth <i>40' To 45'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
50' 5 1/4" of 10"					0700	Start drilling.
	44'-45'	D	Dry	SLIGHTLY GRAVELLY SAND; 10% gravel, 88% sand, 2% silt. Trace mp, 2% f.p., 8% v.f.p., 20% v.c.s., 40% c.s., 20% m.s., 5% f.s., 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, labeled and put on ice. Chemical, Moisture, and Geologic samples are representative.	0730	Sample / core barrel Drill rate =
REMARKS:						
<i>Karen P. Oster</i> <i>3/30/88</i>						

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	Alg B.E.22W	Well Number 279 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. Trace f.p., Trace v.f.p., 5% v.c.s., 65% c.s., 20% m.s., 5% f.s., 3% v.f.s., 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 ^{reddish} 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.	0800	Sample / Core barrel Drill rate =
50' 5 1/4" of 10"						
9' 5"						
59' 10 1/4" of 10"				Total of 10" Carbon Steel Casing = 59' 10 1/4"	0815	Add 9' 5" of 10" Casing
					0855	Resume drilling
	54'-55'	D	Dry	SLIGHTLY GRAVELLY SAND; 10% gravel, 88% sand, 2% silt. Trace m.p., 2% f.p., 8% v.f.p., 15% v.c.s., 45% c.s., 20% m.s., 5% f.s., 3% v.f.s., 2% silt. Well to Moderately Sorted. Gravels are 80% basalt, 5% granite, 5% quartz, 5%	0930	Sample / Core Barrel Drill Rate =
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

DRILL LOG			By <i>A.P. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>299-E17-18</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B Crib</i>
			Date <i>3/30/88</i>	<i>32-14101</i>	Depth <i>55' To 60'</i>		Subcontract No. <i>N/A</i>
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. Similar 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:							
						<i>Kenneth R. Oster</i> <i>3/30/88</i>	

4 of 7

DRILL LOG			By A. P. Oster	Rig B.E. 220	Well Number 277-E17-18	Computer Number N/A	Project or Work Order No. 277-A 36B-110
			Date 3/30/88	Log 62-14101	Depth 110' 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
				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' 10 1/4" of 10"						0950	Add 8' 11 3/4" of 10" casing
8' 11 3/4"							
68' 10"				Total of 10" Carbon Steel Casing = 68' 10"			
						1045	Resume drilling
						1110	stop drilling
						1115	Add 1/2 gal H ₂ O (1st set)
						1135	Resume drilling
						1200	Lunch
						1235	Resume drilling
						1240	Add 1/4 gal H ₂ O
	104'-105'	D	Dry	SAND: COARSE TO MEDIUM; 37% gravel, 45% sand, 29% silt. Trace f.p., 39% v.f.p., 7% v.c.s., 35% c.s., 45% m.s., 5% f.z., 39% v.f.s., 2% silt. Well sorted. Grains are 80% basalt, 10% quartz, 5% granite, 3% quartzite, 2% mica, Trace caliche, and are very angular to subangular. Sands		1245	Sample / Core barrel
							Drill rate =
REMARKS:							

A. P. Oster
3/30/88

DRILL LOG			By <i>A.P. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>299-E17-1B</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B Crib</i>
			Date <i>3/30/88</i>	<i>22-14101</i>	Depth <i>65' To 70'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Cathe, 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 (unreacted). Chemical sample was scooped into squeeze plastic jar from bucket and then was sealed with white tape, labeled, and put on ice. Moisture sample could have added moisture due to pouring water down the hole to help retrieve core sample. Ecologic and chemical samples are representative.			
	68' 10" of 10"					1315	AD 10' 6 1/4" of 10" casing
	10' 6 1/4"						
	79' 4 1/4" of 10"			Total of 10" Carbon Steel Casing = 11' 4 1/4"		1405	Resume drilling
	69'-70'	D	Dry	SAND (COARSE TO MEDIUM); Trace gravel, 90% sand, 10% silt. Trace v.f.p., 5% v.c.s., 30% c.s., 45% m.s., 5% f.s., 5% v.f.s., 10% silt. Moderately Sorted. Gravel, are 100% basalt and very angular. Sands are 40% basalt, 20% quartz,		1410	Sample / Core barrel Drill rate =
REMARKS:							
<i>A.P. Oster</i> <i>3/30/88</i>							

DRILL LOG		By <i>A.P. Oster</i>	Rig <i>B.E. 224</i>	Well Number <i>211-E17-18</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-368 Cr 16</i>
		Date <i>3/30/88</i>	<i>82-14101</i>	Depth <i>70' To 75'</i>		Subcontract No. <i>N/A</i>
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. Trace v.f.p., 5% v.c.s., 5% c.s., 25% m.s., 30% f.s., 10% v.f.s., 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	1:150	Sample/Core barrel Drill rate =
REMARKS:						
<i>Ken P. Oster 3/30/88</i>						

D - Drive Barrel H - 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 <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>249-E1718</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>249-A-36B Crib</i>
			Date <i>3/31/88</i>	# <i>22-14101</i>	Depth <i>75' To 80'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
79' 4 1/4" of 10"						0710	Start drilling
	79'-80'	D	Very Moist	SAND (COARSE); Trace gravel, 98% sand, 2% silt.		0715	Sample/Corr 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 took one barrel load out. This moisture is probably what remained in the hole.			Well Sorted. Gravels are 80% basalt, 20% quartz and are very angular. Sands are 35% basalt, 20% quartz, 10% quartzite, 10% feldspar, 10% clear quartz, 5% mica, 10% rock fragments, (orange, mostly 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. 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.		0720	stopped drilling
79' 4 1/4" of 10"							
9' 9 1/4"							
89' 1 1/2" of 10"				Total 10' Carbon Steel Casing = 89' 1 1/2"		0750	Add 9' 9 1/4" of 10" casing
						0850	Drive Casing
				Trouble getting sand to stay in core barrel.		0900	Resume drilling
						0910	Add 3/4 gal 1/2 C
						0915	Resume drilling
REMARKS:							
<i>Karen R. Oster</i> <i>3/31/88</i>							

D - Drive Barrel H - 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 <i>A.R. Oster</i>	Rig <i>BE-220</i>	Well Number <i>PA-E17-18</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-36B-Crib</i>
		Date <i>3/31/88</i>	# <i>22-14101</i>	Depth <i>85' To 95'</i>	Subcontract No. <i>N/A</i>	
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, 74% sand, 5% silt. 1% v.f.p., 4% v.c.s., 40% c.s., 35% m.s., 10% f.s., 5% v.f.s., 5% silt.	1105	Sample/Core barrel
				Well to Moderately Sorted. Gravels are 75% basalt, 25% quartz	1115	Drill rate =
				and are very angular to subangular. Sands are 35% basalt,	1120	Stop drilling
				20% quartz, 10% quartzite, 10% feldspar, 10% clear quartz, 5%	1130	Drive Casing
				mica, 10% rock fragments (orange/green) - metamorphics and	1140	Add 1/2 gal H ₂ O
				other lithologies and are very angular to subangular.	1145	Resume drilling
				Dry Color is light olive gray (5Y 6/2) Very	1150	Drive Casing
				Strong reaction in 10% HCl. Unconsolidated. Same as	1200	Resume drilling
				previous sample with slight decrease in grain size. Geologic		Add 1/2 gal H ₂ O
				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:				<i>Alex P. Oster</i> <i>3/31/88</i>		

DRILL LOG			By K.R. Oster	Rig B.E. 22W	Well Number 299-E17-18	Computer Number N/A	Project or Work Order No. 210-A-30B Ch 6
			Date 3/31/88	# 22-14101	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 visibly moist so I took one. Geologic samples are representative.			
99' 3" of 10"						1315	Add 8' 6" of 10" casing
8' 6"							
107' 9" of 10"				Total 10" Carbon Steel Casing = 107' 9"			
						1340	Drive casing
						1345	Add 1/2 gal H ₂ O Resume drilling
99'-100' D		Hcist		SAND (COARSE TO MEDIUM); 2% v.f.p., 93% sand, 5% silt.		1400	Sample / core barrel
				Trace f.p., 2% v.f.p., 3% v.c.s., 20% c.s., 45% m.s., 15% f.s., 10% v.f.s., 5% silt. Moderately sorted. Gravels are 50% basalt, 30% quartz, 10% granites, 10% quartzite, 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) - metamorphics and other		1415	Drill rate = Stop drilling.
						1425	Resume drilling
REMARKS:							
<div style="text-align: right;">K.R. Oster 3/31/88</div>							

DRILL LOG		By <i>A. R. Oster</i>	Rig <i>B.E. 22L</i>	Well Number <i>271-E17-18</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>216-A-348 Crib</i>
		Date <i>3/31/88</i>	# <i>22-14101</i>	Depth <i>100' To 105'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				<i>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.</i>		
	<i>104'-105'</i>	<i>D</i>	<i>Dry</i>	<i>SAND (MEDIUM); 2% gravel, 93% sand, 5% silt</i>	<i>1445</i>	<i>Sample/ Core barrel</i>
				<i>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%</i>	<i>1510</i>	<i>Drill rate = stop drilling</i>
				<i>quartz, 10% quartzite, 5% granite, 5% metamorphics and other lithologies, and are very angular to subangular. Sands are</i>		<i>Clean up site/ ready to weld.</i>
				<i>35% basalt, 20% quartz, 10% quartzite, 10% feldspar, 10%</i>	<i>1525</i>	<i>Done for day</i>
				<i>alkal quartz, 10% mica, 5% rock fragments (orange/green) - metamorphics and other lithologies. Dry Color is light</i>		
				<i>gray (5Y 7/2). Very strong reaction in 10% HCl. Unconsolidated. Similar to previous sample with decrease in grain size,</i>		
				<i>increase in mica. Chemical sample scooped from bucket</i>		
				<i>into square plastic jar which is sealed with white tape,</i>		
REMARKS:				<i>A. R. Oster 3/31/88</i>		

D - Drive Barrel H - 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 <i>L. Cordon</i>	Rig <i>14101</i>	Well Number <i>299-17-18</i>	Computer Number	Project or Work Order No. <i>245450</i>
		Date <i>3-31-88</i>		Depth <i>75 To 105</i>		Subcontract No.
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
<i>79-4 1/4</i>					<i>7AM</i>	<i>Start</i>
<i>+ 9-9 1/4</i>	<i>80</i>	<i>D</i>	<i>D</i>	<i>Sand + Silt Dry</i>	<i>7:30</i>	<i>Sample</i>
<i>= 89-1 1/4</i>					<i>7:40</i>	<i>Welding</i>
<i>+ 10-1 1/2</i>				<i>HARD TIME PICKING CUTTINGS (SAND) ADDED 3/8" GAL H2O</i>	<i>8:55</i>	<i>drilling</i>
<i>= 99-3</i>	<i>85</i>	<i>D</i>	<i>D</i>	<i>Sand + Silt Dry</i>	<i>9:30</i>	<i>Sample</i>
<i>+ 8-6</i>					<i>9:45</i>	<i>WELDING</i>
<i>= 107-9</i>				<i>Added 1/2 Gallon H2O</i>	<i>10:55</i>	<i>drilling</i>
	<i>90</i>	<i>D</i>	<i>D</i>	<i>Sand + Silt Dry</i>	<i>11:05</i>	<i>SAMPLE</i>
					<i>12:00</i>	<i>Lunch</i>
				<i>Added 1.5 GAL H2O</i>	<i>12:30</i>	<i>drilling</i>
	<i>95</i>	<i>D</i>	<i>D</i>	<i>Sand - Silt - some Gravel</i>	<i>12:50</i>	<i>Sample</i>
					<i>12:55</i>	<i>WELDING</i>
				<i>Added 1/2 GAL H2O</i>	<i>1:45</i>	<i>drilling</i>
	<i>100</i>	<i>D</i>	<i>D</i>	<i>Sand - Silt - some Gravel</i>	<i>2:00</i>	<i>Sample</i>
	<i>105</i>	<i>D</i>	<i>D</i>	<i>Sand + Silt</i>	<i>2:55</i>	<i>Sample</i>
					<i>3:20</i>	<i>READY TO WELD</i>
				<i>CLEANED UP AROUND RIG</i>	<i>3:30</i>	<i>Went Home</i>
MARKS: <i>90-95-100-105-110-115</i>						<i>L. Cordon</i>

D - Drive Barrel H - 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)

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