**Ground-Water Monitoring
Compliance Projects for
Hanford Site Facilities:
Progress Report for the Period
January 1 to March 31, 1988**

Volume 9 — Appendix C

May 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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201-225	A010
226-250	A011
251-275	A012
276-300	A013

GROUND-WATER MONITORING COMPLIANCE
PROJECTS FOR HANFORD SITE FACILITIES:
PROGRESS REPORT FOR THE PERIOD
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Pacific Northwest Laboratory
Richland, Washington 99352

APPENDIX C

WELL COMPLETION REPORT/TITLE III INSPECTION LIST,
AS-BUILT DIAGRAM, LOGGING CHARTS, AND DRILL LOGS
100-N AREA

PREFACE

This appendix is one of nine volumes, and presents data describing wells completed at the Hanford Site during the first quarter of calendar year 1988 (January through March).

The data in this volume of Appendix C cover the following wells:

- 199-N-58
- 199-N-59
- 199-N-60
- 199-N-61
- 199-N-67

The data are presented in the following order: Well Completion Report/Title III Inspection List, As-Built Diagram, Logging Charts, and Drill Logs.

WELL 199-N-58

Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project RCRA G-11 Monitoring Well Number 109-V-58
Location 100N, 130N-N Ponds Temporary Well Number N/A
Driller Ralph Robinson, Chris Watkins Coordinates N 5,428 W 5,867
Drilling Co. BUSIER (KEH) Casing Elevation 462.88
Geologist John F. Carter Ground Elevation 459.58

DRILLING METHOD

Rotary Air 1.1 Mud N/A
Cable Tool D — H 2-5/8"
Drilling Fluid 100N Ponding Sys. WATER
Other 2-5/8" Surface

COMPLETION DATA

Drilled Depth 51.40
Completion Depth 50.40
Date Started 1/30/87 Completed 1/31/87
Static Water Level/Date 462.88 2/2/87
(TWI 50074-TA 1.0 053)

CASING DATA

Type	Size
<u>Carbon Steel 304 5/8" x 1/2" ASTM A234 WPB 3</u>	<u>2" +3.5' to 14.5'</u>
<u>Carbon Steel 304 5/8" x 1/2" ASTM A234 WPB 3</u>	<u>10" +3.5' to 51"</u>
<u>Stainless Steel 304 5/8" x 1/2" ASTM A312</u>	<u>4" +3.33' to 55.4'</u>

Approved By John F. Carter Date 2/1/87

PERFORATIONS

Type N/A
Depth — Schedule —
App. By John F. Carter Date 2/1/87

SCREEN

Type 304 Stainless Steel
Length 10' ± 15'
Slot Size 20
Depth 70.4' - 35.4'
App. By John F. Carter Date 2/1/87

ANNULAR SEAL

Type	Interval	Volume
<u>Grout</u>	<u>3' - 0.5'</u>	<u>2.5 (20 lbs)</u>
<u>Grout</u>	<u>49.5' - 44'</u>	<u>4 (50 lbs)</u>
<u>Grout</u>	<u>44' - 3.5'</u>	<u>20 (50 lbs)</u>
<u>Grout</u>	<u>3.5' - 0'</u>	<u>1.0 (20 lbs)</u>

App. By John F. Carter Date 2/1/87

GEOPHYSICAL LOGGING

Sondes	Interval	Date
<u>—</u>	<u>0' - 51'</u>	<u>1/30/87</u>
<u>—</u>	<u>—</u>	<u>—</u>
<u>—</u>	<u>—</u>	<u>—</u>
<u>—</u>	<u>—</u>	<u>—</u>
<u>—</u>	<u>—</u>	<u>—</u>
<u>—</u>	<u>—</u>	<u>—</u>
<u>—</u>	<u>—</u>	<u>—</u>
<u>—</u>	<u>—</u>	<u>—</u>

Approved By John F. Carter Date 1/30/87

AQUIFER TESTING

Type of Test Pressure Transient Test
Length of Test 4 hours
Volume Pumped ~2500 gal
Drawdown 3.24'
App. By John F. Carter Date 1/31/87

OTHER APPLICABLE ITEMS

☒ Steam Cleaning 1/1/87	☒ Protective Steel Posts 1/1/87	☒ Downhole TV Inspection 1/30/87
☒ Storage of Const. Material 1/30/87	☒ Safety Paint 1/1/87	☒ Well Abandonment 1/30/87
☒ Tool Lubricants 1/30/87	☒ Straightness Test 1/30/87	☒ Complete As-Built Diagram, Driller's and Geologist's Logs
☒ Concrete Pad 1/1/87	☒ Wall Development 1/30/87	

Approved By John F. Carter Date 1/30/87

Reviewed By DR. R. J. Carter Date 4/30/87
DR. R. J. Carter 12/1/87 NOT YET SURVEYED

A-1800-187 (2/87)

AS-BUILT DIAGRAM

Well Number 102-V-58 Geologist Lester R. Jester Page 1 of 1

Reviewed by J. R. Raymond Date 11/30/87

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
~90' of 1/2" Carbon Steel (Surface Pipe (Removed))		5'		SLT. TO CL. 25' TO 30'
53.5' of 10" Carbon Steel Casing (Removed)		10'		
58' of 6" 5-Bolt 50 Steel (304) Casing		15'		
		20'		
		25'		
		30'		
		35'		
		40'		
		45'		
		50'		
		55'		
		60'		
		65'		
		70'		
		75'		
		80'		
		85'		
		90'		
		95'		
		100'		
		105'		
		110'		
		115'		
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		245'		
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		260'		
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		275'		
		280'		
		285'		
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		325'		
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		340'		
		345'		
		350'		
		355'		
		360'		
		365'		
		370'		
		375'		
		380'		
		385'		
		390'		
		395'		
		400'		
		405'		
		410'		
		415'		
		420'		
		425'		
		430'		
		435'		
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		680'		
		685'		
		690'		
		695'		
		700'		
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		710'		
		715'		
		720'		
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		745'		
		750'		
		755'		
		760'		
		765'		
		770'		
		775'		
		780'		
		785'		
		790'		
		795'		
		800'		
		805'		
		810'		
		815'		
		820'		
		825'		
		830'		
		835'		
		840'		
		845'		
		850'		
		855'		
		860'		
		865'		
		870'		
		875'		
		880'		
		885'		
		890'		
		895'		
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		995'		
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		1005'		
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		1045'		
		1050'		
		1055'		
		1060'		
		1065'		
		1070'		
		1075'		
		1080'		
		1085'		
		1090'		
		1095'		
		1100'		
		1105'		
		1110'		
		1115'		
		1120'		
		1125'		
		1130'		
		1135'		
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		1290'		
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		1305'		
		1310'		
		1315'		
		1320'		
		1325'		
		1330'		
		1335'		
		1340'		
		1345'		

DEPTH	NAME	GRAVEL			SAND					FINES		SORTING	FRAMEWORK			MATRIX			DRY COLOR	HCl REACTION	CONSOLIDATION	DRILL METHOD	DRILL RATE	NAT. GAMMA	COMMENT
		% BOULDER	% 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							
1-17'	ZS8	20	45				20			15		VP	20	6.1	SL	40	Qz	SA	SL	U					
17-20'	ZS8		50		15	10	5	5	5	10		VP	20	6	VA-SR	40	Qz-F	VA-SR	SL	U					
20-25'	ZS8		48		20	10	5	5	5	7		VP	45	6.2	VA-SR	21	Qz	VA-SR	SL	U					
25-30'	SS		48		15	15	10	5	5	5		P	95	6.2	VA-SR	90	Qz-F	VA-SR	SL	U					
30-35'	ZS8		40		15	15	10	5	5	10		VP	45	6.2	VA-SR	10	Qz-F	VA-SR	SL	U					
35-40'	ZS8		30		20	15	10	10	5	10		P	95	6.2	VA-SR	90	Qz-F	VA-SR	SL	U					
40-45'	ZS8		50		15	10	10	5	5	5		VP	90	6	VA-SR	25	Qz-F	VA-SR	SL	U					
45-50'	ZS8		56		15	10	7	4	3	5		P	90	6	VA-SR	35	Qz-F	VA-SR	SL	U					
50-55'	ZS8		55		15	11	7	4	3	5		VP	60	6.2	VA-SR	50	Qz-F	VA-SR	SL	U					
55-60'	SS		45		15	15	10	5	5	5		VP	40	6.6	VA-SR	30	Qz-F	VA-SR	SL	U					
60-70'	SS		40		10	15	20	5	5	5		P	25	6.6	VA-SR	30	Qz-F	VA-SR	SL	U					
70-75'	SS		40		10	15	20	5	5	5		P	25	6.6	VA-SR	30	Qz-F	VA-SR	SL	U					

DRILL LOG		By K.R. Oster	Rig Bucyrus Erie 22W #08K-19153	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CE7308
		Date 9/30/87		Depth 0' To 17'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Well/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
~20' of 12"	0'-17'	Back hoe	Dry	On approximately 9/14/87 a 17' starter hole was dug with a back hoe. ~20' of 12" surface casing was set in hole and backfilled around it. Since the backhoe operator did not take specific depth samples it was decided to make a general description of the top 17' of soil by looking at the piles left by the operator near the hole.		Driller is Ralph Robinson
	0'-17'	Back Hoe	Dry	SILTY SANDY GRAVEL, 20% boulders, 45% gravels, 20% sand, 15% silt. Gravels are mostly basalt and granite with some metamorphics. Sands are mostly basaltic with some quartz-rich clasts. Gravels are mostly subrounded, sands are mostly subangular. Somewhere between 11'-14' the color changes from brown to gray and there is less silt. Both the brown silty soil and the gray, sandier soil have strong reaction in 10% HCl. The gravels have a CaCO ₃ coating on them. All material is unconsolidated and I believe the top 11'-14' (brown silty soil) is		
REMARKS:						

K. R. Oster
9/30/87

D - 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 <i>Karen R. Oster</i> Date <i>9/30/87</i>	Rig <i>B.E. 220</i> # <i>68K-19153</i>	Well Number <i>199-N-58</i> Depth <i>17'</i> To <i>17'</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CE730B</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
				probably back fill material. The gray sandier material (~15') is possibly a natural soil.			
				Rig was moved onto well site on 9/29/87 after being steam cleaned at 200-E Area. Steve Aikart approved the steam cleaning before it was moved.			
				Partial rig up was completed in the afternoon (9/29/87)			
						07:00	Finished rigging up and strung tools.
						12:00	Lunch
						12:50	Started drilling Add 12 gals H ₂ O
						13:05	Drive casing.
						13:15	Resume drilling Add 3 gals H ₂ O
						13:30	Drive casing.
						13:35	Resume drilling.
						13:50	Drive casing.
						13:55	Resume drilling Add 2 gals H ₂ O
REMARKS: <i>Karen R. Oster</i> <i>9/30/87</i>							

[illegible]

6-1-59

A 5000 027 (5 MS)

DRILL LOG		By A.R. Oster	Rig B.E. 220J	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
		Date 10/1/87	# 08K-19153	Depth 20' To 20'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	19'-20'	H	Wet	SILTY SANDY GRAVEL, 50% gravel, 40% sand, 10% silt. 10% v.c.p., 1% c.p., 4% m.p., 15% f.p., 20% v.f.p., 15% v.c.s., 10% c.s., 5% m.s., 5% f.s., 5% v.f.s., 10% silt. Very Poorly Sorted. Gravels are 95% basalt, 5% other lithologies (mainly granite). Sands are 90% basalt, 5% quartz and feldspar, 5% other lithologies. Gravels are very angular to subrounded (when unbroken). Sands are very angular to subangular. Wet Color is dark olive gray (5Y 3/2). Dry Color is olive gray (5Y 5/2). Strong reaction in 10% HCl. Unconsolidated, similar to previous description (no sample taken) except decrease in gravels and silt, increase in sand sized clasts. Samples are representative. Samples taken for U.S. Testing - long list analysis and put on ice. Samples were jarred on 9/30/87.	(1417)	Sample taken 9/30/87 but described today. Drill rate = 271
					0730	Start drilling
						Add 5 gal/s H ₂ O
					0800	Drive Casing
					0810	Resume drilling
REMARKS:						Seen R. Oster 10/1/87.

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22LW</i>	Well Number <i>199-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/1/87</i>	# <i>08K-19153</i>	Depth <i>20' To 25'</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
						0812	Add 3 gals H ₂ O
						0850	Drive casing and outdown bit.
						0910	Resume drilling
							Add 4 gals H ₂ O
						0930	Drive Casing
						0940	Resume drilling
							Add 2 gals H ₂ O
	24'-25'	H	Wet	SILTY SANDY GRAVEL, 48% gravel, 45% sand, 7% silt, 10% v.c.p., 5% o.p., 3% m.p., 14% f.p., 16% x.f.p., 20% v.c.s., 10% c.s., 5% m.s., 5% f.s., 5% v.f.s., 7% silt. Very Poorly Sorted. Gravels are 95% basalt, 2% granite, 2% quartzite, 1% other lithologies. Sands are 85% basaltic, 5% quartz and feldspar, 5% quartzite, 5% other lithologies. Gravels are very angular to subrounded (very few are unbroken). Sands are very angular to subangular. Wet Color is dark olive gray (5Y 3/2), Dry Color is olive gray (5Y 5/2). Strong reaction in 10% HCl. Unconsolidated. Similar to previous.		1010	using dgpt bailer balled core
							Drill rate = 5' / min
						1030	Resume drilling
							Add 4 gals H ₂ O
						1052	Drive casing
						1100	Resume drilling
							Add 3 gals H ₂ O
						1110	Stopped drilling
						1116	Drive Casing
						1119	Resume drilling
REMARKS:							<i>Allen R. Oster</i> <i>10/1/87</i>

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22LD</i>	Well Number <i>199-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>027308</i>
			Date <i>10/1/87</i>	# <i>68X-19153</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
				sample except increase in overall grain size and		1123	Stop drilling
				decrease in basalt content overall. Samples are		1131	Resume drilling
				representative but may not contain the v. coarse		1134	Add 4 gals H ₂ O
				pebble size clasts. Sample taken for U.S. Testing - short		1155	Drive Casing
				list analysis and put on ice.		1200	Lunch
						1253	Resumed drilling
						1300	Add 4 gals H ₂ O
						1306	Add 3 gals H ₂ O
	29'-30'	H	Wet	SANDY GRAVEL, 45% gravel, 50% sand, 5% silt		1332	Using dart bit for Bailed well
				5% c.p., 5% m.p., 15% v.p., 10% v.f.p., 15% vcs., 15% c.s., 10% ms.,			Drill rate = 3'/hour
				5% f.s., 5% v.f.s., 5% silt. Poorly sorted. Gravel is 95%			
				basalt, 2% granite, 2% quartzite, 1% other lithologies.			
				Sands are 90% basaltic, 5% quartz and feldspar, 5%			
				other lithologies. Gravel is very angular to subrounded.			
				Sands are very angular to subangular. (Wet color is dark			
				olive gray (5Y 3/2). Dry color is gray (5Y 5/1). Moisture			
				reaction in 10% HCl. Unconsolidated. Similar to previous			
				sample except increase in sand size clasts, and overall			
REMARKS:							
						<i>Karen R. Oster</i> <i>10/1/87</i>	

DRILL LOG			By K.R. Oster	Rig B.E. 2040	Well Number 197-N-58	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/1/87	#68K-19153	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
				basalt content, decrease in gravel size & clasts and reaction in 10% HCl. Samples are representative. Sample taken for U.S. Testing - short list analysis and put on ice.			
31'6" of 10"						1335	Add 10'4 1/2" of 10" Casing
10'4 1/2"							
41'10 1/2"				Total 10" Carbon steel casing = 41'10 1/2"			
						1515	Drive Casing
						1520	Resume drilling
							Add 7 gals H ₂ O
						1623	Baril Well
						1625	Drive Casing
						1633	Resume drilling
							Add 7 gals H ₂ O
	34'-35'	H	Wet	Sample was taken and put in jars. Sample for U.S. Testing - short list analysis was taken and put on ice but description of sample was saved		1650	Using Joint Barrier Bailed 10 g. H ₂ O
				do in morning			Drill rate = 3.45'/hr.
						1654	Drive Casing
						1700	Resume drilling
						1710	Drive Casing
						1720	Driller done for day
REMARKS: Delivered 29'-30', 29'-30', and 34'-35' soil samples. were delivered to Sigma 5 to be delivered to U.S. Testing in Morning (C-of-C # 3007) Total Drilling Supply Water added to well day = 46 gallons Karen P. Oster 10/1/87							

DRILL LOG		By R. Oster	Rig B.E. 2007	Well Number 197 N 58	Computer Number N/A	Project or Work Order No. 227302
		Date 10/2/87	# VEL-M153	Depth 35' 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
	14-35'	H	Wet	SILTY SANDY GRAVEL. 40% gravel, 50% sand, 10% silt.	(1050)	Sample taken 10/1/87
				5% c.p., 5% m.p., 10% f.p., 20% v.f.p., 15% v.c.s., 15% c.s., 10% m.s.,		but described today
				5% f.s., 5% v.f.s., 10% silt. Very Poorly Sorted Gravels are		Drill rate = 3.75'/min.
				95% basalt, 2% granite, 2% quartzite, 1% other lithologies.		
				Sands are 90% basalt, 5% quartz and feldspar, 5% other	0740	Started drilling
				lithologies. Gravels are very angular to subrounded Sands	0810	Drive Casing
				are very angular to subangular. Wet Color is Dark olive gray	0825	Resume drilling
				(5Y3/2). Dry Color is olive gray (5Y5/2). Slight reaction in		Add 7 gals H ₂ O
				10% HCl. Unconsolidated. Very similar to previous samples	0905	Drive Casing
				except decrease in grain size from fine pebbles to silt,	0910	Resume drilling
				decrease in reactivity to HCl also. Samples are representative.		Add 2 gals H ₂ O
				Sample taken for U.S. Testing and put on ice. Samples	0930	Drive Casing
				juiced 10/1/87. → short list	0938	Resume drilling
					0955	Bail Well
					1003	Resume drilling
						Add 7 gals H ₂ O
					1010	Drive Casing
					1015	Resume drilling
REMARKS:						Karen F. Oster 10/2/87

DRILL LOG			By K.R. Oster	Rig B.E. 220	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/2/87	#LOG - 19153	Depth 35' To 40'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
						1020	Add 2 gal's H ₂ O
						1030	Drive Casing
						1034	Resume drilling
						1036	Add 2 gal's H ₂ O
						1050	Stop drilling
	37-40'	H	Wet	SILTY SANDY GRAVEL, 30% gravel, 40% sand 10% silt.		1055	Using Jart barrel Bailed Well
				1% m.p., 9% f.p., 20% v.f.p., 20% v.c.s., 15% c.s., 10% m.s., 10% f.s., 5% v.f.s., 10% silt. Poorly sorted Gravel are very angular to subrounded. Sands are very angular to subangular.			Drill rate = 1.9'/hour
				Gravels are 95% basalt, 2% quartz + feldspar, 2% granite. 1% other lithologies. Sands are 90% basaltic, 5% quartz and feldspar, 5% other lithologies. Wet Color is dark olive gray (5Y 3/2). Dry Color is gray (5Y 5/1).		1100	Drive Casing
				Slight reaction in 10% HCl. Unconsolidated. Very similar to previous sample except decrease in overall grain size. Samples are representative. Sample taken for U.S. Testing - short list analysis and petrology.		1125	Resume drilling
							Add 7 gal's H ₂ O
						1120	Stop drilling
						1130	Bevel pipe.
41' 10 1/2"	of 10"						
10' 4"							
52' 2 1/2"	of 10"						
				Total 10" Carbon steel casing = 52' 2 1/2"		1140	Add 10' 4" of 10" Casing
REMARKS:							Karen R. Oster 10/2/87

DRILL LOG			By K. R. Oster	Rig B.E. 22W	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/2/87	#LOG-19153	Depth 40' To 45'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Gels, Etc.		Time	Drilling Comments
						1333	Drive Casing
						1340	Resume drilling
							Add 4 gals H ₂ O
						1400	Drive Casing
						1410	Resume drilling
						1430	Drive Casing
						1435	Resume drilling
						1455	Drive Casing
						1500	Resume drilling
						1500	Bail Well
						1508	Drive Casing
						1510	Resume drilling
						1513	Add 3 gals H ₂ O
	44'-45'	H	Wet	SILTY SANDY GRAVEL, 50% gravel, 45% sand, 5% silt.		1530	using dirt bailer Bail Well
				10% c.p., 7% m.p., 13% f.p., 20% v.f.p., 15% v.c.s., 10% c.s., 10% m.s.,			Drill rate = 3' / hour
				5% f.s., 5% v.f.s., 5% silt. Very Poorly Sorted Gravels are		1535	Drive Casing
				90% basalt, 5% granite, 5% other lithologies. Sands are		1540	Resume drilling
				85% basaltic, 5% quartz and feldspar, 5% quartzite,			Add 6 gals H ₂ O
				5% other lithologies. Gravels are very angular to		1604	Drive Casing
REMARKS:							K. R. Oster 10/2/87

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

A 6000-021 (6-85)

[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)

DRILL LOG			By <i>K. R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/5/87</i>	# <i>68K-19153</i>	Depth <i>48' to 50'</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>52' 2 1/2"</i>	<i>of 10'</i>					<i>0715</i>	<i>Started drilling</i>
							<i>Added 5 gals H₂O</i>
						<i>0750</i>	<i>Stopped drilling</i>
							<i>Louis Watkins</i>
							<i>replaces Ralph</i>
							<i>Robinson as driller.</i>
						<i>0800</i>	<i>Resume drilling</i>
							<i>Add 5 gals H₂O</i>
						<i>0850</i>	<i>Bail Well</i>
						<i>0855</i>	<i>Drive Casing</i>
						<i>0900</i>	<i>Resume drilling</i>
							<i>Add 2 gals H₂O</i>
	<i>49' 50'</i>	<i>H</i>	<i>Wet</i>	<i>SILTY SANDY GRAVEL, 50% gravel, 39% sand, 5% silt.</i>		<i>0920</i>	<i>using Drill Barrel Bailed Well</i>
				<i>Trace v.c.p., 1% imp., 25% f.p., 30% v.f.p., 15% v.c.s., 10% c.s., 7% m.s.</i>			<i>Drill rate = 1.5' per</i>
				<i>4% of.s., 3% v.f.s., 5% silt. Poorly Sorted. Gravels are 90% basalt,</i>			
				<i>5% granite, 5% other lithologies. Sands are 85% basaltic,</i>			
				<i>5% quartz and feldspar, 5% quartzite, 5% other lithologies.</i>			
				<i>Gravels are very angular to subrounded. Sands are very angular</i>			
REMARKS:							
<i>Karen R. Oster</i> <i>10/5/87</i>							

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CE7308</i>
			Date <i>10/5/87</i>	# <i>WBK-19153</i>	Depth <i>50' to 50'</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. Wet Color is dark olive gray (5Y3/2). Dry			
				Color is olive gray (5Y5/2). No reaction in 10% HCl. Unconsolidated.			
				Very similar to previous sample except decrease in gravel grain			
				size and increase in sand grain size. Samples are representative.			
				Samples taken for U.S. Testing - long list analysis and			
				put on ice at once.			
<i>52' 2 1/2" of 10"</i>						<i>0925</i>	<i>Add 12' 10 1/2" of 10" casing</i>
<i>12' 10 1/2"</i>							
<i>65' 1"</i>				<i>Total 10" Carbon steel Casing = 65' 1"</i>			
						<i>1035</i>	<i>Drive Casing</i>
						<i>1043</i>	<i>Resume drilling</i>
						<i>1044</i>	<i>Add 5 gals H₂O</i>
						<i>1105</i>	<i>stop drilling</i>
						<i>1115</i>	<i>Drive Casing</i>
						<i>1120</i>	<i>Resume drilling</i>
						<i>1136</i>	<i>Drive Casing</i>
						<i>1140</i>	<i>Resume drilling</i>
						<i>1200</i>	<i>Lunch</i>
						<i>1240</i>	<i>Drive Casing</i>
REMARKS: <div style="text-align: right;"><i>Karen R. Oster</i> <i>10/5/87</i></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 (5-86)

DRILL LOG			By K.R. Oster	Rig B.E. 220	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/5/87	#LOG-19153	Depth 50' 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
						1244	Resume drilling.
							Add 5 gals H ₂ O.
	54-55	H	Wet	SILTY SANDY GRAVEL. 55% gravel, 40% sand, 5% silt.		1330	Using dart & bailer Bailed Well
				5% v.c.p., 5% c.p., 10% m.p., 15% f.p., 20% v.f.p., 15% v.c.s.,			Drill rate = 29'/hour
				11% c.s., 7% m.s., 4% f.s., 3% v.f.s., 5% silt. Very Poorly		1335	Resume drilling.
				Sorted. Gravels are 40% basalt, 15% granite, 10% quartzite,			Add 7 gals H ₂ O
				5% other lithologies. Sands are 50% basalt, 25% quartz		1400	Bailed Well
				and feldspar, 15% quartzite, 10% other lithologies. Gravels		1405	Drive Casing.
				are very angular to subrounded. Sands are very angular		1410	Resume drilling.
				to subangular. Wet Color is olive gray (5Y 4/2). Dry Color			Add 2 gals H ₂ O
				is light olive gray (5Y 6/2). Very slight reaction in 10% HCl.		1425	Drive Casing.
				Slightly different than previous sample. Increase in		1430	Resume drilling.
				gravel grain sizes. Overall decrease in basalt content			Add 2 gals H ₂ O
				(increase in quartz) resulting in lighter olive gray		1441	Drive Casing.
				colors. This sample appears to be reworked		1445	Resume drilling.
				Ringold gravel but still part of the Hanford formation.		1449	Add 3 gals H ₂ O
				Samples are representative. Sample taken for		1455	Drive Casing.
				U.S. Testing and put on ice.		1500	Resume drilling.
REMARKS:							Karen P. Oster 10/5/87

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

A-6000-021 (6-89)

DRILL LOG			By K.R. Oster	Rig B.E. 22W	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/5/87	# 68K-19153	Depth 55' To 61'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
						1507	Bail Well
						1510	Resume drilling
	59'-60'	H	Wet	(RINGOLD) SANDY GRAVEL, 45% gravel, 50% sand, 5% silt.		1515	Using Dart bailer Bailed Well
				5% v.c.p., 5% c.p., 5% m.p., 10% f.p., 20% v.f.p., 15% v.c.s., 15% c.s.,			Drill rate = 4.1 fpm
				10% m.s., 5% f.s., 5% v.f.s., 5% silt. Very Poorly Sorted.		1518	Drive Casing.
				Gravels are 40% basalt, 30% quartzite, 20% granite.		1521	Driller done for day
				10% other lithologies. Sands are 30% basaltic, 40%			
				quartz and feldspar, 20% quartzite, 10% other lithologies.			
				Gravels are very angular to subrounded (very few are			
				unbroken). Sands are very angular to subangular. (Wet			
				Color is dark grayish brown (2.5Y 4/2). Dry Color is			
				light brownish gray (2.5Y 4/2). Very slight reaction in 10% HCl.			
				Driller experienced a Very ^{well} consolidated zone from			
				57'-59' (Top of Ringold Gravels) which changed to			
				well consolidated Sandy Gravels at 59'-60'. This			
				sample has a finer grain size, less basalt, more quartz,			
				was better consolidated and is grayish brown instead			
				of olive gray when compared to the previous sample.			
REMARKS:							
Karen R. Oster 10/5/87							

D - 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)

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
		Date <i>10/6/87</i>	# <i>68K-19153</i>	Depth <i>61' 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>D/W = 56.5' below land surface (PNL 200' E-TAPE #11053)</i>	<i>0745</i>	
				<i>Unsure if this is static H₂O level due to small plug in bottom of pipe will take another static later</i>		
					<i>0800</i>	<i>Started drilling</i>
						<i>Add legal H₂O</i>
					<i>0900</i>	<i>Bail Well</i>
					<i>0905</i>	<i>Resume drilling</i>
					<i>0910</i>	<i>Drive Casing</i>
					<i>0920</i>	<i>Resume drilling</i>
					<i>0930</i>	<i>Add 2 gals H₂O</i>
<i>65' 1" of 10"</i>					<i>1000</i>	<i>Bailed Well</i>
<i>10' 5 1/4"</i>					<i>1005</i>	<i>Add 10' 5 1/4" of 10" Casing</i>
<i>75' 6 1/4" of 10"</i>				<i>Total of 10" Carbon Steel Casing = 75' 6 1/4"</i>		
				<i>D/W = 61.3' below land surface (PNL 200' E-TAPE #11053)</i>	<i>1015</i>	
					<i>1115</i>	<i>Resume drilling</i>
<i>64' 65'</i>	<i>H</i>	<i>Wet</i>		<i>SANDY GRAVEL, 43% gmvsl, 55% sand, 3% silt.</i>	<i>1200</i>	<i>Using start bailed</i>
				<i>2% m.p., 15% f.p., 25% v.f.p., 20% v.c.s., 15% c.s., 10% m.s.,</i>		<i>Bailed Well</i>
				<i>5% of s., 5% v.f.s., 3% silt. Poorly Sorted. Gravels are</i>	<i>1205</i>	<i>Drill rate = 2'/hour</i>
REMARKS:				<i>Karen R. Oster</i> <i>10/6/87</i>		

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/6/87</i>	# <i>08K-A/53</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
				25% basalt, 40% quartzite, 25% granite, 10% other		1210	Lunch
				lithologies. Sands are 30% basaltic, 40% quartz and		1240	Resumed Drilling
				feldspar, 20% quartzite, 10% other lithologies. Gravels are		1300	Drive Casing
				very angular to subangular (all are broken rock fragments)		1302 1305	Resume drilling Add 3 gals H ₂ O
				Sands are very angular to subangular. Wet Color is		1317	Drive Casing
				grayish brown (2.5Y 5/2). Dry Color is light gray (2.5Y 7/2).		1320	Resume drilling
				Slight reaction in 10% HCl. Moderately Consolidated.		1325	Bail Well
				Similar to previous sample except decrease in the		1326	Resume drilling
				gravels to v.c.s. grain sizes and in silt and basalt		1332	Drive Casing
				content. Sample is still grading towards the fine sands		1335	Resume drilling
				found at N-59 & N-60. Samples are representative.		1348	Bail Well
				Sample taken for U.S. Testing short list analysis		1350	Resume drilling
				and put on ice.		1355	Drive Casing
						1356	Resume drilling
						1406	Bail Well
						1407	Resume drilling
	69'-70'	H	Wet	Sample was taken and put in jars. Sample for U.S. Testing		1415	using dart bailer Bailed Well
				short list analysis was taken and put on ice. The			Drill rate = 3.75'/hour
REMARKS:							
<i>K.R. Oster</i> <i>10/6/87</i>							

9-C-22

DRILL LOG			By <i>X.R. Oster</i>	Fig <i>B.F. 220</i>	Well Number <i>194-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/6/87</i>	* <i>08K-A153</i>	Depth <i>70' 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
				description of the sample was saved to do in the morning.		1420	Resumed drilling
						1425	Bailed Well
						1437	Drove Casing
						1428	Bailed Well
				<i>D/B = 69' below land surface (PNL 200' STEEL TAPE)</i>		1432	
				<i>D/W = 61.1' below land surface (PNL 200' E-TAPE #11053)</i>		1435	
				Wait for water to recover in well. Sand seems to be heaving up in well. (Medium Sand found starting at 70')			
				<i>D/W = 59.9' below land surface (PNL 200' E-TAPE #11053)</i>		1450	
				Decided to add water and drill to back flush sand out of well.		1510	Add 60 gals H ₂ O
						1515	Resume drilling
				<i>D/B = 68.6' below land surface (PNL 200' STEEL TAPE)</i>		1530	
				<i>D/W = 61.4' below land surface (PNL 200' E-TAPE #11053)</i>		1534	
						1535	Bailed Well
				<i>D/B = 68.6' b.l.s. (PNL 200' STEEL TAPE) D/W = 61.2' b.l.s. (PNL 200' E-TAPE #11053)</i>		1545	
				<i>D/W = 59.4' below land surface (PNL 200' E-TAPE #11053)</i>		1824	H ₂ O still recovering
				<i>D/B = 67' below land surface (PNL 200' STEEL TAPE)</i>		1828	sands still heaving.
REMARKS: Delivered 60' H ₂ O, and 60' 70' soil sample to Sigma 5 to be delivered to U.S. Testing in the morning (C-of-C #7010) Total amount of Drilling Supply Water added to well today = 11 gallons <div style="text-align: right;"><i>Karen R. Oster</i> 10/6/87</div>							

D - Drive Barrel H - Hard Tool I - 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 <i>A.R. Oster</i>	Rig <i>B.E.220</i>	Well Number <i>199-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/7/87</i>	# <i>WBK-19153</i>	Depth <i>70' 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>75' 6 1/4"</i>	<i>"of 10" 69'-70'</i>	<i>H</i>	<i>Wet</i>	<i>SANDY GRAVEL, 40% gravel, 55% sand, 5% silt</i> <i>3% c.p., 5% m.p., 12% f.p., 20% v.f.p., 10% v.c.s., 15% c.s., 20% m.s.,</i> <i>5% f.s., 5% v.f.s., 5% silt. Poorly Sorted. Gravels are 25%</i> <i>basalt, 40% quartzite, 25% granite, 10% other lithologies.</i> <i>Sands are 30% basaltic, 40% quartz and feldspar, 20% quartzite,</i> <i>10% other lithologies. Gravels are very angular to subrounded</i> <i>(very few are unbroken). Sands are very angular to</i> <i>subrounded. (Wet Color is grayish brown (2.5Y 5/2). Dry Color</i> <i>is light gray (2.5Y 7/2). Very Strong reaction in 10% HCl. Very</i> <i>similar to previous sample except an increase in the fine to</i> <i>coarse pebble grain sizes and a decrease in the very fine pebble</i> <i>to all grain sizes. This sample is still a gradation between</i> <i>the gravels and the medium to fine sands which start at</i> <i>70' below land surface. Samples are representative. Sample</i> <i>was taken for U.S. Testing, short list analysis. Samples</i> <i>were taken and jarred on 10/6/87.</i> <i>D/B = (47' below land surface (PNL 200' STEEL TAPE)</i> <i>D/W = 59.4' below land surface (PNL 200' TAPE # 11053)</i>		<i>(1415)</i>	<i>Sample was taken</i> <i>10/6/87 but described</i> <i>today.</i> <i>Drill rate = 3.15/hour</i>
						<i>0730</i>	
						<i>0735</i>	<i>static H₂O level = 59.1'</i>
REMARKS:							
<i>See R. Oster</i> <i>10/7/87</i>							

DRILL LOG			By K.R. Oster	Rig B.E. 22W	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/7/87	# 181-1753	Depth 70' to 71'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Catch, Etc.		Time	Drilling Comments
				Adding water during drilling to force the sand out of hole.		0745	Start drilling
							Add 80 gals H ₂ O
						0830	Bail Well
				D/W = 54' below land surface (PNL 200' E-TAPE #11053) (H ₂ O sol. H ₂ O)		0835	
				D/B = 68.5' below land surface (PNL 200' STEEL TAPE)		0840	
						0847	Resume drilling
						0905	Bail Well
						0906	Resume drilling
				D/B = 69.5' below land surface (PNL 200' STEEL TAPE)		1030	
				D/W = 104' below land surface (PNL 200' E-TAPE #11053)		1034	
				Waiting for water truck since we can add more water before waiting to prevent the sand from heaving.		1035	
				Added enough water to fill the hole up to 30' below land surface and drilled to push sand out of hole.		1045	Resume drilling
				Bailed a few times also.			Add ? H ₂ O
				D/B = 70.8' below land surface (PNL 200' STEEL TAPE)		1215	
				Add 1 1/4 bags (100 lbs ea) 10-20 U.S. sieve size Colorado		1220	
				Silica sand to hole to bring up D/B prior to setting stainless.			
REMARKS:							Karen R. Oster 10/7/87

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

A-9000 Q21 (b 40)

DRILL LOG		By K.R. Oster	Rig B.E. 220	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
		Date 10/7/87	# 08K-19153	Depth 71' 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
				D/B = 70' below land surface (PNL 200' STEEL TAPE)	1225	
				D/W = 58.6' below land surface (PNL 200' 2-TAPE #11053) (1160' drill) (1160' shaft)	1228	
				Passed 20' section of 8" casing down hole to bottom	1240	Straightness Test
75' 6 1/4" of 10"				determining that hole is straight.	1255	Cut off 2' of 10" casing
73' 6 1/4" of 10"				Total of 10" Carbon Steel Casing = 73' 6 1/4"	1300	Tried to break off bit but broke wrench instead
				Setting stainless as follows:	1400	
				1 10' section of 20 slot, 6" diameter stainless steel screen (top threads are male)		
				1 5' section of 20 slot, 6" diameter stainless steel screen.		
				1 20' section of 6" stainless steel casing, with factory welded centralizers on the top end (20' above screen)		
				1 20' section of 6" stainless steel casing		
				1 10' section of 6" stainless steel casing		
				1 5' section of 6" stainless steel casing		
				1 3' section of 6" stainless steel casing		Stainless Steel Screen
				Totals: Screen = 15', Casing = 58'		70.4' - 55.4' below land
				D/B inside stainless = 70.4' below land surface (PNL 200' STEEL TAPE)	1525	surface
REMARKS: Weld on puller top @ 1550. Done for day at 1600 Total Drilling Supply Water added today = 80 gallons + ? gallons Aaren R. Oster 10/7/87						

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

A 6000-021 (5-86)

9-C.26

DRILL LOG		By <i>A.R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>147-A-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
		Date <i>10/18/87</i>	# <i>48K-19153</i>	Depth <i>70' 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
				Bottom of Casing is at 70.3' below land surface.		
					0735	Break off bit
				Add 2 bags (100 lbs ea) 10-20 U.S. SIEVE SIZE Colorado Silica Sand in annulus.	0840	
				P/B Top of Sand Pack @ 62.6' below land surface (PNL 200' STEEL TAP)	0845	
				Pulled 10" Casing back to 67.3' below land surface	0853	
				P/B Top of Sand Pack @ 65.5' below land surface (PNL 200' STEEL TAP)	0855	
				Add 2 bags (100 lbs ea) 10-20 U.S. SIEVE SIZE Colorado Silica Sand in annulus.	0900	
				P/B Top of Sand Pack @ 57.5' below land surface (PNL 200' STEEL TAP)	0902	
				Pulled 10" Casing back to 61.6' below land surface	0930	
				P/B Top of Sand Pack @ 61.5' below land surface (PNL 200' STEEL TAP)	0935	
				Add 2 bags (100 lbs ea) 10-20 U.S. SIEVE SIZE Colorado Silica Sand in annulus.	1010	
				P/B Top of Sand Pack @ 54.5' below land surface (PNL 200' STEEL TAP)	1012	
				Pulled 10" Casing back to 57.5' below land surface	1028	
				P/B Top of Sand Pack @ 50.3' below land surface (PNL 200' STEEL TAP)	1030	
				Add 3 bags (100 lbs ea) 10-20 U.S. SIEVE SIZE Colorado	1040	
REMARKS:						<i>Karen P. Oster</i> <i>10/18/87</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)

9-C.27

DRILL LOG			By K.R. Oster	Rig B.E. 2211	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/8/87	# 68K-19153	Depth 70' 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
				silica sand in annulus.			
				D/B Top of Sand Pack @ 47' below land surface (PNL 200' STEEL TAPE) 1042			
				Pulled 10" casing back to 51' below land surface.		1110	
				D/B Top of Sand Pack @ 49.5' below land surface (PNL 200' STEEL TAPE) 1122			Artificial Sand Pack =
				Add 2 buckets (50 lbs ea) 1/4" Volclay tablets in annulus		1128	41'-49.5' below land surface
				D/B Top of Bentonite Pellets @ 45.5' below land surface (PNL 200' STEEL TAPE) 1130			
				Pulled 10" casing back to 48' below land surface.		1345	
				D/B Top of Bentonite Pellets @ 47' below land surface (PNL 200' STEEL TAPE) 1348			
				Poured 2 buckets (50 lbs ea) 1/4" Volclay tablets in annulus		1352	
				D/B Top of Bentonite Pellets @ 43' below land surface (PNL 200' STEEL TAPE) 1354			
				Pulled 10" casing back to 45' below land surface.		1402	
				D/B Top of Bentonite Pellets @ 44' below land surface (PNL 200' STEEL TAPE) 1404			Bentonite Pellet Seal =
				Poured 5 bags (50 lbs ea) granular bentonite in annulus.		1412	49.5'-44' below land
				D/B Top of Granular Bentonite seal @ 33.6' below land surface.		1416	surface
				(PNL 200' STEEL TAPE).			
				Pulled 10" casing back to 39' below land surface.		1445	
				D/B Top of Granular Bentonite seal @ 37' below land surface		1458	
				(PNL 200' STEEL TAPE).			
REMARKS:							

K.R. Oster
10/8/87

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

A-6000-021 (5-85)

9-C-28

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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 Walnut

A-6000 02: 15 85:

605

[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 (8-85)

[illegible]

9-C.31

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

FIGURE 3. DRILL LOG			By <i>R. Robinson</i>	Rig <i>3</i>	Well Number <i>197-N-585-60</i>	Computer Number <i>1 N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/30/87</i>	# <i>402-19153</i>	Depth <i>17 to 19'</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' 4 1/2"</i>				<i>Arrived at site, put guy lines out, made</i>		<i>7:00</i>	
				<i>new rope socket, string up tools etc</i>		<i>12:00</i>	<i>break - lunch</i>
		<i>H</i>	<i>W</i>			<i>12:30</i>	<i>messing down ^{grease} machine</i>
		<i>H</i>	<i>W</i>	<i>12 gal</i>		<i>1:50</i>	<i>Drill</i>
						<i>1:05</i>	<i>Drive casing</i>
				<i>3 gal</i>		<i>1:15</i>	<i>Drill</i>
						<i>1:30</i>	<i>Drive casing</i>
						<i>1:35</i>	<i>Drill</i>
						<i>1:50</i>	<i>Drive casing</i>
				<i>2 gal</i>		<i>1:55</i>	<i>Drill</i>
						<i>1:20</i>	<i>Sample</i>
<i>21' 4 1/2"</i>							
<i>10' 1 1/2"</i>							
<i>31' 6"</i>				<i>Ralph Robinson</i>			
REMARKS:							
						<i>Karen P. Oster</i> <i>9/30/87</i>	

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Karen P. Ost
10/1/87

2:10

DRILL LOG			Dr. <i>P. Robinson</i>	Rig <i>3</i>	Well Number <i>199-A-1058</i>	Computer Number <i>1 N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/3/87</i>	* <i>19153</i>	Depth <i>36 To 48</i>	Subcontract No. <i>N/A</i>	
Total Core Log	Depth	Drill Method	Well/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Arrive at jobsite - gate locked		7:00	
<i>41' 10"</i>		<i>H</i>	<i>W</i>	<i>Cobbles - tough going (boulders)</i>		7:40	<i>Drill</i>
	<i>39-40</i>					10:55	<i>Sample</i>
<i>10 4'</i>						11:40	<i>Prep core for weight</i>
<i>52' 2 1/2"</i>						12:00	<i>Unload sand etc</i>
						12:30	<i>Break</i>
		<i>H</i>	<i>W</i>			1:30	<i>Stand pipe + Wdg</i>
	<i>44-45</i>	<i>H</i>	<i>W</i>			3:30	<i>Drill</i>
		<i>H</i>	<i>W</i>			3:35	<i>Sample</i>
							<i>Drill</i>
<i>Ralph Robinson</i>							
REMARKS							
						<i>Karen R. Oster</i>	
						<i>10/2/87</i>	

9-C.34

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9-0-36

DRILL LOG				By <i>E. Watkins</i>	Rig <i>#08K-19153</i>	Well Number <i>199-N-58</i>	Computer Number <i>NIA</i>	Project or Work Order No. <i>CR7308</i>
				Date <i>10-6-87</i>	<i>3</i>	Depth <i>61' To 70'</i>	Subcontract No. <i>NIA</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.			Time	Drilling Comments
<i>65'</i>	<i>65</i>	<i>H</i>	<i>W</i>	<i>fine gravel & sand</i>			<i>7:30</i>	<i>Went to other Rig To get Toolbit & bits</i>
<i>105'</i>	<i>70</i>	<i>H</i>	<i>W</i>	<i>sand - Heavy</i>			<i>7:45</i>	<i>start Rig static measurement</i>
							<i>8:00</i>	<i>drilling</i>
							<i>9:00</i>	<i>Bailed</i>
							<i>9:30</i>	<i>add water 299'</i>
							<i>10'</i>	<i>Bailed well casing</i>
							<i>11:00</i>	<i>drilling unload pipe stainless</i>
							<i>11:15</i>	<i>drilling</i>
							<i>12:00</i>	<i>Spot added sample</i>
							<i>12:30</i>	<i>Lunch</i>
							<i>1:30</i>	<i>drilling</i>
							<i>2:15</i>	<i>sample</i>
				<i>added 60 gal. water and drilled to back flush well drilled for 15 min.</i>			<i>2:30</i>	<i>waiting for static recovery taking measurements</i>
				<i>static - same 68.6' DIB</i>			<i>3:15</i>	<i>add water & drill</i>
				<i>Tried bailing show. static same</i>			<i>3:45</i>	<i>take measurements</i>
<i>REMARKS:</i> <i>David L. Lister Karen P. Oster 9:00 go home</i> <i>10/6/87</i>								

9-C-37

9-C-38

DRILL LOG		By L. Watkins	Fig #68K-19153	Well Number 199-N-58	Computer Number N/A	Project or Work Order No. CR7308
		Date 10 7 87		Depth 0 70' to 71'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
7564	70'			cut off 2' casing	7:30	Water measurement
				Total casing now at 736 1/4	7:45	drilling
					8:20	Barled
					8:35	measure
					8:47	drilling
					10:30	wait for water
					10:45	drilling
					12:15	measure
					12:20	add sand
						measure water
					12:40	straightness test
					1:00	break out tools
						Broke wrench
					2:00	set stainless
					3:20	nick stainless
						prepare tools
						to pulling casing
					4:00	go home

REMARKS:

have P.O. Ste.
10/7/87

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3
2

James Jackson

Karen L. Oster
10/8/87

Standing Water

9-C-40

DRILL LOG			By <i>Watkins</i>	Log <i>#68K-19153</i>	Well Number <i>199-N-58</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10 9 87</i>	3	Depth <i>70' to 725'</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
				added 10 bags Bentonite		7:00	
				and pulled 12" casing from hole			
				Began developing the well		8:40	
				Bailed the very small amount of sand present			
				water silty			
				Began Breaking down Rig		9:30	
				Rig down began steaming pipe and Rig		10:30	
				Began moving casing and equipment to next site		12:00	
				Began digging dead men for rig		2:00	
				moved rig onto site to set up		3:30	
				Rig wouldn't start (read Battery)		4:00	go home
REMARKS:							
<div style="text-align: right;"> <i>John Watkins</i> <i>Alan R. Oster</i> <i>10/9/87</i> </div>							

WELL 199-N-59

Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project <u>RCRA G-W Monitoring</u>		Well Number <u>199-N-59</u>																												
Location <u>100N, 1324-N Ponds</u>		Temporary Well Number <u>N/A</u>																												
Driller <u>Olin Amos</u>		Coordinates <u>N 5,176 W 5,858</u>																												
Drilling Co. <u>Kaiser (K&H)</u>		Casing Elevation <u>459.53</u>																												
Geologist <u>Karen R. Oster</u>		Ground Elevation <u>457.58</u>																												
DRILLING METHOD Rotary Air <u>N/A</u> Mud <u>N/A</u> Cable Tool <u>D</u> <u>H 15'-72.5'</u> Drilling Fluid <u>100N drilling supply water</u> Other <u>0-15' Backhoe</u>		COMPLETION DATA Drilled Depth <u>72.5' below land surface</u> Completion Depth <u>71.5' below land surface</u> Date Started <u>9/21/87</u> Completed <u>11/19/87</u> Static Water Level/Date <u>59.5' b.s. 9/24/87 0750</u> (MW200'-1400' = 11053)																												
CASING DATA <table border="1"> <thead> <tr> <th>Type</th> <th>Size</th> <th>Length</th> </tr> </thead> <tbody> <tr> <td>Carbon Steel Schedule 40 ASTM A53 Grade B</td> <td>12"</td> <td>+5' to ~20'</td> </tr> <tr> <td>Carbon Steel Schedule 40 ASTM A53 Grade B</td> <td>10"</td> <td>+3' to 72.5'</td> </tr> <tr> <td>Stainless Steel 304 Sch 5S ASTM A312</td> <td>6"</td> <td>+194' to 50.5'</td> </tr> </tbody> </table> Approved By <u>Karen R. Oster</u> Date <u>9/24/87</u>				Type	Size	Length	Carbon Steel Schedule 40 ASTM A53 Grade B	12"	+5' to ~20'	Carbon Steel Schedule 40 ASTM A53 Grade B	10"	+3' to 72.5'	Stainless Steel 304 Sch 5S ASTM A312	6"	+194' to 50.5'															
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PERFORATIONS Type <u>N/A</u> Depth _____ Schedule _____ _____ _____ App. By <u>KRO</u> Date <u>9/25/87</u>		SCREEN Type <u>304 Stainless Steel</u> Length <u>10' + 5' = 15'</u> Slot Size <u>20</u> Depths <u>50.5' - 71.5'</u> App. By <u>KRO</u> Date <u>9/24/87</u>																												
		ANNULAR SEAL <table border="1"> <thead> <tr> <th>Type</th> <th>Interval</th> <th>Volume</th> </tr> </thead> <tbody> <tr> <td>Sand</td> <td>71.5'-50'</td> <td>125 (100lb) bags</td> </tr> <tr> <td>Bentonite Pellets</td> <td>50'-45'</td> <td>2 (50lb) buckets</td> </tr> <tr> <td>Granular Bentonite</td> <td>45'-3'</td> <td>29 (50lb) bags</td> </tr> <tr> <td>Cement</td> <td>3'-0'</td> <td>.72 cu ft</td> </tr> </tbody> </table> App. By <u>KRO</u> Date <u>10/26/87</u>		Type	Interval	Volume	Sand	71.5'-50'	125 (100lb) bags	Bentonite Pellets	50'-45'	2 (50lb) buckets	Granular Bentonite	45'-3'	29 (50lb) bags	Cement	3'-0'	.72 cu ft												
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Sonde	Interval	Date																												
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 Reviewed By Karen R. Oster Date 11/30/87
KRO 12/1/87 NOT YET SURVEYED

A-1800-187 (2/87)

AS-BUILT DIAGRAM

Well Number 199-N-59

Geologist L.R. Oster

Page 1 of 1

Reviewed by J.P. Karam

Date 4/9/82

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4.1 模型: 1 变量: 1 个, 2 个

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DRILL LOG			By <i>K. R. Oster</i>	For Bucyrus Erie 220 #68E-19151	Well Number 199-N-59 Depth 0' To 15'	Computer Number N/A	Project or Work Order No. CR7305 Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
20.5'	0' 12"	Back hoe	Dry	On approximately 9/14/87 a 15' starter hole was dug with a backhoe. 20.5' of 12" surface casing was set in hole and backfilled around it. The drill rig was then set upon the hole. Since the backhoe operator did not take specific depth samples it was decided to make a general description of the top 15' of soil by looking at the piles left by the operator near the hole.			Driller is Olin Amos.
	0'-15'	Back hoe	Dry	SILTY SANDY GRAVEL, 15% silt, 20% sand, 45% gravels, 20% boulders. Gravels are mostly basalt and granite with some other metamorphics. Sands are mostly basaltic with some quartz rich clasts. Gravels are mostly subrounded, Sands are mostly subangular. At approximately 10' the color changes from brown to gray and there is less silt. The brown silty soil reacts strongly in 10% HCl and the gray sandier soil does not react.			
REMARKS:				<i>K. R. Oster</i> 9/21/87			

DRILL LOG		By <i>K.R. Oster</i>	Fig <i>B.E. 22W</i>	Well Number <i>199-N-59</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CE 7308</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	Depth <i>15' To 19'</i>		Subcontract No. <i>N/A</i>
				LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				<i>in 10% HCl. All material is unconsolidated</i>		
				<i>and I believe the top 10' (brown silty soil)</i>		
				<i>is probably back fill material. The gray sandier</i>		
				<i>material (~15') is possibly a natural soil.</i>		
					<i>0945</i>	<i>Welding drive shoe</i>
						<i>on 10" casing</i>
					<i>1020</i>	<i>Start drilling</i>
					<i>1035</i>	<i>Drive casing</i>
					<i>1040</i>	<i>Resume drilling</i>
					<i>1045</i>	<i>Add 10 gals H₂O</i>
					<i>1100</i>	<i>Drive casing</i>
					<i>1102</i>	<i>Resume drilling</i>
					<i>1115</i>	<i>Rig dies - no H₂O in</i>
						<i>Radiator - Added H₂O</i>
					<i>1120</i>	<i>Resume drilling</i>
					<i>1123</i>	<i>Bail Well</i>
					<i>1125</i>	<i>Resume drilling</i>
					<i>1126</i>	<i>Add 4 gals H₂O</i>
REMARKS:						
<i>Karen R. Oster</i>						
<i>9/21/87</i>						

DRILL LOG			by <u>A.R. Oster</u>	Rig <u>B.E. 22W</u>	Well Number <u>299-N-59</u>	Computer Number <u>N/A</u>	Project or Work Order No. <u>CR7308</u>
			Date <u>9/21/87</u>	# <u>68K-19151</u>	Depth <u>19' To 20'</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
						1135	Drive Casing
						1137	Add 1 gal H ₂ O
	19'20"	H	Wet	SANDY GRAVEL, 50% gravel, 48% sand, 2% silt.		1138	resume drilling
				Trace s. cobbles, Trace v.p., 7% c.p., 10% m.p., 8% f.p.,		1143	Bail for Sample
				25% v.f.p., 15% v.c.s., 15% c.s., 10% m.s., 5% f.s., 3% v.f.s.,			Drill rate = 3'/hr.
				2% silt. Poorly Sorted Gravels are 95% basalt,		1145	Stop to set up
				5% granite, Trace other lithologies. Sands are			Propane tank
				90% basaltic, 5% quartz and feldspar, 5% other		1155	Resume drilling
				lithologies. Gravels are very angular (when broken)		1205	Stopped for lunch
				to subrounded. Sands are very angular to			
				subangular. Wet Color is dark olive gray (5Y 3/2),			
				Dry Color is olive gray (5Y 5/2). Slight reaction in			
				10% HCl. Unconsolidated. Similar to description of			
				soil at ~15' except broken by hard tool.			
				Samples are representative (for hard tool)			
				Sample taken for U.S. Testing-Long list analysis			
				and put on ice.			
REMARKS:							
<u>Karen R. Oster</u> <u>9/21/87</u>							

LI - Drive barrel TS - 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)

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>199-N-59</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR 7308</i>
		Date <i>9/21/87</i>	# <i>68K-19151</i>	Depth <i>20' To 25'</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>21' 5 1/2" of 10"</i>					<i>1245</i>	<i>Weld 10" Casing</i>
<i>9' 7 1/2"</i>						<i>(Add 9' 7 1/2" of 10")</i>
<i>31' 1" of 10"</i>				<i>Total 10" Carbon steel Casing = 31' 1"</i>		
					<i>1330</i>	<i>Start drilling</i>
					<i>1335</i>	<i>Add 5 gals H₂O</i>
					<i>1408</i>	<i>Drive Casing</i>
					<i>1409</i>	<i>Resume drilling</i>
						<i>Add 5 gals H₂O</i>
					<i>1502</i>	<i>Drive Casing</i>
					<i>1504</i>	<i>Bailed Well</i>
					<i>1506</i>	<i>Resume drilling</i>
						<i>Add 2 gals H₂O</i>
<i>24' 25'</i>	<i>H</i>	<i>Wet</i>		<i>SANDY GRAVEL, 49% gravel, 48% sand, 3% silt.</i>	<i>1519</i>	<i>Using dart barrel drill Bailed Well (25' 1/2")</i>
				<i>1% c.p., 8% m.p., 10% f.p., 30% v.f.p., 10% v.s., 14% c.s.,</i>	<i>1522</i>	<i>Drive Casing</i>
				<i>10% m.s., 10% f.s., 4% v.f.s., 3% silt. Poorly Sorted,</i>	<i>1524</i>	<i>Resume drilling</i>
				<i>Gravels are 95% basalt, 5% granite, Trace other</i>		<i>Add 4 gals H₂O</i>
				<i>lithologies. Sands are 90% basaltic, 5% quartz and</i>	<i>1546</i>	<i>Drive Casing</i>
				<i>feldspar, 5% other lithologies. Gravels are very</i>	<i>1549</i>	<i>Resume drilling</i>
				<i>angular and broken (few unbroken are subrounded)</i>		<i>Add 2 gals H₂O</i>
REMARKS:						
<i>Karen P. Oster</i> <i>9/21, 37</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-6000-621 (5-85)

DRILL LOG		By A.R. Oster	Rig B.E. 22W	Well Number 199-N-59	Computer Number N/A	Project or Work Order No. CR730B
		Date 9/21/87	#GBK-19151	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
				Sands are very angular to subangular. Wet Color is dark olive gray (5Y 3/2). Dry Color is light olive gray (5Y 6/2). Slight reaction in 10% HCl. (Unconsolidated. Similar to previous sample with an overall decrease in grain size. Samples are representative. Sample taken for U.S. Testing. Short list analysis and put on ice.	1607	Drive Casing
					1608	Bailed Well
					1610	Resumed drilling
					1622	Drive Casing
					1623	Resume drilling
	29'-30'	H	Wet	SANDY GRAVEL, 40% gravel, 55% sand, 5% silt. 2% v.c.p., 2% c.p., 1% m.p., 5% f.p., 30% v.f.p., 10% v.c.s., 15% c.s., 15% m.s., 10% f.s., 5% v.f.s., 5% silt. Moderately to Poorly Sorted, Gravels are 95% basalt, 5% other lithologies. Sands are 90% basaltic, 5% quartz and feldspar, 5% other lithologies. Gravels are very angular to subrounded (whr. unbroken). Sands are very angular to subrounded. Wet Color is dark olive gray. Dry Color is olive gray (5Y 5/2). Moderate reaction in 10% HCl. (Unconsolidated. Similar to previous sample with an overall decrease	1645	Using Dart Bailer Bailed Well Drill rate = 3 ft/hr Added 1 gal H ₂ O
REMARKS:						

A.R. Oster
9/21/87

9-0-43

[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 GOOD DEAL (5-85)

DRILL LOG			By <i>K. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-59</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR730B</i>
			Date <i>9/22/87</i>	# <i>68K-19151</i>	Depth <i>30' To 33'</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>40' 10" of 10"</i>						<i>0730</i>	<i>Start Drilling</i>
							<i>Add 2 gals H₂O</i>
						<i>0755</i>	<i>Drive Casing</i>
						<i>0805</i>	<i>Resume Drilling</i>
						<i>0829</i>	<i>Drive Casing</i>
						<i>0834</i>	<i>Barl Well</i>
						<i>0840</i>	<i>Resume Drilling</i>
							<i>Add 2 gals H₂O</i>
				<i>Olin (driller) says it is drilling like bsalt and</i>		<i>0850</i>	<i>Add 2 gals H₂O</i>
				<i>it is probably in large boulders at ~31-33'</i>		<i>0904</i>	<i>Add 2 gals H₂O</i>
						<i>0914</i>	<i>Barled Well</i>
				<i>Olin says boulder must have been a foot or 2'</i>		<i>0917</i>	<i>Resume Drilling</i>
				<i>in diameter but finally drilled through.</i>			<i>Add 2 gals H₂O</i>
						<i>0921</i>	<i>Drive Casing</i>
						<i>0925</i>	<i>Resume Drilling</i>
							<i>Add 5 gals H₂O</i>
						<i>0946</i>	<i>Add 25 gals H₂O</i>
						<i>0950</i>	<i>Drive Casing</i>
REMARKS: <i>Karl R. Oster</i> <i>9/22/87</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 8800-021 (6-86)

ORILL LOG			By K.R. Oster	Rig B.F. 2000	Well Number 194-N-59	Computer Number N/A	Project or Work Order No. CR7308
			Date 9/22/87	#688-1151	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
						0953	Resume drilling
						0954	Add 3 gals H ₂ O
						1002	Bailed Well
						1004	Resumed drilling
						1014	Drive Casing
	34'35"	H	Wet	SANDY GRAVEL, 40% gravels, 38% sands, 2% silt, 5% c.p., 10% m.p., 20% f.p., 25% v.f.p., 10% v.s., 10% c.s., 8% m.s., 7% f.s., 3% v.f.s., 2% silt. Very Poorly Sorted. Gravels are 90% basalt, 5% quartz and feldspar, 5% granite and other lithologies. Sands are 90% basaltic, 5% quartz and feldspar, 5% other lithologies. Gravels are very angular to subrounded (most are subrounded). Sands are very angular to subangular. Wet Color is dark olive gray (5Y 3/2), Dry Color is olive gray (5Y 5/2). Slight reaction in 10% HCl. Unconsolidated but difficult drilling through boulders @ 31'-33'. Similar to previous sample but increase in overall grain.		1018	Using Dart Bailer Bailed Well
							Drill rate = 23'/hr
						1020	Resume drilling
							Add 2 gals H ₂ O
						1030	stop for oil-man
						1033	Resume Drilling
							Add 2 gals H ₂ O
						1038	Drive Casing
						1042	Bail Well
						1044	Resume Drilling
							Add 2 gals H ₂ O
						1100	Drive Casing
						1101	Resume Drilling
REMARKS:							Karen P. Oster 9/22/87

DRILL LOG		By K. R. Oster	Rig B.E. 22W	Well Number 199-N-59	Computer Number N/A	Project or Work Order No. CR7308
		Date 9/22/87	#UBK-19/51	Depth 35' To 40'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				size and in amount of other lithologies present in the gravel portion. More of gravel is shown rounded edges. In samples are representative sample taken for U.S. Testing - short list analysis and put on ice.	1118	Add 2 gals H ₂ O Bail Well
					1120	Resume Drilling Add 2 gals H ₂ O
	39'-40'	H	Wet	SANDY GRAVEL. 55% gravels, 45% sands, 2% silt. 1% c.p., 9% m.p., 15% f.p., 30% v.f.p., 15% v.c.s., 10% c.s., 8% m.s., 7% f.s., 3% v.f.s., 2% silt. Poorly sorted. Gravels are 90% basalt, 5% quartzite, 5% other metamorphics, sands are 90% basaltic, 5% quartz and feldspar, 5% other lithologies. Gravels are angular to subrounded (when unbroken). Sands are very angular to subrounded. Wet Color is dark olive gray (5Y 3/2). Dry Color is gray (5Y 5/1). Very slight reaction in 10% HCl. Unconsolidated, similar to previous sample except decrease in grain size for gravels through v.c. sands and clasts are more rounded in this sample. Samples are	1130	Using dart bailer Bail Well Drill rate = 5'/hr
					1135	Drive Casing
REMARKS:						
						Karen R. Oster 9/22/87

D - Drive Barrel

H - Hard Tool

L - Large

M - Medium

S - Small

VC - Very Coarse

C - Coarse

F - Fine

VF - Very Fine

Stranding Water

A 6000 02/ (5 85)

DRILL LOG			By <u>A.R. Oster</u>	Rig <u>B.E. 22W</u>	Well Number <u>199-N-59</u>	Computer Number <u>N/A</u>	Project or Work Order No. <u>CR7308</u>
			Date <u>9/22/87</u>	# <u>UBK-19151</u>	Depth <u>40' TO 141'</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
				representative sample taken for U.S. Testing -			
				short list analysis and put on ice.			
40' 10" of 10"						1140	Add 10' 3 1/4" of 10" Casing
10' 3 1/4"						1155- 1225	Lunch
51' 1 1/4" of 10"				Total 10" Carbon Steel Casing = 51' 1 1/4"		1250	Drive Casing
						1259	Resume Drilling
						1315	Add 2.5 gals H ₂ O
						1318	Drive Casing
						1320	Resume Drilling
							Add 5 gals H ₂ O
						1329	Bail Well
						1330	Resume Drilling
						1340	Add 2 gals H ₂ O
						1350	Drive Casing
						1358	Resume drilling
							Add 2.5 gals H ₂ O
						1410	Drive Casing
						1412	Resume drilling
REMARKS:							

Karen R. Oster
9/22/87

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>199-N-59</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/22/87</i>	# <i>68K-19151</i>	Depth <i>44' 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
						1416	Add 2gals H ₂ O
	44'-45'	H	Wet	SANDY GRAVEL, 50% gravel, 45% sand, 5% silt.		1420	Using Bart Cooler Bailed Well
				1% c.p., 4% m.p., 15% f.p., 30% v.f.p., 15% v.s., 10% c.s.,			Drill rate = 4' / hr
				10% m.s., 5% f.s., 5% v.f.s., 5% silt. Poorly Sorted,		1422	Drive Casing
				Gravels are 90% basalt, 5% quartzites, 1% granites,		1436	Resume Drilling
				4% other metamorphics, Sands are 90% basaltic,			Add 5gals H ₂ O
				5% quartz and feldspar, 5% other lithologies.		1441	Bailed Well
				Gravels are very angular to subrounded (when		1443	Resumed drilling
				unbroken). Sands are very angular to subangular		1447	Add 2gals H ₂ O
				(Wet Color is olive gray (5Y 4/2), Dry Color is olive		1449	Drive Casing
				gray (5Y 5/2). Slight reaction in 10% HCl,		1453	Stop drilling
				Unconsolidated, Similar to previous sample, with		1515	Resume drilling
				some decrease in grain size, more silt, and less			Add 4gals H ₂ O
				rounded than last sample. Samples are		1527	stopped drilling
				representative. Sample taken for U.S. Testing -		1538	Resumed drilling
				short list analysis and put on ice.		1543	stopped drilling
						1545	Resumed drilling
						1554	Drive Casing
REMARKS:							
<i>Karen R Oster</i> <i>9/22/87</i>							

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22LO</i>	Well Number <i>199-N-59</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
		Date <i>9/22/87</i>	# <i>08K-19151</i>	Depth <i>45' To 50'</i>		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
					1556	Resume Drilling
					1558	Bailed Well
					1600	Resumed drilling
	49'-50'	H	Wet	SANDY GRAVEL, 55% gravel, 42% sand, 3% silt 5% v.c.p., 2% c.p., 5% m.p., 13% f.p., 30% v.f.p., 10% ves., 10% c.s., 13% m.s., 5% f.s., 4% v.f.s., 3% silt Very Poorly Sorted Gravels are 90% basalt, 5% quartzite, 5% other metamorphics, sands are 90% basaltic, 5% quartz and feldspar, 5% other lithologies. Gravels are very angular to subrounded (when unbroken) Sands are very angular to subangular. Wet Color is olive gray (5Y 4/2), Dry Color is gray (5Y 6/1), very slight reaction in 10% HCl. Unconsolidated, similar to previous sample with increase in overall grain size. Samples are representative. Samples taken for U.S. Testing - long list analysis.	1605	Using Dart Bailer Bailed Well Drill rate = 5.5'/hr.
REMARKS:						
						<i>Karen R. Oster</i> <i>9/22/87</i>

[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

* 卷第 02 号 (5-86)

DRILL LOG			By K. R. Oster	Reg BE 2210	Well Number 199 N-59	Computer Number N/A	Project or Work Order No. CR 7308
			Date 9/23/87	# 481-19151	Depth 53' 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
	100' 7 3/4" of 10"					0735	Started drilling
						0805	Drive Casing
						0808	Bail Well
						0810	Resume drilling
							Add 4 gals H ₂ O
	54'-55'	H	Wet	SANDY GRAVEL, 35% gravel, 42% sand, 3% silt.		0832	with dirt bailer Bail Well
				20% cp, 4% amp, 12% of 3, 15% v.f.p., 10% ves, 15% o.s., 25% m.s., 7% of s, 5% v.f.s, 3% silt. Poorly Sorted Gravels are 80%		0835	Resume drilling
				basalt, 5% quartz and feldspar, 5% quartzite, 5%			Add 2 gals H ₂ O
				granite, 5% other metamorphics. Sands are 85%		0903	Drive Casing
				basaltic, 10% quartz and feldspar, 5% other lithologies		0905	Resume drilling
				Gravels are very angular to subrounded (very few are unbroken) Sands are very angular to subangular. Wet		0917	Bail Well
				Color is dark olive gray (5Y 3/2). Dry Color is olive gray (5Y 5/2). Slight reaction in 10% HCl. ^{Unconsolidated,} Decrease in overall		0918	Drive Casing
				grain size and basalt content since previous		0921	Resume drilling
				sample. Samples are representative Sample taken		0923	Add 5 gals H ₂ O
				for U.S. Testing - short list analysis and put on ice.		0942	Bail Well
						0944	Resume drilling

REMARKS:

K. R. Oster
9/23/87

DRILL LOG		By K.R. Oster	Rig B.P. 2211	Well Number 194-N-59	Computer Number N/A	Project or Work Order No. CR7308
		Date 9/23/87	# 48K-19151	Depth 55' to 60'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	59'-10"	H	Wet	SANDY GRAVEL, 35% gravel, 12% sand, 3% silt 29% c.p., 49% m.p., 12% f.p., 17% v.f.p., 10% v.c.s., 15% c.s. 25% m.s., 7% f.s., 5% v.f.s., 3% silt. Gravels are 75% basalt, 10% granite, 5% quartzite, 5% quartz and feldspar, 5% other metamorphics. Sands are 80% basaltic, 10% quartz and feldspar, 10% other lithologies. Gravels are very angular to subrounded (few are unbroken). Sands are very angular to subrounded. Wet Color is dark olive gray (5Y 3/2). Dry Color is olive gray (5Y 5/2). Very slight reaction in 10% HCl. Unconsolidated. Similar to previous sample except decrease in gravel clast size and in overall basalt content. Samples are representative. Sample taken for U.S. Testing short-list analysis and put on ice	0954	Using dart buster Bailed Well Drill rate = 4.2'/hr
					0957	Resume drilling
					1000	Drive Casing
60' 7 1/4" of 10"						
10' 4 1/4"					1005	Add 10' 4 1/4" of 10" Casing
71' 0" of 10"				Total 10" Carbon steel Casing = 71' 0"	1047	Drive Casing
					1054	Resume drilling
					1055	Add 5 gals H ₂ O
REMARKS:				Karen R. Oster 9/23/87		

DRILL LOG				By <i>K.R. Oster</i>	Fig <i>B.E. 22W</i>	Well Number <i>199-N-59</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
				Date <i>9/23/87</i>	# <i>62K-19151</i>	Depth <i>60' 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
							1116	Add 2 gals H ₂ O
							1121	Add 2 gals H ₂ O
							1130	Drive Casing
							1136	Bail Well
							1140	Resume Drilling
								Add 2.5 gals H ₂ O
							1159	Drive Casing
							1205	
							1235	Lunch
							1239	Resume drilling
							1245	Add 2 gals H ₂ O
							1251	Drive Casing
							1256	Resume Drilling
							1305	Add 5 gals H ₂ O
							1308	Add 2 gals H ₂ O
							1317	Bail Well
							1319	Resume drilling
							1320	Add 2 gals H ₂ O
							1322	Drive Casing
REMARKS:								
<i>K.R. Oster</i> <i>9/23/87</i>								

DRILL LOG			By K.R. Oster	File B.E. 22W	Well Number 199-N-59	Computer Number N/A	Project or Work Order No. CR7308
			Date 9/23/87	# 48K-19151	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
				Driller notes very well Consolidated formation (Ringold)		1324	Resume drilling
				starting at about 63' as well as approximate		1325	Add 5 gals H ₂ O
				top of water table.		1338	Add 2 gals H ₂ O
						1341	Drive Casing
						1346	Resume Drilling
	64-65'	H	Wet	SILTY SANDY GRAVEL, (Ringold) 35% gravel, 55% sand		1356	Using dart + bailer Bailed Well
				10% silt, 1% c.p., 4% m.p., 15% f.p., 15% v.f.p., 10% v.s., 10% m.s.,			Drill rate = 2.4"/hr
				20% m.s., 10% f.s., 5% v.f.s., 10% silt Very Poorly Sorted		1409	Drive Casing
				Gravels are 30% basalt, 30% quartzite, 30% granite,		1415	Resume drilling
				10% other lithologies (mostly metamorphics). Sands are		1416	Add 4 gals H ₂ O
				35% basaltic, 55% quartz and feldspar, 10% other		1437	Drive Casing
				lithologies. Gravels are very angular to angular		1443	Resume drilling
	71' 0" of 10"			(very few have one subrounded edge). Sands are		1500	Cut off 1 1/2" of 10"
	- 1 1/2"			very angular to subrounded. Wet Color is grayish			Casing total now = 70' 10 1/2"
	70' 10 1/2" of 10"			brown (2.5 Y 5/2). Dry Color is light gray (2.5 Y 7/2).		1505	Drive Casing
				Strong reaction in 10% HCl. Well Consolidated -		1507	Bail Well
				Hole stays open. Very different from previous		1510	Resume drilling
				sample; Decrease in overall grain size, decrease			Add 4 gals H ₂ O
REMARKS:							
K.R. Oster 9/23/87							

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

A-6000-021 (6-85)

DRILL LOG			By K.R. Oster	Rig B.E. 22W	Well Number 199-N-59	Computer Number N/A	Project or Work Order No. CR7308
			Date 9/23/87	# 68K-19151	Depth 65' To 70'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Celiche, Etc.		Time	Drilling Comments
				in basalt content, increase in quartz-rich lithologies,		1520	Bail Well
				Colors change from olive-grays to grayish browns,		1521	Resume drilling
				strong reaction in HCl, Consolidation - open hole. All these		1525	drive Casing
				are indicative of the formation change from Hanford		1527	Bevel Casing
				to Ringold which appears to be at approximately			
				103'. Samples are representative. Sample taken			
				for U.S. Testing - short list analysis and put on ice			
70' 10 1/4" of 10"						1532	Add 10' 4 1/2" of 10" Casing
10' 4 1/4"							
81' 3"				Total 10" Carbon Steel Casing = 81' 3"			
69-70'	H	Wet		SILTY (E-M) SAND, 0% Gravel, 85% Sand, 15% silt		1530	Using dart bailer Bailed Well
				60% m.s., 15% f.s., 10% v.f.s., 15% silt. Moderately			Drill rate = 5.7'/hr
				Sorted. Sands are 70% quartz and feldspar, 20%		1610	Resumed drilling
				basaltic, 5% mica, 5% other lithologies and are		1641	Drive Casing
				very angular to subrounded. Wet Color is grayish-		1645	Resumed drilling
				brown (2.5Y 5/2), Dry Color is light gray (2.5Y 7/2) Very		1700	Drive Casing
				Strong reaction in 10% HCl. Moderately Consolidated;		1705	Bailed Well
				but sands do heave a little bit. Very different from		1707	Drive Casing
				previous sample - with a great size decrease and		1708	Resume drilling
REMARKS:							
Karl R. Oster 9/23/87							

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DRILL LOG			By K.R. Oster	Rig B.E. 2210	Well Number 199-N-59	Computer Number N/A	Project or Work Order No. CR7308
			Date 9/24/87	#WBK-19151	Depth 72' To 71.5'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Catclike, Etc.		Time	Drilling Comments
				D/W = 59.5' below land surface (PNL 200'E-TAPE #11053)		0750	
				D/B = 69' below land surface (PNL 200' STEEL TAPE)		0755	
				Sand has heaved up in hole so it needs to be cleaned out.			
81'3" of 10"						0800	Cut off 5'9" of 10"
5'9"							
75'6"				Total 10" Carbon Steel Casing = 75'6"			Casing
						0815	Bailing Well
						0825	Started drilling to clean sand from well.
				D/B = 71.5' below land surface (PNL 200' STEEL TAPE)		0835	
				D/W = 60' below land surface (PNL 200'E-TAPE #11053)		0840	
				As water recovers from bailing, the sand heaves in also, so if we pump water into above static level, and drill this should pressurize and push the sand back out the bottom of the hole.			
						0850	Resume drilling while pumping water.
REMARKS: (Added 55 gals H ₂ O) K.R. Oster 9/24/87							

D - Drive 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 <u>K.R. Oster</u>	Rig <u>B.E. 22W</u>	Well Number <u>199-N-59</u>	Computer Number <u>N/A</u>	Project or Work Order No. <u>CR 7308</u>
			Date <u>9/24/87</u>	# <u>68K-19151</u>	Depth <u>71.5' To 71.5'</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
						0900	Stopped drilling.
				D/W = 59' below land surface (PNL 200' E-TAPE # 11053)		0902	
				D/B = 72.5' below land surface (PNL 200' STEEL TAPE)		0904	
						0905	Bailing Well.
				D/W = 40.5' below land surface (PNL 200' E-TAPE # 11053)		0910	
				D/B = 71.5' below land surface (PNL 200' STEEL TAPE)		0920	
				D/W = 60.5' below land surface (PNL 200' E-TAPE # 11053)		0921	
				D/W = 40' below land surface (PNL 200' E-TAPE # 11053)		0946	
				D/B = 71.5' below land surface (PNL 200' STEEL TAPE)		0948	
				Sand has apparently stopped heaving into hole.			
						0955	Breaking bit off.
						1015	Making straightness tester and lifters for stainless.
				Passed a 20' section of 8" casing through hole to bottom confirming that hole is straight.		1125	Straightness Test.
				D/W = 59.5' below land surface (PNL 200' E-TAPE # 11053)		1135	
				D/B = 71.5' below land surface (PNL 200' STEEL TAPE)		1320	
REMARKS:							

Karen R. Oster
9/24/87

DRILL LOG			By K.R. Oster	Rig B.R. 2010	Well Number 199-N-59	Computer Number N/A	Project or Work Order No. CR7308
			Date 9/24/87	#LOG-A151	Depth 71.5' To 70.5'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Poured ~ 1/2 bag (100 lbs ea) 10-20 U.S. sieve size Colorado silica sand inside 10" casing to bring up		1330	
				steel screen and casing			
				D/B = 70.5' below land surface (PNL 200' STEEL TAPE)		1333	
				Setting stainless as follows:		1338	
				1 10' section of 20 slot, 6" diameter stainless steel screen			
				1 5' section of 20 slot, 6" diameter stainless steel screen			
				1 20' section of 6" stainless steel casing with factory welded centralizers on the bottom end nearest the screen			
				1 20' section of 6" stainless steel casing			
				1 10' section of 6" stainless steel casing			
				1 5' section of 6" stainless steel casing			
				1 3' section of 6" stainless steel casing			
				Totals: 15' of screen; 58' of casing		1430	Finished setting ss.
REMARKS:							
Karl R. Oster 9/24/87							

D - Drive Barrel H - Hard 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-59</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
		Date <i>9/24/87</i>	# <i>08K-19151</i>	Depth <i>70.5' To 71.5'</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
				Measured ϕ /B inside s.s. casing @ 70.5' below land surface (PNL 200' STEEL TAPE)	1434	
				Started building cover for s.s. casing to protect it from welding and cutting operations.	1435	
				Started welding on puller top to pull casing.	1500	
				Bottom of 10" casing is at 72' 4"	1530	
				Pulled 10" casing back to 71' 4" below land surface.	1533	inside s.s. casing
				Stainless casing settled approximately 1' during pulling		(Measured ϕ /B = 71.5' ϕ /B. (PNL 200' STEEL TAPE))
				Poured 1 bag (100 lbs ea) 10-20 U.S. sieve size Colorado silica sand in annulus. Measured ϕ /B inside annulus to top of sand pack @ 67' below land surface (PNL 200' STEEL TAPE)	1543	
				Pulled 10" casing back to 70' 2" below land surface.	1545	
				Measured ϕ /B of sand = 68.1' below land surface (PNL 200' STEEL TAPE)	1558	
				Poured 1 1/2 bags (100 lbs ea) 10-20 U.S. sieve size Colorado silica sand in annulus. Measured ϕ /B of sand pack @ 64.7' below land surface (PNL 200' STEEL TAPE)	1600	
					1604	
					1605	
REMARKS:						
<i>Lain R. Oster</i> <i>9/24, 87</i>						

ORILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>177-N-59</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/24/87</i>	# <i>68K-19151</i>	Depth <i>71.5' To 71.5'</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
				Pulled 10" Casing back to 107' below land surface.		11030	
				Measured D/B of sand pack @ 106' below land surface.		11032	
				(PNL 200' STEEL TAPE)			
				Poured 2 1/2 bags (100 lbs ea) 10-20 U.S. Sieve Size		11050	
				Colorado Silica Sand in annulus.			
				Measured D/B of sand pack @ 58' below land surface.		11052	
				(PNL 200' STEEL TAPE)			
				Pulled 10" Casing back to 102.7' below land surface.		11008	
				Measured D/B of sand pack @ 100.5' below land surface.		11010	
				(PNL 200' STEEL TAPE)			
				Poured 1 bag (100 lbs ea) 10-20 U.S. Sieve Size		11018	
				Colorado Silica Sand in annulus.			
				Measured D/B of sand pack @ 57.5' below land surface.		11025	Driller done for day.
				(PNL 200' STEEL TAPE)			
REMARKS:							
<i>Karen P. Oster</i> <i>9/24, 7</i>							

DRILL LOG		By K.R. Oster	Rig Sundt	Well Number 111-1-1	Computer Number N/A	Project or Work Order No. 111-1-1
		Date 9/25/87		Depth 71.5' To 71.5'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Poured 1.5 bags (100 lbs = 1) 10-20 U.S. sieve size	0713	
				Colored to surface. Sealed in annulus		
				Measured $\frac{1}{8}$ sand pack @ 52' below land surface	0750	
				(PNL 200 Sieve Size)		
				Measured $\frac{1}{8}$ = 58.5' below land surface (PNL 200 Sieve Size) #11053	0752	
				Pulled 10" casing back to 57.6' below land surface	0801	
				Measured $\frac{1}{8}$ sand pack @ 55' below land surface (PNL 200 Sieve Size)	0818	
				Sealed in annulus		
				Poured 2.5 bags (100 lbs = 1) 10-20 U.S. sieve size	0834	
				Colored to surface. Sealed in annulus		
				Measured $\frac{1}{8}$ sand pack @ 47' below land surface	0855	
				(PNL 200 Sieve Size)		
				Pulled 10" casing back to 47' below land surface	0901	
				Measured $\frac{1}{8}$ sand pack @ 50' below land surface	0906	Artificial Sand Pack
				(PNL 200 Sieve Size)		76.5' below
				Poured 3 bags (100 lbs = 1) 10-20 U.S. sieve size	0910	
				Sealed in annulus		
				Measured $\frac{1}{8}$ sand pack @ 50' below land surface	0916	
REMARKS: Sealed in annulus. 9/25/87						

DRILL LOG		By J. D. Hester	Rig #6BK-1951	Well Number 111-N-57	Computer Number N/A	Project or Work Order No. 11173/13
		Date 7/25/84		Depth 71.0' to 71.5'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
				Pulled 10" casing back to 48.16' below surface.		
				Measured 1/2" Bentonite Pellet (2) 45.5'	0935	
				Test sample (see report 10/2/84)		
				Pulled 10" casing back to 46.16' below surface.	0940	
				Measured 1/2" Bentonite Pellet (2) 46.25' below	0942	
				Test sample (see report 10/2/84) (1' gap)		
				Poured 1 bucket (50 lbs) of Volclay to bottom.	0945	
				Test sample.		
				Measured 1/2" Bentonite Pellet (2) 45' below	0948	
				Test sample (see report 10/2/84)		
				Poured 1 bag (25 lbs) of Volclay to bottom.	0950	
				Test sample.		
				Measured 1/2" Bentonite Pellet (2) 45' below	0952	
				Test sample (see report 10/2/84)		
				Pulled 10" casing back to 37.8' below surface.	1030	
				Measured 1/2" Bentonite Pellet (2) 34' below	1040	
				Test sample (see report 10/2/84)		
				Poured 1 bag (25 lbs) of Volclay to bottom.	1105	
REMARKS:						
<div style="text-align: right;"> <i>Sawmiller</i> 7/25/84 </div>						

9-C-70

DRILL LOG			By A.R. Oster	Rig 3.E.2210	Well Number 197-N-59	Computer Number N/A	Project or Work Order No. 387308
			Date 9/25/87	#08K-19151	Depth 71.5' to 71.5'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Measured 1/8 Granular Bentonite Seal @ 21.5' below		1107	
				land surface (PNL 200' STEEL TAPE)			
				Pulled 10" Casing out to 28' below land surface.		1125	
				Measured 1/8 Granular Bentonite Seal @ 25.5' below		1135	
				land surface (PNL 200' STEEL TAPE)			
				Poured 7 bags (50 lbs ea) Bentonite Crumbles in annulus.		1145	
				Measured 1/8 Granular Bentonite Seal @ 29.5' below		1147	
				land surface (PNL 200' STEEL TAPE)			
				Pulled 10" Casing out of hole.		1215	
				Measured 1/8 Granular Bentonite Seal @ 35.5' below		1248	
				land surface (PNL 200' STEEL TAPE)			
				Poured 9 bags (50 lbs ea) Bentonite Crumbles in annulus.		1256	
				Measured 1/8 Granular Bentonite Seal @ 3' below		1258	
				land surface (PNL 200' STEEL TAPE)			
				Pulled 12" Casing out of hole.		1302	
				Measured 1/8 Granular Bentonite Seal @ 3' below		1303	
REMARKS:				land surface (PNL 200' STEEL TAPE)			

O - 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 86)

9-C-72

[illegible]

D - Drive flangel H - Hard Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _____ Standing Water = 2000 CPM or less

WELL 199-N-60

Well Completion Report/Title III Inspection List

Project RCRA 3-W Monitoring Well Number 199-N-60
Location 100-N 334-N Roads Temporary Well Number N/A
Driller W. S. Co. Inc. Coordinates N 5,351 W 5,867
Drilling Co. Kaiser (KEH) Casing Elevation 461.94
Geologist John R. Oster Ground Elevation 459.37

DRILLING METHOD		COMPLETION DATA	
Rotary Air	<u>N/A</u> Mud <u>N/A</u>	Drilled Depth	<u>70' below land surface</u>
Cable Tool	<u>D</u> <u>H</u> <u>20'-75'</u>	Completion Depth	<u>70.25' below land surface</u>
Drilling Fluid	<u>100-N 20' 100-N 20' 100-N 20'</u>	Date Started	<u>12/17/87</u> Completed <u>11/19/87</u>
Other	<u>0-20' Borehole</u>	Static Water Level/Date	<u>423' 1/3 11/5/87 2:00</u> <small>(CALC. FROM 3-PALE #1053)</small>

CASING DATA	
Type	Size
<u>Carbon Steel Schedule 40 ASTM A53 Grade B</u>	<u>10" -5' to 20'</u>
<u>Carbon Steel Schedule 40 ASTM A53 Grade B</u>	<u>10" -3' to 71'</u>
<u>Carbon Steel 304 ST. ASTM A312</u>	<u>6" +2.54' to 55'</u>

Approved By John R. Oster Date 10/15/87

PERFORATIONS		SCREEN		ANNULAR SEAL		
Type	Schedule	Type	Length	Type	Interval	Volume
<u>N/A</u>		<u>304 Stainless Steel</u>	<u>10' + 5' - 15'</u>	<u>Sand</u>	<u>71' - 11.5'</u>	<u>255.22 cu yds</u>
Depth		Slot Size	<u>20</u>	<u>Gravel</u>	<u>10.5' - 11.5'</u>	<u>2.75 cu yds</u>
		Depths	<u>55' - 70.25'</u>	<u>Gravel</u>	<u>11.5' - 3.25'</u>	<u>14.50 cu yds</u>
				<u>Gravel</u>	<u>3.25' - 0'</u>	<u>12.03</u>
App. By	Date	App. By	Date	App. By	Date	
<u>John R. Oster</u>	<u>11/5/87</u>	<u>John R. Oster</u>	<u>11/5/87</u>	<u>John R. Oster</u>	<u>11/5/87</u>	

GEOPHYSICAL LOGGING			AQUIFER TESTING	
Sondes	Interval	Date	Type of Test	Length of Test
<u>Natural Gamma</u>	<u>0' - 3'</u>	<u>10/15/87</u>	<u>Constant Discharge</u>	<u>2 hours</u>
<u>Neutron</u>	<u>0' - 1'</u>	<u>10/15/87</u>	<u>Volume Pumped</u>	<u>~4,400 gallons</u>
<u>Resistivity</u>	<u>0' - 1'</u>	<u>11/5/87</u>	<u>Drawdown</u>	<u>> 53'</u>
<u>TV Camera</u>	<u>70' - 0'</u>	<u>11/30/87</u>		
Approved By	Date	Approved By	Date	
<u>John R. Oster</u>	<u>10/15/87</u>	<u>John R. Oster</u>	<u>11/5/87</u>	

OTHER APPLICABLE ITEMS		
<u>KRO Steam Cleaning 10/1/87</u>	<u>KRO Protective Steel Posts 11/1/87</u>	<u>KRO Downhole TV Inspection 11/30/87</u>
<u>KRO Storage of Const. Material 10/1/87</u>	<u>KRO Safety Paint 11/1/87</u>	<u>N/A Well Abandonment KRO 11/1/87</u>
<u>KRO Tool Lubricants 10/1/87</u>	<u>KRO Straightness Test 10/15/87</u>	<u>KRO Complete As-Built Diagram, Driller's and Geologist's Logs 11/1/87</u>
<u>KRO Concrete Pad 11/16/87</u>	<u>KRO Well Development 11/1/87</u>	
Approved By	Date	
<u>John R. Oster</u>	<u>11/1/87</u>	

Reviewed By J. P. Hageman Date 11/30/87
DR Oster 12/1/87 NOT YET SURVEYED

A-1800-187 (3/87)

Reviewed by JL Raymond Date 11/30/07

[illegible]

A-1600-184 (3/87)

Well <u>199-A-60</u>	Drilled Depth <u> </u>	Interval Logged <u>29'-1"</u>
Log Type <u>NEWERON</u>	Date <u>10-15-77</u>	Casing Size <u>10 1/2"</u>
Logged By <u>D.L. McDaniel - PDI</u>	Water Level Depth <u>47'</u>	
Logging Scale: Conductivity <u>1000 μm</u>	Time Constant <u>2</u>	
Vertical Scale <u>20'/in</u>	Logging Speed <u>25'/MIN</u>	
Source Strength <u>3 Ci 244AmBe</u>	Spacer Length <u>4'</u>	
Remarks: REF. PROCEDURE GW-5 REV. 1 PROBE SERIAL QN 274547

Well <u>15-A-10</u>	Drilled Depth <u>100'</u>	Interval Logged <u>20-1</u>
Log Type <u>SPRINGS</u>	Date <u>10-12-77</u>	Casing Size <u>12" x 16"</u>
Logged by <u>J. L. MacArthur</u>	FWL <u>47'</u>	Water Level Depth <u>47'</u>
Logging System Bandwidth <u>20/150</u>	Time Constant <u>5</u>	
Vertical Scale <u>20/150</u>	Logging Speed <u>2.5"/min</u>	
Source Strength <u>125 ohm CI 100' x 10"</u>	Spool Length <u>100'</u>	
Remarks <u>REF. PROCEDURE GW-4 REV. 1</u> <u>PROBE SER # 42-98</u>		

5000' 45

SPAN CHECK

Repeat section

5000' 15

10

20

40

50

5000' 45

SPAN

50

Well <u>99-A-213</u>	Drilled Depth	Interval Logged <u>27-28</u>
Log Type <u>NAT. GAMMA</u>	Date <u>10-15-97</u>	Casing Size <u>10 1/2"</u>
Logged By <u>T. L. McLaughlin - PNL</u>	Water Level Depth <u>47'</u>	
Logging Series Sensitivity <u>100%</u>	Time Constant <u>3</u>	
Vertical Scale <u>20'/100'</u>	Logging Speed <u>15'/100'</u>	
Source Strength <u>N/A</u>	Spacer Length <u>N/A</u>	
Remarks <u>REF. PROCEDURE GW-6 REV. 2</u> <u>PROB. SER. IN CG-27A-97</u>		

09%

SPAN CHECK

100%

100%

REPEAT SECTION

09%

SPAN

100%

53-6735-20612-721

BOREHOLE NO. 177-N-60

DEPTH	NAME	GRAVEL			SAND					FINES		SORTING	FRAMEWORK			MATRIX			DRY COLOR	HCI REACTION	CONSOLIDATION	DRILL METHOD	DRILL RATE FT/HR	NAT. GAMMA	COMMENT
		% BOULDER	% 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							
0'-10'	FSG	20	45						15	1	VP	90	G.H	SR	90	Q	SA	gray	U	U	B	—		No Sample	
24'-25'	SG	—	—	45	15	10	10	10	5	5	P	95	G.Q	VA-SR	90	Q-F	VA-SA	gray	VSL	U	H	1.6'			
27'-30'	SG	—	—	30	10	15	15	15	10	5	VP	97	Q	VA-SR	95	Q-F	VA-SA	gray	VSL	U	H	2.5'			
34'-35'	SG	—	—	35	15	15	10	10	10	5	VP	95	G	VA-SR	90	Q-F	VA-SA	gray	VSL	U	H	4.9'			
39'-40'	SG	—	—	45	15	10	10	10	5	5	P	95	G	VA-SR	90	Q-F	VA-SA	gray	VSL	U	H	5.4'			
44'-45'	SG	—	—	50	15	10	10	8	4	3	P	95	G	VA-SR	90	Q-F	VA-SA	gray	VSL	U	H	5.9'			
49'-50'	SG	—	—	40	15	15	10	10	10	4	P	95	G	VA-SR	90	Q-F	VA-SA	gray	—	U	H	6'			
54'-55'	SG	—	—	40	15	15	15	9	4	2	VP	70	G.Q	VA-SR	85	Q-F	VA-SA	gray	—	U	H	4.8'			
59'-60'	SG	—	T	35	12	20	15	10	5	3	VP	60	G.Q	VA-SR	70	Q-F	VA-SA	gray	—	U	H	3.7'			
64'-65'	(2)GS	—	—	25	15	15	15	10	10	10	VP	30	G.Q	VA-SR	30	Q-F	VA-SA	gray	VSL	C	H	4.2'		Ringable	
69'-70'	(2)GS	—	—	20	10	15	20	15	10	10	P	40	QG	VA-SA	30	Q-F	VA-SR	gray	ST	C	H	1.7'			

GMD 506-212

DRILL LOG			By <i>A.R. Oster</i> Date <i>10/12/87</i>	Rig <i>Bayrus</i> <i>Erie 220</i> <i>#68K-19153</i>	Well Number <i>199-N-60</i> Depth <i>0' To 20'</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</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
~20' of 12"		Back	Dry	On approximately 9/14/87 a ~20' starter hole was dug with a backhoe. ~20' of 12" surface casing was set in hole and back filled around it. Since the backhoe operator did not take specific depth samples it was decided to make a general description of the top ~20' of soil by looking at the piles left by the operator near the hole.			Driller is Louis Watkins.
	0'-20'	Back hoe	Dry	SILTY SANDY GRAVEL, 20% boulders, 45% gravels, 20% sand, 15% silt. ^{Very Poorly Sorted} Gravels are mostly basalt and granite with some metamorphics. Sands are mostly basaltic with some quartz-rich clasts. Gravels are mostly subrounded. Sands are mostly subangular. Somewhere between 11'-14' the color changes from browns to grays and there is less silt. Both the brown silty soil and the gray sandier soil have strong reactions in 10% HCl. The gravels have a CaCO ₃ coating on them. All material is Unconsolidated, and I believe the top 11'-14' (brown silty soil) is probably backfill material.			
REMARKS:							
<i>Loren R. Oster</i> <i>10/12/87</i>							

DRILL LOG			By <i>A.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-60</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR 7308</i>
			Date <i>10/12/87</i>	# <i>68K-A153</i>	Depth <i>20' To 22'</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
				The gray sandier material ~15'-20' is possibly a natural soil.			
				Rig was steam cleaned on 10/9/87 and moved onto well site. Partial rig up was done on 10/9/87.			
						0700	Finished rigging up and strung tools
						1000	Started drilling Add 25 gals H ₂ O
				Louis assumed the 19'-20' sample was taken by the back hoe operator since the starter hole was so deep. I decided that on this hole the 24'-25' will be the long list analysis sample instead of 19'-20'.		1200	Driller did not take 19'-20' sample.
						1205	Set 21' 3 3/4" of 10" casing and drive shoe in hole
21' 3 3/4" of 10"							Add 7' 8 1/4" of 10" casing
7' 8 1/4"				Total of 10" Carbon Steel Casing = 29' 0"			
29' 0"						1315	Resume drilling
						1350	Bail Well
						1355	Resume drilling
REMARKS:							
<i>A.R. Oster</i> <i>10/12/87</i>							

DRILL LOG			By <i>K.R. Oster</i>	Ria B.E. 2210	Well Number <i>199-N-60</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/12/87</i>	# <i>68K-19153</i>	Depth <i>22' 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
							Add 5 gals H ₂ O
						1405	Drive Casing
						1407	Resume drilling
						1420	Add 2 gals H ₂ O
						1430	Using dirt bailer Bailed Well
	24'-25'	H	Wet	SANDY GRAVEL, 45% gravel, 50% sand, 5% silt.			Drill rate = 1.6"/hr
				5% bc.p., 5% mp.p., 17% of.p., 18% v.f.p., 15% v.s., 10% a.s.,			
				10% m.s., 10% f.s., 5% v.f.s., 5% silt. Poorly Sorted.		1435	Resume drilling
				Gravels are 95% basalt, 2% granite, 2% quartzite,			Add 7 gals H ₂ O
				1% other lithologies. Sands are 90% basaltic, 5%			
				quartz and feldspar, 5% other lithologies. Gravels			
				are very angular to subrounded (very few are unbroken).			
				Sands are very angular to subangular. Wet Color is			
				dark olive gray (5Y 3/2). Dry Color is gray (5Y 6/1). Very			
				slight reaction in 10% HCl. Unconsolidated. Similar to			
				previous sample except broken by hard tool. Samples			
				are representative. Sample taken for U.S. testing - long			
29' 0" of 10"				list analysis and put on ice (no 19'-20'-long list)		1450	Add 8' 4" of 10" Casing
8' 4"				Total of 10" Carbon Steel Casing = 37' 4"		1530	Drive Casing
37' 4" of 10"							
REMARKS: Delivered 24'-25' soil samples to Sigma. 5 to be delivered to U.S. Testing in the morning. (cc-of. C#2011) Total of Drilling Supply water added to Well today = 34 gallons <i>Karen R. Oster</i> <i>10/12/87</i>							

DRILL LOG		By A.R. Oster	Rig B.E. 22W	Well Number 199-N-60	Computer Number N/A	Project or Work Order No. CR7308
		Date 10/13/87	# 66K-19153	Depth 29' 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
37' 4" of 10"					0700	Start Drilling
						Add 10 gals H ₂ O
	29'-30'	H	Wet	SANDY GRAVEL, 30% gravel, 65% sand, 5% silt.	0845	Casing dented. Bail Well
				1% c.p., 5% m.p., 9% f.p., 15% v.f.p., 10% v.c.s., 15% c.s., 15% m.s.,		Drill rate = 0.5"/hr
				15% f.s., 10% v.f.s., 5% silt. Very Poorly Sorted. Gravels	0850	Drive Casing
				are 97% basalt, 2% quartzite, 1% other lithologies.	0855	Resume drilling
				Sands are 95% basaltic, 3% quartz and feldspar, 2%		Add 2 gals H ₂ O
				other lithologies. Gravels are very angular to sub-	0911	Drive Casing
				rounded. Sands are very angular to subangular. Wet	0914	Resume drilling
				Color is Dark olive gray (5/4 3/2). Dry Color is gray (5Y 5/1).	0924	Drive Casing
				Very slight reaction in 10% HCl. Unconsolidated. Very	0928	Resume drilling
				Similar to previous sample except overall decrease		Add 5 gals H ₂ O
				in grain size, and an increase in basalt content.	0940	Bail Well
				Samples are representative. Sample taken for	0943	Resume drilling
				U.S. Testing - short list analysis and put on ice.	0946	Drive Casing
					0950	Resume drilling
						Add 5 gals H ₂ O
REMARKS:						
Karen R. Oster 10/13/87						

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

A-6000-021 (6-85)

9-C-84

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>177-N-60</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/13/87</i>	# <i>68X-19153</i>	Depth <i>30' To 35'</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>34' 35'</i>	<i>H</i>	<i>Wet</i>	<i>SANDY GRAVEL, 35% gravel, 40% sand, 5% silt.</i>		<i>1010</i>	<i>Using dart bailer Bailed Well</i>
				<i>1% c.p., 5% m.p., 10% f.p., 19% v.f.p., 15% v.c.s., 15% c.s., 10% m.z., 10% f.s., 10% v.f.s., 5% silt. Very Poorly Sorted.</i>		<i>1012</i>	<i>Add 3 gals H₂O</i>
				<i>Gravels are 95% basalt, 3% granite, 2% other lithologies.</i>		<i>1014</i>	<i>Bored Pipe</i>
				<i>Sands are 90% basaltic, 5% quartz and feldspar, 2% quartzite, 3% other lithologies. Gravels are very angular to subrounded. Sands are very angular to subangular.</i>			
				<i>Wet color is dark olive gray (5Y 3/2). Dry color is gray (5Y 5/1). Very slight reaction in 10% HCl. Unconsolidated.</i>			
				<i>Very similar to previous sample except overall increase in grain size and decrease in basalt content. Samples are representative. Sample taken for U.S. Testing - short list analysis and put on ice.</i>			
<i>37' 4" of 10"</i>						<i>1025</i>	<i>Add 10' 2 1/2" of 10" Casing</i>
<i>10' 2 1/2"</i>							
<i>47' 6 1/2" of 10"</i>				<i>Total 10" Carbon Steel Casing = 47' 6 1/2"</i>			
						<i>1115</i>	<i>Drive Casing</i>
						<i>1120</i>	<i>Resume drilling</i>
						<i>1140</i>	<i>Add 2 gals H₂O</i>
REMARKS: <i>Karen R. Oster</i> <i>10/13/87.</i>							

6
7
8
9

DRILL LOG			By K.R. Oster	Rig B.E. 22W	Well Number 199-N-60	Computer Number N/A	Project or Work Order No. CR 7308
			Date 10/13/87	# 68K-19153	Depth 35' To 40'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
						1145	Drive Casing
						1150	Resume drilling
							Add 2 gals H ₂ O
						1208	Add 2 gals H ₂ O
						1210	Bail Well
						1212	Resume drilling
	39'-40'	H	Wet	SANDY GRAVEL, 45% gravel, 50% sand, 5% silt.		1220	using dart bailer Bailed Well
				Traces v.c.p., 4% o.c.p., 10% m.p., 12% f.p., 23% v.f.p., 15% v.c.s., 10% a.s., 10% m.s., 10% f.s., 5% v.f.s., 5% silt Poorly Sorted			Drill rate = 5.7/hr
				Gravels are 95% basalt, 2% granite, 3% other		1227	Resume drilling
				lithologies. Sands are 90% basaltic, 5% quartz and		1230	Add 3 gals H ₂ O
				feldspar, 2% quartzite, 3% other lithologies. Gravels		1240	Add 2 gals H ₂ O
				are very angular to subrounded. Sands are very		1245	Bail Well
				angular to subangular. (Wet Color is dark olive gray,		1249	Resume drilling
				(5Y 3/2). Dry Color is light olive gray (5Y 6/2). Very		1251	Drive Casing
				Slight reaction in 10% HCl, 11% consolidated. Very similar		1257	Resume drilling
				to previous sample except overall increase in grain		1300	Add 4 gals H ₂ O
				size and a lighter dry color. Samples are representative		1314	Bail Well
REMARKS:				Sample taken for U.S. Testing short list analysis and put on ice.			

Kalel F. Oster
10/13/87

59 250/3000 C. Coarse V/F - Very Fine C. Coarse F - Fine VF - Very Fine _____ Standing Water 4 2000 075 15 85

DRILL LOG		By I.R. Oster	Rig B.E. 22W	Well Number 199-N-60	Computer Number N/A	Project or Work Order No. C27308
		Date 10/13/87	# 68K-19153	Depth 40' To 45'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1316	Resume drilling
	41'-45'	H	WET	SANDY GRAVEL, 50% gravel, 47% sand, 3% silt.	1330	Using dart barrel Bailed Well
				1% v.c.p., 4% o.c.p., 5% a.m.p., 15% f.p., 25% v.f.p., 15% v.c.s., 10% c.s.,		Drill rate = 5.9'/hr
				10% m.s., 8% f.s., 4% v.f.s., 3% silt. Poorly Sorted Gravels	1334	Add 4 gals H ₂ O
				are 95% basalt, 3% granite, 2% other lithologies. Sands	1335	Bevel Pipe
				are 90% basaltic, 5% quartz and feldspar, 5% other		
				lithologies. Gravels are very angular to subrounded		
				Sands are very angular to subangular. Wet Color		
				is dark olive gray (5Y 3/2). Dry Color is olive gray (5Y 5/2)		
				Very slight reaction in 10% HCl, (unconsolidated, very		
				similar to previous sample except overall increase in		
				grain size and a darker dry color. Samples are		
				representative. Sample taken for U.S. Testing - short		
				list analysis and put on ice.		
47' 6 1/2" of 10"						
9' 9 3/4"						
57' 4 1/4" of 10"				Total 10" Carbon Steel Casing = 57' 4 1/4"	1400	Add 9' 9 3/4" of 10" Casing
					1443	Drive Casing
					1450	Resume drilling
REMARKS:						
<div style="text-align: right;"> <i>Done R. Oster</i> <i>10/13/87</i> </div>						

9-C.87

C - Coarse M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _____ Standing Water

A-0000 021 (5-87)

 

[illegible]

 

4-5000.021 (5-66)

DRILL LOG				By <i>K.R. Oster</i>	Rig <i>3 E 22W</i>	Well Number <i>199-N-60</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
				Date <i>10/14/87</i>	# <i>68K-19153</i>	Depth <i>49' To 50'</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
							0700	Bevel Pipe
							0730	Start Drilling
								Add 1.5 gals H ₂ O
	<i>49-50</i>	<i>H</i>	<i>Wet</i>	<i>SANDY GRAVEL, 40% gm vel, 56% sand, 4% silt.</i>			<i>0810</i>	<i>Using dart bailer Bailed Well</i>
				<i>Trace v.e.p., 1% o.p., 5% m.p., 15% f.p., 19% v.f.p., 15% v.e.s.,</i>				<i>Drill rate = 6'/hr</i>
				<i>15% o.e.s., 10% m.s., 10% f.s., 4% v.f.s., 4% silt. Poorly Sorted.</i>			<i>0815</i>	<i>Drive Casing</i>
				<i>Gravels are 95% basalt, 3% granite, 2% other lithologies.</i>			<i>0820</i>	<i>Resume drilling</i>
				<i>Sands are 90% basalt, 5% quartz and feldspar, 5% other lithologies.</i>				<i>Add 3 gals H₂O</i>
				<i>Gravels are very angular to subangular.</i>			<i>0841</i>	<i>Drive Casing</i>
				<i>Sands are very angular to subangular. Wet Color is</i>			<i>0843</i>	<i>Resume drilling</i>
				<i>dark olive gray (5Y 3/2). Dry Color is olive gray, (5Y 5/2)</i>			<i>0848</i>	<i>Add 2 gals H₂O</i>
				<i>No reaction in 10% HCl. Unconsolidated. Very similar to</i>			<i>0853</i>	<i>Bail Well</i>
				<i>previous sample except overall decrease in grain size.</i>			<i>0857</i>	<i>Resume drilling</i>
				<i>Samples are representative. Samples taken for U.S.</i>			<i>0859</i>	<i>Drive Casing</i>
				<i>Testing - long list analysis and put on ice.</i>			<i>0903</i>	<i>Resume drilling</i>
								<i>Add 3 gals H₂O</i>
							<i>0923</i>	<i>Drive Casing</i>
							<i>0926</i>	<i>Bail Well</i>
REMARKS:								
<i>Karen R. Oster</i>								
<i>10/14/87</i>								

9-C-89

DRILL LOG			By K.R. Oster	Fig B.E. 22W	Well Number 199-N-60	Computer Number N/A	Project or Work Order No. CR 7308
			Date 10/14/87	# 68K-19153	Depth 50' 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
						0930	Resume drilling
							Add 2gals H ₂ O
	54'-55'	H	Wet	SANDY GRAVEL, 40% gravel, 58% sand, 2% silt.		0940	using dart Bailer Bailed Well
				2% v.c.p., 5% c.p., 8% m.p., 10% f.p., 15% v.f.p., 15% v.c.s.,			Drill rate = 4.8/hr
				15% c.s., 15% m.s., 9% f.s., 4% v.f.s., 2% silt. Very Poorly		0944	Add 2gals H ₂ O
				Sorted. Gravels are 70% basalt, 15% granite, 10% quartzite,		0947	BEVEL PIPE
				5% other lithologies. Sands are 85% basaltic, 10% quartz			
				and feldspar, 5% other lithologies. Gravels are very			
				angular to subrounded. Sands are very angular to subangular.			
				Wet color is dark olive gray (5Y 3/2) Dry Color is olive gray,			
				(5Y 5/2). No reaction in 10% HCl. Unconsolidated, similar			
				to previous sample except increase in overall grain			
				size and decrease in overall basalt content. This sample			
				could be reworked Ringold. Samples are representative.			
				Sample taken for H.S. Testing - short list analysis and pul.			
				ur ice			
57' 4 1/4"	of 10"					1000	Add 10' 3 1/4" of 10" Casing
10' 3 1/4"							
67' 7 1/2"				Total of 10" Carbon Steel Casing = 47' 7 1/2"			

Karen R. Oster
10/14/87

Stocking Water

ACB000021 (E-PS)

DRILL LOG			By K. R. Oster	Rig B.E. 2210	Well Number 199-N-60	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/14/87	*WBK-19153	Depth 55' To 60'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
						1037	Drive Casing
						1045	Resume drilling
						1105	Add 1.5 gals H ₂ O
						1117	Drive Casing
						1121	Resume drilling
							Add 2 gals H ₂ O
						1134	Bail Well
						1138	Resume drilling
						1142	Drive Casing
						1147	Add 4 gals H ₂ O
	59'-60'	H	Wet	SANDY GRAVEL, 35% gravel, 62% sand, 3% silt.		1215	using start bailer Bailed Well
				Trace small cobbles, 3% v.c.p., 4% o.c.p., 6% m.p., 10% f.p., 12% v.f.p.			Drill rate = 3.7'/hr
				12% v.c.s., 20% o.c.s., 15% m.s., 10% f.s., 5% v.f.s., 3% silt.		1220	Drive Casing
				Very poorly sorted. Gravels are 60% basalt, 20% granite,		1223	Resume drilling
				15% quartzite, 5% other lithologies. Sands are 70% basaltic,			Add 3 gals H ₂ O
				20% quartz and feldspar, 5% quartzite, 5% other lithologies.		1236	Add 1/2 gal H ₂ O
				Gravels are very angular to subangular. Sands are very		1250	Bail Well
				angular to subangular. Wet Color is dark olive gray (5Y 3/2)		1300	Resume drilling
REMARKS:							
Karen R. Oster 10/14/87							

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-60</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/14/87</i>	# <i>48K-19153</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
				Dry Color is light olive gray (5Y 6/2). No reaction in 10% HCl.		1301	Add 2.5 gals H ₂ O
				Unconsolidated. Similar to previous sample except decrease		1310	Bail Well
				in overall grain size and basalt content, lighter dry color.		1315	Drive Casing
				Samples are representative but may not include the		1318	Resume Drilling
				small cobbles. Sample taken for U.S. Testing - short list		1319	Add 3 gals H ₂ O
				analysis and put on ice.		1330	Add 1.5 gals H ₂ O
	64'-65'	H	Wet	(Ringold) SLIGHTLY SILTY GRAVELLY SAND, 25% gravel, 10% silt, 10% c.p., 5% m.p., 10% f.p., 8% v.f.p., 15% v.c.s., 15% c.s., 15% m.s., 10% f.s., 10% v.f.s., 10% silt. Gravel are 30% basalt, 30% granite, 30% quartzite, 10% other lithologies. Sands are 30% basaltic, 40% quartz and feldspar, 20% quartzite, 5% mica, 5% other lithologies. Gravel are very angular to subrounded (very few are unbroken). Sands are very angular to subrounded. Wet Color is dark grayish brown (2.5Y 4/2). Dry Color is light brownish gray (2.5Y 6/2). Very slight reaction to 10% HCl. Different from previous sample with decreases in overall grain size and basalt content, and grayish-brown colors instead of olive grays.		1346	using dark barrel Bailed Well
						1350	Drive Casing
						1355	Bevel Pipe

REMARKS:

Karen P. Oster
10/14/87

9-C-92

[illegible]

0 - 0.25 mm (1) Hard Part 1 - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _____ Standing Water

DRILL LOG			By K.R. Oster	Rig B.E. 22W	Well Number 199-N-60	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/15/87	# U6K-19153	Depth 67' To 70'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				1/2" = 60.3' below land surface (PNL 200'E-TAPE #11053)		0700	
						0705	Start drilling
						0745	Drive Casing
						0750	Resume drilling
						0810	Bail We'll
						0815	Resume drilling
							Add ~50 gals H ₂ O
							to keep sand from
							heaving
	69'-70'	H	Wet	SLIGHTLY SILTY GRAVELLY SAND, 20% gravel, 70% sand, silt. 10% 3% m.p., 7% f.p., 10% v.f.p., 10% ves., 15% cc's, 20% m.s., 15% f.s., 10% v.f.s., 10% silt. Poorly sorted. Gravels are 40% basalt, 30% quartzite, 20% granite, 10% other lithologies. Sands are 30% basaltic, 50% quartz and feldspar, 10% quartzite, 10% other lithologies. Gravels are very angular to subangular. Sands 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. Moderately Consolidated		0940	Using dual Bailer Bailed Well Drill rate = 1.7'/hr
REMARKS:							
K.R. Oster 10/15/87							

9-C.95

DRILL LOG			By K.R. Oster	Rig 3.E.22W	Well Number 194-N-60	Computer Number N/A	Project or Work Order No. J27308
			Date 10/15/87	# 48K-19153	Depth 70' 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
				but it heaves up after being drilled. Similar to previous sample except overall decrease in grain size and a decrease in basalt content of the gravels, lighter color and stronger HCl reaction. Samples are representative. Sample taken for U.S. Testing - short list analysis and put on ice.			
				P/B = 72.4' below land surface (PNL 200' STEEL TAPE)		0945	
				P/W = 57.6' below land surface (PNL 200' STEEL TAPE #11053) ^{42.0' below} _{10' below} static 1015			
				P/B = 70.4' below land surface (PNL 200' STEEL TAPE)		1018	
				Attempting to force sand back out of hole.		1028	Resume drilling
							Add 110 gals H ₂ O
						1044	Bail Well
				P/B = 71.6' below land surface (PNL 200' STEEL TAPE)		1046	
				Poured 1/4 bag (100 lbs ea) 10-20 U.S. sieve size Colorado Silica Sand in bottom of hole.		1048	
				P/B = 70.6' below land surface (PNL 200' STEEL TAPE)		1050	
78' 0 3/4"						1130	Cutoff 4' of 10" casing
74' 0 3/4"				Total 10" Carbon Steel Casing = 74' 0 3/4"			
REMARKS:							
<div style="text-align: right;"> K. R. Oster 10/15/87 </div>							

B - Blk. S. - Small V.C. - Very Coarse C - Coarse F - Fine V.F. - Very Fine _____ Standing Water

A 8000-021 (5-85)

DRILL LOG			By K.R. Oster	Rig B.E. 222	Well Number 199-N-60	Computer Number N/A	Project or Work Order No. CR7308
			Date 10/15/87	# 68K-19/53	Depth 70' To 71'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Passed a 20' section of 8" pipe down hole to bottom.		1155	Straightness Test
				Logs run: Natural gamma 69'-2', Neutron 69'-1',		1200	Break off Bit
				Density 69'-1'.		1245-	Geophysical
				D/B = 70.2' below land surface (PWL 200' STEEL TAPE).		1335	Logging
				Setting stainless steel as follows:		1345	
				1 10' section of 6" 20 slot stainless steel (304) screen			
				with end cap - male threads up.			
				1 5' section of 6" 20 slot stainless steel (304) screen			
				1 20' section of 6" stainless steel (304) casing with factory			
				welded centralizers on the top end			
				1 20' section of 6" stainless steel (304) casing			
				1 10' section of 6" stainless steel (304) casing			
				1 5' section of 6" stainless steel (304) casing			
				1 3' section of 6" stainless steel (304) casing			
				Totals: Screen = 15', Casing = 58'			
				D/B inside 6" S.S. casing = 70.75' below land surface (PWL 200' STEEL TAPE)		1500	Lost 2 S.S. weights down
							well unable to retrieve.
				Poured 3/4 bag (100 lbs ea) 10-20 U.S. sieve size Colorado		1508	

K.R. Oster
 10/15/87

Harvey R. Oster
10/15/87

[illegible]

C - Coarsest H - Hard Text L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _____ Standing Water

A-4000-021 (5-85)

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-60</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
		Date <i>10/16/87</i>	# <i>UBK-19153</i>	Depth <i>71' To 71'</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
				Poured 8 3/4 bags (100 lbs ea) 10-20 U.S. sieve size Colorado Silica Sand in annulus. Pulled 10" casing back to 50.75' below land surface. Measured P/B top of Sand Pack @ 49.5' below land surface (PNL 200' STEEL TAPE).	1145	Artificial Sand Pack = 71' - 49.5' below land surface.
				Poured 3.5 buckets (50 lbs ea) 1/4" Volclay tablets in annulus. Pulled 10" casing back to 46' below land surface. Measured P/B top of Bentonite Pellet Seal @ 44.5' below land surface (PNL 200' STEEL TAPE).	1230	Bentonite Pellet Seal = 49.5' - 44.5' below land surface.
				Poured 21 bags (50 lbs ea) of bentonite crumbles in annulus. Pulled 10" casing completely out of well. Measured P/B top of granular bentonite seal @ 14.3' below land surface (PNL 200' STEEL TAPE).	1605	
				P/B = 59.9' below land surface (PNL 200' E-TAPE #11053)	1608	
				P/B = 70.6' below land surface (PNL 200' STEEL TAPE)	1610	
					1615	Driller done for day.
REMARKS:						
<i>Karen R. Oster</i> <i>10/16/87</i>						

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

A 6000-021 (2-85)

9-C-98

ORILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 220W</i>	Well Number <i>199-N-60</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
		Date <i>10/19/87</i>	# <i>68K-19153</i>	Depth <i>71' To 71'</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
				Poured 7 bags (50 lbs ea) bentonite crumblies in annulus. Pulled 12" Cast Iron Steel Casing completely from hole and reset a 4' section of 10" casing in hole to hold it open for the cement.	0745	Gravelly Bedrock
				D/B Top of formation in hole is 5.2' below land surface.	0750	Core 1 = 44.5' - 3.75' below land surface.
				(PNL 200' STEEL TAPE)		
				D/W = 59.5' below land surface (PNL 200' E-TAPE # 11053)	0755	
				D/B inside 10" SS. casing = 118.5' below land surface (PNL 200' STEEL TAPE)	0800	
				Started bailing well.	0805	
				D/B inside 10" SS. casing = 70.25' below land surface (PNL 200' STEEL TAPE)	0815	
				Bailed @ ~ 7.5 gals/min for 40 min until there is only about 2 tablespoons of sand in a 5 gallon bucket from one bailer trip.	0845	
					0850	Rig down and move off site.
REMARKS:						

Karen R. Oster
10/19/87

9-C.100

[illegible]

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

[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

[illegible]

[illegible]

9-C.103

D - 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 (6-86)

[illegible]

q_1 is taken

James P. Oster
10/14/87

DRILL LOG			By <i>Watkins</i>	Rig <i>#153</i>	Well Number <i>194-N-60</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/15/87</i>		Depth <i>67 to 72</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 3/4</i>	<i>70</i>	<i>H</i>	<i>W</i>	<i>sand and small pea gravel</i>		<i>7:00</i>	<i>take DWS static measurements</i>
				<i>Hole caved to bottom of casing (Heavy sand)</i>		<i>7:15</i>	<i>drilling</i>
				<i>cut off 4' of casing</i>		<i>9:40</i>	<i>sample</i>
				<i>casing now 74' 3"</i>		<i>10:01</i>	<i>go after geologist</i>
						<i>10:30</i>	<i>drilling hole back out</i>
				<i>set stainless to 70' 9"</i>		<i>10:45</i>	<i>add sand to hold hole open</i>
						<i>11:00</i>	<i>out of hole</i>
						<i>11:01</i>	<i>unload truck</i>
						<i>11:20</i>	<i>cut off casing straightness test</i>
						<i>11:50</i>	<i>straightness test</i>
						<i>12:00</i>	<i>break down tools</i>
						<i>12:15</i>	<i>wait for logging of well</i>
						<i>1:45</i>	<i>start running stainless</i>
						<i>2:50</i>	<i>Geologist gets tape stuck in stainless</i>
							<i>logs weights (Repair tape)</i>
						<i>3:15</i>	<i>weld on casing</i>
						<i>3:30</i>	<i>puller on</i>
REMARKS: <i>John Watkins</i> <i>Karen R. Oster 10/11/87</i>							

A - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine _____ Standing Water

A-6000 021 16 951

WELL 199-N-61

Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project <u>RCRA 3-W Monitoring</u>		Well Number <u>199-N-61</u>			
Location <u>100-N 1324-N Ponds</u>		Temporary Well Number <u>N/A</u>			
Driller <u>Olin Amos</u>		Coordinates <u>N 5,320 W 5,570</u>			
Drilling Co. <u>Kaiser (KEH)</u>		Casing Elevation <u>462.02</u>			
Geologist <u>John F. Oster</u>		Ground Elevation <u>459.70</u>			
DRILLING METHOD		COMPLETION DATA			
Rotary Air <u>N/A</u> Mud <u>N/A</u>		Drilled Depth <u>25.5' below land surface</u>			
Cable Tool <u>D</u> <u>H 16'-27.5'</u>		Completion Depth <u>25.5' below land surface</u>			
Drilling Fluid <u>50-N Drilling Supply Water</u>		Date Started <u>9/28/87</u> Completed <u>10/13/87</u>			
Other <u>0-16 Backlogs</u>		Static Water Level/Date <u>55.1 gals 10/13/87 0-10</u> <small>(94.200' - 38.9' = 55.3')</small>			
CASING DATA					
Type Size					
<u>Carbon Steel Schedule 40 ASTM A53 Grade B 12" +5' to +20'</u>					
<u>Carbon Steel Schedule 40 ASTM A53 Grade B 10" +3' to 45'</u>					
<u>Stainless Steel 304 Schedule 40 ASTM A312 1" +2.31' to 51.5'</u>					
Approved By <u>John F. Oster</u> Date <u>10/1/87</u>					
PERFORATIONS		SCREEN		ANNULAR SEAL	
Type <u>N/A</u>		Type <u>304 Stainless Steel</u>		Type	Interval Volume
Depth	Schedule	Length <u>21.5' ±</u>		<u>Sand</u>	<u>4.5' - 5.5' 3.00 cu yds</u>
		Slot Size <u>52</u>		<u>Sand/Fine</u>	<u>4.5' - 4.8' 0.50 cu yds</u>
		Depths <u>51.5' - 46.6'</u>		<u>Granular</u>	<u>4.5' - 4.8' 0.50 cu yds</u>
				<u>Cement</u>	<u>4.5' - 0' 1.08 cu yds</u>
App. By <u>John F. Oster</u>	Date <u>10/1/87</u>	App. By <u>John F. Oster</u>	Date <u>10/1/87</u>	App. By <u>John F. Oster</u>	Date <u>10/1/87</u>
GEOPHYSICAL LOGGING			AQUIFER TESTING		
Sondes	Interval	Date	Type of Test		
<u>TV Camera</u>	<u>0' - 46.6'</u>	<u>11/30/87</u>	<u>Constant Discharge / Recovery</u>		
			Length of Test <u>5 hours</u>		
			Volume Pumped <u>~4000 gallons</u>		
			Drawdown <u>4.45'</u>		
Approved By <u>John F. Oster</u> Date <u>11/30/87</u>			Approved By <u>John F. Oster</u> Date <u>10/30/87</u>		
OTHER APPLICABLE ITEMS					
<u>No</u> Steam Cleaning <u>Inexplicable</u> <u>KRO</u> Protective Steel Posts <u>11/1/87</u> <u>KRO</u> Downhole TV Inspection <u>11/30/87</u>					
<u>KRO</u> Storage of Const. Material <u>9/28/87</u> <u>KRO</u> Safety Paint <u>11/1/87</u> <u>N/A</u> Well Abandonment <u>10/1/87</u>					
<u>KRO</u> Tool Lubricants <u>9/28/87</u> <u>KRO</u> Straightness Test <u>9/30/87</u> <u>KRO</u> Complete As-Built Diagram, Driller's and Geologist's Logs <u>11/1/87</u>					
<u>KRO</u> Concrete Pad <u>11/1/87</u> <u>KRO</u> Well Development <u>10/30/87</u>					
Approved By <u>John F. Oster</u> Date <u>11/1/87</u>					

Reviewed By DR RAK Date 11/30/87
DR RAK 12/1/87 NOT YET SURVEYED

A-1800-187 (3/87)

AS-BUILT DIAGRAM

Well Number 199-N-61 Geologist Loren R. Oster Page 1 of 1

Reviewed by J. H. Raymond Date 11/20/87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill Rate	
Description	Diagram		Diagram Litho.	Lithologic Description		
~20' of 12" Carbon Steel		5		SILTY SANDY GRAVEL	-	
Surface Pipe (Removed)		10			-	
70' of 10" Carbon Steel		15			-	
Casing (Removed)		20		SANDY GRAVEL	2.6/hr	
53' of 6" Stainless Steel		25		SILTY SANDY GRAVEL	2.5/hr	
(304) Casing		30			3.4/hr	
Factory Welded Centralizers		35			5.5/hr	
		40			4.2/hr	
		45		SANDY GRAVEL	3.6/hr	
		50		Static H ₂ O Level @ 55.1' b.l.s. 10/2/87	4.3/hr	
15' of 6" Stainless Steel		55		SILTY SANDY GRAVEL	3.1/hr	
(304) 20 slot screen		60		Ringold Contact @ 59' b.l.s.	3.75/hr	
		65		(FINE) SAND	3.7/hr	
Completion Depth = 60.6' b.l.s.		70		Drilled Depth = 67.5' b.l.s.		
Completion Symbols			Lithologic Symbols			
+ Concrete Seal			~ Clay			
/ Granular Bentonite Seal			- Silt			
X Bentonite Pellet Seal			• Sand			
• Artificial Sand Pack			○ Gravel			
○ Natural Gravel Pack			○ Gravel with weathering Rinds			
			□ Caliche			

93-6725-20012-721

BOREHOLE NO. 199-N-61

93-6739-200(12-72)

BOREHOLE NO. 111-15-01

DEPTH	NAME	GRAVEL			SAND					FINES		SORTING	FRAMEWORK				MATRIX				HCl REACTION	CONSOLIDATION	DRILL METHOD	DRILL RATE FT/HR	NAT. GAMMA	COMMENTS
		% BOULDER	% COBBLE	% PEBBLE	% VC SAND	% C SAND	% M SAND	% F SAND	% VF SAND	% SILT (Σ)	% CLAY (C)		% BASALT	OTHER MAJOR LITHOLOGIES	ROUNDNESS (1=VERY FINE)	% BASALT	OTHER MAJOR LITHOLOGIES	ROUNDNESS	DRY COLOR							
0'-16'	ZSG	20	45	→	←		20		V	15	1	VP	90	G, H	SR	90	Qu	SA	brownish-gray	ST/-	U	B	-		No Sample	
19'-20'	SG	-	-	40	10	15	15	10	5	5	-	P	95	Q, G	VA-SR	90	Qu-F	VA-SA	olive gray	ST	U	H	2.6'			
24'-25'	ZSG	-	-	30	10	15	15	10	10	10	-	VP	90	G	VA-SR	90	Qu-F	VA-SA	gray	ST	U	H	2.5'			
29'-30'	ZSG	-	-	45	10	10	10	11	7	7	-	VP	95	-	VA-SR	90	Qu-F	VA-SR	gray	M	U	H	3.4'			
34'-35'	ZSG	-	-	55	12	8	7	6	6	6	-	VP	90	G	VA-SR	90	Qu-F	VA-SA	gray	M	U	H	5.5'			
39'-40'	ZSG	-	-	50	12	12	11	5	5	5	-	P	85	G, Qu	A-SR	85	Qu-F	VA-SA	gray	SL	U	H	4.2'			
44'-45'	SG	-	-	51	15	10	10	5	5	4	-	P	90	G	A-SR	90	Qu-F	VA-A	olive gray	M	U	H	3.6'			
49'-50'	SG	-	-	55	15	12	10	5	2	1	-	M-P	90	G	VA-SR	90	Qu-F	VA-SA	olive gray	SL	U	H	4.3'			
54'-55'	ZSG	-	-	50	10	10	10	5	5	10	-	VP	70	G, Q, H	VA-SR	80	Qu-F	VA-SA	olive gray	VSL	U	H	3.1'			
59'-60'	ZSG	-	-	30	5	15	20	10	10	10	-	VP	30	G, Q, H	VA-SR	40	Qu-F	VA-SA	gray	VSL	C	H	3.75'		Ringold	
64'-65'	S	-	-	T	T	T	10	60	20	10	-	W	10	Qu-F, H	VA	10	Qu-F, H	VA-SA	lt. gray	VSL	C	H	3.7'		"	

GPO-596-313

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>Bucyrus Erie 220</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/28/87</i>	# <i>08K-19151</i>	Depth <i>0' To 16'</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
~20'	of 12"	Back	Dry	On approximately 9/14/87 a 16' starter hole was dug with a backhoe. ~20' of 12" surface casing was set in hole and backfilled around it. Since the backhoe operator did not take specific depth samples it was decided to make a general description of the top 16' of soil by looking at the piles left by the operator near the hole.			Driller is Olin
	0'-16'	hoe	Dry				Amos
	0'-16'	Back hoe		SILTY SANDY GRAVEL, 15% silt, 20% sand, 45% gravels, 20% boulders. Gravels are mostly basalt and granite with some metamorphics, sands are mostly basaltic with some quartz-rich clasts. Gravels are mostly subrounded, sands are mostly subangular. At approximately 11'-12' the color changes from brown to gray and there is less silt. Some of the brown silty soil reacts strongly in 10% HCl and some of it has no reaction. The gray sandier soil has no reaction in 10% HCl. The gravels have a CaCO ₃ coating on most of them. All material is			
REMARKS:							
						<i>Karen R. Oster</i> <i>9/28/87</i>	

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR 7308</i>
			Date <i>9/28/87</i>	# <i>08K-19151</i>	Depth <i>16' To 16'</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
				unconsolidated and I believe the top 11'-12' (brown silty soil) is probably backfill material. The gray sandier material (~15') is possibly a natural soil.			
				Although no work was scheduled for weekends apparently the rig was set up on Sat. (9/26/87). Rig does not look very clean.			Steam Cleaning on rig is not acceptable but tools and pipe are.
	16'					0815	Started drilling
							Add 5 gals H ₂ O
						0840	Add 5 gals H ₂ O
						0900	Shaft on Spud tool broke.
						0920	Drive Casing
						0925	Resume Drilling
						0935	Drive Casing
						0938	Resume Drilling
						0950	Bail Well
						0951	Resume Drilling
						0955	Bail Well
REMARKS:							
<i>Karen P. Oster</i> <i>9/28/87</i>							

DRILL LOG			By <i>A. R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/28/87</i>	# <i>60K-19151</i>	Depth <i>16' 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
						0957	Resume drilling
							Add 4 gals H ₂ O
						1005	Drive Casing
						1006	Resume drilling
							Add 3 gals H ₂ O
	19'-20'	H	Wet	SANDY GRAVEL, 40% gravel, 55% sand, 5% silt. 3% c.p., 7% m.p., 15% f.p., 15% v.f.p., 10% v.c.s., 15% c.s., 15% m.s. 10% f.s., 5% v.f.s., 5% silt. Poorly Sorted Gravels are 95% basalt, 5% quartzite, granite and other lithologies. Sands are 90% basalt, 5% quartz and f.e.k.p.r., 5% other lithologies. Gravels very angular to subrounded (when unbroken), Sands are very angular to subangular. Wet (color is Dark Olive gray (5Y 3/2) Dry Color is olive gray (5Y 5/2) Strong reaction in 10% HCl. Unconsolidated. Similar to description of soil at 15' except broken by hard tool. Samples are representative. Sample taken for U.S. Testing - Long list analysis and put on ice.		1020	Using 3/4" bailer Bailed well
						1035	Radiator was out of water again.
REMARKS: → Some gravels have CaCO ₃ coating on unbroken sides.							
<i>James R. Oster</i> <i>9/28/87</i>							

DRILL LOG			By <i>K. R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR 7308</i>
			Date <i>9/28/87</i>	# <i>48K-19151</i>	Depth <i>20'</i> To <i>20'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.		Time	Drilling Comments
<i>21'3" of 10"</i>						<i>1040</i>	<i>Set 21'3" of 10" casing</i>
							<i>and drive shoe in hole</i>
<i>21'3" of 10"</i>						<i>1045</i>	<i>Add 9'6" of 10" casing</i>
<i>9'6"</i>							
<i>30'9" of 10"</i>				<i>Total 10" Carbon Steel Casing = 30'9"</i>			
						<i>1116</i>	<i>Resume Drilling</i>
							<i>Add 5 gals H₂O</i>
						<i>1125</i>	<i>Add 2 gals H₂O</i>
						<i>1157</i>	<i>Drive Casing</i>
						<i>1205</i>	<i>Lunch</i>
						<i>1235</i>	<i>Resume drilling</i>
						<i>1247</i>	<i>Add 2 gals H₂O</i>
						<i>1253</i>	<i>Drive Casing</i>
						<i>1256</i>	<i>Resume drilling</i>
						<i>1306</i>	<i>Drive Casing</i>
						<i>1309</i>	<i>Resume drilling</i>
						<i>1314</i>	<i>Drive Casing</i>
						<i>1318</i>	<i>Bail Well</i>
						<i>1320</i>	<i>Resume drilling</i>
REMARKS:							
<i>Karen R. Oster</i>							
<i>9/28/87</i>							

DRILL LOG				By <i>L.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
				Date <i>9/28/87</i>	# <i>UBK-19151</i>	Depth <i>20' To 25'</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
							1321	Add 5 gals H ₂ O
							1343	Bail Well
							1346	Resume drilling
							1348	Add 2 gals H ₂ O
	24'-25'	H	Wet	SILTY SANDY GRAVEL, 30% gravel, 60% sand, 10% silt; 10% m.p., 12% f.p., 12% v.f.p., 10% v.c.s., 15% c.s., 15% m.s., 10% f.s., 10% v.f.s., 10% silt Very Poorly Sorted, Gravels are 90% basalt, 5% granites, 5% other lithologies. Sands are 90% basaltic, 5% quartz and feldspars, 5% other lithologies. Gravels are very angular to sub-rounded (very few are unbroken). Sands are very angular to subangular. Wet color is dark olive gray (5Y 3/2), Dry Color is gray (5Y 5/1). Strong reaction in 10% HCl. ^{findings not dated} Similar to previous sample except an overall decrease in grain size and a decrease in the basalt content in the gravel size clasts. Samples are representative. Sample taken for U.S. Testing short list analysis and put on ice.			1355	Using dart bailer Bailed Well Drill rate = 2.5'/hr.
							1356	Drive Casing
							1359	Resume drilling
								Add 2 gals H ₂ O
							1408	Add 2 gals H ₂ O
							1414	Drive Casing
							1415	Resume drilling
							1420	Add 5 gals H ₂ O
							1426	Bail Well
							1427	Resume drilling
							1431	Drive Casing
							1433	Resume drilling
							1454	Add 2 gals H ₂ O
REMARKS:								<i>Loren R. Oster</i> <i>9/28/87</i>

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/28/87</i>	# <i>UBK-19151</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
						1457	Bail Well
						1459	Resume drilling
						1502	Drive Casing
						1515	Resume drilling
						1530	Stop drilling
							Bevered Casing
						1540	Add 2 gals H ₂ O
						1545	Add 10' 1" of 10" Casing
<i>30' 9" of 10"</i>							
<i>10' 1"</i>							
<i>40' 10" of 10"</i>				<i>Total of 10" Carbon Steel Casing = 40' 10"</i>			
						1621	Drive Casing
						1628	Resume drilling
						1629	Add 5 gals H ₂ O
							Using dirt bailer
						1644	Bailed Well
	<i>29-30'</i>	<i>H</i>	<i>Wet</i>	<i>SILTY SANDY GRAVEL, 45% gravel, 48% sand, 7% silt, 2% c.p., 8% m.p., 17% f.p., 18% v.f.p., 10% v.c.s., 10% c.s., 10% m.s., 11% f.s., 7% v.f.s., 7% silt. Very Poorly Sorted, Gravels are 95% basalt, 5% other lithologies, Sands are 90% basaltic, 5% quartz and feldspar, 5% other lithologies. Gravels are very angular to subrounded (very few are unbroken).</i>		1646	Resumed drilling
						1654	Add 2 gals H ₂ O
						1659	Drive Casing
						1701	Resume drilling
REMARKS: Radiation Monitor checked site, driller, geologist @ 1500. * Note Spray Painting operations within 100 ft. of Well drilling ~0100-1530. <i>K.R. Oster</i> <i>9/28/87</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 K.R. Oster	Rip B.E. 22W	Well Number 199-N-61	Computer Number N/A	Project or Work Order No. 4R7308
			Date 9/29/87	# 68K-19151	Depth 34' to 35'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
40' 10"	of 10"					0730	Start drilling
							Add 4 gals H ₂ O
	34'-35'	H	Wet	SILTY SANDY GRAVEL, 55% gravel, 39% sand, 6% silt.		0750	Using dart bailer Bailed Well
				Trace v.c.p., 4% c.p., 10% m.p., 21% f.p., 20% v.f.p., 12% v.c.s.,			Drill rate = 55'/hr
				8% c.s., 7% m.s., 6% f.s., 6% v.f.s., 6% silt. Very		0755	Drive Casing
				Poorly Sorted. Gravels are 90% basalt, 5% granite,		0800	Resume drilling
				5% other lithologies, Sands are 90% basalt, 5% quartz			Add 2 gals H ₂ O
				and Feldspar, 5% other lithologies. Gravels are very		0810	Drive Casing
				angular to subrounded. Sands are very angular to		0815	Resume drilling
				subangular. Wet Color is dark olive gray (5Y 3/2),			Add 2 gals H ₂ O
				Dry Color is gray (5Y 5/1). Moderate reaction in 10% Unconsolidated.		0820	Add 2 gals H ₂ O
				HCl. Similar to previous sample except overall		0825	Drive Casing
				increase in grain size and decrease in the basalt		0828	Bail Well
				content of the gravels. Samples are representative.		0830	Resume drilling
				Sample taken for U.S. Testing - short list analysis			Add 2.5 gals H ₂ O
				and put on ice.		0839	Add 2 gals H ₂ O
						0845	Drive Casing
						0846	Resume drilling
REMARKS: Kare R. Oster 9/29/87							

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

A-6000-021 (5-85)

9-C.117

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-A-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/29/87</i>	# <i>UBK-1951</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
						0847	Add 2 gals H ₂ O
						0855	Bail Well
						0857	Resume drilling
							Add 3 gals H ₂ O
						0903	Drive Casing
						0907	Resume drilling
						0915	Add 2 gals H ₂ O
						0918	Bail Well
						0920	Resume drilling
							Add 5 gals H ₂ O
							using dirt bailer
	39'-40'	H	Wet.	SILTY SANDY GRAVEL, 50% gravel, 45% sand 5% silt		0930	Bail Well
				1% c.p., 8% m.p., 32% f.p., 19% v.f.p., 12% v.c.s., 12% c.s.,			Drill rate = 4.2'/hr
				11% m.s., 5% f.s., 5% v.f.s., 5% silt. Poorly Sorted.		0935	Bevel casing
				Gravels are 85% basalt, 5% granite, 5% quartzites,			
				5% other lithologies. Sands are 85% basaltic,			
				5% quartzites, 5% quartz and feldspar, 5% other			
				lithologies. Gravels are angular to subrounded.			
				Sands are very angular to subangular.			
REMARKS:							
<i>Karl F. Oster</i> <i>9/29/87</i>							

DRILL LOG			By <i>F.R. Oster</i>	Ris <i>B.E. 22W</i>	Well Number <i>199-N-61</i>	Computer Number	Project or Work Order No. <i>CR7308</i>
			Date <i>9/29/87</i>	# <i>68K-19151</i>	Depth <i>40'</i> To <i>40'</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
				Wet Color is dark olive gray (5Y 3/2). Dry Color is ^{olive} gray (5Y 5/2). Slight reaction in 10% HCl. Unconsolidated, similar to previous sample except overall decrease in grain size, basalt content, and reactivity to 10% HCl. Samples are representative. Sample taken for U.S. Testing - short list analysis and put on ice.			
<i>40' 10"</i>	<i>of 10"</i>					<i>0940</i>	<i>Add 10' 2" of 10" Casing</i>
<i>10' 2"</i>							
<i>51' 0"</i>	<i>of 10"</i>			<i>Total 10" Carbon Steel Casing = 51'</i>			
						<i>1030</i>	<i>Drive Casing</i>
						<i>1034</i>	<i>Resume drilling</i>
							<i>Add 4 gals H₂O</i>
						<i>1045</i>	<i>Add 2 gals H₂O</i>
						<i>1050</i>	<i>Drive Casing</i>
						<i>1051</i>	<i>Resume drilling</i>
						<i>1104</i>	<i>Add 2 gals H₂O</i>
						<i>1106</i>	<i>Drive Casing</i>
						<i>1110</i>	<i>Resume drilling</i>
REMARKS:							
<i>For F. Oster</i> <i>9/29/87</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)

9-C-119

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/29/87</i>	# <i>08K-19151</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
						1111	Add 2gals H ₂ O
						1120	Bail Well
						1122	Resume drilling
						1127	Drive Casing
						1130	Resume drilling
						1131	Add 3gals H ₂ O
						1145	Drive Casing
						1151	Resume drilling
							Add 5gals H ₂ O
						1205	Lunch
						1240	Resume drilling
	44'-45'	H	Wet	SANDY GRAVEL, 51% gravels, 45% sands, 4% silt.		1248	Using dart bailer Bailed Well
				2% v.c.p., 2% c.p., 4% m.p., 23% f.p., 20% v.f.p., 15% v.c.s., 10% c.s.,			Drill rate = 3.6'/hr
				10% m.s., 5% f.s., 5% v.f.s., 4% silt. Poorly Sorted.		1300	Add 2.5gals H ₂ O
				Gravels are 90% basalt, 5% granite, 5% other lithologies		1302	Drive Casing
				Sands are 90% basaltic, 5% quartz and feldspar,		1303	Resume drilling
				5% other lithologies. Gravels are angular to		1307	Add 2gals H ₂ O
				subrounded. Sands are very angular to angular. Wet		1316	Drive Casing
REMARKS: * Note Spray Painting Operations within 100 feet of Well drilling ~ 1300-1530 hrs.							

Karen R. Oster
9/1/87

DRILL LOG			By <i>K.R. Oster</i>	Fig <i>B.E. 2010</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/29/87</i>	# <i>68K-19151</i>	Depth <i>45' To 50'</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
				Color is dark olive gray (5Y 3/2). Dry Color is olive gray (5Y 5/2). Moderate reaction in 10% HCl.		1319	Add 2.5 gals H ₂ O
				(Unconsolidated. Similar to previous sample except		1320	Resume drilling
				increase in sand and coarse pebble size clasts and		1332	Bail Well
				a decrease in medium to very fine pebble size clasts,		1334	Resume drilling
				Increase in basalt content overall and more		1340	Drive Casing
				reactive in 10% HCl. Samples do not contain		1342	Resume drilling
				the very coarse pebbles but are otherwise		1350	Drive Casing
				representative. Sample taken for U.S. Testing -		1354	Resume drilling
				short list analysis and put on ice.			Add 4 gals H ₂ O
						1402	Add 2 gals H ₂ O
						1408	Bail Well
						1409	Resume drilling
						1412	Add 2 gals H ₂ O
	49'-50'	H	Wet	SANDY GRAVEL, 55% gravel, 44% sand, 1% silt.		1425	Using dart bailer Bailed Well
				Trace vc.p., 3% c.p., 5% m.p., 32% f.p., 25% v.f.p., 15% ves,			Drill rate = 4.3/hr
				12% b.c.s., 10% m.s., 5% f.s., 2% v.f.s. 1% silt. Moderately			
				to Poorly Sorted. Gravels are 90% basalt, 5% granite,			
				5% other lithologies, Sands are 90% basaltic, 5%			
REMARKS:							
<i>Kenn R. Oster</i> <i>9/29/87</i>							

DRILL LOG			By <i>A.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/29/87</i>	# <i>48K-19151</i>	Depth <i>50' To 51'</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
				quartz and feldspar, 5% other lithologies. Gravels are very angular to subrounded. Sands are very angular to subangular. Wet Color is olive gray (5Y 4/2), Dry Color is light olive gray (5Y 6/2). Slight reaction in 10% HCl, Unconsolidated. Similar to previous sample except increase in sand clast size and decrease in pebble clast size (Better sorting). Samples are representative. Samples taken for U.S. Testing - long list analysis and put on ice.			
<i>51' 0" of 10"</i>						<i>1440</i>	<i>Add 9' 8" of 10" Casing</i>
<i>9' 8"</i>							
<i>60' 8" of 10"</i>				<i>Total 10" Carbon Steel Casing = 60' 8"</i>			
						<i>1530</i>	<i>Drive Casing</i>
						<i>1536</i>	<i>Resume drilling</i>
							<i>Add 2 gals H₂O</i>
						<i>1540</i>	<i>Add 2 gals H₂O</i>
						<i>1558</i>	<i>Add 3 gals H₂O</i>
						<i>1600</i>	<i>Bail Well</i>
						<i>1601</i>	<i>Resume drilling</i>
REMARKS:							
<i>Karen R. Oster</i> <i>9/29/87</i>							

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>BE 22W</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/29/87</i>	# <i>68K-19151</i>	Depth <i>51' To 54'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.		Time	Drilling Comments
						1617	Drive Casing
						1619	Resume drilling
						1627	Bail Well
						1629	Add 2 gals H ₂ O
						1630	Resume drilling
						1634	Drive Casing
						1635	Resume drilling
						1636	Add 2 gals H ₂ O
						1643	Add 2 gals H ₂ O
						1647	Drive Casing
						1650	Resume drilling
						1652	Add 2 gals H ₂ O
						1657	Bail Well
						1702	Resume drilling
						1703	Add 2 gals H ₂ O
						1714	Drive Casing
						1715	Driller done for day

REMARKS: Delivered the 34'-35', 39'-40', 44'-45', and 49'-50' soil samples to Sigma 5 to be delivered to U.S. Testing in the morning (C.O.F.C # 7004)
Total L Hing Supply Water added to hole today = 7' 5 gallons

Karen F. Oster
9/29/87

DRILL LOG		By K. R. Oster	Rig B.E. 22W	Well Number 199-N-61	Computer Number N/A	Project or Work Order No. CR7308
		Date 9/30/87	# 68K-19151	Depth 54' To 55'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
40' B' of 10'					0730	Start drilling
						Add 5 gals H ₂ O
					0750	Drive Casing
					0753	Bail Well
					0755	Resume drilling
						Add 2.5 gals H ₂ O
	54'-55' H	Wet		SILTY SANDY GRAVEL, 50% gravel, 40% sand, 10% silt.	0805	using dart bailer Bailed Well
				10% m.p., 20% f.p., 20% v.f.p., 10% v.c.s., 10% c.s., 10% m.s.,		Drill rate = 3.1"/hr
				5% f.s., 5% v.f.s., 10% silt Very poorly sorted. Gravels	0810	Resume drilling
				are 70% basalt, 10% granite, 10% quartzite, 10% other		Add 2.5 gals H ₂ O
				metamorphics. Sands are 80% basaltic, 10% quartz	0824	Drive Casing
				and feldspar, 10% other lithologies. Gravels are	0827	Resume drilling
				very angular to subrounded. Sands are very angular		Add 2 gals H ₂ O
				to subangular. Wet Color is dark olive gray (5Y 3/2),	0830	Add 2 gals H ₂ O
				Dry Color is olive gray (5Y 5/2) Very slight reaction	0837	Add 2 gals H ₂ O
				in 10% HCl. Unconsolidated Similar to previous	0841	Drive Casing
				sample except, overall decrease in grain size, basalt	0842	Resume drilling
				content and reaction in HCl. Samples are representative	0850	Drive Casing
REMARKS:						Karen P. Oster 9/30/87

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

A 6000-021 (5-85)

9-C-124

DRILL LOG			By K. R. Oster	Rig B.E. 2200	Well Number 199-N-61	Computer Number N/A	Project or Work Order No. CR7308
			Date 9/30/87	# 48K-14151	Depth 55' To 40'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Sample taken for U.S. Testing - short list analysis and put on ice.		0853	Resume drilling
							Add 3 gals H ₂ O
						0907	Bail Well
						0909	Resume drilling
							Add 1 gal H ₂ O
						0915	Drive Casing
						0916	Resume drilling
						0917	Add 2.5 gals H ₂ O
	59'-40'	H	Wet	(RINGOLD) SILTY SANDY GRAVEL, 30% gravel, 40% sand, 10% silt.		0940	Using dart bailer Bailed well
				5% m.p., 15% f.p., 10% v.f.p., 5% v.c.s., 15% c.s., 20% m.s., 10% f.s., 10% v.f.s., 10% silt. ^{Very Poorly Sorted.} Gravels are 30% basalt,		0942	Drill rate = 0.15'/hr Bore pipe.
				30% granite, 30% quartzite, 10% other metamorphics, Sands are 40% basaltic, 50% quartz and feldspar, 10% other lithologies, Gravels are very angular to subrounded (very few). Sands are very angular to subangular. Wet Color is olive brown (2.5Y 4/4). Dry Color is light brownish gray (2.5Y 6/2). Very slight reaction in 10% HCl. Well Consolidated. Different			Ringold Contact @ 59' ds
REMARKS:							
Kaven P. Oster 9/30/87							

D - Drive Barrel H - Hard 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 K.R Oster	Rig B.E. 2210	Well Number 199-N-61	Computer Number N/A	Project or Work Order No. CR7308
		Date 9/30/87	# WBK-19151	Depth 60' To 60'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				than previous sample - Decrease in grain size and basalt content, more consolidated and more of the gravels are broken. Colors change from olive grays to olive browns. Hole stays open confirming this is Ringold formation. Olin says the contact is at approximately 59' and the top foot or so is very consolidated with less consolidation below. Samples are representative. Sample taken for U.S. Testing - short list analysis, and put on ice.		
60' 8" of 10"					0945	Add 9' 5 1/2" of 10" Casing
9' 5 1/2"						
70' 1 1/2" of 10"				Total 10" Carbon Steel Casing = 70' 1 1/2"		
					1037	Drive Casing
					1056	Resume drilling
						Add 5 gals H ₂ O
					1114	Add 2 gals H ₂ O
					1124	Stop drilling
					1128	Bail Well
REMARKS: X-Spray Painting Operations within 100' of Well drilling operations from 1300-1500. Fumes are really bad - make Olin and I dizzy and giving headaches. 9/30/87 Karen P. Oster						

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

A 6000 021 (6 85)

9-C.127

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>9/30/87</i>	# <i>68K-19151</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
						1130	Resume drilling
							Add 2gals H ₂ O
						1144	Drive Casing
						1146	Resume drilling
						1152	Bail Well dry.
						1205	Lunch
				<i>D/W = 56.1' below land surface (PNL 200' & TAPE #11053)</i>		1245	
						1250	Drive Casing
						1251	Resume drilling
						1308	Drive casing
						1313	Stop driving
						1317	Resume drilling
	<i>64'-65'</i>	<i>H</i>	<i>Wet</i>	<i>(FINE) SAND, Trace Gravel, 90% sand, 10% silt.</i>		1333	<i>Using dart bailer Bailed Well</i>
				<i>Trace v.f.p., Trace v.c.s., Trace c.s., 10% m.s., 60% f.s., 20% v.f.s., 10% silt. Well Sorted Gravels are 80% quartz</i>			<i>Drill rate = 57'/hr</i>
				<i>and feldspar, 10% basalt, 10% metamorphics. Sands are</i>		1334	Drive Casing
				<i>70% quartz and feldspar, 10% basaltic, 10% mica,</i>		1336	Resume drilling
				<i>10% other lithologies. Gravels are very angular.</i>		1347	Drive Casing
						1350	Resumed drilling
REMARKS:							<i>Karen P. Oster 9/30/87</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 K.R. Oster	Fig B.E. 22W	Well Number 199-N-61	Computer Number N/A	Project or Work Order No. CR7308
			Date 9/30/87	#48K-19151	Depth 65' To 67.5'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Sands are very angular to subangular. Wet Color is grayish brown (2.5Y 5/2), Dry Color is light gray (2.5Y 7/2). Moderately Consolidated but after drilling, sands heave up hole. Different from previous sample but still Ringold. Decrease in overall grain size and basalt content. Lighter Color and even less reaction in 10% HCl.		1410	Bailed Well
						1415	Stopped to wait for water to return to static.
							Drill depth = 67.5' below land surface
				Samples are representative, Sample taken for U.S. Testing - short list analysis and put on ice.			
				D/W = 55.9' below land surface (PNL 200' E-TAPE #11053)		1510	
				D/B = 65' below land surface (PNL 200' STEEL TAPE).		1512	
				Sand heaved up 2.5' in hole			
				As water recovers from bailing, the sand heaves in also, so if we pump water into hole, to above static level, and drill this should pressurize, and push the sand back out the bottom of the hole.			
REMARKS:							
<div style="text-align: right;"> <i>Karen R. Oster</i> 9/30/87 </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 <i>K. R. Oster</i>	Fig <i>B.E. 224</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CE7308</i>
			Date <i>9/30/87</i>	# <i>68K-19151</i>	Depth <i>67.5' to 67.5'</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
						1515	Resumed drilling while adding ~70 gals H ₂ O Drills, bails, and checks D/B & D/W.
				Passed 20' section of 8" pipe through hole to bottom confirming that hole is straight.		1556	Straightness Test
				Checking D/B periodically indicates the sand only heaved in to 67' below land surface and appears stable.		1604	Bail Well
				Checking D/W periodically indicates the water has equilibrated at 57' which is 1' lower than measured after lunch. It is possible that the measurement after lunch was affected by discharges to the percolation basin in morning and early afternoon. will take new static tomorrow morning to find out where to set stainless screen.			
REMARKS: Delivered 54'-55', 59'-60', 64'-65' soil samples to Sigma 5 to deliver to U.S. Testing in morning. Total Drilling Supply Water added to Well today = $32.5 + 70 = 102.5$ (Drilling) (SAVING 2000) (LITERS) <div style="text-align: right;"><i>Karen P. Oster</i> CE-OF-C # 1005 9/30/87</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 <i>K.R. Oster</i>	Rig <i>B.E. 226</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR730B</i>
			Date <i>10/11/87</i>	# <i>UBK-19151</i>	Depth <i>075' To 606'</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
						0700	Prepared puller top to pull 10" casing
				D/W = 55.85' below land surface (PNL 200' E-TAPE # 11053)		0740	
				D/B = 60.6' below land surface (PNL 200' STEEL TAPE)		0743	
				Poured ~ 1/4 bag (100 lbs ea) 10-20 U.S. sieve size Colorado Silica Sand inside 10" carbon steel casing to bring up the D/B prior to setting the 6" stainless steel casing and screen.		0745	
				D/B = 60.6' below land surface (PNL 200' STEEL TAPE)		0750	
						0755	Breaking off bit.
				Setting stainless as follows:		0815	
				1 10' section of 20 slot, 6" diameter stainless steel screen. (Top threads are male instead of female so all pipe following must be the same)			
				1 5' section of 20 slot, 6" diameter stainless steel screen.			
				1 20' section of 6" stainless steel casing with factory welded centralizers on the top and 20' away from the screen. (due to male threads on top of the 10' section of screen)			
REMARKS:				<i>Karl R. Oster</i> <i>10/11/87</i>			

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR 7308</i>
			Date <i>10/1/87</i>	# <i>08K-19151</i>	Depth <i>660' To 660'</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" stainless steel casing			
				1 10' section of 6" stainless steel casing			
				1 3' section of 6" stainless steel casing			
				Totals: 15' of screen; 53' of casing		0850	Finished settings S.
				Measured D/B inside 6" S.S. casing @ 66' below land surface (PNL 200' STEEL TAPE)		0855	
				Bottom of 10" Carbon steel casing is at 67' 5 1/2"			
						0900	Weld on pulker top.
				Add 1 bag (100 lbs ea) 10-20 U.S. Sieve size Colorado Silica Sand inside annulus between 10" C.S. casing and 6" S.S. casing.		0918	
				Measured D/B of Sand pack @ 67' below land surface (PNL 200' STEEL TAPE)		0920	
				Pulled 10" casing back to 66' below land surface		0925	
				Measured D/B of Sand pack @ 63' below land surface (PNL 200' STEEL TAPE) 6" S.S. casing settled ~ 66'		0935	
				Pulled 10" Casing back to 65' below land surface (PNL 200' STEEL TAPE)		0945	
REMARKS:							
<i>Karen R. Oster</i> <i>10/1/87</i>							

DRILL LOG		By K.R. Oster	Rig B.E. 22W	Well Number 199-N-61	Computer Number N/A	Project or Work Order No. CR7308
		Date 10/11/87	# 08K-19151	Depth 06' To 46'		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 $\frac{1}{8}$ sand pack @ 63.5' below land surface (PNL 200' STEEL TAPE).	0950	
				Poured 1 bag (100 lbs ea) 10-20 U.S. sieve size Colorado Silica sand in annulus.	0955	
				Measured $\frac{1}{8}$ sand pack @ 40' below land surface (PNL 200' STEEL TAPE).	0958	
				Poured 6 $\frac{3}{4}$ bags (100 lbs ea) 10-20 U.S. sieve size Colorado Silica sand in annulus. Pulled 10" casing back to 48' below land surface. Measured $\frac{1}{8}$ of top of sand pack @ 47' below land surface (PNL 200' STEEL TAPE).	12:00	Lunch
				Poured 3 buckets (50 lbs ea) $\frac{1}{4}$ " Volclay tablets in annulus. Pulled 10" casing back to 42' below land surface. Measured $\frac{1}{8}$ to top of Bentonite Pellet Seal @ 41.5' below land surface (PNL 200' STEEL TAPE).	1300	Bentonite Pellet Seal = 47' - 41.5' below land surface
				Poured 2 $\frac{1}{2}$ bags (50 lbs ea) of Bentonite Crumbles in annulus. Pulled 10" casing out of hole and pulled 12" casing out of hole. Measured $\frac{1}{8}$ of top of	1600	Granular Bentonite Seal = 41.5' - 4.5' below land surface
REMARKS:						Karen R. Oster 10/11/87

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. J2W</i>	Well Number <i>199-N-61</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>CR7308</i>
			Date <i>10/1/87</i>	# <i>48L-19151</i>	Depth <i>66' To 66'</i>	Subcontract No. <i>N/A</i>	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.		Time	Drilling Comments
				Granular bentonite seal @ 4.5' below land surface			
				(PNL 200' STEEL TAPL)			
				Hole caved in on top of granular bentonite seal before		1603	
				5' section of 10" casing could be set into hole to			
				prevent caving. A backhoe will be used to dig			
				it out to the top of the granular bentonite and			
				the 5' section of 10" casing will be placed back			
				in to prevent hole from caving before cement			
				seal is poured. (Backhoe will be used at same			
				time as they are digging the dead men out).			
				Start bailing well to develop it.		1610	
				Bailed for hour 5 min @ ~ 31 gals/min. to develop		1715	
				well.			
REMARKS:							
<i>Karen F. Oster</i> <i>10/1/87</i>							

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[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 031 15 R51

9-0-130

[illegible]

D - Drive Burzel H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Startling Water A - 1000 psi - 10.00

9-C-137

[illegible]

D - Drive Wheel H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Stabilizing Wheel 4-Piece Box Set

WELL 199-N-67

Well Completion Report/Title III Inspection List

Project 1301-N, DOE Survey Well Number 199-N-167
Location 1301-N Grid and Trench Temporary Well Number N/A
Driller L. Olin Amos Coordinates _____
Drilling Co. Kaiser (KEH) Casing Elevation _____
Geologist Karen R. Oster, Shannon H. Goodwin Ground Elevation _____

DRILLING METHOD		COMPLETION DATA	
Rotary Air	<u>N/A</u> Mud <u>N/A</u>	Drilled Depth	<u>79' b.l.s.</u>
Cable Tool	D <u>N/A</u> H <u>2' - 40' b.l.s.</u>	Completion Depth	<u>76' b.l.s.</u>
Drilling Fluid	<u>DO-N Drilling Supply Water</u>	Date Started	<u>2/10/88</u> Completed <u>3/2/88</u>
Other		Static Water Level/Date	<u>65' b.l.s. 2/29/88 KEO</u> <u>PNL 300' & TAPE #12174</u>

CASING DATA			
Type	Size		
<u>Carbon Steel ASTM A53 Type S Grade B</u>	<u>Sch 40 12" dia.</u>	<u>+5'</u>	<u>to 14'</u>
<u>Carbon Steel ASTM A53 Type S Grade B</u>	<u>Sch 40 10" dia.</u>	<u>+1'</u>	<u>to 76'</u>
<u>Stainless Steel 304 Sch 10S</u>	<u>6" dia.</u>	<u>+2'</u>	<u>to 60.5'</u>
Approved By <u>Karen R. Oster</u> Date <u>2/29/88</u>			

PERFORATIONS		SCREEN		ANNULAR SEAL		
Type		Type		Type	Interval	Volume
<u>N/A</u>		<u>304 Stainless Steel</u>		<u>Sand</u>	<u>76' - 54.5'</u>	<u>7 bags (20 lbs ea)</u>
Depth	Schedule	Length	<u>13' 6"</u>	<u>Gravel</u>	<u>54.5' - 41'</u>	<u>4 bags (50 lbs ea)</u>
		Slot Size	<u>20 slot</u>	<u>Gravel</u>	<u>41' - 30'</u>	<u>22 bags (50 lbs ea)</u>
		Depths	<u>76' - 60.5'</u>	<u>Cement</u>	<u>30' - 0'</u>	<u>5 bags (20 lbs ea) 16 bags (50 lbs ea)</u>
App. By <u>K.R.O.</u> Date <u>2/29/88</u>		App. By <u>Karen R. Oster</u> Date <u>2/24/88</u>		App. By <u>Karen R. Oster</u> Date <u>2/29/88</u>		

GEOPHYSICAL LOGGING			AQUIFER TESTING	
Sondes	Interval	Date	Type of Test	
<u>Natural Gamma</u>	<u>79' - 5'</u>	<u>2/24/88</u>	Length of Test	
<u>Neutron</u>	<u>74' - 2'</u>	<u>2/24/88</u>	Volume Pumped	
<u>Density</u>	<u>74' - 5'</u>	<u>2/24/88</u>	Drawdown	
Approved By <u>Karen R. Oster</u> Date <u>2/24/88</u>			Approved By _____ Date _____	

OTHER APPLICABLE ITEMS		
<u>KEO Steam Cleaning 2/10/88</u>	<u>KEO Protective Steel Posts 3/2/88</u>	<u>Downhole TV Inspection</u>
<u>KEO Storage of Const. Material 2/10/88</u>	<u>KEO Safety Paint 3/2/88</u>	<u>Well Abandonment</u>
<u>KEO Tool Lubricants 2/10/88</u>	<u>KEO Straightness Test 2/24/88</u>	<u>KEO Complete As-Built Diagram,</u>
<u>KEO Concrete Pad 3/1/88</u>	<u>KEO Well Development 3/1/88</u>	<u>Driller's and Geologist's Logs</u>
Approved By <u>Karen R. Oster</u>	Date <u>3/4/88</u>	<u>3/4/88</u>

Reviewed By T.L. McKeehan Date 3-9-88

A-1800-187 (3/87)

Reviewed by W. P. [Signature] Date 3-9-88

[illegible]

A-1800-126 (3/87)

5000 Hz

SPAN CHECK

5000 Hz

REPEAT SECTION

5000 Hz

SPAN

Well <u>199-N-67</u>	Drilled Depth <u>20'</u>	Interval Logged <u>77-72</u>
Log Type <u>NEWTON</u>	Date <u>2-24-88</u>	Casing Size <u>10"</u>
Logged by <u>J.L. McLean PAU</u>	Water Level <u>54'</u>	
Loading Scale <u>5000%</u>	PCA Constant <u>2</u>	
Vertical Scale <u>20'/in.</u>	Logging Speed <u>25'/min.</u>	
Probe Strength <u>30" AMAR</u>	Spacer Length <u>4"</u>	
REMARKS <u>REF. PROCEDURE GW-5 REV. 1</u> <u>PROBE SERIAL CN 2745A7</u>

Well	199-1-1-17	Drilled Depth	10'	Interval Logged	79-5'
Log Type	W.I. Gamma	Date	2-29-88	Casing Size	10"
Logged By	J.L. Wicks	Phone	-P.H.E.	Vertical Level	59'
Logging Series	Sensitivity 500, 1000, 5000, 50,000, 500,000, 5,000,000				
Vertical Scale	20'/in.	Logging Speed	10'/min.	Free Constant	3
Source Strength	N/A	Blade Length	N/A		
Remarks: REF. PROCEDURE GW-1 REV. 2 PROB. SER. # 0627A 87

		GRAVEL			SAND					FINES		SORTING	FRAMEWORK			MATRIX			DRY COLOR	HCI REACTION	CONSOLIDATION	DRILL METHOD	DRILL RATE FT/HOUR	NAT. GAMMA	COMMENT	
DEPTH	NAME	% BOULDER	% 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'	SG	—	—	35	10	15	20	10	5	5	—	VP	95	G, Qz	VA-SR	185	Qu, F	VA-SA	olive gray	5Y5/2	VSL	U	H	1.48		
7'-10'	SG	—	—	45	5	10	20	10	5	5	—	VP	95	G, Qz	VA-SR	85	Q, F	VA-SA	olive gray	5Y5/2	SL	U	H	2.14		
14'-15'	ZSG	—	—	40	5	15	15	10	5	10	—	VP	95	G, Qz	VA-SR	80	Q, F	VA-SA	gray	5Y5/1	ST	U	H	1.76		
19'-20'	GZS	—	—	20	10	15	15	10	10	20	—	P	60	G, H	VA-SA	60	Qu, F	VA-SA	olive brown gray	5Y4/2	VST	U	H	5.88		
24'-25'	ZSG	—	—	35	10	10	15	10	10	10	—	VP	95	H, G	VA-SR	80	Qu, F	VA-SA	olive gray	5Y4/2	ST	U	H	4.84		
29'-30'	ZSG	—	—	30	10	15	15	10	10	10	—	VP	70	H, G	VA-SR	30	Qu, F	VA-SA	olive gray	5Y4/2	H	U	H	8.82		
34'-35'	ZSG	—	—	30	15	15	10	10	10	10	—	VP	95	H, G	VA-SA	30	Q, F	VA-SA	olive gray	5Y5/2	VSL	U	H	8.57		
39'-40'	ZGS	—	—	25	15	15	15	10	10	10	—	P	75	H, G	VA-SA	75	Qu, F	VA-SA	olive gray	5Y5/2	VSL	U	H	5.77		Hot (P.L.)
44'-45'	ZSG	—	—	35	10	15	15	15	5	5	—	V.P.	25	G, Qz, H	VA-SA	40	Qu, F	VA-SA	olive gray	5Y4/2	—	U	H	6.52		(P.L. SOLID)
49'-50'	ZSG	—	—	30	10	15	15	10	10	10	—	P	25	G, Qz, H	VA-SA	40	Qu, F	VA-SA	olive brown gray	5Y4/2	SL	U	H	37.5		
54'-55'	ZGS	—	—	25	10	15	15	15	10	10	—	VP	35	G, Qz, H	VA-SA	40	Qu, F	VA-SR	olive gray	5Y4/2	VST	SLC	H	5.88		
59'-60'	ZSG	—	—	30	10	10	15	15	10	10	—	V.P.	35	G, Qz, H	VA-SA	35	Qu, F	VA-SR	olive gray	5Y4/2	VST	U	H	6.98		
64'-65'	ZSG	—	—	30	10	15	15	10	10	10	—	V.P.	35	G, Qz, H	VA-SA	30	Qu, F	VA-SR	olive gray	5Y4/2	VST	U	H	10.34		
69'-70'	ZSG	—	—	30	10	15	15	10	10	10	—	VP	40	G, Qz, H	VA-SA	30	Q, F	VA-SR	light olive gray	5Y5/2	SL	U	H	4.48		
74'-75'	SG	—	—	40	20	15	10	5	5	5	—	H-P	30	G, Qz, H	VA-SA	30	Qu, F	VA-SR	light olive gray	5Y5/2	VSL	U	H	5.45		

GPO 596-313

[illegible]

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

9-C-146

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>177 N-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
			Date <i>2/17/88</i>	# <i>68K-19151</i>	Depth <i>0' To 2'</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
						0835	Start Drilling
10' of 12"				Total 12" carbon steel casing = 10'		0840	Add 10' of 12" casing
						0845	Resume drilling
							Add 3 gals H ₂ O
						0850	Stop drilling
						0855	Drive casing
						0905	Add 4 gals H ₂ O
							Resume drilling
						0917	Add 2 gals H ₂ O
						0925	Stopped drilling
						0938	Drive casing
						0935	Resume drilling
						0955	Drive casing
						1000	Resume drilling
						1025	Drive casing
						1028	Resume drilling
						1029	Add 2 gals H ₂ O
						1040	Drive casing
REMARKS:							
<i>Karen P. Oster</i> <i>2/17/88</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

9-C.147

DRILL LOG			By <i>X.R. Oster</i>	Rig <i>BE 220</i>	Well Number <i>199-N-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
			Date <i>2/17/88</i>	# <i>63K-19151</i>	Depth <i>2' 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
						1044	Resume drilling
						1056	Drive Casing
						1058	Resume drilling
						1118	Drive Casing
						1123	Resume drilling
						1128	Drive Casing
						1135	Break for Lunch
						1255	Mechanic starts working on clutch
						1445	Mechanic left site
						1450	Resumed drilling
						1452	Add 2 gals H ₂ O
						1505	Drive Casing
						1510	Resume drilling
						1522	Add 2 gals H ₂ O
						1525	Drive Casing
						1530	Done for day
REMARKS: Total Drilling supply Water Added today = 15 gallons <i>X.R. Oster</i> 2/17/88							

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

DRILL LOG			By <i>R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>199-N-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
			Date <i>2/18/88</i>	# <i>68K-19151</i>	Depth <i>4' to 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
						0800	Started drilling
						0820	Add 2gals H ₂ O
						0835	Drive Casing
						0840	Resume drilling
						0853	Drive Casing
	4'-5'	H	Wet	SANDY GRAVEL, 35% Gravel, 60% sand, 5% silt.		0855	Using dust bailer Bailed Well
				2% asp., 9% m.p., 7% f.p., 17% v.f.p., 10% v.c.s., 15% c.s., 20% m.s.,			Drill rate = 1.48'/hr.
				10% f.s., 5% v.f.s., 5% silt. Very Poorly Sorted. Gravels are		0900	Resume drilling
				95% basalt, 4% granite, 1% quartzite and are very		0907	Add 2gals H ₂ O
				angular to subrounded. Sands are 85% basalt, 15% quartz		0920	Drive Casing
				and feldspar, and are very angular to subangular. Wet		0924	Resume drilling
				Color is dark olive gray (5Y 3/2), Dry Color is olive gray		0935	Drive Casing
				(5Y 5/2). Very slight reaction in 10% HCl. No Consolidation		0937	Resume drilling
				Samples are representative. Sample taken for Gamma			Add 1gal H ₂ O
				Scan.		0948	Drive Casing
						0950	Resume drilling
							Add 3gals H ₂ O
						1005	Drive Casing
REMARKS:							
<i>Teri R. Oster 2/18/88</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

9-C.149

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 220</i>	Well Number <i>199-N-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
			Date <i>2/18/88</i>	# <i>08K-19151</i>	Depth <i>5' To 9'</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
						1010	Resumed drilling
							Add 3gals H ₂ O
						1022	Drive Casing
						1025	Resume drilling
							Add 2gals H ₂ O
						1037	Drive Casing
						1038	Resume drilling
						1050	Bail Well
						1052	Resume drilling
							Add 2gals H ₂ O
						1103	Add 4 gals H ₂ O
						1111	Bailed Well
						1113	Resume Drilling
						1118	Drive Casing
						1121	Resume drilling
						1129	Bailed Well
						1130	Break for Lunch
						1250	Resume drilling
REMARKS:							<i>Karl P. Oster</i> <i>2/18/88</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	Rig B.E. 220	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2/18/88	# 68K-19151	Depth 9' 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
						1255	Add 2 gals H ₂ O
	9'-10'	H	Wet	SANDY GRAVEL, 45% gravel, 50% sand, 5% silt.		1305	using dart biter Bailed Well
				Trace v.c.p., 5% c.p., 15% m.p., 10% f.p., 15% v.f.p., 5% v.c.s., 10% c.s., 20% m.s., 10% f.s., 5% v.f.s., 5% silt Very Poorly Sorted. Gravels are 95% basalt, 4% quartzite, 1% granite and are very angular to subrounded. Sands are 85% basalt and 15% quartz and feldspar and are very angular to subangular. Wet Color is dark olive gray (5Y 3/2) Dry Color is olive gray (5Y 5/2). Slight reaction in 10% HCl. No Consolidation. Similar to previous sample except increase in grain size and reaction to 10% HCl. Sample taken for Gamma Scan. Samples are representative.			Drill rate = 2.14'/hr
10' 0" of 12" + 9' 6"						1310	Add 9' 6" of 12" Casing
19' 6" of 12"				Total 12" Carbon Steel Casing = 19' 6"			
						1345	Drive Casing
						1350	Resume drilling
							Add 4 gals H ₂ O
REMARKS:							
K.R. Oster 2/18/88							

DRILL LOG			By K.R. Oster	Rig B.E. 2210	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2/18/88	# 68K-A151	Depth 10' To 12'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
						1402	Drive Casing
						1405	Resume drilling
						1412	Add 2 gals H ₂ O
						1415	Drive Casing
						1420	Resume drilling
						1428	Drive Casing
						1432	Bail Well
						1435	Resume drilling
						1450	Drive Casing
						1455	Resume drilling
							Add 3 gals H ₂ O
						1523	Drive Casing
						1525	Done for day
REMARKS: Total drilling supply water added to well today = 30 gallons							
K.R. Oster 2/18/88							

D - Drive Barrel

H - Hard Tool

L - Large

M - Medium

S - Small

VC - Very Coarse

C - Coarse

F - Fine

VF - Very Fine

___ Standing Water

4-0000-001-10-001

9-C.152

DRILL LOG			By <i>K.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
			Date <i>2/19/88</i>	# <i>68K-19151</i>	Depth <i>12' To 15'</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>19' 6" of 12"</i>						<i>08:00</i>	<i>Start drilling</i>
							<i>Add 4 gals H₂O</i>
						<i>08:28</i>	<i>Bailed Well</i>
						<i>08:31</i>	<i>Drive Casing</i>
						<i>08:35</i>	<i>Resume drilling</i>
						<i>08:45</i>	<i>Add 2 gals H₂O</i>
						<i>08:55</i>	<i>Drive Casing</i>
						<i>08:59</i>	<i>Resume drilling</i>
						<i>09:12</i>	<i>Drive Casing</i>
						<i>09:14</i>	<i>Resume drilling</i>
						<i>09:20</i>	<i>Bailed Well</i>
						<i>09:25</i>	<i>Resume drilling</i>
						<i>09:31</i>	<i>Drive Casing</i>
						<i>09:33</i>	<i>Resume drilling</i>
							<i>Add 3 gals H₂O</i>
						<i>09:45</i>	<i>Drive Casing</i>
						<i>09:48</i>	<i>Resume drilling</i>
						<i>10:00</i>	<i>Drive Casing</i>
REMARKS:							
<i>Karen R. Oster</i> <i>2/10/88</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 5000 051 15 001

DRILL LOG		By X.R. Oster	Rig B.E. 22W	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
		Date 2/19/88	# 68K-19151	Depth 15' to 19'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	14'-15'	H	Wet	SILTY SANDY GRAVEL, 40% Gravel, 50% sand, 10% silt.	1005	Using dart bailer Bailed Well
				3% c.p., 12% m.p., 10% f.p., 15% v.f.p., 5% v.c.s., 15% c.s.,		drill rate = 1.76/hr
				15% m.s., 10% f.s., 5% v.f.s., 10% silt. Very Poorly Sorted.	1010	Resumed drilling
				Gravels are 95% basalt, 3% granite 2% quartzite,	1012	Drive Casing
				and are very angular to subrounded. Sands are	1014	Resume drilling
				80% basalt, 15% quartz and feldspar, 5% other sands		Add 2 gals H ₂ O
				and are very angular to subangular. Wet Color is	1025	Drive Casing
				dark olive gray (5Y 3/2). Dry Color is gray (5Y 5/1).	1030	Resume drilling.
				Strong reaction in 10% HCl. No Consolidation. Similar		Add 2 gals H ₂ O
				to previous sample except overall decrease in	1040	Drive Casing
				grain size, decrease in basalt content of sand portion,	1044	Bail Well
				slightly lighter dry color, and stronger reaction in	1045	Resume drilling
				10% HCl Sample taken for gamma scan. Samples	1100	Drive Casing
				are representative.		
20' 1/2" of 10"					1105	Set 20' 1/2" of 10" casing
9' 5 1/2"				Total of 10" carbon steel casing = 29' 6"	1120	Add 9' 5 1/2" of 10" casing
29' 6" of 10"					1130	Break for Lunch
					1250	Continue Welding
REMARKS:						
Karel R. Oster 2/19/88						

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

DRILL LOG			By <i>J.R. Oster</i>	Rig <i>B.E. 22W</i>	Well Number <i>199-N-67</i>	Computer Number	Project or Work Order No. <i>1301-N</i>
			Date <i>2/19/88</i>	# <i>68K-19151</i>	Depth <i>19' To 25'</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
						1311	Resume drilling
							Add 3gals H ₂ O
						1324	Drive Casing
	19'-20'	H	Wet	GRAVELLY SILTY SAND, 20% GRAVEL, 60% sand, 20% silt.		1330	using dart bit Bailed Well
				Trace v.c.p., Trace c.p., 4% m.p., 6% f.p., 10% v.f.p., 10% v.c.s.,			Drill rate = 5.88/hr
				15% c.s., 15% m.s., 10% f.s., 10% v.f.s., 20% silt. Poorly		1335	Resume drilling
				Sorted. Gravels are 60% basalt, 15% granite, 10%			Add 3gals H ₂ O
				metamorphics, 5% other lithologies and are very		1340	Add 3gals H ₂ O
				angular to subangular. Sands are 60% basalt, 35%		1348	Drive Casing
				quartz and feldspar, 5% other sands, and are very		1351	Resume drilling
				angular to subangular. Wet Color is dark grayish brown		1352	Add 3gals H ₂ O
				(2.5Y 4/2), Dry Color is light brownish gray (2.5Y 6/2).		1357	Bailed Well
				Very strong reaction in 10% HCl. No Consolidation.		1400	Resumed drilling
				Different from previous sample: Overall decrease		1410	Add 3gals H ₂ O
				in grain size and basalt content, change from grays		1428	Drive Casing
				to browns (Color change at 19'), stronger reaction in 10%		1430	Resume drilling
				HCl. Some silt and fine sand clumps are found. Sample		1445	Drive Casing
				taken for gamma scan. Samples are representative.			
REMARKS:							
<i>Allen R. Oster</i> <i>2/19/88</i>							

[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 A.R. Oster	Rig B.E. 22W	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2/22/88	#68K-19151	Depth 29' 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
29'6"	0'10"					0750	Start drilling
	29'-30'			SILTY SANDY GRAVEL, 30% gravel, 60% sand, 10% silt. Trace v.c.p., 1% c.p., 8% m.p., 6% f.p., 15% v.f.p., 10% v.s., 15% c.s., 15% m.s., 10% f.s., 10% v.f.s., 10% silt. Very Poorly Sorted. Gravels are 90% basalt, 5% metamorphics, 5% granite and are very angular to subrounded. Sands are 80% basalt, 15% quartz and feldspar, 5% other sands and are very angular to subangular. Wet Color is olive gray (5Y 4/2). Dry Color is light olive gray (5Y 4/2). Moderate reaction in 10% HCl. No Consolid- ation. Similar to previous sample with decrease in overall grain size, basalt content of gravel and reaction in 10% HCl. Sample Taken for gamma scan. Samples are representative		0800	Using dart Bailer Bailed Well Drill rate = 8.82/hr
29'6"	0'10"					0805	Add 9'11" of 10" Casing
39'5"	0'10"			Total of 10" Carbon steel casing = 39'5"			
						0840	Drive Casing
						0846	Resume drilling
REMARKS:				14 A.R. Oster 2/22/88			

DRILL LOG		By A.R. Oster	Rig B.E. 22W	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
		Date 2/22/88	#68K-19151	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
						Add 4 gals H ₂ O
					0900	Drive Casing
					0910	Resume drilling
						Add 2 gals H ₂ O
					0922	Bail Well
					0926	Resume drilling
						Add 2 gals H ₂ O
					0935	Drive Casing
	34'-35'	H	Wet	SILTY SANDY GRAVEL, 30% Gravel, 60% sand, 10% silt.	0940	using dart bailer Bailed Well
				Trace v.c.p., 4% c.p., 10% m.p., 6% f.p., 10% v.f.p., 15% v.c.s.,		Drill rate = 8.57"/hr
				15% c.s., 10% m.s., 10% f.s., 10% v.f.s., 10% silt. Very	0945	Resume drilling
				Poorly Sorted. Gravels are 95% basalt, 4% metamorphics,	0951	Drive Casing
				10% granites and are very angular to subangular. Sands	0954	Resume drilling
				are 80% basalt, 15% quartz and feldspar, 5% other	1003	Bail Well
				sands and are very angular to subangular. Wet Color is	1006	Resume drilling
				dark olive gray (5Y 3/2). Dry Color is olive gray (5Y 5/2).		Add 3 gals H ₂ O
				Very slight reaction in 10% HCl. No Consolidation. Very	1015	Add 2 gals H ₂ O
				Similar to previous sample except slight increase in	1020	Drive Casing
REMARKS:						Kyle R. Oster 2/22/88

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

A 6000 (021) (5-85)

DRILL LOG			By <i>K. Roster</i>	Rig <i>B.E. 2210</i>	Well Number <i>199-N-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
			Date <i>2/22/88</i>	# <i>68K-19151</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
				grain size and basalt content of gravels, less reaction in 10% HCl. Sample taken for gamma scan. Samples are representative.			
<i>39' 5" of 10"</i>						<i>1025</i>	<i>Add 9' 9" of 10" Casing</i>
<i>9' 9"</i>							
<i>49' 2" of 10"</i>				<i>Total of 10" Carbon Steel Casing = 49' 2"</i>			
						<i>1105</i>	<i>Drive Casing</i>
						<i>1115</i>	<i>Resume drilling</i>
						<i>1120</i>	<i>Break for Lunch</i>
						<i>1235</i>	<i>Resume drilling</i>
						<i>1253</i>	<i>Drive Casing</i>
	<i>39'-40'</i>	<i>H</i>	<i>Wet</i>	<i>SLIGHTLY SILTY GRAVELLY SAND, 25% gravel, 65% sand, 10% silt, 5% m.p., 5% f.p., 15% v.f.p., 15% ves, 15% ocs, 15% ms, 10% fs, 10% v.f.s, 10% silt. Poorly Sorted. Gravels are 75% basalt, 15% metamorphics, 10% granite and are very angular to subangular. Sands are 75% basalt, 20% quartz and feldspar, 5% other sands, and are very angular to subangular. Wet Color is dark olive gray (5Y 3/2). Dry Color is olive gray (5Y 5/2). Very slight reaction in 10%</i>		<i>1300</i>	<i>Using dart Bailer Bailed Well</i>
							<i>Drill rate = 5.77'/hr</i>
						<i>1302</i>	<i>Resume drilling</i>
							<i>Add 4 gals H₂O</i>
						<i>1322</i>	<i>Drive Casing</i>
						<i>1332</i>	<i>Add 4 gals H₂O</i>
						<i>1334</i>	<i>Resume drilling</i>
							<i>Add 4 gals H₂O</i>
REMARKS:							

Karen P. Oster
2/2 '88

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

A 6000 021 (5 85)

DRILL LOG			By K.R. Oster	Rig B.E. 2200	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2/22/88	#BK-19151	Depth 40' To 45'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				^{unconsolidated.} HCl. Similar to previous sample except decrease in grain size and basalt content. Sample taken for gamma scan. Samples are representative. R.M. says this sample reads 6000-8000 dpm when wet.			Top of Ringold @ 43' b.s.
	44'-45'	H	Wet	(RINGOLD) SILTY SANDY GRAVEL, 35% gravel, 100% sand, 5% silt, 1% v.c.p., 4% c.p., 10% o.p., 10% o.f.p., 10% o.v.f.p., 10% o.v.c.s., 15% o.c.s., 15% o.m.s., 15% o.f.s., 5% o.v.f.s., 5% silt. Very Poorly Sorted. Gravels are 25% basalt, 25% granite, 30% quartzite, 20% other metamorphics and are very angular to subangular. Sands are 40% basalt, 50% quartz and feldspar, 10% other lithologies and are very angular to subangular. Wet color is dark grayish brown (2.5Y 4/2). Dry color is light brownish gray (2.5Y 6/2). No Reaction in 10% HCl. No Consolidation. Different from previous sample. Change to Ringold at 43' b.s. Overall increase in grain size, decrease in basalt content and reaction in 10% HCl.		1400	Using dart + bailer Bailed 11
						1404	Resume drilling
						1412	Add 4 gals H ₂ O
						1415	Bail Well
							Drive Casing
REMARKS:							
<div style="text-align: right;">Karen R. Oster 2/22/88</div>							

[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)

9-C.160

DRILL LOG			By K.R. Oster	Hig B.E. 3010	Well Number 199-N-57	Computer Number N/A	Project or Work Order No. 1301-1
			Date 2/25/88	# 1081-1715	Depth 45' To 76'	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/O = 57' b.l.s. (PNL 300'-TAPE # 12174)		0740	
				It was determined that the extra water			
				in the hole was due to a small amount of water			
				seeping in the hole in 199-N-2 @ 61' b.l.s.			
				The 6" ss. casing was installed in the hole by 11:00		0800	S.S. screens =
				was pulled back to 11:00 the bottom of the hole			76' - 60.5' b.l.s.
				is at 76' b.l.s.			
				D/O inside case = 75.5' b.l.s. (PNL STEEL TAPE # L200-01)		0805	
				(sand in bottom of hole)			
				Started adding sand and pulling back 10" casing.		0810	
				Still having trouble pulling due to a bad clutch.		0930	Pulled 10" back 1'.
				so will try new puller top.			Work on new top.
				Started pulling back 10" casing.		0945	
				Poured 8 bags (100 lbs ea) 10-20 U.S. sieve size		1000	Artificial Sand Pack
				Colorado silica sand in casing. Pulled 10" casing			= 76' - 54.5' b.l.s.
				back to 55.5. Measured D/O top of casing			
				at 54.5' b.l.s. (PNL STEEL TAPE # L200-01)			
REMARKS:							
Karen P. Oster 2/25/88							

D - Drive Barrel

H - Hard Tool

L - Large

M - Medium

S - Small

VC - Very Coarse

C - Coarse

F - Fine

VF - Very Fine

— Standing Water

A 6000-021 (5-85)

DRILL LOG		By <i>K.R. Oster</i>	Rig <i>B.E. 2000</i>	Well Number <i>201-27</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
		Date <i>2/26/87</i>	# <i>681-17151</i>	Depth <i>15'</i> To <i>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
				<i>D/W = 45' b.l.s. (PNL E-TAPE # 12174)</i>	<i>0740</i>	
					<i>0835</i>	<i>Started pulling 10"</i>
						<i>Casing falling bentonite</i>
				<i>Poured 1'4 bags (50 lbs ea) Envirogel granular bentonite into annulus. Pulled 10" casing back to 20' b.l.s. Measured D/B top of Granular Bentonite @ 30' b.l.s. (PNL STEEL TAPE # 2200-01)</i>	<i>1115</i>	<i>Granular Bentonite seal 15' - 20' b.l.s.</i>
				<i>Discovered that weld on the stainless steel casing had broken at 15' b.l.s. and will have to be welded back on.</i>	<i>1120</i>	
					<i>1125</i>	<i>Break in casing</i>
				<i>Pulled 10" casing out of hole. Concrete mixer jammed. There is a 6" gap between the top of the granular bentonite and the casing.</i>	<i>1245</i>	
				<i>Started digging around 10" casing to get it low enough to weld the stainless steel casing back on.</i>	<i>1315</i>	
					<i>1525</i>	<i>Done for day</i>
REMARKS: <div style="text-align: right;"><i>Karen P. Oster</i> <i>2/21 '88</i></div>						

DRILL LOG		By R. Oster	Rig #461-19151	Well Number 177 N 61	Computer Number	Project or Work Order No.
		Date 2/29/88		Depth To		Subcontract No.
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W: 45' b.l.s. (PNL 300'E-TAPE #12174)	0200	
				Started mixing and pouring concrete	0805	
				Rig won't stay running so we had to pull it		
				Started pulling 12" casing	0130	
					1140	Break or Lunch
				Pulling 12" casing again	1250	
				Welded back on the 12" ss. casing that came off the top	1400	
				Mixed 13 bags (90 lbs ea) concrete, 8 bags (50 lbs ea)	1450	
				Portland cement Type I+II, 1/2 bag (50 lbs ea) charged		
				Portlandite with 50 gals H ₂ O and poured into annulus.		
				Pulled all 12" casing steel casing from hole. Top		
				of cement seal just ground surface.		
				Started filling well. Bailed at approximately 12'.	1450	
				for 15 minutes.		
				Decreased flow of filling material. Started	1505	
				filling annulus.		
REMARKS:						
Karen R. Oster 2/29 '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 421 (5 85)

FIGURE 3. DRILL LOG		By <i>R.Oster</i>	Rig <i>3-2-2010</i> <i>#23 1757</i>	Well Number <i>19-N-57</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				<i>D/O = 6' 0" - 8' 0" - 14' 0" #12174)</i>	<i>0750</i>	
				<i>D/B = 7' 0" o.l.s. (W. Oster logs # 2000-01)</i>	<i>0755</i>	
				<i>Estimated D/O = 11 at approx rate of 10 ft/min for 30 min.</i>	<i>12:00</i>	
				<i>Changing rig to a bucket</i>	<i>0900</i>	
				<i>Pouring concrete pad (4' x 4' x 4")</i>	<i>0915</i>	
				<i>Gravel pit on north side of well</i>		
				<i>111' depth - gravel pit</i>		
				<i>Digging post holes and cleaning more soil</i>	<i>13:00</i>	
				<i>Two posts are cemented in place (to be removed)</i>	<i>15:00</i>	<i>Done Grading</i>

Karen R. Oster
 3/1/88

9-C.165

[illegible]

[illegible]

DRILL LOG		By O. Amos	Rig 22" 1	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
		Date 2-16-88		Depth 0' To 0'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				AT change shack waiting for RM	7:00	
				RM arrived head to Rig	9:00	
				AT Rig RM not sure its ok to drill - she thinks it might be too close to crib	1:10	
				Decision made to move rig farther away - Tear down & move	10:30	
				Head to change shack to undress & get suited out	11:30	
				Lunch	12:00	
				AT change shack get dressed & head to Rig	12:30	
				AT Rig Set up drill	1:00	
				Drill set up having trouble adjusting the clutch on the walking beam	2:45	
				clutch won't adjust right head in	3:25	
REMARKS: To change shack & head in. Ken P. Oster 3/3/88						

A-6000 021 (b 85)

DRILL LOG			By D. Amos	Rig 1	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2-18-88		Depth 3' To 12'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
12"	5	H	✓	Boulders			
10' 4 1/2"	10	H	✓	Boulders + gravel		7:30	get dressed
19' 6"						7:55	AT Rig drilling
						11:20	Set + weld
							casing
						11:30	Head to street
							to undress
						12:00	Lunch
						12:30	dress
						12:50	Start to Finish welding
						1:30	Drilling
						3:30	Head in to
							undress
						4:00	Head home
REMARKS:							
Karen P. Oster 3/3/88							

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

A 6000 021 (5-85)

9-C.169

9-C-170

DRILL LOG		By <i>O. Ames</i>	Rig <i>1</i>	Well Number <i>199-V-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
		Date <i>2-19-98</i>		Depth <i>12' 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
<i>20' 1/2"</i>	<i>15</i>	<i>H</i>	<i>w</i>	<i>Boulders & gravel</i>		
<i>1' 5 1/2"</i>	<i>20</i>	<i>H</i>	<i>w</i>	<i>Gravel & cobbles silt</i>	<i>7:15</i>	<i>AT change shack</i>
<i>29' 6"</i>	<i>25</i>	<i>H</i>	<i>w</i>	<i>11</i>	<i>8:00</i>	<i>AT Rig Drilling</i>
					<i>11:30</i>	<i>Head in to lunch</i>
						<i>+ change out of whites</i>
					<i>17:00</i>	<i>Lunch</i>
					<i>17:30</i>	<i>does</i>
					<i>17:50</i>	<i>weld 10"</i>
					<i>1:45</i>	<i>Drilling</i>
					<i>3:30</i>	<i>shot down Head in To</i>
						<i>change out of whites</i>
					<i>4:00</i>	<i>Head home</i>
REMARKS:						
<i>Lane P. Oster</i> <i>3/3/98</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 15 R/L

DRILL LOG		By O. Amor	Rig 1	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
		Date 2-22-88		Depth 29' 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
101'	20'	H	Let	Sand + Gravel	7:15	Dress
246'	35'	H	"	Sand + Gravel (silt) contaminated	7:50	start drilling
94'	40'	H	"	"	8:05	welding
585'	45'	H	"	" Kingold	8:45	Drilling
	50'	H	"	"	11:25	undress
					11:45	Lunch
					12:15	Dress
					12:35	Drilling
					2:25	welding
					3:03	Drilling
					3:25	undress
						Head in hole
					3:45	undress
REMARKS:						
Lyle O. Amor						
Karen P. Oster						

[illegible]

9-C.172

9-C.173

DRILL LOG			By O. Amos	Rig 1	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2-24-88		Depth 78' 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
	75'	H	W	Sand & gravel Check water level 65'		7:40	
				Drilling		7:45	
				Fix straightener tool		9:30	
				Run straightener + 5'		10:00	
				Drilling (trying to keep sand from sticking)		10:25	
				Set Stainless		1:00	
				get ready to pull casing		1:45	
				Having trouble with clutch on Rig		2:40	
				Heading to well # 55		3:25	
Jorge O. Amos							

REMARKS:

Sam R. Oster

3/3/88

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

A 6000 021 15 85)

DRILL LOG			By O. Amos	Rig 1	Well Number 199-n-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2-25-88		Depth 76' To 76'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Drill		7:15	
				check water level 59'		1:40	
				level higher because of water in hole			
				start pulling 10" casing		8:05	
				Top sand pack - 54.5' 8 100 lb bags		12:50	
				Top of pellets - 49.5' 4 bags		2:30	
				Granular Bentonite 6-50 lb bag		3:25	undress
						3:45	Head home
				Lyle O. Amos			
REMARKS:							
Lyle O. Amos 3/3/88							

DRILL LOG			By J. H. H.	Rig 31	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2/26/87		Depth 76' To 76'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				check water level 65'		7:40	Dress 7:15
				start pulling casing, 10' +		7:45	
				Add Bentonite			
				Stainless casing 6-11-20		11:20	Head in to
				at 2' below ground			undress
				start mixing concrete		12:45	+ lunch
				mixer won't mix concrete in			Top of Bentonite
				is 20'			
				dig down around casing,		1:15	
				so I can weld flange on			
				head in to undress		3:25	
				head home		3:45	
				sig. to O. Amos			
REMARKS:							
Karen R. Oster 3/3/88							

DRILL LOG			By J. Amos	Rig 1	Well Number 147-N-1	Computer Number N/A	Project or Work Order No. 1301-N
			Date 2-27-88		Depth 76' To 76'		Subcontract No. N/A
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Dress		7:15	
				Check water level		7:40	
				Start pouring & mixing in wheel barrel concrete		7:55	
				Rig won't run call mechanic		8:20	
				Start pulling 12" casing		9:30	
				Undress for lunch		11:30	
				lunch		11:50	
				Dress		12:35	
				Pull casing		12:50	
				Well stands in place & in use		2:00	
				Start backing hole		2:50	
				Tear down rig to use next		15:05	
				Finish backing tomorrow			
				Undress		3:25	
				Head home		3:45	
				J. A. Amos			
REMARKS:							
<div style="text-align: right;"> <i>Karen P. Oster</i> 3/3/88 </div>							

DRILL LOG		By <i>J. Amos</i>	Rig <i>1</i>	Well Number <i>144-N-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
		Date <i>3/1/88</i>		Depth <i>76' To 74'</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>Drill</i>	<i>7:15</i>	
				<i>check water level 65'</i>	<i>7:40</i>	
				<i>Depth to Bottom - 76'</i>		
				<i>Bail hole</i>	<i>8:15</i>	
				<i>clean Rig & tools</i>	<i>9:00</i>	
				<i>pour pad</i>	<i>9:15</i>	
				<i>undress</i>	<i>11:30</i>	
				<i>lunch</i>	<i>11:45</i>	
				<i>dress</i>	<i>12:15</i>	
				<i>dig post holes & clean tools</i>	<i>12:40</i>	
				<i>cement posts in</i>	<i>2:15</i>	
				<i>undress</i>	<i>3:20</i>	
				<i>pour pad</i>	<i>3:45</i>	
				<i>dig & clean</i>		
REMARKS:						
<i>Alan P. Oster</i> <i>3/3/88</i>						

9-C.177

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

A 6000 021 (5 85)

9-C.178

[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)

DRILL LOG			By K. Oster	Rig B.E. 22W	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-A1
			Date 2/22/88	# 68K-14151	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
				Sample taken for gamma scan. Samples are representative. 8000-10,000 dpm when wet.			
	49'-50'	H	Wet.	SILTY SANDY GRAVEL, 30% Gravel, 60% sand, 10% silt. 3% c.p., 7% m.p., 10% f.p., 10% v.f.p., 10% v.c.s., 15% c.s., 15% m.s., 10% f.s., 10% v.f.s., 10% silt. Poorly Sorted. Gravels are 25% basalt, 25% granite, 30% quartzite, 20% other metamorphics and are very angular to subangular. Sands are 40% basalt, 50% quartz and feldspar, 10% other lithologies and are very angular to subangular. Wet Color is dark grayish brown (2.5Y4/2). Dry Color is light brownish gray (2.5Y6/2). Slight reaction in 10% HCl. No consolidation. Very similar to previous sample with decrease in grain size and slight increase in reaction to 10% HCl. Sample taken for gamma scan. Samples are representative. 8000-10,000 dpm when wet.		1420	Using dart barker Bailed Well Drill rate = 37.5'/hr
	49' 2" of 10"						
	9' 3"						
	58' 5" of 10"			Total of 10" Carbon steel casing = 58' 5"		1425	Add 9' 3" of 10" casing
						1503	Drive Casing
REMARKS:				Karl R. Oster 2/22/88			

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

A 6000 021 (5-85)

DRILL LOG				By <i>K.R. Oster</i>	Rig <i>B.E. 2210</i>	Well Number <i>199-N-67</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>1301-N</i>
				Date <i>2/23/88</i>	# <i>48K-19151</i>	Depth <i>54' To 55'</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
							0740	Started drilling
								Add 2 gals H ₂ O
							0800	Bailed Well
							0805	Resumed drilling Add 5 gals H ₂ O
							0820	Drive Casing
	54'-55'	H	Wet	SLIGHTLY SILTY GRAVELLY SAND, 25% gravel, 65% sand 10% silt.			0830	Using Dirt Bailer Bailed Well
				Trace c.p., 5% m.p., 10% f.p., 10% v.f.p., 10% v.c.s., 15% c.s.,				Drill rate = 5.88"/hr
				15% m.s., 15% f.s., 10% v.f.s., 10% silt. Very Poorly			0835	Resume drilling
				Sorted. Gravel is 35% basalt, 15% granite, 25%				Add 3 gals H ₂ O
				quartzite, 10% caliche, 15% other metamorphics and			0842	Drive Casing
				are very angular to subangular, sands are 40% basalt			0847	Resume drilling
				50% quartz and feldspar, 10% other sands, and are			0901	Bailed Well
				very angular to subrounded. Wet color is grayish				
				brown (2.5Y 5/2). Dry color is light brownish gray (2.5Y 6/2)				
				Very strong reaction in 10% HCl. Slightly Consolidated				
				from 55'-56' b.i.s. Similar to previous sample with a				
				decrease in grain size, increase in basalt content and				
				much stronger reaction in 10% HCl. Including chunks				
REMARKS:								
<i>K.R. Oster</i> <i>2/23/88</i>								

DRILL LOG		By K.R. Oster	Rig B.E. 220	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
		Date 2/23/88	# 68K-A151	Depth 55' 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
				of caliche in this sample. Sample taken for gamma scan. Samples are representative.		
				9000 dpm when wet.		
58' 5" of 10"					0915	Add 10' 2 1/2" of 10" casing
10' 3 1/2"						
10' 4 1/2"				Total of 10" Carbon Steel Casing = 68' 7 1/2"		
					0955	Drill casing
					1025	Resume drilling
						At 3 p.m. 10
					1045	Drill casing
						Resume drilling
						At 4 p.m. 10
					1055	Drill casing
					1105	Resume drilling
						At 5 p.m. 10
					1115	Drill casing
					1125	Resume drilling
						At 6 p.m. 10
					1135	Drill casing
					1145	Resume drilling
						At 7 p.m. 10
					1155	Drill casing
					1205	Resume drilling
						At 8 p.m. 10
					1215	Drill casing
					1225	Resume drilling
						At 9 p.m. 10
					1235	Drill casing
					1245	Resume drilling
						At 10 p.m. 10
					1255	Drill casing
					1305	Resume drilling
						At 11 p.m. 10
					1315	Drill casing
					1325	Resume drilling
						At 12 p.m. 10
					1335	Drill casing
					1345	Resume drilling
						At 1 p.m. 10
					1355	Drill casing
					1405	Resume drilling
						At 2 p.m. 10
					1415	Drill casing
					1425	Resume drilling
						At 3 p.m. 10
					1435	Drill casing
					1445	Resume drilling
						At 4 p.m. 10
					1455	Drill casing
					1505	Resume drilling
						At 5 p.m. 10
					1515	Drill casing
					1525	Resume drilling
						At 6 p.m. 10
					1535	Drill casing
					1545	Resume drilling
						At 7 p.m. 10
					1555	Drill casing
					 

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
				feldspar, 15% other sands and are very angular to subrounded. Wet color is grayish brown (2.5Y 5/2). Dry color is light brownish gray (2.5Y 6/2). Very strong reaction in 10% HCl. Similar to previous sample with no caliche, increase in grain size, decrease in basalt and consolidation. No Consolidation. Sample taken for gamma scan. Samples are representative 3000 dpm when wet.			
	10' - 115'	H	Wet	Silty Sandy Gravel: 20% Gravel, 60% Sand, 10% Silt. 3% CP, 7% MP, 10% FP, 10% VFP, 10% VCS, 15% CS, 15% MS, 10% FS, 10% VFS, 10% Silt. Very poorly sorted. Gravels are 35% Basalt, 25% Granitic, 25% Quartzitic, 15% Meta. VA to SA. Sands are 30% Basalt, 60% Quartz + Crd., 10% Ry. Frags. VA to SR. Wet color is grayish brown (2.5Y 6/2), Dry color is 2.5Y 7/4 (pale yellow)		1122	Using dart Bailer Bailed Well
							Drill rate = 10.34' / hr
						1125	Break for Lunch
						1245	Resume drilling
						1258	Drive Casing
						1301	Resume drilling
						1308	Bail Well
						1310	Resume drilling
						1312	Improve casing
REMARKS:							

Taren R. Oster 2/23/88
 Alan H. Rhoads 2/12/88

DRILL LOG			By S. M. Goodwin	Rig FE 22	Well Number 199-N-67	Computer Number N/A	Project or Work Order No. 1301-N
			Date 22 (or 1988)	Depth #631-111	Depth 65' To 70'	Subcontract No. N/A	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
	64-65'	H	W	(CONT.) BY THE HCL IS VERY STRONG.		1330	WEIDING 8' 6"
				SIMILAR TO PREVIOUS SAMPLE, UNIFORM -			OF 10" CARBON
				DATED. GAMMA COUNT SAMPLE TAKEN			STEEL CASING
				SAMPLE IS REPRESENTATIVE 7000 DPM			
				WHEN WET.			
	68' 7 1/2"			ADDED 8' 6" OF CARBON STEEL CASING		1355	FINISHED WEIDING
	8' 6"			TOTAL 10" CASING = 77' 1 1/2"			
	77' 1 1/2"						
						1400	DRAINING CASING
				ADDED 4 GAL DRILL H ₂ O		1405	DRILLING; ADDED 20
							4 gals H ₂ O
						1425	DRAINING CASING
	69-70'	H	W	SILTY SANDY GRAVEL: 30% GRAVEL, 60% SAND, 10% SILT, 10% MP, 10% FP, 10% VFP, 10% VCS, 15% CS, 15% MS, 10% F, 10% VFS, 10% Silt. VERY POORLY SORTED. GRAVELS ARE 40% BASALT, 25% GRANULITES, 20% QUARTZITE, 15% METAL; VA TO SA. ADDED 20% BASALT, 100% QUARTZ		1430	
						1435	DRILLING
						1450	DRAINING CASING
						1500	DRILLING WELL
							WITH DRIFT
							BRIDGE
							Drill rate - 4.48"/hr
REMARKS:							
2/23/88 Alvin H. Goodwin							

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

A 6000 021 (5 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

A-6000-021 (5-85)

DRILL LOG		By K.R. Oster	Rig B&B 22W	Well Number 199 N 107	Computer Number N/A	Project or Work Order No. 1301-N
		Date 2/24/88	#68K-14151	Depth 70' To 78'		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 = 105' b.l.s. (PML 300' E-TAPE # 12174)	0740	
					0742	Drive Casing
					0750	Start Drilling
					0830	Drive Casing
					0835	Resume Drilling
	41' 15"	H	Wet	SANDY GRAVEL, 40% gravel, 55% sand, 5% silt. 10% mp., 10% f.p., 20% v.f.p., 20% v.co., 15% co.s., 10% m.s., 5% f.s., 5% v.f.s. Moderately to poorly sorted. Gravels are 30% basalt, 20% granite, 30% quartzite, 20% other metamorphics and are very angular to subangular. Sands are 30% basalt, 60% quartz and feldspar, 10% other sands and are very angular to rounded. Wet color is grayish brown (2.5Y 5/2). Dry color is light gray (2.5Y 7/2). Very slight reaction in 10% HCl. Similar to previous sample, slight increase in grain size, increase in fineness and reaction in 10% HCl. Unconsolidated. Sample taken for grain size. Samples are representative, 5000 dpm.	0845	Using Jet Buffer Bailed Well
						Drill rate = 5.45'/hr
					0900	Used Hony sniffer in well and read 4 ppm
					0905	Resume Drill
					0910	Bailed Well
REMARKS:						
Karen P. Oster 2/24/88						

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 J. Oster	Rig B. Oster	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
				D/B = 78' h.l.c. (PIL steel pipe 2" 20-01)		0930	
						0930	Work on straightness
							1001
				Passed a 90' section of 8" pipe down hole to bottom maintaining the hole in straight.		1000	Straightness test.
				4/8" 70' section (PIL steel pipe 2" 20-01)			
				Trying to back pressure sand back down.			
				74'-5'			
				Set SS casing			
				1' 2" 304 stainless steel casing			
				1' 2" 304 stainless steel casing			
				2' 2" 304 stainless steel casing			
				1' 2" 304 stainless steel casing			
REMARKS:				Total = 15' 6" of 6" screen, 62' 3" of 6" casing.			
				Face - P. Oster 2/2 '88			

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