PNL-6581 Vol. 4
UC-41,11

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

Volume 4 — Appendix A (contd)

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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PNL-6581 Vol. 4

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PNL-6581 Vol. 4
UC-41, 11

GROUND-WATER MONITORING COMPLIANCE PROJECTS FOR HANFORD SITE FACILITIES: PROGRESS REPORT FOR THE PERIOD JANUARY 1 TO MARCH 31, 1988

Volume 4 -- Appendix A (contd)

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Pacific Northwest Laboratory
Richland, Washington 99352

APPENDIX A (contd)

PREFACE

This appendix is one of nine volumes, and presents data describing wells completed at the Hanford Site during the fourth quarter of calendar year 1987 (October through December).

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

- 299-E33-30
- 299-E34-2
- 299-E34-3
- 299-E34-4
- 299-E34-5
- 299-E34-6

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

WELL 299-E33-30

Battelle
Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project 200 Area RCRA Monitoring Wells
Location 700 East Area
Driller Louis Watkins / Mike Donnelly
Drilling Co. Kaiser Engineering Hanford
Geologist M. Chamness, G. Davis, C. Scott, S. Goodwin, C. Hodge, L. Fair

Well Number 299-E33-30
Temporary Well Number NA
Coordinates N45,983 W67,960
Casing Elevation 1663.7'
Ground Elevation 1661.92'

DRILLING METHOD

Rotary Air NA Mud NA
Cable Tool D ✓ H ✓
Drilling Fluid Zone East water
Other Backhoe 0'-10"

COMPLETION DATA

Drilled Depth 280.1' Dual system
Completion Depth 275'
Date Started 8/29/87 Completed 9/20/87
Static Water Level/Date 257.57' 9/15/87

CASING DATA

Type	Size			
CARBON STEEL	16"	0'	to	58' 4"
" "	12"	0'	to	123' 6½"
" "	10"	0'	to	208' ½"
" "	8"	0'	to	284' 9¼"
CRUSHED STEEL	4"			275' + 1.78' stickup

Approved By MAC Date 11/24/87

PERFORATIONS

Type ____

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

App. By MAC Date 11/12/87

SCREEN

Type 8" st. ste. 4' 4" st. steel
Length 10' 3" & 20'
Slot Size 30 & 20
Depths 277'-266' 9" & 275'-255'

App. By MAC Date 11/12/87

ANNULAR SEAL

Type	Interval	Volume
20/30 silica sand	280'-255'	8½ 100 lb bags
Bent pellets	255'-245'	3½ Gal. bags
Bent. crumbles	~245'-4'	362 50 lb bags
Bentonite cement	2.5'-0'	unmeasured

App. By MAC Date 11/24/87

GEOPHYSICAL LOGGING

Sondes	Interval	Date
Nat Gamma	2' - 279'	9/15/87
neutron	2' - 279'	9/15/87
density	1' - 278'	9/15/87
____	____ - ____	____
____	____ - ____	____
____	____ - ____	____
____	____ - ____	____

Approved By MAC Date 11/24/87

AQUIFER TESTING

Type of Test step drawdown / constant discharge
Length of Test 12 hrs
Volume Pumped 160 gpm for 2 hrs = 22,400 gal
Drawdown 0.02'

Approved By [signature] Date 12/4/87

OTHER APPLICABLE ITEMS

MAC Steam Cleaning	MAC Protective Steel Posts	VTM Downhole TV Inspection
MAC Storage of Const. Material	MAC Safety Paint	NA Well Abandonment
MAC Tool Lubricants	MAC Straightness Test 9/15/87	✓ Complete As-Built Diagram, Driller's and Geologist's Logs
MAC Concrete Pad	SA Well Development 9/22/87	

Approved By M. A. Chamness Date 12/4/87

Reviewed By W. L. McGraw Date 12-22-87

A-1800-187 (3/87)

PREFACE

This Inspection Plan identifies the inspections required and the responsible people to perform the inspections of the monitoring wells to be constructed under Project B-678.

The inspection of well construction activities is intended to provide assurance that the work performed by construction forces is in accordance with the approved contract documents. The degree of inspection is commensurate with the significance of the monitoring wells with regard to function and safety.

Inspectors

Listed below are the names of the individuals whose initials appear within this inspection plan.

Name	Initial	Organization	Job Title
John F. Keller	JFK	Kaiser Engineering Hanford	Superintendent
Michele A. Chamness	MAC	Pacific Northwest Laboratory	Scientist

The PNL project manager has reviewed the completed inspection plan and is satisfied that all the applicable inspections of the work were made during the construction of the wells.

G. V. Last
PNL Project Manager

1-13-88
Date

CONSTRUCTION INSPECTION SERVICES

Described herein are the inspection services to be provided and documented by PNL.

Pre-Award Submittal Review

	Item	Contract Reference	Initial	Date
1.	Verify contractor and drillers are licensed for well drilling in the State of Washington.	01100-1.2 01300-1.2.1A	JJK	1-12-88
2.	Verify cable tool drilling experience is five years or more with drive barrel and hard tool.	01100-1.2	JJK	1-12-88
3.	Verify documentation of ground-water monitoring wells drilled by contractor.	01100-1.2	JJK	1-12-88
4.	Verify contractor submitted description of drilling method and equipment.	01300-1.2.1B	JJK	1-12-88
5.	Verify contractor submitted resumes of personnel.	01300-1.2.1C	JJK	1-12-88

Procurements

Verify materials to be furnished to the contractor are as described in the construction specification.

	Item	Contract Reference	Initial	Date
1.	Stainless steel screen (8 inch telescope size).	01100-1.5A	JJK	1-12-87
2.	Stainless steel screen (4 inch).	01100-1.5B	JJK	1-12-87
3.	Centralizers.	01100-1.5C	JJK	1-12-87
4.	Stainless steel casing (4 inch).	01100-1.5D	JJK	1-12-87

	Item		Contract Reference	Initial	Date
5.	Artificial sand packs.		01100-1.5E	JTK	1-12-88
6.	Bentonite pellets.		01100-1.5F	JTK	1-12-88
7.	Bentonite grout.		01100-1.5G	JTK	1-12-88
8.	Granular bentonite.		01100-1.5H	JTK	1-12-88
9.	Sack crete.		01100-1.5I	JTK	1-12-88
10.	Portland cement.		01100-1.5J	JTK	1-12-88
11.	Well cap.		01100-1.5K	JTK	1-12-88
12.	Brass survey marker.		01100-1.5L	JTK	1-12-88
13.	Sample jars.		01100-1.5M	JTK	1-12-88
14.	Hydrologic sampling equipment.		01100-1.5N	JTK	1-12-88
15.	Drive shoes.		01100-1.5O	JTK	1-12-88
16.	Carbon steel casing.	a. 16 inch	01100-1.5P	JTK	1-12-88
		b. 12 inch	01100-1.5P	JTK	1-12-88
		c. 10 inch	01100-1.5P	JTK	1-12-88
		d. 8 inch	01100-1.5P	JTK	1-12-88
17.	Guard posts.		01100-1.5Q	JTK	1-12-88
18.	Paint: primer		01100-1.5R	JTK	1-12-88
	finish enamel		02011-3.5I	JTK	1-12-88

Performance Submittals

	Item	Contract Reference	Initial	Date
1.	Verify submission and approval of construction schedule.	01300-1.2.2A	JTK	1-12-88
2.	Verify drilling logs are submitted daily.	01300-1.2.2B	JTK	1-12-88
3.	~~Verify submission and acceptability of flow meter certification.~~ DFC NO. 200-1	01300-1.2.2C		

ATTACHMENT 1

DESIGN/FIELD CHANGE		DFC No. 200-1
Task No. N/A	Project Title - 200 Area Burial Ground Detection Monitoring	Final Approval Date 11/25/87

Documents Affected

1. Construction Specifications KEY-1914 (B-677) and (B-678)
2. Inspection Plan Construction Project KEH-1914 (B-677)

Description of Change

Line out and disregard any statements concerning flow meter certification. Specifically paragraph 1, 2.2C under performance submittals in the referenced construction specs. and item 3 under the performance submittals section of the referenced inspection plan.

Justification

See attached letter

Distribution

PNL
SP Airhart
MA Chamness
CS Cline
DR Dahl
TJ Gilmore
RM Smith
JS Wilbur

WHC
RE Clayton
C Hodge
RB Kasper
DM Tulberg

Remarks

None

Initiator/Author	Phone	Organization(s)	Date
G. V. Last GV Last	376-1054	Geosciences/PNL	11/25/87

Approvals

DR Raymond 11/25/87

Project Manager	QA
GV Last 11/25/87	DR Dahl 11/30/87

Well Number 299-E33-30

The remaining sections of this inspection plan shall be completed for each well.

Well Drilling Activities

	Item	Contract Reference	Initial	Date
1.	Verify wells are constructed in continuous operation.	01100-1.3	MAC	1/8/88
2.	Verify contractor uses approved water source.	01600-2.0	MAC	1/8/88
3.	Verify beveled edge is cut on temporary casing by contractor.	01600-2.1A	MAC	1/8/88
4.	Verify suitability of split spoon sampling equipment.	01600-2.2	N/A	
5.	Steam cleaning equipment.	01600-2.3	MAC	1/8/88
6.	Aquifer testing equipment.	01600-2.4	MAC	1/8/88
7.	Verify contractor has copy of WAC Chapter 173-160 "Minimum Standards for Construction and Maintenance of Water Wells" and the construction specification at the jobsite.	02011-1.2	MAC	1/8/88
8.	Verify contractor has a copy of all addendums and change orders at the jobsite.	02011-1.2	MAC	1/8/88

Monitoring Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify proper technique of cable tool drilling.	02011-3.1.1	MAC	1/8/88
2.	Verify steam cleaning is being done properly.	02011-3.1.2	MAC	1/8/88

Well Number 299-E33-30

	Item	Contract Reference	Initial	Date
3.	Verify contractor is handling and storing construction materials properly.	02011-3.1.3	MAC	1/8/88
4.	Verify bevel on casing and welding is done as specified.	02011-3.1.4	MAC	1/8/88
5.	Verify the contractor uses proper tool lubricants.	02011-3.1.5	MAC	1/8/88
6.	Verify only approved drilling additives are used.	02011-3.1.6	MAC	1/8/88
7.	Verify the proper disposal of drill cuttings and water.	02011-3.1.7	MAC	1/8/88

Well Testing

	Item	Contract Reference	Initial	Date
1.	Verify water-level measurements are taken. Note in log.	02011-3.2.1		
2.	Verify the bottom of temporary casing is free of plugging material at end of each day. Note in log.	02011-3.2.1	MAC	1/8/88
3.	Verify ground-water samples are taken when needed.	02011-3.2.2	MAC	1/8/88
4.	Verify aquifer testing is done at each well.	02011-3.2.3	MAC	1/8/88
5.	Verify formation samples are taken as required.	02011-3.3	MAC	1/8/88

Well Number 299-E33-30

Borehole Construction

	Item	Contract Reference	Initial	Date
1.	Verify temporary casing is telescoped at no more than 100 feet intevals.	02011-3.4A	MAC	1/8/88
2.	Verify depth of well.	02011-3.4B	MAC	1/8/88
3.	Verify proper action is taken if overdrilling occurs.	02011-3.4C	MAC	1/8/88
4.	Verify acceptable passing of alignment test.	02011-3.4D	MAC	1/8/88
5.	Verify all temporary casing is removed from the well.	02011-3.4E	MAC	1/8/88

Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify position of 8 inch screen and pullback of casing to expose screen.	02011-3.5A	MAC	1/8/88
2.	Verify adequate well development.	02011-3.5B	MAC	1/8/88
3.	Witness aquifer test.	02011-3.5B	MAC	1/8/88
4.	Verify proper setting of 4 inch screen, casing, and centralizer.	02011-3.5C	MAC	1/8/88
5.	Verify proper placement of sand pack.	02011-3.5D	MAC	1/8/88
6.	Verify proper location and thickness of bentonite pellet seal.	02011-3.5E	MAC	1/8/88
7.	Verify proper mixing, placement, and location of Volclay bentonite-based grout.	02011-3.5F	N/A	

	Item	Contract Reference	Initial	Date
8.	Verify proper concrete seal at top of well.	02011-3.5G	MAC	1/8/88
9.	Verify proper construction of concrete pad and placement of brass survey marker.	02011-3.5H	MAC	1/8/88
10.	Verify proper placement, construction, and painting of guard posts.	02011-3.5I	MAC	1/8/88
11.	Verify contractor cleans up site and properly stores excess materials.	02011-3.5J	MAC	1/8/88
12.	If abandonment of well occurs, verify proper abandonment.	02011-3.6	N/A	
13.	Verify contractor maintains the drill log daily.	02011-3.7		
14.	Prepare punchlist at construction completion for exceptions.		N/A	

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AS-BUILT DIAGRAM

Well Number 299-E33-30 Geologist W.A. Chamness, E.S. Davis, C. Hodge, C. Scott, L.L. Fair, S. Goodwin Page 1 of 3

Reviewed by J.K. McClain Date 12-22-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
Portland cement		5		SILTY SANDY GRAVEL
		10		" " "
		15		" " "
16" carbon steel casing		20		" " "
		25		" " "
		30		" " "
12" carbon steel casing		35		" " "
		40		" " "
		45		" " "
		50		" " "
10" carbon steel casing		55		" " "
		60		GRAVELLY SAND
		65		" "
bentonite crumbles 2.5'-245'		70		" "
		75		" "
		80		SAND
		85		"
		90		"
		95		"
8" carbon steel casing		100		SLIGHTLY GRAVELLY SAND
		105		SAND
4" stainless steel casing		110		"
		115		CL SILTY GRAVELLY SAND
		120		" " "
		125		SL GRAVELLY SAND
		130		SLIGHTLY SILTY SLIGHTLY GRAVELLY SAND

A-1800-156 (3/87)

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AS-BUILT DIAGRAM

Well Number 299-E23-20 Geologist M. Chamness, G. Davis, C. Hodge, C. Scott, S. Goodwin, L. Fair Page 2 of 3

Reviewed by D.T. McClain Date 12-22-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		135		slightly silty slightly gravelly SAND
		140		" " " " "
		145		" " " " "
		150		SAND
		155		"
		160		SLIGHTLY SILTY SAND
		165		" " "
10" carbon steel casing		170		" " "
		175		" " "
		180		SILTY SAND
		185		SLIGHTLY SILTY SAND
		190		" " "
		195		" " "
		200		" " "
		203		SANDY SILT
4" stainless steel casing		205		SL. SILTY GRAVELLY SAND
		210		SL. SILTY SL. GRAVELLY SAND
bentonite crumbles ~245' - 215'		215		SLIGHTLY GRAVELLY SAND
		220		" " "
		225		SAND (fine)
		230		SILTY SANDY GRAVEL
centralizing assembly on 4" casing		235		" " "
		240		" " "
6" carbon steel casing		245		" " "
bentonite pellets 251.5' - ~215'		250		" " "
water table 257.57' 9/15/87		255		" " "
silica sand 251.5" - 280'		260		" " "

A-1800-186 (3/87)

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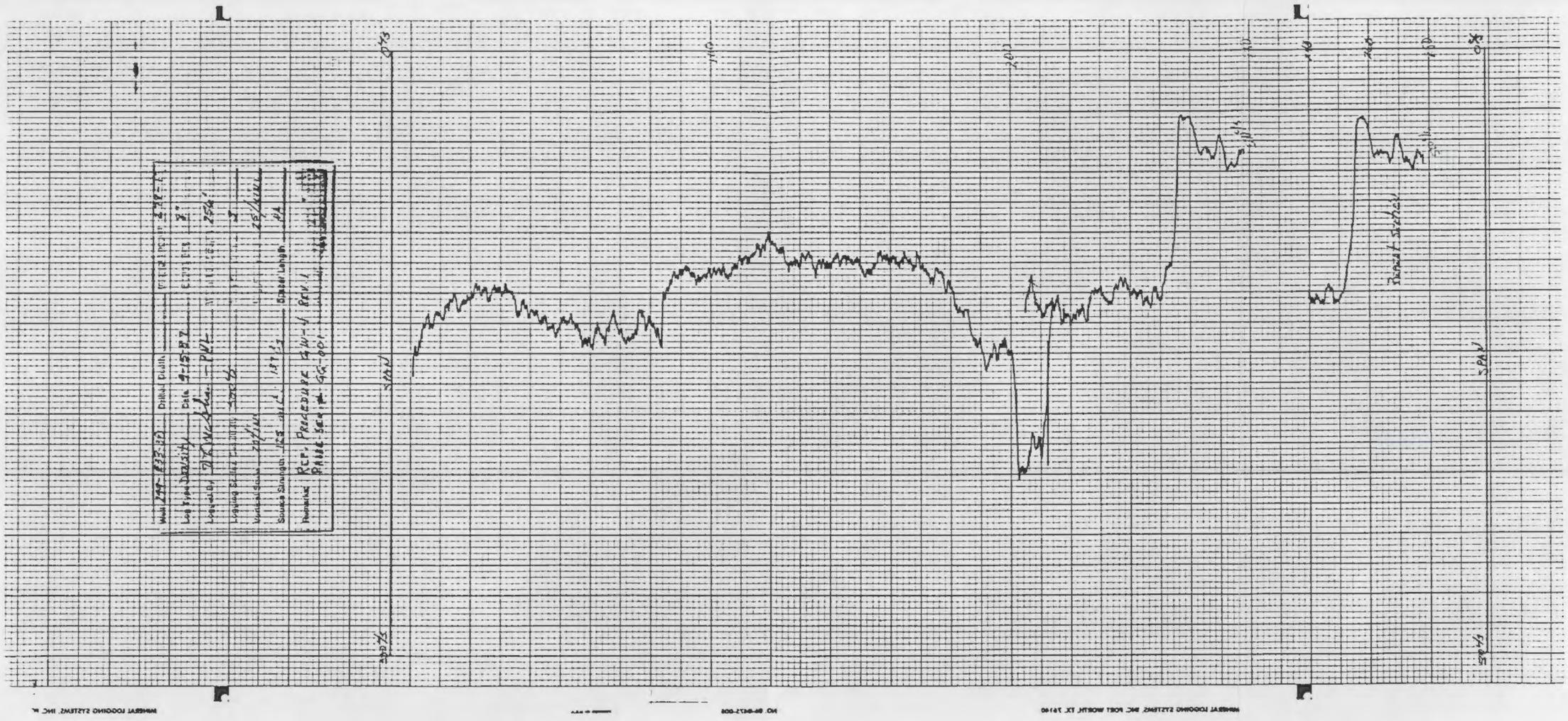
AS-BUILT DIAGRAM

Well Number 209-E 33-30 Geologist M. Chamness, G. Davis, C. Scott, C. Hodge, S Goodwin, L. Fair Page 3 of 3

Reviewed by V. L. McGhan Date 12-22-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
4" Stainless steel 20 slot screen		265		SANDY GRAVEL
6" ss steel, 30slot telescoping screen		270		SLIGHTLY SILTY SAND
20/30 Silica sand 2mm 220'-251.5'		275		SILTY, SANDY GRAVEL
8" carbon steel casing		280		SL. SILTY, SL. GRAVELLY SAND
	TD = 281			Basalt at ~277'

A-1800-188 (3/87)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Log Run Depth
Logging Speed
Mud Density
Viscosity
Source Strength
Remarks
Date
Elevations
Logging Engineer
Witnessed by
Recorded by
Run No.
Bit Size
Casing Size
Depth Logger
Depth Driller
Bottom Log Interval
Top Log Interval
Permanent Datum
Elev. Perm. Datum
Log Measured From
Drilling Measured From
Rig
Location
Field
Well
Company
Ref. Procedure
Base Scale
Gamma Ray
Tension
Caliper
Resistivity
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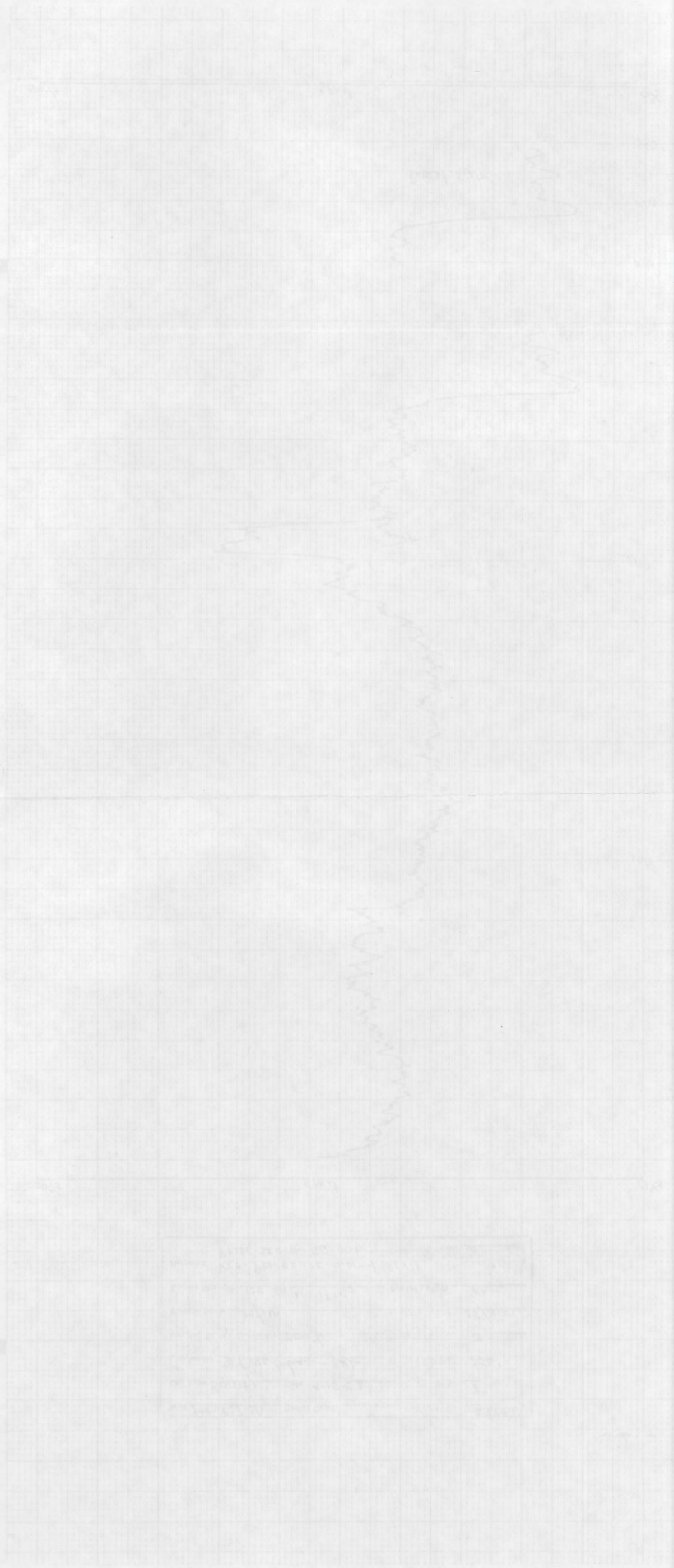
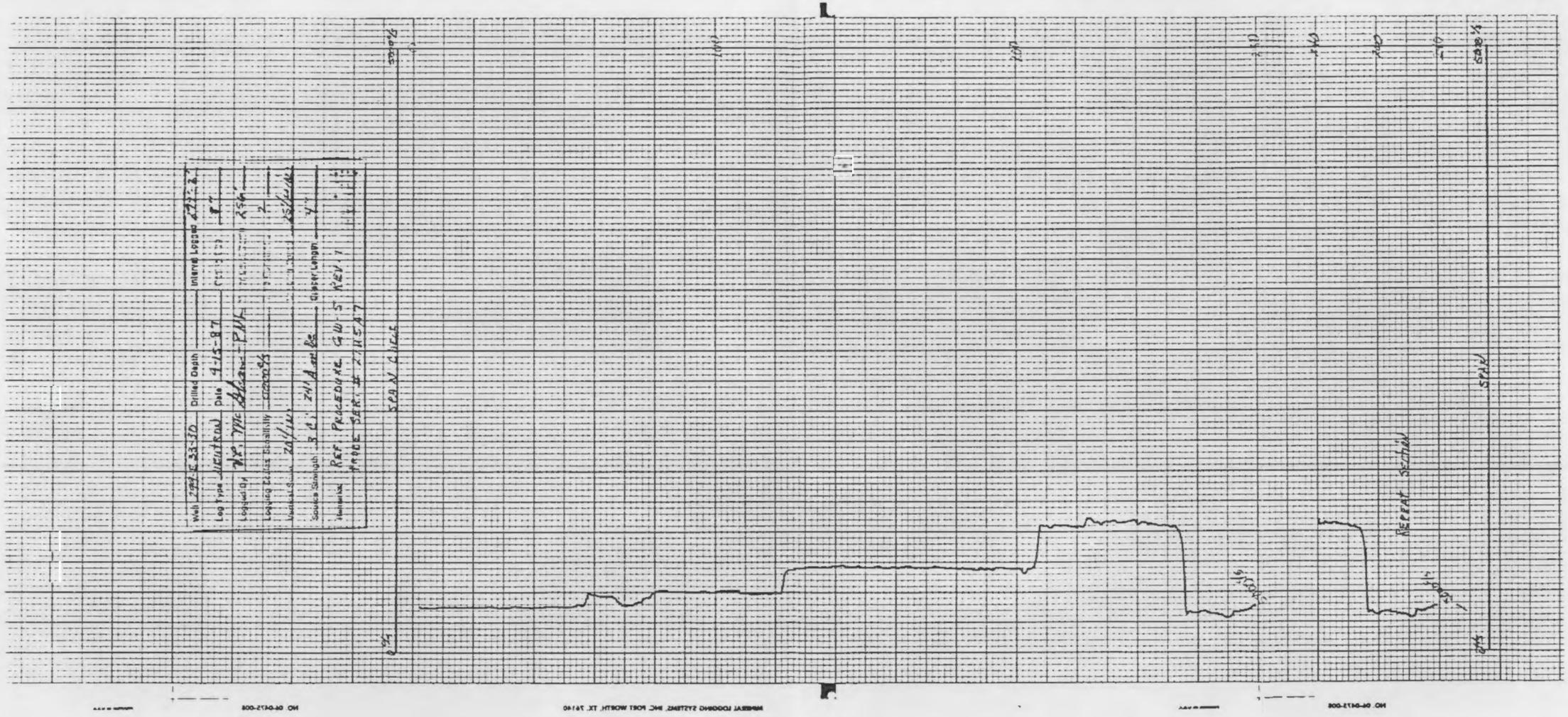
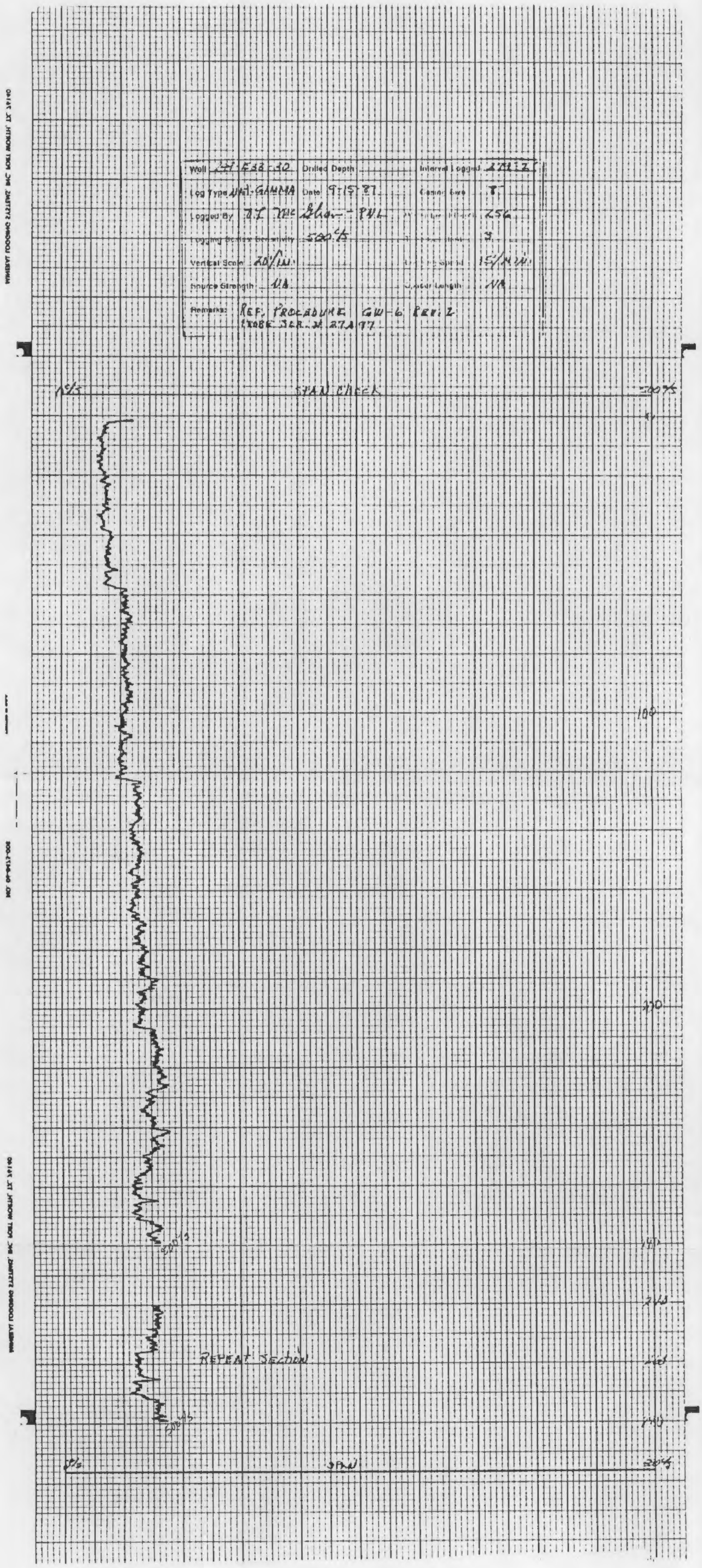
Gamma Ray
Caliper
Tension
Resistivity
Spontaneous Potential

4-A.1223




Well 2NE-E 33-3D
Log Type Neutron
Logged Bottom 2nd Mississippi
Logged Scale Scale/Inch 5"/100'
Vertical Scale 20/100'
Source Sample R C
Remarks RAT PROCEDURE GAMMA SER. #2 NEAT
Drilled Depth
Date 4-15-87
Interval Logged 2722-87
Cluster Length
SEA N (Neutron)
REPEAT SECTION
MUD LOGGING SYSTEMS, INC. FORT WORTH, TX. 76140


Well EB8-30
Drilled Depth
Interval Logged 270-0
Log Type NEU-GAMMA
Date 9-15-87
Logged By D.T. THE Blue - PHL
Casing Dia 8
Logging Device Sensitivity 500 CPS
Vertical Scale 20'/IN.
Speed 15'/MIN.
Source Strength 1 Ci
Remarks: REF. PROCEDURE GW-6 REF: 2
TRIBE SER. M 27A 87
STAN. CHECK
REPEAT SECTION
100
170
200
270
MINERAL LOGGING SERVICES, INC. WELL LOGGING EQUIPMENT
800-231-8402 DNV

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	P.F. 60 C.	299-E33-30		YEH 1915-1
Date 8/29/87	68K-1115	**Depth** 0 To 0	N/A	**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Setting up drill rig, still need to put tools in, dig cluster hole etc.	2230	
					2315	quit for day

M.A. Chamness 8/29/87

REMARKS:

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

A-6000-021 (5-85)

4-A.1229

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G Davis	BE 66 #150	299-E33-30	N/A	KEH-015-1
Date: 8/31/87	#68K-1915	Depth: 0 To 10'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	5'	backhoe	D	SILTY SANDY GRAVEL: 65% gravel, 25% sand, 10% silt.	8:45	sample collected w/ backhoe
				Sample is trace small cobble, 5% V.C.P., 20% C.P., 20% M.C.P. 10% F.P., 10% V.F.P., 5% V.C.S. 5% C.S., 5% M.S. 10% F.S. and V.F.S., 10% silt. Very poorly sorted. Gravels are 60% basalt, 30% qtz + fold, 5% other. Sands are 50% basalt 10% qtz + fold. 10% other. Gravels SA to R Sands SA to SR. Wet color: 5Y 4/3 (olive). Dry color 5Y 7/2 (light gray). No HCl test. Unconsolidated. No moisture. Sample taken. Cobbles include several granite		
	9-10'	backhoe	slightly moist	SILTY SANDY GRAVEL: 65% gravel, 25% sand, 10% silt. Sample is trace large cobble, 3% small cobble 5% V.C.P., 15% C.P., 20% M.C.P., 12% F.P., 10% V.F.P., 5% V.C.S 5% C.S., 5% M.S. 10% F.S. and V.F.S., 10% silt. Very poorly sorted. Gravels are 65% basalt, 25% qtz + fold, 10% other, SA to R. Sands are 65% basalt, 30% qtz + fold, 5% other, A to SR. Wet color 5Y 5/3 (olive)	9:15	sample taken w/ backhoe

REMARKS:

Greg Davis 8/31/87

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)

4-A.1230

DRILL LOG	By G. DAVIS	Rig BE 60L #150 C8K-1916	Well Number 29P-E33-30	Computer Number N/A	Project or Work Order No. KCH-1915-1
	Date 8/31/87		Depth 10' To 10'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Dry color No HCl test. Unconsolidated. Large cobbles present in this sample + more f. sand v.f.s. No moisture sample taken		
					11:10	RM's check site
				drilling setting up rig + tool string. 20'0" of 16"	MORNING	
				casing set in hole.	12:00 - 12:30	lunch break
				50 gal H_2O added	13:00	drilling began - hard to drill with large cobbles
					14:30	RM's check site
				10 gal H_2O added	15:00	
					15:30	end of shift

REMARKS:

Greg Davis 8/31/87

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)

4-A.1231

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C. Hodge	B.E. 60L	299-E33-30	N/A	KEH-1915-1
Date 8/31/87	# 68K-19150	Depth 10' To 15'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1640	Arrived Rig (problem w/ escorts @ shift change)
20' 0" of 16"		casing		DRILLING IS SLOW		Driller has 20' 0" of casing total.
					1720	Drilling rough - Drillers goes to E32-4 for consultation
					1730	Driller returns To pick up backhoe & moves to E32-4 to sample from casing
					1900	DINNER BREAK
					1945	RESUME DRILLING
	14-15'	H		SILTY SANDY GRAVEL: 55% gravel 30% sand, 15% silt; 10% mp, 20% fp, 25% vfp, 7% vcs, 6% cs, 5% ms, 9% fs & vfs, 15% silt; very poorly sorted; gravels are: 70% basalt, 15% quartz, 15% feldspar & granitic grains, tr serpentine; sands are 55% basalt, 30% quartz, 15% feldspar & granitic grains, tr. serpentine; gravels are very angular to well rounded (larger granitics);	2020	SAMPLE TAKEN W/ DART BAILER
					2025	RESUME DRILLING
					2030	DRIVING CASING

REMARKS:

DRILLER: Craig Wamsley

C. Hodge 8/31/87

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)

4-A.1232

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C. Hodge	B.E.60L	299 - E33-30	N/A	KEH-1915-1
Date: 8/31/87	#68K-19150	Depth: 15' To 17'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'0"	of 16" casing			Sands are angular to Subrounded; wet color is 5Y/3/2 (dark olive gray); dry color is : ; no HCl test, unconsolidated; Similar to previous sample, but smaller size fraction in general.		
					2050	DRILLING Then
						will add casing.
9' 1"					2235	Finish welding 9' 7"
29' 1"						of 16"
					2300	OID SIFT - OUT OF WATER

REMARKS:

C. Hodge 8/31/87

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)

4-A.1233

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C Scott		J99 E 33-30	N/A	RKH-1915-1
Date: 9/1/87	BEK-1915	Depth: 17 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
99'					7:00	Circ. slurry
						f/ pit
					8:00	drill w/ hard tool
					8:50	add'l Bent + H_2O
						start drilling
	19-20'	H	D	19-20' sample: SILTY GRAVEL GRAVEL: 50%	14:15	20' Sample taken
				gravel, 40% sand 10% s.lt. Sample		w/ bailer – very
				is tr VCP, 3% CP, 2% FP, 15% FP,		soupy
				7% VFP, 15% VCS, 10% CS 10%/15,	14:30	RU checker drill
				5% FS, 10% silt. Very		
				poorly sorted. Gravel is		
				95% basalt, 3% qtz 2% other		
				Subangular to rounded. Sand is		
				80% basalt 15% qtz + felds spar		
				5% other; Subangular to subrounded		
				No HCl test Color of wet Bar is		
				5Y 4/1. Dry Color 5Y 7/1		

REMARKS: Logged by driller for [illegible] drift

D. K. Thompson
9/1/87

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)

4-A.1234

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G Davis	BE 60L	199-E 33-30	N/A	VEH - 1915-1
Date: 9/1/87	GAK - 1915	Depth: 20' 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' 7"				25 gal H_2O added to [illegible]	16:15	[illegible]
	24'-25'	H	W	SILTY SANDY GRAVEL: 50% gravel, 40% sand, 10% silt. Sample is 2% C.P, 8% M.P., 25% f.P., 15% v.f.P., 15% VCS, 10% C.S, 8% M.S., 7% f.s, 5% v.f.s, 10% silt. Very poorly sorted. Gravel are 85% basalt, 10% qtz + felds, 5% other; A to SA. Sand are 70% basalt, 25% qtz + felds, 5% other; A to SR. Wet color 5y 4/1 (dark grey). Dry color 5y 7/1 (light grey). No HCl reaction. Unconsolidated. Less basalt in this sample (especially sand fraction)	16:30	sample taken w/ dart bailer - testing of loose concrete
29' 7"				10 gal H_2O added	17:15	
91"					17:20	drillers welding 91" of 16" casing
38' 8"					19:30	lunch break
					20:00	drillers preparing rig
				10 gal. H_2O added	20:10	drilling resumed
				5 gal H_2O added	21:05	
	29'-30'	H	W	SILTY SANDY GRAVEL: 45% gravel, 40% sand, 15% silt. Sample is 2% C.P., 10% M.P., 23% f.P., 10% V.f.P., 7% v.c.s	21:30	sample taken w/ dart bailer
38' 8"						

REMARKS:

Greg Davis 9/1/87

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)

4-A.1235

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	CME 60L	[illegible] 132-30	N/A	KEIL - 1715-1
Date	6BK-1115	Depth		Subcontract No.
9/1/87		30' To 35'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
28' 8"				10% C.S, 13% M.S, 10% f.s. and VFS, 15% silt. Very poorly		
				sorted. Gravels are 80% basalt, 15% qtz + feldspar,		
				5% other, Sands are 60% basalt, 35% qtz + feldspar,		
				5% mafic. Gravels are VA to SR, Sands SA to R		
				wet color 5y 4/1 (olive gray) Dry color 5y 6/2 (light		
				olive gray) No HCl test, Unconsolidated, More silt		
				than previous sample, also less basalt in sand		
				fraction relative to previous sample.		
				15 gal H2O added	22:00	
					22:00	Auger auto. + clean out everything!
	21'-35'	H	W	SILTY SANDY GRAVEL: 45% gravel, 40% sand, 15%	23:00	sample taken with
				silt. Sample is 2% C.G, 10% M.G, 23% F.G, 10% VFG, 10% V.C.S		dual bailers
				10% C.S, 10% M.S, 10% F.S and V.F.S 15% silt. Very poorly		
				sorted Gravels are 85% basalt, 10% qtz + feld, 5%		
				other. Sands are 55% basalt, 40% qtz + feld., 5% other		
				Gravels are M to SR, Sands SA to R. Wet color 5y 4/1		
				(olive gray) Dry color 5y 7/1 (light gray). No HCl		
28' 8"				test. Unconsolidated. Sample very similar		

REMARKS:

Greg Davis 9/1/87

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)

4-A.1236

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G DAVIS	BF 60L	299 - E33 - 30	N/A	KEH 1915 -1
Date 9/1/87	6BK - 1915	Depth 25' 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
38'8"				to previous one - somewhat less basalt		
				5 gal H2O added	23:20	
					23:30	end of shift

REMARKS:

Greg Davis 9/1/87

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)

4-A.1237

DRILL LOG	By C Scott	Rig OE 601 68K-19150	Well Number 299-E33-30	Computer Number N/A	Project or Work Order No. KH 1915-1
	Date 7/12/87		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
38'8"	1/16"	H		39-40' Sample. silty		Cleaned out
9 5/8"				SAND GRAVEL: 40% Gravel		hole w/ Baker
48' 1½"				50% sand 10% silt. Sample		
				is 15% MP* 10% FP 15% VFP		Pulled 9 5/8" &
				10% VCS, 30% CS 10% MS, Much		16" casing
				Very poorly sorted * [25% of MP		
				are freshly broken - originally of	9:45	Drilling from
				CP or VCP size] Gravel is		1-1
				90% basalt 10% qtz, qtzite,	10:00	Pulled out
				Metamorphics SA to SR. Sand is		cuttings pit,
				60% basalt, 30% qtz + fsp, 10%		drilled
				other. SA. No HCl test. Color		
				of wet fines is 2.5Y 4/2 dk grayish	10:40	39-40' sample
				brn. Color of dry fines is 5Y 8/1		taken, bore
				white.		
						20 gal water added
						this shift.

REMARKS:

C Scott
7/12/87

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)

4-A.1238

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C Scott	[illegible]	199-I 33-30	N/A	[illegible] 715-1
Date 9/2/87	6ck 17:50	**Depth** 40' To 48'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18 1½"	0/10	" H		44-48' sample : SLIGHT	11:20	44-48' sample
				SANDY GRAVEL : 30% gravel, 60%		1 bag / bailer
				sand, 10% silt. Sample is 7% VC	12:40	Welding
				8% FP, 6% VFP, 10% VCS, 40% CS,		of 16" casing
				10% MS, 10% silt. Poorly Sorted.	12:00	lunch break
18 1½"				* [50% of MP are freshly broken	12:30	welding
9'10¾"				initially up to CP size] Gravel is		9'10¾" of
58'¼"				92% basalt 5% qtz + qtzite,		16"
				3% other. SA to SR. Sand is		
				60% basalt 35% qtz - feldsp.	13:55	Drilling
				5% other. SA to well sorted. Color		
				of wet fines is 5Y 4/2. Dry		
				fines are 5Y 7/2. Dry sand	14:15	RA stopped by
				in last sample 01 less gravel.		
			—	= WIND		

REMARKS:

C Scott

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

A-8000-021 (5-85)

4-A.1239

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C Scott	B-61 Ing	77 1 23-3 D	11/4	KT 4 13.5-1
Date	**Rig**	**Depth**		**Subcontract No.**
9,0184	68K 7750	48' To 50'		n/a

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
58'¼"	48-50'	H	W	49-50' sample needs just caught	15:00	49-50' Sample
				one dose of soil.		taken w/ bailer.

REMARKS:

C Scott
4/21/92

D - Drive Barrel H - 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)

4-A.1240

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G DAVIS	BE 601	299 F33-30	N/A	KE11 - 1915-1
Date: 9/2/87	68K-19150	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
58' 1/4"	49'-50'	H	W	SILTY SAND GRAVEL: 40% gravel, 50% sand, 10% silt. Sample is: m.p, 20% f.p, 20% v.f.p, 20% v.c.s, 15% c.s, 10% m.s, 5% f.s and vfs 10% silt. Poorly sorted to very poorly sorted Gravels are 85% basalt 10% qtz + felds, 5% other. Sandstone is 35% basalt, 60% qtz and felds, 5% other. Gravels are A to SR. Sandstone SA to SR. Wet color 5y 4/2 (olive gray) Dry color 5y 7/1 (light gray). No HCl test. Unconsolidated. Less basalt in sand fraction of this sample vs previous	15:00	
	54'-55	H	W	SILTY SANDY GRAVEL: 40% gravel, 50% sand, 10% silt. Sample is: m.p, 20% f.p, 20% v.f.p, 20% v.c.s, 15% c.s, 10% m.s, 5% f.s and vfs 10% silt. Poorly to very poorly sorted. Gravels are 85% basalt, 15% qtz + felds, 5% other. Sandstone is 40% basalt, 55% qtz + feldspar, 5% other. Gravels SA to SR Sands are SA to SR. Wet color 5y 5/3 (olive). Dry color 5y 7/1 (light gray). No HCl test. Unconsolidated. Similar to previous sample	16:30	
58' 1/4"						

REMARKS:

Greg Davis 9/2/87

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 (5 85)

4-A.1241

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BE 60L	297-E33-30	N/A	KH-1715-1
Date: 7/2/87	*68K-19150	Depth: 55' 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
58' ¼" of	16" casing					
				Driller discussed situation w/ foreman; core barrel	17:15	Drilling stopped
				of appropriate size unavailable; driller started		
				breaking tools down		
					19:00	lunch break
				started stringing tools for 12" casing, welding	19:30	
20' 8 ¾"				12" casing for remainder of shift		
21'						
41' 8 ¾" of 12" casing						
					23:30	end of shift

REMARKS:

Greg Davis 7/2/87

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)

4-A.1242

DRILL LOG

By C Scott | Rig CE Long 6ZL-19155 | Well Number 297-522-30 | Computer Number N/A | Project or Work Order No. KSH 1915-1

Date 7/3/84 | 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
11'8 3/4"	1	12"		Waiting for 12" core barrel	12:00	Lunch break
20'7 1/2				Driving barrel, still waiting		
62'4 1/4				Welding		Drilling w/ 8"
9'11"						barrel (don't know
				Have two samples needing description.		when he started w/
72'3 1/4"	4	10"				12" barrel)
				Lens of FS to VFS at 62' — 1 foot thick	12:30	59-60' sample
						taken w/ core
				59-60' sample GRAVELLY SAND:		barrel. Samples
				10% gravel, 85% sand, 5% silt.		
				Sample is 2% FP, 8% VFP, 20% VCS	14:40	64-65' sample
				60% CS, 5% MS, 5% silt. Well sorted. Gravel is		taken w/ core
				65% basalt, 20% qtz, 15% other. Well-sd.		barrel. Moist.
				Sand is 65% Quartz, 25% plag,		
				feldsp, 10% other. 5R color of wet	15:05	69-70' sample
				fines is 2.5Y 6/4, Dry Color is		taken w/ core
				2.5Y 7/2. Lens from 61' to FS to		barrel. Same as
				VFS lens in bottom of barrel (62'). Moist. Lens	15:20	Finished drilling,
						preparing to well

REMARKS:
Lens is dry. Ar. Ash

C Scott
7/3/84

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

A-6000-021 (5-85)

4-A.1243

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C Scott	BT 100	199 T 32 R 32 E 17	N/A	
Date	Depth			Subcontract No.
7/2/99	60 To 60			N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				cont — but may be too low —		
				set in bottom of full bucket of ft		
				sand hour before being put in test.		

REMARKS:

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

A-6000-021 (5-85)

4-A.1244

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G DAVIS	BE 60L	27'1-E33-30	N/A	KEH-1715-1
Date: 9/3/87	TGBX-1150	Depth: 60' 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
72' 3¼" of 12" casing					16:00	ground on cuttings
					16:45	Drilling & sampling to correct gap core barrel-catcher also 1 to 1.5 days lost due to insufficient # of 12" core barrels
	64-65'	D	M	GRAVELLY SAND: 10% gravel, 85% sand, 5% silt.	(14:40)	sample taken in core barrel
				Sample is trace C.P., 2% M.P. 5% F.P, 3% V.F.P., 20% VCS 60% C.S., 5% M.S, 5% silt. WS to MS. Gravels are 70% basalt, 20% gly. + folds., 10% other. Sands are 40% basalt 45% gly. + folds, 15% other. Gravels A to SR. Sands SA to SR. No color determination. No HCl test. Unconsolidated. Sample may similar to previous one but less basalt. Coarse pebbles include slightly metamorphosed mudstone.		
	69-70'	D	SM	GRAVELLY SAND: 10% gravel, 85% sand, 5% silt.	(15:05)	sample taken in core barrel
				Sample is 2% M.P., 3% F.P., 5% V.F.P., 20% VCS, 60% CS. 5% MS., 5% silt. Well sorted. Gravels are 65% basalt, 25% gly + folds. 10% other. Sands are 35% basalt, 50% gly + feldsp., 15% other. Gravels are A to SR. Sands		
12' 3¼"						

REMARKS:

Greg Davis 9/3/87

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)

4-A.1245

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G DAVIS	CE 60L	299-E33-20	N/A	KEH-1915-1
Date: 9/3/87	#68K-19150	Depth: 70' To 80'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
72' 3¾"	of 12"	casing		ore SM to CR. Wet color 5Y 4/3 (olive). Dry color 5Y 4/2		
10' 7½"				(Light olive gray) No HCl Rxn. Unconsolidated. Less basalt		
82' 5¾"				than previous sample - no coarse pebbles.		
					17:00	drilling, welding 10' 2½"
						of 12" casing
					18:30	drilling resumed
	71'-75'	D	D	GRAVELLY SAND: 10% gravel, 85% sand, 5% silt.	18:40	sample taken in
				Sample is 2% m.p., 3% f.p., 5% v.f.p., 20% v.c.s., 55% c.s.,		core barrel
				5% m.s., 5% f.s. sand v.f.s. 5% silt. Well sorted. Gravels		
				are 70% basalt, 25% qtz + feldspar, 5% ltbr. Sands are		
				35% basalt, 50% qtz + feldspar, 15% other. Granules to		
				A to CR. Sand: SM to P. Wet color 5Y 4/4 (olive)		
				Dry color 5Y 4/3 (olive). Hard to Mod. Unconsolidated.		
				Similar to previous sample but more f.s. + v.f.s.		
	79'-80'	D	D	FINE GRAINED SAND: 0% gravel, 90% sand,	19:05	sample taken in
				10% silt. Sample is 80% F.S., 10% v.f.s., 10% silt,		core barrel
				Very well Sorted. Sand is 80% qtz + feldspar, 15%		
82' 5¾"				basalt, 5% other (mica, binding mineral flakes). Some color in		

REMARKS:

Greg Davis 9/3/87

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)

4-A.1246

DRILL LOG	By G. DAVIS	Rig CE 60L	Well Number 3N/1 E32-20	Computer Number N/A	Project or Work Order No. KEH-1715-1
	Date 7/3/87	#GBK-11150	Depth 80' To 85'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
82' 5 7/11" of 12" casing				SM to SP. Wet color 5Y 4/4 olive. Dry color 5Y 6/3		
				(pale olive). No HCl test. Unconsolidated. Mixed		
				fine sand than previous sample. Less fines		
				content.		
82' 5 7/11" 9" 11 1/2"					17:10	lunch break
					19:50	drilling preparing to drill 9" 11 1/2" of
12' 5 1/4" of 12" casing						12" casing
					21:15	lights went out
					21:35	it on again
					21:45	drilling resumed
	811' 85'	D	D	FINE GRAINED SAND: Trace gravel 95% sand	22:05	Sample taken #2
				5% silt. Sample is 75% F.S., 20% V.F.S., 5% silt		core barrel
				Very well sorted. Grains are 100% fines. Sand are		
				80% qtz + folds, 15% fines, 5% clay. Rounds SA.		
				Sands SM to SP. Wet color 5Y 4/3 (olive) Dry color		
				5Y 5/2 (olive gray). No HCl test. Unconsolidated. Similar		
				to previous sample but some gravel		
12' 5 1/4"	of 12" casing			present.		

REMARKS:

Greg Davis 9/3/87

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)

4-A.1247

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BT 401	297 E 33-30	N/A	KEH-1915-1
Date 9/3/87	"CRW 17150	Depth 85' To 90'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
92' 5¼"	of 12"	coring	Z		22:35	sample in Bonnie
	87' 90'	D	D	FINE GRAINED SAND: 95% sand, 5% silt. Sample		core barrel
				is 5% V.F., 65% F.S., 25% v F.S., 5% silt. Well sorted.		
				Sand is 80% qtz + feldspar, 15% lithics, 5%		
				clays; SA to R. Weathering 5Y 4/3 (olive) clay		
				coloring 5Y 4/2 (olive gray). No HCl test. Very consolidated		
				with some small pores. Very similar to the previous		
				samples with 10% fines and friable.		
					22:40	trip out of hole
						due to grinding
						noise of drillers
						on formation drillsite
					23:30	end of shift

REMARKS: no RM on shift

Greg Davis 9/3/87

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)

4-A.1248

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S M GOODWIN	BE 60 L	299-E33-30	N/A	KEH-1915-1
Date: 4 SEPTEMBER '87	68 K-19150	Depth: 90' To 95'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
92'5 1/4" of		12"	CASING		700	DRILLER IS LEWIS
						VIATIONS, SERVICE
						RIG & DRIVE CASIN
					815	PREPARING TO WELD
						12" CASING
92'5 1/4"				ADDED 10'4 1/2" OF 12" CARBON STEEL CASING	815	WELDING 12"
10'4 1/2"				TOTAL 12" CASING = 102' 9 1/4"	920	FINISHED WELDING
102' 9 1/4"					930	DRILLING
					944	BAILED WELL
					1000	DRIVING 10" CASING
					1005	BAILED WELL
	94.95'	D	D	FINE GRAINED SAND; TRACE VFP, 95% SAND, 5%	1020	SAMPLED W/ CORE
				SILT. 5% MS, 45% FS, 45% VFS, 5% SILT.		BARREL
				WELL SORTED. SANDS ARE 80% QUARTZ & FELD,		
				10% BASALT, 10% MICA & OTHER; SA TO SR	1040	BAILED WELL
				DRY COLOR IS 2.5Y 7/4 (PALE YELLOW). NO HCL TEST.	1100	CASING DROPPING
				UNCONSOLIDATED. SIMILAR TO LAST SAMPLE; SLIGHTLY		DOWN HOLE; DRIVING
				FINER. SOME SAND IS IN MOISTER "CLUMPS".		W/ CORE BARREL

REMARKS:
MOISTURE SAMPLE.

9/4/87

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)

4-A-1249

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S M Goodwin	BE 60 L	299-E33-30	N/A	KCH-1915-1
Date	**Depth**			**Subcontract No.**
4 SEPT 1987	68'6" - 191'5"	95' To 95'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	99-100'	D	D	SLIGHTLY CEMENTED COARSE GRAINED SAND: 5% GRAVEL, 90% SAND, 5%	1110	
				SILT. TRACE MP & CP, 2% FP, 3% VFP, 5% VCS,		
				65% CS, 10% MS, 5% FS, 5% VFS, 5% SILT.		
				WELL SORTED. GRAVELS ARE 75% BASALT, 15%		
				QUARTZITE, 10% GRANITICS; SP TO R. SANDS ARE		
				70% QUARTZ & FELD., 20% BASALT, 10% MICA/		
				RX. GRAINS; VA TO SR. DRY COLOR IS SALT & PEPPER		
				W/ LT BROWNISH CASTING ON UNWASHED SAMPLE (10YR		
				CHROMA FOR MUNSELL). NO HCl TEST UNCONSOLIDATED		
				SANDS ARE MUCH COARSER & MORE GRAVEL IS	1115	PREPARING TO WELD
				PRESENT. MOISTURE SAMPLE.	1130	WELDING 12" CASING
					1200	LUNCH BREAK
					1230	END BREAK
102' 9 1/4"				ADDED 10' 11" OF 12" CARBON STEEL CASING	1240	WELDING 12"
10' 11"				TOTAL 12" CASING = 113' 8 1/4"	1315	FINISHED WELDING 12"
113' 8 1/4"					1325	DRILLING
					1340	BAILING
					1350	BAILED

REMARKS:

Allen M. Stark 9/4/87

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)

4-A.1250

DRILL LOG	By: S M Goodwin	Rig: BE 60 L	Well Number: 299 - E33 - 30	Computer Number: N/A	Project or Work Order No.: KER - 1915 - 1
	Date: 4 Sept. 1987	68K - 14150	Depth: 95' To 110'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1400	BAILING WELL
	104-105'	D	D	COARSE SAND : 2% GRAVEL, 95% SAND, 3% SILT.	1410	SAMPLED W/ CORE
				2% VFP, 10% VCS, 65% CS, 10% MS, 5% FS,		BARREL
				5% VFS, 3% SILT. WELL SORTED. GRAVELS		
				WERE 80% BASALT, 15% QUARTZITE, 5% GRANITICS;	1420	BAILING WELL
				VA TO B. SANDS ARE 25% BASALT, 70% QUARTZ		
				+ FELDSPAR, 5% MICA / RX FRAGS; VA TO SR. NO	1430	BAILING WELL
				HCL TEST. UNCONSOLIDATED & DRY; SIMILAR TO		
				LAST SAMPLE; SLIGHT DECREASE IN GRAVEL		
				& SILT. COLOR IS SALT & PEPPER; TOO COARSE		
				FOR CHART; VERY SLIGHT TO NONE CARBONATE		
				OR UNWASHED. MOISTURE WHILE TAKEN		
	109-110'	D	D	COARSE SAND : 2% GRAVEL, 95% SAND, 3% SILT	1435	SAMPLED W/ CORE
				TRACE FP, 2% VFP, 15% VCS, 60% CS, 10% MS,		BARREL
				5% FS, 5% VFS, 3% SILT WELL SORTED. GRAVELS		
				ARE 70% BASALT, 25% QUARTZITE, 5% GRANITICS;		
				VA TO SR. SANDS ARE 25% BASALT, 70% QUARTZ		

REMARKS:

1/4/87

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)

4-A.1251

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S M Goodwin	BE 60 L	299-E33-30	N/A	KEH-1915-1
Date: 4 SEPT. 1987	68K-19150	Depth: 110' to 110'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	109-110'	D	D	(CONT) + FELDSPAR, 5% MICA/OTHER; VA TO SR.	1435	
				NO WET COLOR; DRY COLOR IS BRNISH SALT &		
				PEPPER - TOO COARSE FOR CHART NO HCL		
				TEST. UNCONSOLIDATED VERY SMEARE TO LAST		
				SAMPLE; SOME HEMATITE STAINS ON GRAINS		
				+ SMALL CaCO3 CEMENTED "CLUMPS"		
				SOME GRAVELS w/ CALICHE COATING. MASSIVE	1440	PREPARING TO WELD 12"
				SAMPLE TAKEN	1450	WELDING 12" CASING
113' 8 1/4" or	12"			ADDED 9' 9 1/4" OF 12" CARBON STEEL CASING		
9' 9 1/4"				TOTAL 12" CASING = 123' 6 1/2"	1515	CRAIG IS NEW
123' 6 1/2"						DRILLER; WELDING.

REMARKS:

Thomas M. Martin 9/4/87

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)

4-A.1252

DRILL LOG	By G. DAVIS	Rig B.E. 60L	Well Number 299-E33-30	Computer Number	Project or Work Order No. KEH-1915-1
	Date 9/4/87	# 68K-19150	Depth 110' To 115'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
12 3 6½"	of 12"					
	114-115'	D	SM	MOISTURE SAMPLE TAKEN	1655	Sample taken w/ core barrel
				SILTY GRAVELY SAND; 25% gravel, 65% sand, 10% silt. Sample is trace M.P., 5% F.P., 20% V.F.P., 30% V.C.S., 25% C.S., 5% M.S., 5% F.S. and V.F.S., 10% silt. Poorly sorted. Gravels are 80% basalt, 15% qtz + felds, 5% other. Sands are 10% basalt, 85% qtz + feldspar, 5% other. Gravels A to SA; Sands A to SR. Wet color 5Y 4/4 (olive). Dry color 5Y 6/3 (pale olive). No HCl test. Unconsolidated. Sample contained mostly gravel size fragments. Mica flakes present.		

REMARKS:

Greg Davis 9/4/87

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)

4-A.1253

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	B.E. 60C	29-E33-30	N/A	KEH-1915-1
Date: 9/4/87	#68K-19150	Depth: 115' To 120'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
123'6½"	@ 12"	END OF		12" CASING		
	119-120'	D	SM	MOISTURE SAMPLE TAKEN	1730	sample taken w/ plastic barrel
				GRAVELLY, SILTY SAND : 20% gravel, 70% sand, 10% silt.		
				Sample is trace M.P., 15% f.P., 5% V.f.P., 5% V.C.S., 25% C.S.		
				20% M.S., 20 f.s. and V.F.S., 10% silt. Poorly to very poorly		
				sorted. Gravels are 70% limestone, 5% qtz + feldspar, 5%		
				others. Sands are 10% limestone, 55% qtz + feldspar,		
				5% others (including mica flakes). Gravels SA to SR.		
				Sands SA to R. Wet color 5y 5/3 (olive) Dry color 5y 7/2		
				(light gray). No HCl test. Unconsolidated but with		
				distinct lumps of material. Sample contains		
				more fine gravel-sand than previous +		
				gravels of slightly larger size (+ more rounded).		
123'6½" of 12"		casing			18:00	end of 12" casing
					19:00	lunch break
					17:30	end of break, drillers
				Finished 0'-120' core barrel + set up 8" casing barrel		

REMARKS:

Wayne Davis 9/4/87

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)

4-A.1254

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BE 60L	299-E33-30	N/A	KEH-1915-1
Date 9/1/87	**#** 68K-19150	**Depth** 120' To 120'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
		START		of 10" casing	20:30	Drilling welding 10"
				20' 6"		casing → RALPH
				20' 8½"	21:30	AND CRAIG W.
				21' 0"	22:00	
				20' 11¼"	22:15	
				83' 1¾" of 10" casing		
					22:35	end of shift

REMARKS:

G. J. Davis 9/4/87

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)

4-A.1255

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
S M Goodwin	BE 60 L	299-E33-30	N/A	IGEH-1915-1
Date: 8 Sept. 1987	68K-19150	Depth: 120' To 125'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
83' 1¾" of	10"			DRILLER IS LOOSE WATKINS	700	STARTED; FINISHED
						83' 1¾" WELD.
83' 1¾"				ADDED 20' 10¼" OF 10" CARBON STEEL CASING	730	WELDING 10" CASING
20' 10¼"				TOTAL 10" = 104'		
104' of 10"				ADDED 20' 9½" OF 10" CARBON STEEL CASING		
70' 9½"				TOTAL 10" = 124' 9½"		
					1200	LUNCH BREAK
124' 1½" of	10"			ADDING 10' 9½" OF 10" CARBON STEEL CASING	1230	
10' 1½"				TOTAL 10" = 135' 2"		
135' 2"	of 10"				1410	DRILLING
					1420	BAILING WELL
					1430	FELIX MURPHY CUTTING
						10" CASING DI ½
	124-125	D	D	SLIGHTLY GRAVELLY A COARSE SAND: 5% GRAVEL, 90% SAND, 5% SILT.	1440	SAMPLED W/ CORE
				1% CR, 4% VFP, 15% VCS, 50% CS, 15% MS, 10%		BARREL
				FS & VFS, 5% SILT. WELL SORTED. GRAVELS ARE		
				60% BASALT, 30% QUARTZITE, 10% GRANITIC; VA TO		
				SR. SANDS ARE 30% BASALT, 60% QUARTZ & FELD.,		

REMARKS:

9/6/87

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)

4-A.1256

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S M Goodwin	Be 60 C	299-E33-30	N/A	10611-1915-1
Date: 8 SEPT. 1987	68K-19150	Depth: 125' To 130'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
135' 2"	124-125'	D	D	(CONT.) 10% MICA + PY FINES, VA TO SR TOO	1440	CASING FOLLOWING
				COARSE FOR MUNSELL; WETTED SAMPLE IS SALT +		HOLE
				PEPPER; UNWETTED HAS LT. BROWN COATING NO		
				HCL TEST. UNCONSOLIDATED. MORE SAND + LESS	1445	CELLA D WELDING
				SILT THAN LAST SAMPLE, STILL CONTAINS PLUMPS		CAVES OUT TO 10"
				OF MATERIAL. CLUMPS ARE GENERALLY FINER		
				GRAINED + LACK CEMENTED LOOSELY - CRUMBLE		
				W/ PRESSURE). MOISTURE SAMPLE TAKEN.		
	129-130'	D	D	SLIGHTLY GRAVELLY SLIGHTLY SILTY SAND.	1510	SAMPLED W/ CORE
				5% GRAVEL, 85% SAND, 10% SILT. 2% FP,		BARREL
				3% VFP, 10% VCS, 35% CS, 25% MS, 10% FS		
				+ VFS, 10% SILT, WELL SORTED TO MODERATELY	1515	AFTERNOON DRILLER
				SORTED. GRAVELS ARE 60% BASALT, 30% QUARTZITE,		ARRIVED.
				10% GRANITIC; VA TO SR. SANDS ARE 30%		
				BASALT, 60% QUARTZ + FELDSPAR, 10% MICA/CLAYS,		
				VA TO SR. COLOR ABOVE (125'). NO HCL TEST. MORE		
135' 2"				SILT THAN LAST SAMPLE + SANDS FINER		

REMARKS: DRILLER IS CRAIG

Allen M. Todd 9/6/87

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)

4-A.1257

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S M Goodwin	B-61 Cook	299-E33-30	N/A	KCH-1915-1
Date: 8 Sept 1987	6816-19150	Depth: 130' To 130'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
135' 2"	129-13'	D	D	(Cont.) Still contains fragile caco3 con-	1510	
				cretions of fractured material. Un-		
				consolidated. Moving sample tube.	1536	Bailing well
					1548	Measuring cable
135' 2"						

REMARKS:

Shannon M. Goodwin 9/8/87

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)

4-A.1258

DRILL LOG	By G DAVIS	Rig BE 60L	Well Number 299 - E33 - 30	Computer Number N/A	Project or Work Order No. KE II - 1915-1
	Date 9/8/87	#GBK - 1915	Depth 130' To 140'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
135' 2"					16:30	driller mud ring
10' 5¼"						10' 5¼" of 10" casing
145' 7¼"					17:05	drilling resumed
					17:20	sample taken in core barrel
	134'-135'	D	D	SLIGHTLY GRAVELLY SLIGHTLY SILTY SAND: 5% gravel, 85% sand, 10% silt. Sample is 2% f.p., 3% v.f.p., 5% v.c.s, 10% c.s., 25% m.s., 25% f.s., 20% v.f.s, 10% silt Moderately sorted. Gravels are 80% basalt, 20% qtz + feldsp Sands are 25% basalt, 65% qtz + feldsp, 10% non. Gravels A to SA. Sands SA to SR Wet color 5Y 4/1 (olive). Dry color 5Y 7/2 (light gray). No HCl test. Unconsolidated Sample has powdery texture + much finer material than previous core. Material falls out of core barrel several times before sample comes up		
						driller estimates 2' of powdery material
	139'-140'	D	D	SLIGHTLY GRAVELL SLIGHTLY SILTY SAND: 5% gravel 85% sand 10% silt Sample is trace m.p., 2% f.p., 3% v.f.p. 10% v.c.s., 35% c.s., 25% m.s., 15% f.s and v.f.s, 10% silt.	18:15	
145' 7¼"				Moderately to poorly sorted. Gravels are 75% basalt		

REMARKS:

W. A. Clement 9/8/87

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)

4-A.1259

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BE 60L	299 - E33-30	N/A	KEH - 1915-1
Date: 9/8/87	"60K - 1915	Depth: 140' To 145'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
145' 1/4"	139'-140'	D	D	(cont'd) 20% qtz + feldsp, 5% other. Sand is 40% basalt,		
				55% qtz + feldspar, 5% other. Gravels A to SA Sands SA		varies drilling in
				to R. Wet color 5Y 5/3 (olive). Dry color 5Y 7/2 (ll. gray)		this material
				No HCl test Unconsolidated. Much less fine + very fine		
				sand compared with previous sample. Sample		
				represented.		
145' 1/4"					18:35	drill preparing to weld 10" casing
10' 5 1/4"					18:50	welding 10' 5 1/4" of 10" casing
156' 1/2"					17:05	Driller Break
					19:45	Driller welding
					20:45	drilling resumed
	144-145	D	D	SLIGHTLY GRAVELLY SLIGHTLY SILTY SAND: 5% gravel,	21:00	sample taken in core bottle
				85% sand, 10% silt. Sample is trace f.p. 5% v.f.p.,		
				20% v.c.s, 20% c.s, 15% m.s., 15% f.s, 15% v.f.s, 10% silt. Moderately		
				well sorted. Gravels are 75% basalt, 20% qtz + felds, 5%		
				other, Sands are 25% basalt, 70% qtz + feldsp 5% other.		
				Gravels are A to SR. Sands SA to R. Wet color 5Y 4/3		
156' 1/2"				(olive). Dry color 5Y 7/2 (light gray) No HCl test Unconsol-		

REMARKS:

D. A. Clemens 9/8/87

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)

4-A.1260

DRILL LOG	By G. DAVIS	Rig DE GOL	Well Number 299 - E33-30	Computer Number N/A	Project or Work Order No. KEW-115-1
	Date 7/8/87	#GBK-19150	Depth 145' To 155'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
15' 1/2"	144-145'	D	D	lated. Very similar to previous sample.		
	144-150'	D	D	MEDIUM COARSE SAND: 3% gravel, 90% sand, 7% silt	21:30	sample taken
				Sample is trace f.g., 3% V.F.P., 5% V.C.S., 15% C.S., 50% M.S., 20% f.s		w core barrel
				and V.F.S., 7% silt. Well to moderately sorted. Gravels 65%		
				basalt, 30% qtz + felds., 5% other. Sands are 30% basalt,		
				60% qtz + feldspars, 10% other. Gravels A to SA. Sands SA to		
				Rounded. Wet color 5y 5/3 (olive) Dry color 5y 7/2 (light		
				gray) No HCl test. Unconsolidated. Sand fraction		
				similar to last sample but less gravel + silt in		
				this sample		
10' 11 1/2"					22:00	drills, welding
166' 5"	of 10"	casing				10' 11 1/2" of 10" casing
					23:15	Drilling resumed
	151-155'	D	D	MEDIUM COARSE SAND: 3% gravel, 90% sand, 7%	23:20	sample taken w
				silt. Sample is 3% V.F.P., 5% V.C.S., 15% C.S., 50% M.S., 20%		core barrel
				f.s. and V.F.S., 7% silt. Well to mod. sorted Gravels		
				60% basalt, 30% qtz + feldsp 10% other. Gravels		

REMARKS:

M.A. Chavez 7/8/87

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)

4-A.1261

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G DAVIS	BE 60L	27?-E33-30	N/A	KEH - 1915 - 1
Date: 9/8/87	#60K-13150	Depth: 155' To 155'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
166' 5"				Sands 30% lt gray, 60% 8½ + pale ap. SA to SR Sands SA to SR. Wet color 5y 4/3 (olive)		
				No dry color. No HCl test. Unconsolidated. Very		
				similar to previous sample.		
					23:30	end of shift

REMARKS:

Greg Davis 9/8/87

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)

4-A.1262

DRILL LOG	By LD Feit	Rig BE 60L	Well Number 197-E32-30	Computer Number N/A	Project or Work Order No. [illegible]
	Date 9 September 1987	6PK - 1115 D	Depth 154' To 165'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	159-160'	D	DRY	SLIGHTLY SILTY SAND: (88% Sand, 12% Silt)	0815	
				– 5% VCS, 20% CS, 35% MS, 30% FS, 8% VFS, 12% silt		
				– moderately sorted – (sands) Angular to subrounded quartz		
				composed of 55% basalt, 45% quartz –		
				overall color (wet) 5Y 4/1 olive gray (dry) 5Y 4/1 –		
				light gray – slight reaction to 10% HCL – unconsolidated		
				– similar to previous samples.		
	161' 165'	D	DRY	SLIGHTLY SILTY SAND: (2% Gravel, 88% Sand, 10% Silt)	0850	
				– 2% VFP, 4% VCS, 21% CS, 49% MS, 20% FS, 3% VFS,		
				10% Silt – moderately sorted – (gravels) Subangular to		
				subrounded quartz composed of 50% basalt, 20% feldspar,		
				10% quartz, 10% opaques – (sands) subangular to		
				subrounded grains composed of 45% basalt, 45% quartz		
				rich, 5% opaques, 4% micaceous, 1% garnet – overall color		
				(wet) 5Y 4/2 olive gray (dry) – 5Y 6/2 light olive gray		
				– slight reaction to 10% HCL – unconsolidated – similar to		
				previous samples.		

REMARKS:

M.A. Chamness
9/9/87

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)

4-A.1263

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
J. Fecht	RF C-61	300 E 22 20	N/A	PCH 1915-1
Date: 9 October, 1987	GL 1910	Depth: 100' To 115		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
166.5' 10'4"					1	10'4" - 6" [illegible] - drilling rewound
176'9"	169'-170	D	DRY	SLIGHTLY SILTY SAND: (1% Gravel, 84% Sand, 15% Silt)	1030	
				- 1% VFP, 4% VCS, 26% CS, 39% MS, 15% FS, 3% VFS,		
				15% silt - moderately sorted - (Gravels) angular subangular		
				grains composed of 70% basalt, 30% feldspars, 10% quartz -		
				(sands) subangular subrounded grains composed of 45%		
				basalt, 31% quartz, 15% [illegible], 3% serpentine, 2%		
				biotite chips - small color - (dry) 5Y 6/2 light olive gray -		
				(dry) 5Y 6/2 light olive gray - slight reaction to 10%		
				HCL - unconsolidated - similar to previous sample		
176'9" 10'4"					1130	reamed 10'4" to 10" casing - back to bottom
187'1"	174'-175'	D	DRY	SLIGHTLY SILTY SAND: (trace Gravel, 85% Sand, 15% Silt)	1330	resumed drilling
				- 4.5% VFP, 32% VCS, 32% CS, 40% MS, 15% FS, 5% VFS,		
				15% silt - moderately sorted (Gravels) angular subangular		
				grains composed of 60% basalt, 40% feldspars, 20% quartz -		
				(sands) subangular subrounded grains composed of 40% basalt, 30%		
				quartz, 20% feldspars, 5% mica chips, 5% [illegible] small cobbles		
187'1"				(trace) = 5Y 4/1 - dark grey - (dry) = 5Y 6/2 light olive gray - slight reaction to		

REMARKS: 10% HCL unconsolidated total [illegible] very coarse

M.A. Chamness 3/18/87

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)

4-A.1264

DRILL LOG	By	Rig	Well Number	Computer Number	Project or Work Order No.
	J. Fair	BL 60 L	[illegible] P-36-20	N/A	LFE 1915-1
	Date: 9 September 1987	631-1950	Depth: 100 To 185'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	179'180'	D	W/S?	SILTY SAND: ([illegible] sand vs. silt) - 2 ½ YR 5/3, FR -	1400	
				FG, 20% VFS, 20% silt - very well sorted - (sand) subrounded		
				to rounded grains composed of 50% basalt, 20% quartz,		
				15% feldspars, 5% accessory clays - overall color (wet)		
				5Y 4/4 olive - (dry) 5Y 6/3 pale olive - slight reaction		
				to HCl - unconsolidated - Has more silt content than previous sample.		
	180'185'	D	W/S	SILTY SAND: (70% sand, 30% silt) - 2 ½ YR 5/3 -	1420	
				FG, 20% VFS, 20% silt - very well sorted - (sand) subrounded		
				to subangular grains composed of 35% basalt, 40% quartz,		
				20% feldspars, 5% accessory clays - Overall color (wet)		
				5Y 4/4 olive - (dry) 5Y 6/3 pale olive - No HCl reaction -		
				unconsolidated - Has higher silt content than previous		
				sample.		
180'4" [illegible]					1450	casing 10"x3/4" at 2' above ground
179'6"						

REMARKS:

D.A. Clauson
9/9/87

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)

4-A.1265

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G DAVIS	BEGOL	209 - E32 - 30	N/A	KEH - 1915 - 1
Date: 9/9/87	#GBK - 0150	Depth: 185' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'6¾"	of 10"	Casing			16:10	grease nipple added
	189-190'	D	VERY SLIGHTLY moist	SLIGHTLY SILTY SAND: 90% sand, 10% silt. Sample is 20% f.s, 70% v.f.s, 10% silt. VWS. Sand is 10% basalt, 80% qtz + feldsp, 10% other (mica flakes 5%) SR to R. Wet color 5y 5/3 (olive). Dry color 5y 7/1 (light gray). No HCl test. Unconsolidated w some lumps of basalt. Dry previous sample and increased amt of fine to very fine sands.	16:20	
					16:40	drilling ahead
					16:45	drilling resumed
	194-195'	D	very slightly moist	SLIGHTLY SILTY SAND: 90% sand, 10% silt. Sample is 10% f.s. 80% v.f.s. 10% silt VWS. Sand is 10% basalt, 80% qtz + feldsp. 10% other (mica flakes 5%) SR to R. Wet color 5y 5/3 (olive) Dry color 5y 6/2 (light olive gray). No HCl test. Unconsolidated w some lumps of mineral flour previous sample otherwise very similar.	17:05	
					17:10	welder on duty start to 8" casing string
						(continue more section 10" left to weld); drilling depth
197'6¾"	of 10"	Casing			17:45	talk with shift foreman Drilling returned

REMARKS:

Greg Davis 9/9/87

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 6000 021 (5-85)

4-A.1266

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BE 601	299 - E33 - 30	N/A	KEH - 1915 - 1
Date 9/7/87	#68K - 19150	Depth 195' To 203'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197' 6 3/4"					17:50	Driller attempting to jump weld on
10' 5 3/4"					18:00	Driller welding 10' 5 3/4" of 10" casing
208' 1/2"	of 10"	Casing	rig		19:00	Lunch break
					19:35	Drilling resumed
	199-200'	D	slightly moist	SLIGHTLY SILTY SAND: 90% s.a.d, 10% s.lt, Sample is 10% of S.	20:20	sample taken as core barrel
				80% V.F.S. 10% s.lt. VWS, Sample is 10% basalt, 80% gl + fl Pebbles 10% other, SR to R. Wet color 5y 5/3 (olive) Dry color 5y 6/2 (lt olive gray). No HCl test. Slight consolidation. More moisture than previous sample		
	203'	D	moist	SANDY SILT: 50% sand 50% silt. Sample is 50% V.F.S, 50% s.lt. VWS, sand 25% basalt, 65% gl + fl dep. 10% other, SR to R. Wet color 5y 5/3 (olive) Dry color 5y 6/2 (lt olive gray). No HCl test. Sample appears to be 1 foot layer containing three ground. Sample shows multiple 1/8" layers.	21:10	sample taken as drive core
208' 1/2"	of	10"	Casing			

REMARKS:

Greg Davis 9/7/87

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 (5-85)

4-A.1267

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BE 66	299 - E33 - 30	N/A	KEH: 1715-1
Date: 7/7/87	GBK - 17150	Depth: 203' To 205'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
208' ½"	204-205'	D	wet / slightly moist	SLIGHTLY SILTY GRAVELLY SAND: 10% gravel, 75% sand, 15% silt. Sample is trace V.F., 2% M.P., 3% F.P., 5% V.F.P., 20% V.C.S. 20% C.S. 5% M.S. 15% F.S. 15% V.F.S. 15% silt. PC Grains are 85% basalt, 10% qtz + feldspar, 5% other. Sand is 55% basalt, 30% qtz + feldspar, 15% other (incl. drlg perpetuation mixing). Gravels A to SR. Sand SA-R. Wet color 5Y 4/2 (olive gray) Dry color 5Y 7/1 (lt gray). No HCl test. Unconsolidated. Sample contains minor coarse material from previous [illegible]	21:40	sample taken - core shattered
					21:50	no 8" casing available so Driller doing repairs + adjustments on rig
					23:30	end of shift
208' ½"	OB	10" Casing				

REMARKS:

No RM's on the night shift

Greg Davis 7/7/87

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 (5-85)

4-A.1268

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S M Goodwin	BE 100 C	[illegible]	N/A	KGN-1915-1
Date	**Depth**			**Subcontract No.**
10 Sept. 1987	68K-1715	205' To 208'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
208' 7" or 10" Casing				CHANGING TOOLS & PUTTING 10" CORE BARREL	700	LOUIS WATKINS
				ON STRING.		DRILLER.
					830	WAITING FOR 5"
				CLEANING UP AROUND PIG		CASING IN START
						WELDING

REMARKS:

[signature] 9/10/87

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)

4-A.1269

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BE 60L	297 F 32 - 30	N/A	VEH 1115-1
Date 9/10/87	Make · MISO	Depth 205' To 205'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
82' 4½"	of 8"	casing			15:00	drilling welding
				82' 4½"		8" casing for
				20' 6¾"		sliding shift
				20' 10"		
				30' 8"		
				20' 1"		
				20' 3"		
				181' 9½"		
				20' 1"	23:10	drilling preparing
				201' 10½" of 8" casing		to weld 20' of 8" casing
					23:30	end of shift

REMARKS:

9/10/87

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)

4-A.1270

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
I. Fair	BE 60-C	91-E33-30	N/A	YEW 1115-1
Date 9/11/87	Depth 2705' To 2710'			Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30"@5'					0715	drill for flushing up
18" casing						hole to 8" casing
30"@5' 1"					0830	[illegible]
20"@95' 10'						[illegible]
20"@95'					0930	add 1 jt 8" casing
					0945	welding completed
					0940	drilling commences
	2705'-2710'	D	Dry	SLIGHTLY GRAVELLY SILTY SAND: 7% Gravel, 83% Sand, 10% Silt.	1000	obtained sample from
				2% FP, 5% VFP, 30% VCS, 20% CS, 10% MS, 13% FS, 12% VFS,	1040	[illegible] drilling 10' to
				10% Silt - moderately sorted (Granule) subangular to subrounded		8" [illegible] casing
				grains consist of 65% basalt, 20% quartz, 7% Calcite, and		
				trace fragments, 8% Feldspar and granites (Sand) 60% basalt, 20%		
				quartz, 10% granites and trace fragments, 7% feldspar, 3% trace		
				(Wet) - 5Y 3/1 - very dark gray (Dry) - 5Y 5/1 - gray - No HCL		
				test - unconsolidated - Sample is slightly less coarse than		
				previous sample - grains contain less basalt		

REMARKS:

I. D. Fair 9-11-87

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)

4-A.1271

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
J. Fair	PE/ARL	[illegible] 22-20	N/A	KEH 1915-1
Date: 9-11-87	6810 11150	Depth: 210' To 220'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10" 10"					1140	Drilling resumes
8" 220'	314'-315'	D	Dry	SLIGHTLY GRAVELLY SAND : 6% Gravel, 89% Sand, 5% Silt, 1% MP, 3% FP, 2% VFP, 25% VCS, 30% CS, 20% MS, 10% FS, 8% VFS, 5% Silt. - moderately to poorly sorted - (Gravels) Subangular to subrounded grains consist of 70% basalt, 20% quartz, 1% Siltstone Lithic Fragments, 3% unsporting (Sands) Subangular grains consist of 60% basalt, 8% quartz, 10% feldspar, 3% unsporting, 2% mica. Wet - 5Y 4/1 (dark gray) Dry - 5Y 6/2 (light olive gray) - No HCl test - unconsolidated - slightly less gravel from previous sample, same mineralogy	1153	Obtain sample from above basalt
	315'-320'	D	Dry	SLIGHTLY GRAVELLY SAND : 7% Gravel, 88% Sand, 5% Silt, 1% MP, 3% FP, 3% VFP, 30% VCS, 35% CS, 20% MS, 7% MS, 6% VFS, 5% Silt. - moderately to poorly sorted - (Gravels) Subangular to subrounded grains consist of 60% basalt, 15% quartz, 20% Siltstone Lithic Fragments, 5% unsporting. (Sands) Subangular to subrounded grains consist of 60% basalt, 35% quartz, 8% feldspar, 6% Siltstone, 1% mica chips. Wet - 5Y 3/2 (dark olive gray) Dry - 5Y 5/2 (olive gray) No HCl test - unconsolidated - slightly more gravel from previous sample - grains mostly less than basalt.	1305	Obtain sample from above basalt

REMARKS:

J. D. Fair 9/11/87

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)

4-A.1272

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
T Tait	BE 60L	[illegible] 132-30	N/A	HEW-1915-1
Date: 9-11-87	60K-17150	Depth: 220' To 335'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
224'7½"					1345	Hammering 10' of 8"
+ 10'						Casing
234'7½"					1415	Begin drilling
	224'-225'	D	Dry	(FINE grained) SAND: 92% sand, 8% silt. Sample is VWS 10% f.s. 82% v.f.s. 10% s.lt. Sand are 5% basalt, 95% qtz + felds, 5% other (primarily mica flakes). SR/R Wet color 5y 4/3 (olive) Dry color 5y 7/3 (pale yellow) No Hcl Test. Unconsolidated. Sample has no gravel or coarse sand fraction verses previous sample. Also much less basalt.	1500	Collected sample from dirt barrel

REMARKS:

Doug Davis 9/11/87

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)

4-A.1273

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BE 60L	299-E32-30	N/A	V11-1915-1
Date: 9/4/87	68K-19150	Depth: 225' To 235'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
234' 9¾"	of 8" casing					
	229-230'	D	D	SILTY SANDY GRAVEL: 60% gravel, 32% sand, 8% silt. Sample is trace S.C., 2% V.C.P, 10% C.P, 18% M.P, 18% F.P, 12% V.F.P, 10% V.C.S, 8% C.S, 6% M.S, 4% F.S, 4% V.F.S, 8% silt. VPS - Gravels are 50% basalt, 20% qtz + feldsp, 25% metamorphic (granite, rhyolite), 5% other. SA/SR. Sands are 45% basalt, 30% qtz + feldsp, 25% other (including metamorphics, granite, rhyolite) VA/SR. Wet color 5Y 4/3 (olive). Dry color 5Y 7/1 (light gray). No HCl test. Unconsol. Drilled. Very different than previous sample - much more gravel, much less fine material, & a good amount of "other" mineralogies. Several small SR granite cobbles in sample.	15:45	sample taken in core barrel. No moisture sample taken
10'					17:40	driller finished welding 10' of 8"
244' 7½"					17:15	drilling resumed
	234-235'	D	D	SILTY SANDY GRAVEL: 60% gravel, 35% sand, 5% silt. Sample is 5% C.P, 20%, M.P, 20% F.P, 15% V.F.P., 15% V.C.S, 10% C.S., 5% M.S, 5% F.S + V.F.S, 5% silt. VPS. Gravels are 65% basalt, 25% qtz + feldsp, 10% other (granite, pebbles + metamorphics).	18:00	sample taken in core barrel

REMARKS:

Greg Davis 9/11/87

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)

4-A.1274

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	BE 60L	299 - E33 - 30	N/A	KEH - 1915.1
Date: 9/11/87	#68K - A1150	Depth: 235' To 740'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
244' 9¾"	234-235 (cont'd)			A/SR. Sandstone 45% basalt, 30% qtz + feldspar, 25% other (including granite + metamorphics). SA/R. Wet color 5Y 4/2 (olive gray). Dry color 5Y 7/2 (light gray). No HCl test. Unconsolidated. Similar to previous sample but lacking larger pebbles + small cobbles. Moisture sample taken.		
	239-240'	D	D	SILTY SANDY GRAVEL: 60% gravel, 35% sand, 10% silt. Samples 10% V.C.P., 10% C.P., 20% M.P., 10% F.P., 10% V.F.P., 10% V.C.S., 10% C.S., 5% M.S., 5% F.S., 5% V.F.S., 10% silt. V.P.S. Gravelstone 85% basalt, 10% qtz + felds., 5% other (granule fragments) SR. Sandstone 60% basalt, 35% qtz + feldspar, 5% other. A to R. Wet color 5Y 4/3 (olive) Dry color 5Y 6/2 (light olive gray). No HCl test. Unconsolidated. More coarse + very coarse pebbles in this sample than before.	18:50	sample taken in core barrel drilling thru loose gravels; driller using cat head to drive casing in to the ground
					19:00	lunch break
					19:30	resumed drilling
					20:25	RM on site; also
				drilling stopped + drill. cutting off * "of 8" casing that was damaged while driving the pipe in core barrel		
244' 9¾"						

REMARKS: * the driller had already figured in the amt. of pipe cut off. The piece of 8" casing added at 17:40 was actually longer than 10', but was measured to the exact length.

Greg Davis 9/11/87

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)

4-A.1275

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. Davis	RE 601	299-E33-30	N/A	KEH 17151
Date: 9/11/87	#68-1915	Depth: 240' To 245'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
244' 9¾"					21:00	Drilling cutting 20' section of 8" casing into 10'
10' 0"						section A
254' 9¾"					21:50	Driller welding 10'0" of 8" casing
					22:20	Drilling resumed
	241'-245'			SILTY SANDY GRAVEL : 50% gravel, 42% sand, 8% silt.	22:35	
				Sample was VC.P, 1% C.P, 2% M.P, 25% f.P, 23% f.P, 7% V.C.S,		
				15% C.S., 15% M.S., 5% f.S. + V.S., VPS. Gravel are 40% basalt,		
				10% qtz + feldspar SA to SR. Sandstone 35% basalt,		
				60% qtz + feldspar, 5% other. R/SR. Wet color 5y 4/3		
				(olive). Dry sample not determined. No HCl test		
				Unconsolidated. Less gravel + fine sand than		
				previous sample.		
					23:30	end of shift

REMARKS:

Greg Davis 9/11/87

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)

4-A.1276

DRILL LOG	By M.A. Chauncey	Rig CF Bol.	Well Number 79-CB-10	Computer Number	Project or Work Order No. [illegible]
	Date 7/12/87	688-115.0	Depth 245' To 254'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
249'9½"	249'-254'	R	dry	SILTY SAND & GRAVEL: 50% gravel, 43% sand, 7% silt	8:00	
& 8"				1% sc, 1% vp, 10% cp, 18% op, 12% fp, 5% vp, 15% vc, 10% c,		
				8% ms, 4% fs, 4% vfs, 2% silt. Very poorly sorted. Gravel -		
				65% basalt, 15% plg, vg lste, 20% igneous & mets; rounded		
				to well rounded. Sand - 11% basalt, 40% qtz, 2% lste,		
				12% feldspar & rk frags, very angular to subrounded.		
				Color dry - ~10YR 6/2 pale brown; grng. Dry, loose &		
				unconsolidated. Similar to last sample, less basalt in		
				gravel.		
				At ~253'-254' the sediments in the bottom of the barrel	1:20	
				were wet. It is still a silty sandy gravel, no marked		
				increase in silt content is shown. Soil at the top of the		
				barrel are dry. Compression may be causing moisture to move		
				along sides of barrel; test holes are also wet, are		
				probably getting moisture up from the water table,		
				which should be at ~255'.		
				M.A. Chauncey 7/12/87		

REMARKS:

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

A 6000 021 (5-85)

4-A.1277

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
U.A. Chambers	CF 600	CP 1 23 30		
Date		Depth		Subcontract No.
9/11/87	1154 1150	254' To 256'	N/A	N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche Etc.	Time	Drilling Comments
254'9¾"	255'-256'	D	wet	Sandy gravel (fluvial): 100% gravel, 20% sand, 5% silt, 15% vcp,	0930	
				5% cp, 11% mp, 10% fp, 22% vfp, 10% ws, 15% s, 5% m, 3% f,		
				2% vfs, 5% silt, poorly sorted gravel - 30% basalt, 12% qtz +		
				glzite, 16% ppram, 2% other + clasts; angular to rounded		
				Sand - 20% basalt, 30% qtz, 2% feldsp + mafic, 8% lithic		
				+ ck frags, very angular to rounded fine size - 5Y6/1		
				gray in wet lab. Unconsolidated fine and smaller		
				gravel from cuttings sample.	1045	changing to hard tool
					1155/1230	lunch break
					1225	changing tools
115'					1300	welding on 10' at 8"
264'9¾"	of 8"					
				U.A. Chambers 9/12/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1278-

DRILL LOG	By G Davis	Rig RE GOL	Well Number 299-E33-30	Computer Number N/A	Project or Work Order No. WHC-1715
	Date 9/12/87	"68 K. 1150	Depth 254 To 265'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
264'9¼"	254-260	H	W	SILTY SANDY GRAVEL: 55% gravel, 40% sand, 5% silt	1510	sample taken - no
				Sample is 1% c.P, 14% m.P, 20% f.P, 20% v.f.P, 5% v.c.S, 10% c.S, 10% m.S, 10% f.S, 5% v.f.S, 5% silt. PS/VPS. Gravels are 70% basalt, 15% qtz + feldspar, 10% other (mainly aphanitic and granular frag.)		dust boiler
				Sands are 75% basalt, 20% qtz + feld, 5% other. Gravels A/R. Sands SR/A. Wet color 5y 4/2 (olive). Dry color 5y 6/1 (gray). No HCl test. Uncontaminated. Same gravels than previous		
				sample.		
264'9¼"	264-265	H	W	SANDY GRAVEL: 45% gravel, 50% sand, 5% silt. Sample is dirty. 1% c.P, 12% m.P, 16% f.P, 26% v.f.P, 20% v.c.S, 20% c.S, 6% m.S, 2% f.S, 2% v.f.S, 5% silt. PS. Gravels are 50% basalt, 35% qtz + feldspar, 15% other (granitic metamorphic pebble fragments) SA. Sands are 65% basalt, 25% qtz + feldspar, 10% other. A to SR. Wet color 5y 3/2 (dark olive gray). Dry color 5y 6/1 (gray) No HCl test Uncontaminated	1645	sample taken - no dust boiler
				Less total gravel than previous sample but larger gravels than previously. Also very little smaller sand fraction vs previous sample.		

REMARKS:

Greg Davis 9/12/87

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)

4-A-1279

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	EE 602	279 - E 32 - 20	N/A	KEM - 19151
Date: 7/12/87	# 68K - 1915	Depth: 265' To 370'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
264' 9⅝"					16:50	Drilling well along
10'						10' of 8" casing
274' 7⅛"				Hach Kit test for cyanide Negative	17:00	Lunch Break
					17:35	resumed drilling
				Drilling difficult, driller reporting 50 gallons of water to advance pilot hole through material which has caved up the well during previous drilling; according to mud person cable driller is redrilling about 5 feet of material.	21:35	
	267-270'	H	W	SLIGHTLY CLAYEY SILTY SAND: 85% sand, 15% silt. Sample is 25% f.s., 30% m.s., 30% f.s., 30% v.f.s., 15% silt. Sand is 40% basalt, 50% clay & pebbles, 5% calcite, SR to R. Wet color 5Y 5/2 (Olive gray). Dry color 5Y 7/1 (light gray). No HCl test. Unconsolidated. Sample may differ than previous cuttings, more silty fine sands. MS	22:10	Dust bailed
					23:00	end of shift

REMARKS: No RIG shift

Greg Davis 7/12/87

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)

4-A.1280

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L. Tosi	B-61 Mobil	97 E33-30	N/A	KEH 19151
Date: 9-14-87	68K 19150	Depth: 310' To 375'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc. Lewis Watkins - driller	Time	Drilling Comments
7 7/8"					0715	Adding 10' of 8" casing
4 10' 287'05					0745	Begin drilling
	310'	21	D	SILTY SAND - PALE; 6' mod. sl. 35% round, F sand,	1030	Cuttings sample from dual tube
				2% CP, 2% pit, 20% FF, 26% LF, 15% VCS, 10% CS, FGRDS,		Pit added 35 gal H2O this morning
				3% FS, 2% VCS, 52% silt. Poorly sorted. Grains to		
				subrounded grains of mixed 60% basalt, 25% quartzites, 10%		
				quartz, 5% [illegible] grains to subrounded		
				grains consisted of 30% basalt, 20% quartzites, 20% quartz,		
				10% coarse [illegible] grains. Top 10' drilled		
				in Holt formation. Bottom 5' appeared to be reworked		
				from previous sample: gravels, fine silty sand, mineralogy.		

REMARKS:

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

A-6000-021 (5-85)

4-A.1281

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
[illegible]	PEDCO	[illegible]	N/A	[illegible]
Date: 9-14-87	[illegible]	Depth: 0' To 280'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
[illegible]	[illegible]	H	Wet	SLIGHTLY GRAVELLY [illegible]	1125	[illegible]
				[illegible]	1145	[illegible]
				FS, [illegible]		[illegible]
				[illegible]		
				[illegible]		
				[illegible]		
				[illegible]		
				[illegible]	1300	[illegible]
				[illegible]		[illegible]
				[illegible]		[illegible]
						[illegible]
					1310	Drillers [illegible]
					1400	[illegible]
					1515	[illegible]

REMARKS:

[illegible] Cleaned [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)

4-A.1282

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chavarria	RE 60	299-E33-30	N/A	KEH-1915-1
Date		Depth		Subcontract No.
11/11/87	60K-1950	280' To 280'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				11'7" of [illegible] + 1 = 280'4 + ½" = 280'4½"		See [illegible]
				280'4½" DP hole	1020	
				straightness test performed	1200	
					noon	Hands break
				No further work on this well tonight, do not have		
				screen for this well yet and the driller is now		
				working on E22-4		
				No RM this shift		
				M.A. Chavarria 11/11/87		

REMARKS:

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

A 6000-021 (6-85)

4-A.1283

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
[illegible]	[illegible]	[illegible]	N/A	[illegible]
Date: 7 15 87		Depth: [illegible] To [illegible]		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				4'7" casing above ground. TF - 280'4" + 2 1/2" - 282 6 1/2"	0930	
				[illegible] 4'7"	0[illegible]	Waiting on sand pump
				primary measurements		to clean out hole
				Measured flow line casing 279.6' 279.6'		
				4'7" + 2.2'		
				281.8		
				odd 2.2' - 4.58		
				277.32'		
				[illegible] 10'2" + 4'7" = 10'10" [illegible]		
				T.T - 262.75 - 4'7"		
				- 4.58'		
				257.57'	1945	Pulled out to bottom
						this measurements
						+ 280.12' K.B.
					1000	Telling screen
					1015	Top measurements
						+ 22.16' OK ✓
						do K.B.

REMARKS:

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

A-6000-021 (5-85)

4-A.1284

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
[illegible]	BELL	203 B 12-20	N/A	[illegible] 25-1
Date 7-15-87	[illegible]	Depth [illegible] 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
39.79'				Drill pull [illegible]	1030	
				Pulled back 2' - no visible change in depth of		
				Screen - 379.86'.		
				Pulled back a total of 5.1 ½"		
				Logging hole	1030	
				Make up = 2.95' Plug segment before swedging = 379.9'		
				Beginning to swedge	1300	
				Swedging Completed	1400	
				Waiting on Water Flow after which access to the steam	1430	
				cleaned before usage here		
					1500	Finish day - [illegible]
						have [illegible]

REMARKS:

[illegible]
[illegible]

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

A-6000-021 (5-85)

4-A.1285

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G D'Ivis	BE 60L	299 - E33 - 30		KEH - 1915 - 1
Date: 9/15/87	#GBK-1915	Depth: completion 280'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
280'/24"				TB at ~280'; drill, hoisting well - repairs	18:15	
				only water, no soils		
				Drilled hole until 21:30 then left for	21:30	
				overnight		

REMARKS:

Log Done 9/15/87

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)

4-A.1286

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
J.D. Taylor	Wilco L	79 E 32 20	N/A	PEH 1915-1
Date: 9-16-87	68k.1915.0	Depth: [illegible] To 280'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
284'9-5/8"				Driller hauling well-wash [illegible] bailed it dry	0700	
				D/B = 269.8' (steel tape) depth was double-checked using drillstring.	1115	
				Depth with drillstring was measured to be 272' so steel tape		
				reading is accurate. The 8" telescoping screen is thus		
				10' above where it was set on 9/15/87. The driller today,		
				(Jason Watkins) said he marked his drill string upon reaching		
				the bottom of the screen and said the screen had not moved		
				since starting bailing this morning. Screen apparently		
				moved during last night shift. Will attempt to		
				pull screen, redrill and reset screen.		
				Screen rehooked + pulled from well. Screen is in good shape	1330	
				and will be re-used. Still unsure of why screen came up.		
				Preparing to re-drill.		

Richard Thompson
9/16/87

REMARKS:

9-16-87

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)

4-A.1287

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. DAVIS	B.C. 60L 68K RIGS	2779 C 33-30	N/A	KE 11-1915-1
Date 9/16/87		Depth 280' To 280'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				LB bottom 282'5" + 2'3½" - 5'7" = 279' 11½"		
				Set screen, LB screen 279'3"		
				286' + 2'3½" - 9'1" = 279' 3½" after		
				Driller pulled back 8'2" of casing; driller cutting	2100	
				off casing		
				T/B at 279' 0" + TAPE 2 3½ - 2'0" stick-up = 279' 3½"		
				Bailed well, measured DP at 279'7". Still needs to		
				be bailed, we only did a little.		
				DID 25 bails.		
					2320	quit for day

REMARKS:

Drlg Down 9/16/87

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)

4-A.1288

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R. Oster	BE 60C	299-E33-30	N/A	KEH-A15-1
Date: 9/17/87	6BK-17150	Depth: 280' To 280'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				During swedging operations the swedge tool came unscrewed and is now in the hole.	0730	
				Making up fishing tools.	0800	
				Spent rest of shift fishing for swedge.		
				Making tools to fish for swedge and trying to pull it out. Swedge is stuck on top of 8" screen, wedged in tight, will have to try using the main line instead of the sand line to fish for it, and/or make a stronger fishing tool	2300	
					2320	quit for day

REMARKS:

M.A. Chamness 9/17/87

Karen P. Oster 9/17/87

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)

4-A-1289

DRILL LOG	By: L.A Chauvin	Rig: BE 602	Well Number: 299-E33 30	Computer Number	Project or Work Order No.: YEH 1315-1
	Date: 9/18/87	68K-11150	Depth: To	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Still trying to get the sludge back out of the hole, making different bits to try to do that.		
				L A Chauvin 9/18/87		

REMARKS:

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

A-6000-021 (5-86)

4-A.1290

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
W.A. Chambers	E.E. 604	299-E33-30		WEH-1715-1
Date: 9/9/87	604 1715-0	Depth: To	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Still trying to get sandpe out of hole. Craig has a light hold of it with the fishing tools, but cannot break it loose of the screen.	2310	quit for day
				W.A. Chambers 9/9/87		

REMARKS:

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

A-6000-021 (5-85)

4-A-1291

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
AIRHART	B.E. 60L	299-E33-30	NA	KEH-(915-)
Date: 9-21-87	68K-19150	Depth: COMPLETION To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Fishing for swedge	0700-	1400
				Successfully pulled swedge out of hole.	1400	
				Telescoping screen pulled out w/ swedge.		
				Re-stringing tools	1430-	1500.
				S.P. Ambient		

REMARKS:

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

A-6000-021 (6-85)

4-A.1292

ORILL LOG	By N.A. Chamness	Rig B.E. 60L	Well Number 299-E33-30	Computer Number	Project or Work Order No. KE4-1215-1
	Date 7/20/87	60K-12150	Depth completion To	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DB 282.5' + 1.5' (tape) = 284' - 5.5' stickup = 278.5'		
				Sand keeps coming in around the bottom of the		
				casing, and since there is ~22' of water, this		
				should be good enough for total depth.		
				Set 10'3" of 8" stainless steel telescope screen (cut stainless		
				collar off of the one used before that was pulled out.)		
				Tried to measure depth to bottom inside screen, weights		
				are stuck in knit inside of screen. Depth appears to		
				be 283'7" - 5'6" = 278'1"		
				If you can get the tape out tomorrow, you might try		
				remeasuring it.		
				No RM on night shift		
				N.A. Chamness 7/21/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1293

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
AIRHART	B.E. 60 L	299-E 33-30	NA	KEH-1315-1
Date	68K-19150	**Depth** COMPLETION To		**Subcontract No.** NA
9-22-87				

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Trying to retrieve tape from hole	0800	
				Successfully retrieved steel tape from	0930	
				hole.		
				Measured D/B = 276.5' below land surface	0950	Top of screen
				Measured D/W = 256.5' below land surface	1000	~~200.5~~ ~ 267' below land
				Instructed driller to begin pulling 8" casing	1010	267'
				Pulled 8" casing back ~ 1'	1110	
				D/B screen = 277' appears to have settled .5'	1115	
				Pulled 8" casing back ~ 2'	1125	
				D/B screen = 277' - no movement	1130	
				Pulled 8" casing back ~ 3'	1145	
				D/B screen = 277' - no movement	1230	
				Pulled 8" casing to 269'6" below land surface	1300	
				D/B screen = 277'	1330	
				Began bailing using 4" sand pump	1340	
				Took sample from bailer - water is a black	1500	
				color and contains silts & v.fine sands w/ ~		
				1 cup coarse sand/bailer load.		

REMARKS:

S.P. Airhart

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

A-6000-021 (5-85)

4-A.1294

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
AIRHART	BE - 60L	299-F33-30	N/A	KEH-1915-1
Date: 9-23-87	GBK-1915	Depth: COMPLETION To		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Began setting pump & riser pipe.	0900	
				Finished setting pump & riser pipe	1045	
				D/intake ~ 270' from land surface		
				set ½" stilling pipe	1150	
				Set transducer @ 270.5' below land surface	1205	
				Tore rig down & pulled away from hole	1400	
				S.P. Airhart		

REMARKS:

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

A-6000-021 (5-86)

4-A.1295

DRILL LOG	By AIRHART	Rig NO RIG	Well Number 299-E33-30	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 9-24-87		Depth COMPLETION TD		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Performed constant-discharge test	0745	- 1115
				Discharge rate = 160 gpm		
				No drawdown, ∴ No recovery		
				RPT checked vs out w/ GM	1115	
				SP Amend 9/24/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1296

DRILL LOG	By AIRIART	Rig AMERICAN CRANE 17T-19959	Well Number 299-E33-30	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 9-25-87		Depth COMPLETION To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulling pump equipment	0800	1030
				Added 1 bag 10-20 Colorado silica sand to	1050	
				275' below land surface		
				Adding 4" stainless steel casing and screen		
				The following sections were added in given		
				order:		
				1 20' section 20-slot screen		
				1 20' section casing		
				1 20' section casing w/ centralizers		
				10 20' sections casing		
				1 10' section casing		
				1 5' section casing		
				NOTE: A small amount of clear oil coated		
				female end of s.s. Workers & drillers were		
				asked if the oil had been applied by		
				them. All denied. Attempted to wipe off oil		
				w/ clean towel.		
				D/B inside stainless = 275' below land surface	1145	

REMARKS:

Steve D. Plum
9/25/87

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)

4-A.1297

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
AIRHART	AMERICAN CRANE	299-E33-30	NA	KEH-1915-1
Date: 9-25-87	17T-19959	Depth: COMPLETION To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Added 5 bags of 10-20 silica sand.	1420	
				D/sand = 252' below land surface		
				Pulled 8" casing to 262' below land surface	1424	
				D/sand = 255'		
				Added 2½ bags of 10-20 silica sand	1445	
				D/sand = 245'		
				Pulled 8" casing to 251'6" below land surface	1500	
				D/sand = 251'5"		
				Added 3½ buckets Volclay pellets	1520	
				D/pellets = 243'.		
				Added 5 bags of Enviro-gel 10+100 mesh	1525	
				bentonite.		
				S.P. Airhart 9-25-87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1298

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chawner	American	29-E33-20	N/A	KEW-515-1
Date: 9/25/87	Cyprus 141-17159	Depth: Completion To		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled back 10', DP crumbles 211'9", added 4 bags Envirogel bentonite crumbles, DB @ 231'	1620	
				Pulled back to expose 231'11½" weld, DB 235', added 6 100lb bags bentonite crumbles, DP 212'9"	1640	
				Pulled back 10', DB crumbles to expose 224'9½" weld, DB 223'6", added 6-100 lb bags bentonite crumbles DP at 207'9"		
				Pulled back 10' to expose 214'7½" weld, DB 213', added 6 100lb bags bentonite crumbles, DB 197'3"	1655	
				Pulled back 10' to expose 204'7½" weld, DB at 203'3" (inside 208½" of 10" casing).	1705	
					1830	went looking for pulling head
					1900/1930	lunch
					1930/2000	welding head on
				Added 5 50 lb bags Envirogel bentonite crumbles, DB 194'8" from top of 10" casing	2025	
				Pulled back to expose 197'10¾" weld, DB 198'3". Added 10 bags bentonite, DP 168'	2050	
				M.A. Chawner 9/25/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1299

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
N. A. Chaumes	American crane	299-E33-30	N/A	KEH-1915-1
Date: 9/25/87	417-1979	Depth: Completion TD		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled back to expose 178'1" weld, DB 186'0". Added	2105	
				10 50 lb bags bentonite, TE 173'2".		
				Pulled back to expose 176'9" weld, DB at 177'2". Added	2125	
				12 50 lb bags bentonite TE 163'2"		
				Pulled back to expose 166'[illegible] weld, DB at 167'. Added 14	2140	
				50 lb bags bentonite crumbles, TE at 146'6".		
				Pulled back to expose 136'11/2" weld, DB at 135'3". Added	2200	
				14 50 lb bags bentonite crumbles, TE at 125'3"		
				Pulled back to expose 115'7 1/4" weld, DB at 113'4". Added	2225	
				12 50 lb bags Envirogel bentonite, TE at 125'9".		
				Pulled back to expose 135'2" weld, DB at 135'1". Added	2245	
				15 50 lb bags Envirogel bentonite crumbles, TE at 112'9"		
				Pulled back to expose 121'9 1/2" weld, DB from bp of weld	2300	
				at 119'.		
				Pulled 15" casing back to 104' weld at surface.	2305	
					2315	quit for day
				RM came out at 2245, did not check anything		

REMARKS:

N.A. Chaumes 9/25/87

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)

4-A.1300

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
AIRHART	AMERICAN CRANE	299-E33-30	NA	RFH-1915-1
Date: 9-26-87	17T-19959	Depth: COMPLETION To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calicha, Etc.	Time	Drilling Comments
				D/crumbles : 117' below land surface	0730	
				Added 2 bags Enviroset bentonite (8 mesh)	0740	
				Pulled remaining 10" casing out of hole	0745 - 0840	
				D/crumbles : 115' below land surface	0845	
				Added 10 bags Enviroset bentonite (8 mesh)	0850	
				D/crumbles : 104' below land surface		
				Pulled 12" casing to 110' below land surface	0950	
				D/crumbles : 110'		
				Added 15 bags bentonite to 95' below land	1005	
				Pulled 12" casing to 99' 10" below land surface	1015	
				Added 32 bags bentonite to 70' 3" below land	1035	
				Pulled 8" casing to 88' 6" below land.	1130	
				Added 4 bags bentonite to 70'	1145	
				Resumed pulling. Boom lacing broke on boom.	1250	
				Shut Down crane	1300	
				Fixed boom Resumed pulling	1450	
				Pulled to 81' 3". More problems	1520	
				Resumed pulling	1535	

REMARKS:

S.P. Airhart 9-26-87

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 (5-86)

4-A.1301

DRILL LOG	By M.A. Chauness	Rig Mayo Drilling	Well Number 209-E33-30	Computer Number	Project or Work Order No. 880-1
	Date 9/26/87	UT-13759	Depth Completion To	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled back to expose 82'5¾" weld, DB 79'2". Added	1605	
				10 bags bentonite crumbles, DB 67'6"		
				Pulled back to expose 72'3¾" weld, DB at 72'6".	1625	
				Added 25 50 lb bags bentonite crumbles, DB at 52'		
				Pulled back to expose 62'11" weld, DB at 68'1" Added	1645	
				40 50 lb bags, DB at 25'11"		
				Pulled the rest of the 10" casing out of the hole, DB		
				at 13' from top of 16" casing, which is 55'4½" long		
				Pulled 3'1" of 16", cut off guide head. DB at 48'.		
				Added 5 50 lb bags bentonite, DB at 46'9"		
				Pulled back to expose 48'1½" weld, DB at 47'6".	1844	
				Added 20 50 lb bags bentonite, DB at 29'		
				Pulled back to expose 28'5" weld, DB at 23'1". Added	1915	
				25 50 lb bags bentonite, DB at 12'2"	1900/1930	Quick Leak
				Pulled back to expose 22'2" weld, DB 21'10". Added	2005	
				10 bags bentonite, DB at 14'6".		
				Pulled back to expose 20' weld, DB at 17'3". Added 25		
				50 lb bags bentonite, DB 5½' from top of casing		

REMARKS:

M.A. Chauness 9/26/87

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)

4-A.1302

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chauvaux	American Crane	299-E33-30		KEH-1915-1
Date: 9/26/87	17T-19959	Depth: completion To	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Put 8' piece of 12" casing in hole before pulling Hx rod	2120	
				& 6" bit. Pulled rest of 12" casing out, DB		
				outside 12" piece, 2' below ground surface, DB inside		
				12" piece, 6½'.		
					2125	Done on this site
						for day. No LPT
						up til now.
				M.A. Chauvaux		
				9/26/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1303

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
WAMSLEY	150	~~32-2~~ E-33-30		
Date 8/29/87		Depth ~~[illegible]~~ To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				MOVED RIG. TOOK OVER	3:15	
				TO SLAB YARD AND STEAM		
				CLEANED. WENT TO NEW		
				WELL SIGHT WITH RIG.		
				SET IT UP AND MOVED		
				EVERYTHING from ~~[illegible]~~ 32-2		
				TO NEW SIGHT	11:30	

REMARKS:

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

A-6000-021 (5-85)

4-A.1304

DRILL LOG

By: Watkins
Date: 8 31 87
Rig: 150
Well Number: E-33-30
Depth: 0 To 13'
Computer Number:
Project or Work Order No.:
Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
16" 20'	5	Back Hoe	D	Boulders & cobbles - soil	8:45	sample
	10	Backhoe	D	Boulders & cobbles - sand	9:15	sample
					12:00	Lunch
				finished stringing tools	12:30	finish stringing Tools
				and chasing tools & moving	1:00	Drilling
				Equipment to start well	3:30	change shifts
				spent all morning until 1:00pm		go home
				doing The above		

REMARKS:

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

A-6000-021 (5-85)

4-A-1305

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
WAMSLEY	150	E-33-30		Subcontract No.
Date 8/31/87		Depth 13 To		

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'-0"	14'	HT	WET	BOULDERS + COBBLES - SAND		
				RIG BREAKDOWN	5:30	
20'	14'	HT		Gravel + Silt Lin	7:30	Start Drilling
	15'	HT	W	" "	8:30	Sample
9'7	17'			" "	9:30	Welding
29-7				Light plant quit 10pm		
				Started 10:30 pm		
				Finished welding	10:40	
				OUT OF WATER CANT DRILL		
				GATHERED UP TOOLS + SHUT		
				DOWN RIG H T	11:00	SHUT DOWN RIG
						NO WATER
				Spudding Welch Lin Coulter		
				about to go Needs		
				Repair		

REMARKS:

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

A-6000-021 (5-8)

4-A.1306

DRILL LOG	By Watkins	Rig 150	Well Number E 33-30	Computer Number	Project or Work Order No.
	Date 9/82		Depth 17' To 23'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calliche, Etc.	Time	Drilling Comments
29'7"	17	·		Disassemble spudding clutch —	7:00	
	20'	~~RH~~ H	W	~~gravel — large~~	~~7:40~~	
	"	·		Help mechanics reassemble —	7:45	
				spud clutch - Mechanics		
				forgot second set of clutch		
				plates when reassembling clutch		
				they had to disassemble clutch again		
				I left to go assist setting up —	11:00	
				other drill Rig - 22-W		
					12:00	Lunch
				Go back to 60-L or Rig 150 —	12:30	
				adjust spudding clutch		
					12:45	Drilling
					2:00	sample
					3:30	go home

REMARKS:

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

A-6000-021 (5-85)

4-A.1307

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
WAMSLEY	150	E-33-30		
Date 9/1/87		Depth 23 To 37		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
29'7"	25	H	W	Gravel - Med - Large - Silt	4:30	
+ 9'1	30	H	W	" " " "	9:30	
38'-8"	TOTAL	H	W	" " " "		
	35	H	W	" " " "	11:00	
				5:30 - 7:00 Welded on joint of pipe 9"-1"		
				45' MARK ON CABLE		

REMARKS:

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

A 6000 021 (5 85)

4-A.1308

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E-33-30		
Date 9 2 87		Depth 37 To 52		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
38'8"	40	H	W	med-gravel sand	7:00	clean out hole
9'5½"	45	H	W	med gravel sand silt	8:00	weld casing
9 10¾"	50	H	W	med gravel sand	9:40	drilling
total					10 40	sample
58 ¼					11:25	sample
					11:40	weld casing
					12:00	lunch
					12:30	weld casing
					1:50	Drilling
					3:00	sample
					3:30	go home

REMARKS:

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

A-6000-021 (5 85)

4-A.1309

DRILL LOG	By WAMSLEY	Rig 150	Well Number E-33-30	Computer Number	Project or Work Order No.
	Date 9/2/87		Depth 52 To 58		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
58' 1/4"						
	55	H	W	SMALL GRAVEL - SAND	4:25	
	58 1/4			END of 16" CASING	6:00	
				BAILED HOLE OUT AND STARTED		
START of 12" PIPE				BREAKING TOOLS DOWN	7:10	LUNCH
20' 8 3/4"				STARTED STRINGING TOOLS	7:40	
+ 21'				for 12" DRY BARRELL	9:00	
41' 8 3/4"				STARTED RUNNING IN	9:15	
				12" STRING of PIPE	10:45	
				HAD TO MAKE NEW TAIL		
				OUT LINE for CASING	11:30	
				BLOCK		

REMARKS:

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

A 6000-021 (5-85)

4-A.1310

12" DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E-33-30		
Date: 9 3 87		Depth: 58' To 70'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
11 8½	60	DB	D	Sand coarse	7:00	Weld casing
20 7½	65	DB	D	" "	9:00	Look for core
9"11"	70	DB	D	~~Fine~~ Sand clay		Barrel
total					10:00	string up tools
72'3"				Had difficulty Locating	11:00	Drilling
				10" core barrel	~~10:00~~	
				resorted to using 8" core	11:30	weld casing
				barrel - progress - slow	12:00	Lunch
				Need another	12:30	welding
				10" core barrel	1:30	sample
				only One for four Rigs	2:20	sample
					3:05	sample
					3:30	go home

REMARKS:

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

A-6000-021 (5-85)

4-A.1311

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
WAMSLEY	150	E-33-30		
Date 9/3/87		Depth 70' To 90		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Celiche, Etc.	Time	Drilling Comments
72'-3" 1/4				GOT TO WORK LOUIE WAS GOING	3:20	HAD TO ROUNDUP
+ 10'-2 1/2"				SLOW WITH UNDERSIZE CORE BARREL		CORE BARREL +
82'-5 1/4"				THE RIG THAT HAD THE 10" CORE		WRENCHES
+ 9'-11 1/2"				BARREL WAS DONE WITH IT SO I BROKE		
92'-5 1/4				OFF THE 8" AND PUT ON THE 10"	4:45	
TOTAL	12" CASING			WELDED ON PIECE OF PIPE 10'-2 1/2"	6:00	STARED DRILLING
	75	DB	DRY	SAND	6:30	
	80	DB	DRY	"	7:00	LUNCH
				WELDED ON PIECE OF PIPE		
				9'-11 1/2"	9:00	
				LIGHT PLANT ~~[illegible]~~ RAN OUT		
				OF FUEL WOULDN'T RESTART	10:00	
	85	DB	DRY	SAND	10:20	
	90	DB	DRY	SAND	10:45	
				JACK SHAFT ON RIG IS MAKING	11:00	SHUT DOWN
				A BAD NOISE	11:30	CLEANED UP
				Craig Wamsley 9/3/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1312

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E-33-30		
Date: 9 4 87		Depth: 90 To 110		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
92'5¼	90				7:00	Greas Rig
10'4½"	95	DB	D	sand fine	7:30	weld casing
10'11	100	DB	D	sand coarse	9:00	Drilling 10"
99¾	105	DB	D	sand coarse	10:00	unload casing
total	110	DB	D		10:20	sample
1236½				2nd sample 11:10 am	11:30	weld casing
					12:00	lunch
				Welding on casing incomplete	12:30	weld casing
					1:30	drilling
					2:00	sample
					2:30	sample
					3:00	weld casing
					3:30	go home

REMARKS:

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

A 6000 021 (5-85)

4-A.1313

DRILL LOG	By WAMSLEY	Rig 150	Well Number E-33-30	Computer Number	Project or Work Order No.
12"	Date 9/4/87		Depth 110 To 123'-6½"		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
123'-6½"				FINISH WELDING ON PIECE	3:15	WELDING
TOTAL				OF CASING 9'-9¾"	4:35	DRILLING
	115	DB	DRY	SAND COARSE	4:55	½ SAMPLE
	120	DB	DRY	SAND COARSE	5:30	SAMPLE
	123			NO SAMPLE - END OF 12" CASING	6:00	
START OF		10" RDB		BROKE OFF 10" CORE BARRELL AND	7:00	LUNCH
20'-6"				PUT ON 8" CORE BARRELL	8:30	
+208½"				RAN OUT OF OXYGEN, GOT NEW BOTTLE	8:45	
						WELDING
+41-2½"						
21--						
62'-2½"						
+20-11¼						
83'-1¾"					11:30	
+ TOTAL						

REMARKS:

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

A-6000-021 (5-85)

4-A.1314

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E 33-30		
Date: 9 8 87		Depth: 123 To 132		Subcontract No.

12" 123' 6½

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10" 83' 1¾"	~~105~~	~~DB~~	~~D~~	finish welding 83' 1¾	7:00	start
+ 20' 10¼	~~130~~	~~DB~~	~~D~~		7:30	weld pipe
+ 20' 9½"	125	DB	D	coarse sand		
+ 10' 4½	130	DB	D	" "		
135' 2"				~~shut down~~	10:30	no oxygen. to cut casing
				no way to haul oxygen shut down		
					12:00	lunch
					12:30	down - still
					12:45	oxygen arrived
					1:00	weld casing
					~~2:40~~	~~sample~~
					~~3:10~~	~~sample~~
					1:30	drilling
					2:40	sample
					3:10	sample
					3 30	go home

REMARKS:

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

A-6000-021 (5-85)

4-A.1315

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L. Amsley	150	G-33-30		
Date: 9/8/87		Depth: 132 To 157		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
135-2"				STARTED TO WELD ON PIECE of	3:30	
+ 10-5 1/4"				PIPE 10'-5 1/4"	4:30	
145-7 1/4					5:30	
+ 10-5 1/4	135	DB	DRY	FINE SILT - SAND. NOT WANTING TO STAY		IN D.B.
156 1/2"	140	DB	DRY	" " "	6:20	
				WELED ON PIECE of PIPE 10'-5 1/4"	7:00	WELDING TRUCK
	145	DB	DRY	" " " 9:00		~~Lunch~~
	150	DB	DRY	" " " 9:30		DRILLING
				WELDING ON PIECE of PIPE	10:00	
156-1/2				10'-4 1/2		WELDING
+ 10 4 1/2					11:00	
166'-5"						
	155	DB	DRY	" " "	11:20	
				WELDER WOULDN'T START		
				TWICE HAD TO JUMP IT		
				WITH MY TRUCK		
				Craig Wamsley		

REMARKS:

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

A-6000-021 (5-85)

4-A.1316

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E 33-30		
Date 9 Jul 87		Depth 157 To 185		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
166' 5"	160	DB	D	sand fine to coarse	7:00	grease Rig
10' 4"	165	DB	D	" "	7:15	start drilling
10' 4"	170	DB	D	" "	8:15	sample
10' 5 3/4"	175	DB	D	" "	9:00	sample
Total	180	DB	D	" "	10:05	weld casing
197' 6 3/4"	185	DB	D	" "	10:30	sample
					11:30	weld casing
					12:00	Lunch
					1230	weld casing
					1:00	sample
					2:00	sample
					2:20	sample
					2:50	~~sample~~ weld casing
					3:30	go home

REMARKS:

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

A-6000 021 (5-85)

4-A.1317

DRILL LOG	By WAMSLEY	Rig 150	Well Number 6-33-30	Computer Number	Project or Work Order No.
	Date 9/22/87		Depth 185 To 207		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc. GROUND LEVEL	Time	Drilling Comments
197-6¼"	190	DB	D	FINE SAND SILT	4:30	DRILLING
+ 10-5¾"	195	DB	D	" " "	5:10	
208-1½"				WELDED ON PIECE of PIPE 10'-5¾"	5:30	
TOTAL	10"			WELDER WONT START.	6:30	WELDING
CASING				GOT WELDER GOING	7:00	LUNCH
	200	DB	D	" " "	8:30	DRILLING
	205	DB	D	COARSE SAND	9:40	DRILLING
				HAD TO RE PLUMB RIG OVER HOLE	10:30	
				STARING TO BREAK off 10" CORE		
				BARRELL AND PUT ON 8" HAD		
				TO ROUNDUP WRENCHES AND CORE		
				BARRELL	11:30	

REMARKS:

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

A-6000 021 (5-85)

4-A.1318

8" DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E-33-30		
Date 9 10 87		Depth 10" 207 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
82 4½					7:00	change tools
					8:30	pick up clean up area
				no drilling today	9:30	unload pipe
						and new Jars
				~~no drinking water~~	10:30	put on new Jars
						and core Barrel
					11:45	start welding
						casing
					12:00	Lunch
					12:30	weld casing
					3:30	go home

REMARKS:

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

A-6000-021 (5-85)

4-A.1319

DRILL LOG

8" CASING

By	Rig	Well Number	Computer Number	Project or Work Order No.
WAMSLEY	150	E-33-30		
Date 9/10/87		Depth 207 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
82-4½					3:15	
+ 20-6¾						
102-11¼"						
+ 20-10				LIGHT PLANT RAN OUT of		
122-9¾"				DIESEL AT 10:10 · GOT LIGHTS		
+ 20-8				BACK AT 10:35		
144-5¼"						
+ 20-7				RAN 8" PIPE ALL NIGHT		
164-6¼"				LONG		
+ 20-3						
184-9¼"				204'-10¼ IS JUST TACKED		
20-1				ON		
204'10¼"					11:30	
				Craig Wamsley		

REMARKS:

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

A 6000-021 (5-85)

4-A.1320

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E 33-30'		
Date: 9 11 82		Depth: 207 To ~~215~~ 217		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204'	10¼				7:00	weld casing
	-1"				9:35	grease Rig
207	9¼				9:40	drilling
+ 10'					10:00	sample
214	9¼				11:00	weld casing
+ 10'					11:30	drilling
+ 10					11:50	sample
					12:00	Lunch
	210	DB	D	small gravel & coarse sand	12:30	
					1:00	sample
	215	DB	D	" "	1:30	weld casing
	220	DB	D	gravel & clay moist	2:00	drilling
	225	DB	D	" "	3:00	sample
					3:30	go home
Total						
casing						
234	9¼					

REMARKS:

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

A-6000 021 (5-85)

4-A.1321

DRILL LOG	By WAMSLEY	Rig 150	Well Number E-33-30	Computer Number	Project or Work Order No.
	Date 9/11/87		Depth 227 To 249		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
234-9¼"	230	DB	DRY	GRAVEL-MED - SAND	3:45	
+ 10'	235	DB	DRY	" " "	6:00	
244-9¼"	240	DB	DRY	WELDED ON PIECE of 8"	6:50	
+ 10				10' from 4:30-5:40	7:00	LUNCH
254-9¼"	[illegible]			PIPE STOPPED following ABOUT		
				241'-244' THEN FELL TO 245'.		
	[illegible]			STARTED WELDING ON PIECE of	8:30	
				8" PIPE 10' LONG		
	245	DB		GRAVEL LARGE SAND COARSE	10:45	
					11:30	

REMARKS:

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

A 6000 021 (5 85)

4-A.1322

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E 33-30		
Date: 9 12 87		Depth: 249 To 260		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
254 9½	250	DB	D	moist gravel sand	800	
+ 10'	255	DB	W	wet silt sand & gravel	9:50	
264 9½	2				2:00	started drilling
					8:00	sample
				now drilling with Hard	9:50	sample
				Tool	10:00	begin changing
						tools
					12:00	Lunch
					12:30	weld casing
					1:00	begin drilling
					5:30	go home

REMARKS:

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

A-5000-021 (5-85)

4-A.1323

DRILL LOG	By WAMSLEY	Rig 150	Well Number E-33-30	Computer Number	Project or Work Order No.
	Date 9/11/81		Depth 260 To 273		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
264-9¼					3:15	
10	260	HT	W	GRAVEL-MED - SAND	3:45	
274'-9¼"				WELDED A SPADE ON BOTTOM		
				OF BIT SO IT WOULD DRILL FASTER	4:30	
	265	HT	W	" " "	5:00	
				STARTED WELDING ON 10' JOINT	5:15	
				OF 8" CASING		
					6:50	DRILLING
				AT 266' FINE SAND HAVING TO	7:00	LUNCH
				DRIVE PIPE THRU IT AS I CANT		
				DRILL OUT BOTTOM OR CANT BAIL		
				AS IT SUCKS SAND UP INTO PIPE		
				CAUSING PLUG. HAD TO ADD 50		
				GALLONS WATER TO MAKE ANY FOOTAGE AND DRILL OUT 6' PLUG		
				AFTER BAILING.		
	270	HT	W	[redacted] VERY FINE SAND	10:15	

REMARKS: BAD DUST STORM FROM ABOUT 9:00 TO 11:30 COULDN'T HARDLY SEE TO DO ANYTHING

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

A-6000 021 (5-85)

4-A.1324

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E 33-30		
Date 8/14/87		Depth 273 To 280		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
274 3/4					7:00	Begin welding casing
— 1 3/4					~~7:00~~	
274 8 1/2					900	drilling
+ 10'					10 30	sample
	275	H	W	Small gravel	11:30	sample
284' 8 1/2"	280	H	W	gravel " "	12:00	lunch
				& sounds	12:30	drilling
				feels & drills like basalt!	1:00	buildup bit
				Geologists think that it may be	2:00	drilling - Hard
				boulders & cobbles. Progress almost	3:30	go home
				down to 0		

REMARKS:

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

A 6000 021 (5-85)

4-A.1325

DRILL LOG	By WAMSLEY	Rig 150	Well Number 6-33-30	Computer Number	Project or Work Order No.
	Date 9/14/87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLED ON ROCK TO SATISFY	3:30	
				GEOLOGIST.	4:45	
				CAME OVER TO OTHER RIG #4		
				AND RAN STRAITNESS TEST		
				AND SET STAINLESS SCREEN	6:00	
				WENT BACK OVER TO MY RIG		
				AND RAN STRAITNESS TEST	7:00	LUNCH
				WENT BACK OVER TO RIG #4		
				AND STARTED TO WELD ON PULLING		
				NIPPLE AND PULL PIPE BACK		
				TO EXPOSE STAINLESS SCREEN		
				Craig Wamsley		

REMARKS:

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

A 6000 021 (5-85)

4-A.1326

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
Watkins	150	E33-30		
Date: 9 15 87		Depth: 280 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
226' 2"				drilled and back flushed well to regain and clean out hole	7:00	drilled
				set screen to 280	10:00	set screen
				pulled back casing to expose screen, slugged screen afterwards	11:00	pull casing
				began tearing down Rig	12:00	Lunch
					12:30	surge pipe
					1:30	begin tearing down Rig
					3:00	meeting
					3:30	go home

REMARKS:

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

4-A.1327

Drill Log

Watkins

9/16/87

Rig 150

well
E 33-30
280'

Bail to develope well

well draws down to 1'

Time		
Time	7:00	bail well
	8:00	grease Rig
	8:30	bail well again
	9:00	take water sample
	10:00	wait for Geologists
	11:10	take measurment of well screen - 10' up inside casing
	11:30	begin fishing for screen
	12:00	Lunch
	12:30	meeting
	1:00	fishing
	2:00	retrieved screen
	2:30	weld casing
	3:30	go home

DRILL LOG 9/16/87 WELL
WAMSLEY RIG 150 3-33-30

HAD TO DRILL HOLE BACK 3:30
DOWN TO IT ORIGINAL DEPTH
from 272'-280' AS THE ~~SCREEN~~ SCREEN
HAD COME BACK UP HOLE. 8:30
GEOLOGIST MEASURED BACK IN
HOLE WAS AT RIGHT DEPTH SO
~~I~~ I SET SCREEN TO 280' PULLED
BACK CASEING 8'-2" TO EXPOSE
SCREEN. ~~GEOLOGIST~~ REMEASURED
SCREEN STAYED ON BOTTOM. 10:30
SPOOLED CABLE OVER AND BROKE
TOOLS DOWN 11:30

WELL IS READY ~~for~~ SWEDGING
AND DEVELOPING.

Craig Wamsley

BOTTOM AT 279'-7"
STATIC AT 256'-½"

Rig 150 E 33-30

Drill Log 9/17/87

Watkins (swaged for 10 minutes)

started swage in hole 7:30 am

swage came off end of shaft stuck in hole. Fished all day for it (no luck)

12:00 Lunch
12:30

Fabricated Fishing tools

started work on 3rd set of tools let nite shift take over

5:30 pm go home

DRILL LOG RIG 150 E-33-30
WAMSLEY 9/17/87

CAME TO WORK SWEDGE WAS STUCK IN HOLE. FABED A NEW FISHING TOOL TRYED IT TELL 7:00

7:00 LUNCH

CAME BACK AFTER LUNCH AND ~~FISH~~ MADE A FRICTION TYPE FISHING TOOL. GOT A HOLD OF TOP OF SWEDGE 4 DIFFRENT TIMES BUT COULDNOT PULL IT LOOSE. THE SWEDGE IS AT 270' OR TOP OF SCREEN BUT IS WEDGED BETWEEN STAINLESS SCREEN AND INNER DIAMETER OF PIPE.

Craig Wamsley

Rig 150 E 33-80

Drill Log 9-19-87

fished for swedge 7:00
fabricated different tool

12:00
Drill Log Lunch 1230
9/21/87 no Luck 7:30 go home
monday sept 21 1987
modified tool 7:00
began fishing

Lunch 12:00
1230

Latched on to 2:00
swedge (got it out!)
began changing tools 3:30 go home

RIG 150

DRILL LOG 9/19/87 E33-85

FISHED FOR [redacted] SWEDGE

WITH LOUIE 3:30

7:30

LUNCH

CAME BACK AFTER LUNCH

AND FISHED. HAD TO [redacted] TAKE

OUT BAD SPOT IN SAND LINE

THEN MADE A LATCH FOR

FISHING TOOL. WENT BACK

DOWN HOLE AND HOOKED ON

TO SWEDGE AFTER A FEW TRYS.

HOOKED DRILL LINE TO SAND

LINE AND CABLE STRETCHED

TO POINT OF SNAPPING. NICED

SMALL 2¼-3¼ SRING OF TOOLS

AND LATCH JACK TO GO IN AND

HOOK ON TO BALE ON TOP OF

FISHING TOOLS AND JAR BACK

ON SWEDGE AS STRAIT PULL WILL

BREAK CABLE. 11:30

Craig Wamsley

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
WAMSLEY	150	E-33-30		
Date 9/21/87		Depth 280 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				STRUNG UP 8" STRING OF	3:30	
				HARD TOOL'S. THEN WELDED ON		
				PIECE OF PIPE TO PUT CASING		
				BACK DOWN TO BOTTOM AGAIN		
				STARTED DRILLING	7:00	LUNCH
				GOT CASING BACK DOWN TO		
				ROCK BUT COULDNT GET FINE SAND		
				OUT OF BOTTOM. WOULD GET		
				BIT TO BOTTOM THEN TAKE BAILER		
				TO GET CUTTINGS AND WOULD BRING		
				IN MORE SAND. GEOLOGIST SAID IT		
				WAS OK AT 279'	9:30	
				TOOK STAINLESS SCREEN AND CUT		
				SWEDGE OUT OF TOP. THEN FILED		
				THE RUFF EDGES OFF AND SET		
				TO THE BOTTOM. GEOLOGIST WENT		
				TO MEASURE TO MAKE SURE IT WAS		
				AT BOTTOM AND GOT TAPE STUCK!	11:30	

REMARKS:

H - Hand Dug H - Hand Tool L - Large M - Medium S - Small VL - Very Coarse C - Coarse F - Fine VF - Very Fine Reading Water

4-A.1334

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E 33-30		
Date 9/20/87		Depth 280 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				began fishing for geologists tape	700	
				Recovered P&L tape	9:45	
				Rigged up to pull casing	10:00	
				pulled casing back 1'	10:15	
				and took measurment	10:30	
				pulled casing back 3'	11:00	
				and take measurement		
				pulled back another 5'	12:00	Lunch
					1230	
				set up to bail hole	1245	
				Bail hole	1:00	
				Break down tools	3:30	
					4:30	go home

REMARKS:

D - Drive Head H - Hand Auger L - Large M - Medium S - Small VS - Very Coarse C - Coarse F - Fine VF - Very Fine Sampling Water Accepted by NRC

4-A.1335

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
WAMSLEY	150	E-33-30		
Date 9/22/87		Depth 280 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				CAME TO WORK HELPED LOUIE	3:30	
				BREAK DOWN 8" SRING OF TOOL		
				AND PUT LINE OVER ON THE BULL		
				DRUM. BAILED ON IT TILL THERE		
				WAS NO MORE SAND. THEN WENT		
				OVER TO ~~[illegible]~~ THE RIG MEL WAS		
				ON # 4	5:00	

REMARKS:

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

4-A.1336

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E-33-30		
Date 9 23 87		Depth 280 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
				picked up drill tools -	7:00	
				around platform & loaded onto truck		
				Unloaded pump test equipment -	8:30	
				Began setting pump	9:30	
					12:00	Lunch
					12:30	
				Began tearing down Rig	1230	
				Drove Rig to slab yard	1:50	
				for steam cleaning		
				Began cleaning up area	2:15	
				around drill platform picking up		
				Junk, tools, blocks etc.		

REMARKS:

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

4-A.1337

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Date 7-23-87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				INSTALL 12-21' 3" GAL PVC	9:00	GEA
				" 1-11' " " "		
				" 1-3' " " "		
				" 1-5' PUMP		
				273 feet		
				INSTALL 13-21' 2" GAL PVC		
					11:45	GEA
				273 feet		

REMARKS:

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 6180 021 (6-85)

4-A.1338

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
McAffee		299E-33-32		
Date 09-25-87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pubb 19=21' 3" Gal Pipe	9:00	AM
				" 1=11' 3 " "		
				" 1=3 3" "		
				" 1= 7' Pump		
				273 feet		
					10:15	AM
				Pubb 13: 21' ½" Gal Pipe		
				273 feet		

REMARKS:

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

A-6000 (02) (6-85)

4-A.1339

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Date 09-25-87		Depth 299E-33-30 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				1-20' 4" Stainless SCREEN	1015	ACM
				1-20' 4" " PIPE		
				1-20' 4" " Pipe with centerguides		
				1-20' 4" " PIPE		
				1-20' 4" " "		
				1-20' 4" " "		
				1-20' 4" " "		
				1-20' 4" " "		
				1 20' 4" " "	1145	ACM
				1 20' 4" " "		
				1 20' 4" " "		
				1 20' 4" " "		
				1 20' 4" " "		
				1 20' 4" " "		
				1-20' 4" " "		
				1-10' 4" " "		
				1 5' 4" " "		
				1 2' 4" " "		
				277 feet		

REMARKS:

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

4-A.1340

FIGURE 3.
DRILL LOG

By: Leroy Coston
Date: 1-4-68
Rig: 2½
Well Number: 299-E33-30
Depth: To
Computer Number:
Project or Work Order No.:
Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Had moved drill & Bailed	10:30	
				approx. 150 gal. water clean		
				with no sand coming in.		

REMARKS:

D - Drive Barrel H - Hard Lead L - Loose M - Medium S - Soft VL - Very Loose C - Core F - Fine VF - Very Fine Breaking Water Caving Water

4-A.1341

WELL 299-E34-2

Battelle
Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project 200 Area RCRA Monitoring Wells
Location 200-EAST
Driller Olin Amos / Don St. George
Drilling Co. Kaiser Engineering Hanford
Geologist M.A. Chamness, R. Fromme, P. White, R. Hoch, K.R. Oster

Well Number 299-E24-2
Temporary Well Number N/A
Coordinates N45,271 W70,048
Casing Elevation 630.8'
Ground Elevation 629.03'

DRILLING METHOD

Rotary Air N/A Mud N/A
Cable Tool D N/A H 0-241.5'
Drilling Fluid 200E water
Other N/A

COMPLETION DATA

Drilled Depth 241 1/2' below surface
Completion Depth 239'11". below surface
Date Started 7/18/87 Completed 9/30/87
Static Water Level/Date 223.5'/7/28/87

CASING DATA

Type	Size			
Carbon steel	16"	0'	to 40' 1 1/2"	
Carbon steel	12"	0'	to 195' 1/2'	+ 2" stickup
Carbon steel	10"	0'	to 1/2 43 1/2'	+ 3" stickup
" "	8"	0	to 240 2 1/4	+ 3 1/2" stickup
Stainless Steel	4"	stickup 2 1/2"	to 240'3"	+1.72' stickup

Approved By MAC Date 11/24/87

PERFORATIONS

Type
Depth / Schedule
1/2
App. By MAC Date 10/27/87

SCREEN

Type 8" telescoping 4" stainless
Length 10' 3" | 20' 2 1/2"
Slot Size 20 | 20
Depths 240.42' | 220'11"
230.17' | 219'1"
App. By MAC Date 11/19/87

ANNULAR SEAL

Type	Interval	Volume
3/8" crushed	241 1/2" - 205'	3 1/2 cu yds 100 lb bags
Bent chips	205' - 203'	5 gal buckets
Bent granules	203' - 126.58'	25 lbs
Portland Cement	126.58' - 116.75'	60 gallons

Portland Cement 5'-0'
App. By MAC Date 11/24/87

GEOPHYSICAL LOGGING

Sondes	Interval	Date
gamma gamma	0' - 240'	7/28/87
Neutron	0' - 240'	7/28/87
Natural gamma	0' - 240'	7/28/87

Approved By MAC Date 11/24/87

AQUIFER TESTING

Type of Test Constant Discharge / Development
Length of Test 5 hrs
Volume Pumped 26,000
Drawdown 0.58
Approved By [signature] Date 2/2/88

OTHER APPLICABLE ITEMS

MAC Steam Cleaning
✓ Storage of Const. Material
✓ Tool Lubricants
MAC Concrete Pad
MAC Protective Steel Posts
MAC Safety Paint
✓ Straightness Test 7/28/87
✓ Well Development 7/28/87
✓ Downhole TV Inspection
WA Well Abandonment
✓ Complete As-Built Diagram, Driller's and Geologist's Logs

Approved By [signature] Date 12/4/87

Reviewed By [signature] Date 12-23-87

A-1800-187 (3/87)

PREFACE

This Inspection Plan identifies the inspections required and the responsible people to perform the inspections of the monitoring wells to be constructed under Project B-678.

The inspection of well construction activities is intended to provide assurance that the work performed by construction forces is in accordance with the approved contract documents. The degree of inspection is commensurate with the significance of the monitoring wells with regard to function and safety.

Inspectors

Listed below are the names of the individuals whose initials appear within this inspection plan.

Name	Initial	Organization	Job Title
John F. Keller	JFK	Kaiser Engineering Hanford	Superintendent
Michele A. Chamness	MAC	Pacific Northwest Laboratory	Scientist

The PNL project manager has reviewed the completed inspection plan and is satisfied that all the applicable inspections of the work were made during the construction of the wells.

G. V. Last — 1-13-88

PNL Project Manager — Date

CONSTRUCTION INSPECTION SERVICES

Described herein are the inspection services to be provided and documented by PNL.

Pre-Award Submittal Review

	Item	Contract Reference	Initial	Date
1.	Verify contractor and drillers are licensed for well drilling in the State of Washington.	01100-1.2 01300-1.2.1A	JK	1-12-88
2.	Verify cable tool drilling experience is five years or more with drive barrel and hard tool.	01100-1.2	JK	1-12-88
3.	Verify documentation of groundwater monitoring wells drilled by contractor.	01100-1.2	JK	1-12-88
4.	Verify contractor submitted description of drilling method and equipment.	01300-1.2.1B	JK	1-12-88
5.	Verify contractor submitted resumes of personnel.	01300-1.2.1C	JK	1-12-88

Procurements

Verify materials to be furnished to the contractor are as described in the construction specification.

	Item	Contract Reference	Initial	Date
1.	Stainless steel screen (8 inch telescope size).	01100-1.5A	JK	1-12-87
2.	Stainless steel screen (4 inch).	01100-1.5B	JK	1-12-87
3.	Centralizers.	01100-1.5C	JK	1-12-87
4.	Stainless steel casing (4 inch).	01100-1.5D	JK	1-12-87

	Item		Contract Reference	Initial	Date
5.	Artificial sand packs.		01100-1.5E	JK	1-12-88
6.	Bentonite pellets.		01100-1.5F	JK	1-12-88
7.	Bentonite grout.		01100-1.5G	JK	1-12-88
8.	Granular bentonite.		01100-1.5H	JK	1-12-88
9.	Sack crete.		01100-1.5I	JK	1-12-88
10.	Portland cement.		01100-1.5J	JK	1-12-88
11.	Well cap.		01100-1.5K	JK	1-12-88
12.	Brass survey marker.		01100-1.5L	JK	1-12-88
13.	Sample jars.		01100-1.5M	JK	1-12-88
14.	Hydrologic sampling equipment.		01100-1.5N	JK	1-12-88
15.	Drive shoes.		01100-1.5O	JK	1-12-88
16.	Carbon steel casing.	a. 16 inch	01100-1.5P	JK	1-12-88
		b. 12 inch	01100-1.5P	JK	1-12-88
		c. 10 inch	01100-1.5P	JK	1-12-88
		d. 8 inch	01100-1.5P	JK	1-12-88
17.	Guard posts.		01100-1.5Q	JK	1-12-88
18.	Paint: primer		01100-1.5R	JK	1-12-88
	finish enamel		02011-3.5I	JK	1-12-88

Performance Submittals

	Item	Contract Reference	Initial	Date
1.	Verify submission and approval of construction schedule.	01300-1.2.2A	JK	1-12-88
2.	Verify drilling logs are submitted daily.	01300-1.2.2B	JK	1-12-88
3.	Verify submission and acceptability of flow meter certification.	01300-1.2.2C		

DFC NO. 200-1

ATTACHMENT 1

DESIGN/FIELD CHANGE		DFC No. 200-1
Task No. N/A	Project Title - 200 Area Burial Ground Detection Monitoring	Final Approval Date 11/25/87

Documents Affected

1. Construction Specifications KEY-1914 (B-677) and (B-678)
2. Inspection Plan Construction Project KEH-1914 (B-677)

Description of Change

Line out and disregard any statements concerning flow meter certification. Specifically paragraph 1, 2.2C under performance submittals in the referenced construction specs. and item 3 under the performance submittals section of the referenced inspection plan.

Justification

See attached letter

Distribution

PNL
SP Airhart
MA Chamness
CS Cline
DR Dahl
TJ Gilmore
RM Smith
JS Wilbur

WHC
RE Clayton
C Hodge
RB Kasper
DM Tulberg

Remarks

None

Initiator/Author	Phone	Organization(s)	Date
G. V. Last GV Last	376-1054	Geosciences/PNL	11/25/87

Approvals

DM Raymond 11/25/87

Project Manager	QA
GV Last 11/25/87	DR Dahl 11/20/87

Well Number 299-E34-3

The remaining sections of this inspection plan shall be completed for each well.

Well Drilling Activities

	Item	Contract Reference	Initial	Date
1.	Verify wells are constructed in continuous operation.	01100-1.3		
2.	Verify contractor uses approved water source.	01600-2.0	MAC	1/8/98
3.	Verify beveled edge is cut on temporary casing by contractor.	01600-2.1A	MAC	1/8/98
4.	Verify suitability of split spoon sampling equipment.	01600-2.2	N/A	
5.	Steam cleaning equipment.	01600-2.3	MAC	1/8/98
6.	Aquifer testing equipment.	01600-2.4	MAC	1/8/98
7.	Verify contractor has copy of WAC Chapter 173-160 "Minimum Standards for Construction and Maintenance of Water Wells" and the construction specification at the jobsite.	02011-1.2	MAC	1/8/98
8.	Verify contractor has a copy of all addendums and change orders at the jobsite.	02011-1.2	MAC	1/8/98

Monitoring Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify proper technique of cable tool drilling.	02011-3.1.1	MAC	1/8/98
2.	Verify steam cleaning is being done properly.	02011-3.1.2	MAC	1/8/98

Well Number 299-E34-2

	Item	Contract Reference	Initial	Date
3.	Verify contractor is handling and storing construction materials properly.	02011-3.1.3	MAC	1/8/88
4.	Verify bevel on casing and welding is done as specified.	02011-3.1.4	MAC	1/8/88
5.	Verify the contractor uses proper tool lubricants.	02011-3.1.5	MAC	1/8/88
6.	Verify only approved drilling additives are used.	02011-3.1.6	MAC	1/8/88
7.	Verify the proper disposal of drill cuttings and water.	02011-3.1.7	MAC	1/8/88

Well Testing

	Item	Contract Reference	Initial	Date
1.	Verify water-level measurements are taken. Note in log.	02011-3.2.1	MAC	1/8/88
2.	Verify the bottom of temporary casing is free of plugging material at end of each day. Note in log.	02011-3.2.1	MAC	1/8/88
3.	Verify ground-water samples are taken when needed.	02011-3.2.2	MAC	1/8/88
4.	Verify aquifer testing is done at each well.	02011-3.2.3	MAC	1/8/88
5.	Verify formation samples are taken as required.	02011-3.3	MAC	1/8/88

Well Number 299-E34-2

Borehole Construction

	Item	Contract Reference	Initial	Date
1.	Verify temporary casing is telescoped at no more than 100 feet intevals.	02011-3.4A	MAC	1/8/88
2.	Verify depth of well.	02011-3.4B	MAC	1/8/88
3.	Verify proper action is taken if overdrilling occurs.	02011-3.4C	MAC	1/8/88
4.	Verify acceptable passing of alignment test.	02011-3.4D	MAC	1/8/88
5.	Verify all temporary casing is removed from the well.	02011-3.4E	MAC	1/8/88

Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify position of 8 inch screen and pullback of casing to expose screen.	02011-3.5A	MAC	1/8/88
2.	Verify adequate well development.	02011-3.5B	MAC	1/8/88
3.	Witness aquifer test.	02011-3.5B	MAC	1/8/88
4.	Verify proper setting of 4 inch screen, casing, and centralizer.	02011-3.5C	MAC	1/8/88
5.	Verify proper placement of sand pack.	02011-3.5D	MAC	1/8/88
6.	Verify proper location and thickness of bentonite pellet seal.	02011-3.5E	MAC	1/8/88
7.	Verify proper mixing, placement, and location of Volclay bentonite-based grout.	02011-3.5F	MAC	1/8/88

	Item	Contract Reference	Initial	Date
8.	Verify proper concrete seal at top of well.	02011-3.5G	MAC	1/8/88
9.	Verify proper construction of concrete pad and placement of brass survey marker.	02011-3.5H	MAC	1/8/88
10.	Verify proper placement, construction, and painting of guard posts.	02011-3.5I	MAC	1/8/88
11.	Verify contractor cleans up site and properly stores excess materials.	02011-3.5J	MAC	1/8/88
12.	If abandonment of well occurs, verify proper abandonment.	02011-3.6	N/A	
13.	Verify contractor maintains the drill log daily.	02011-3.7		
14.	Prepare punchlist at construction completion for exceptions.		N/A	

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AS-BUILT DIAGRAM

Well Number 299-E34-2 Geologist W.A. Chamness + R. Peterzic, R. Lagen, T. White, R. Oster Page 1 of 2

Reviewed by T.K. McGhan Date 12-23-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill rate (ft/hr)
Description	Diagram		Diagram Litho.	Lithologic Description	
Cement 3'-0'		5'		SILTY SANDY GRAVEL	
		12'		SANDY Gravel	
		15'		" "	17/hr
		20'		" "	17/hr
		25'		" "	3 3/hr
		30'		" "	2.5'
		35'		" "	8.5'
16" carbon steel		40'		" "	7.5'
		45'		" "	3 3/hr
		50'		silty sandy gravel	6 1/
bentonite crumbles 3'-136.6'		55'		" "	5'/hr
		60'		sandy gravel	10'/hr
		65		" "	6'/hr
		70'		Silty Sandy Gravel	8.5'
		75'		Sandy (55) Gravel (40)	5 1/hr
		80'		" "	10/hr
		85'		" "	8.5'
		90'		" "	3 1/
		95'		" "	6 7/hr
		100'		" "	6.7 /hr
12" carbon steel		105'		" "	7.5/hr
10" carbon steel casing		110'		" "	6 7/hr
8" carbon steel casing		115'		" "	10
4" stainless steel casing		120'		" "	6 3/hr
		125'		silty sandy gravel	
		130'		sandy gravel	

A-1800-156 (3/87)

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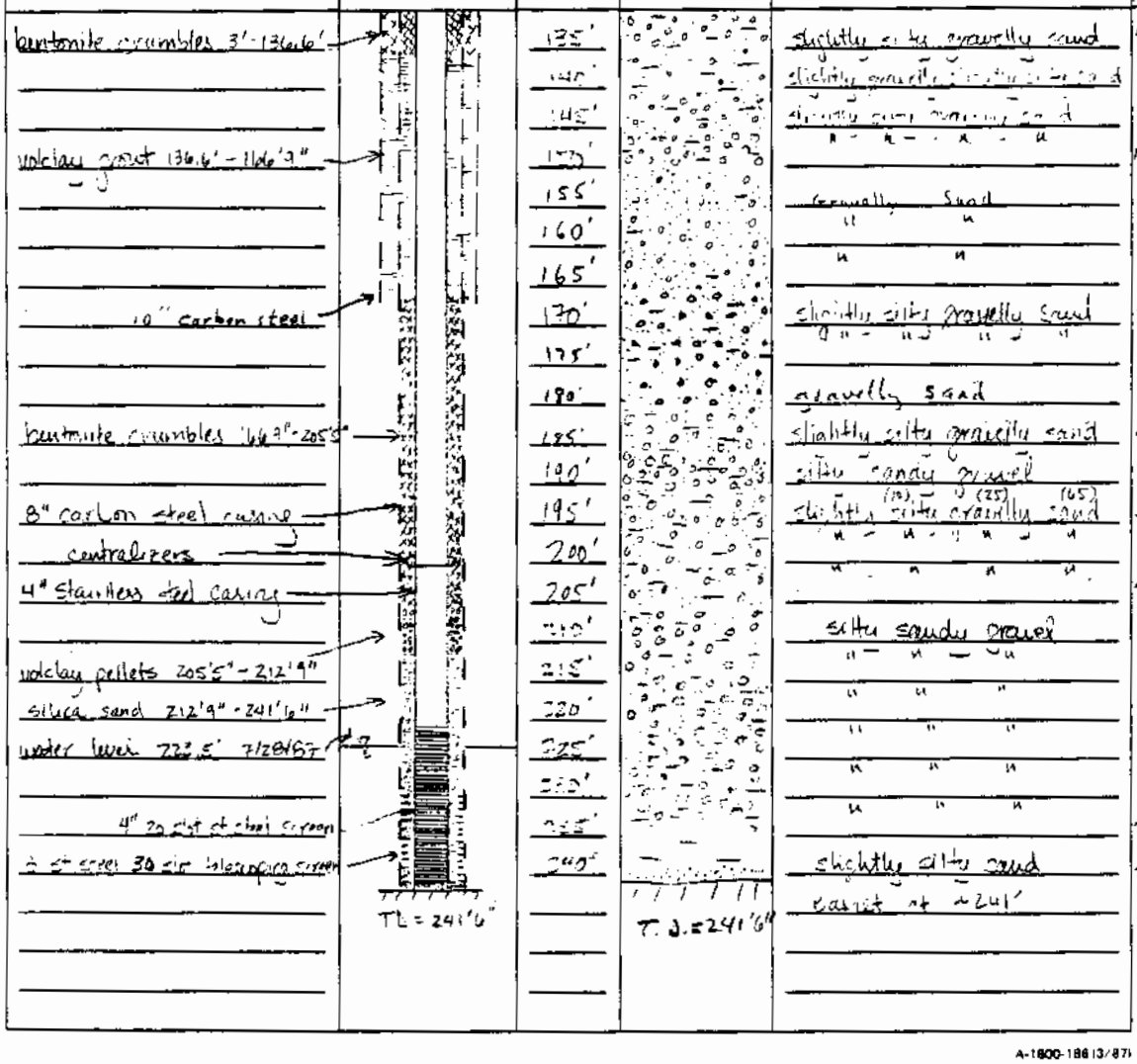
Pacific Northwest Laboratories

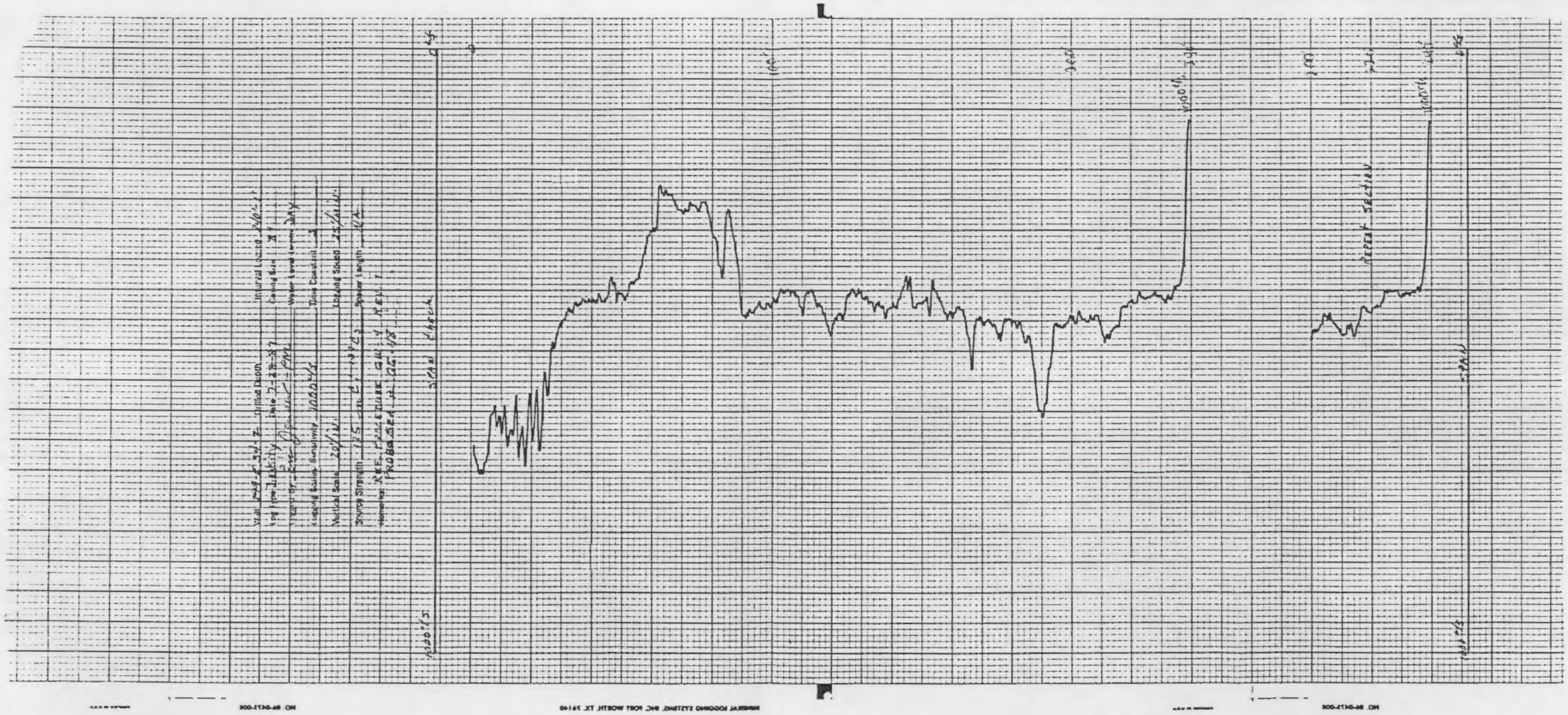
AS-BUILT DIAGRAM

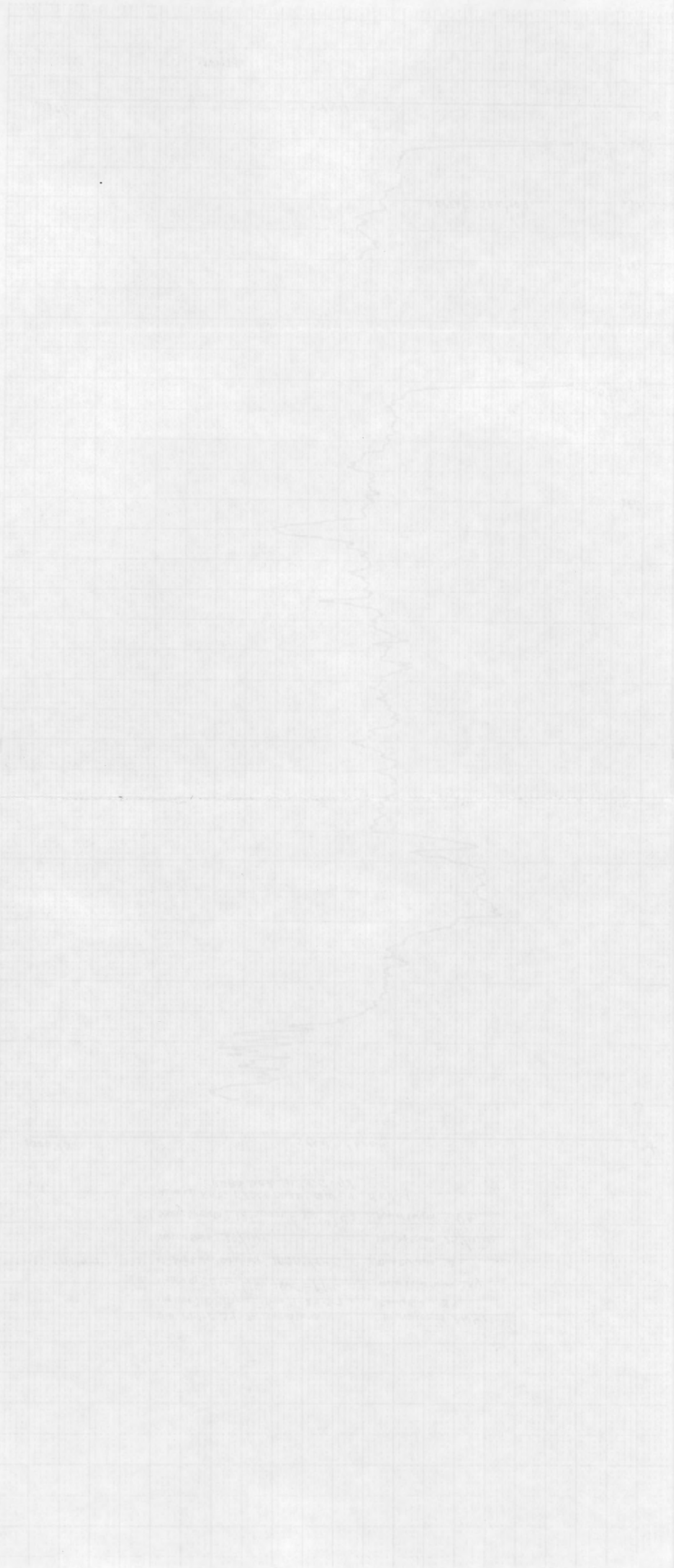
Well Number 299-E24-2 Geologist M.A. Chamness + R. Tallman, R. Hagen Page 2 of 2

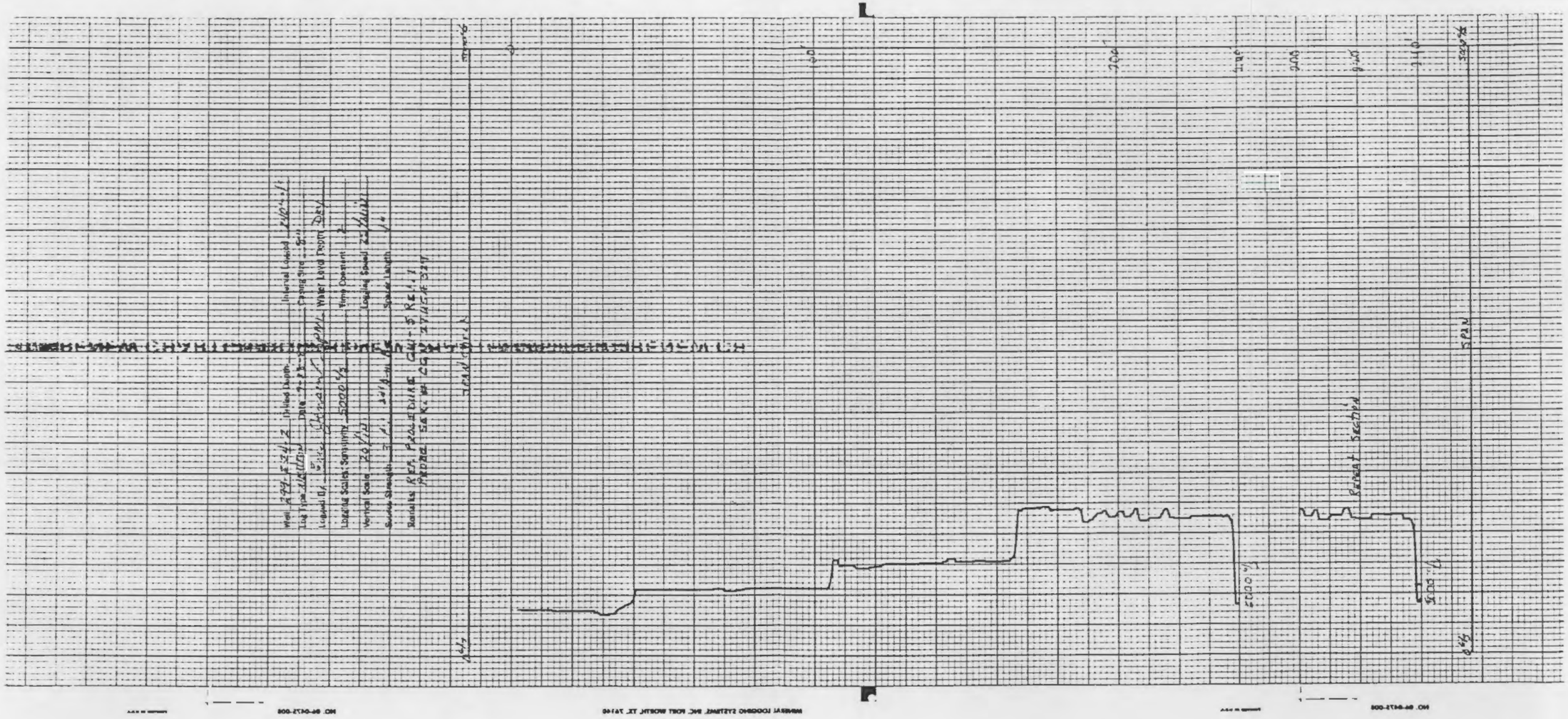
Reviewed by D.L. McElroy Date 12-23-87

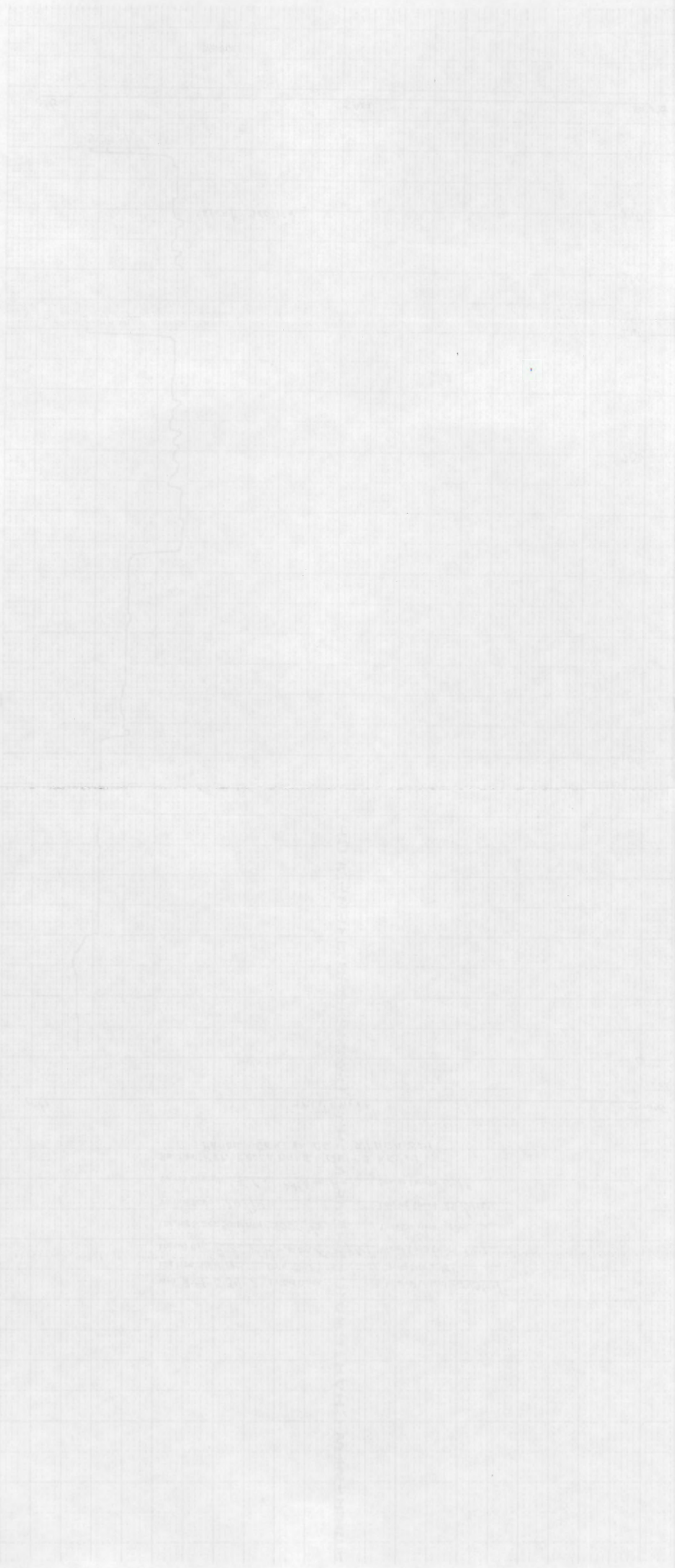


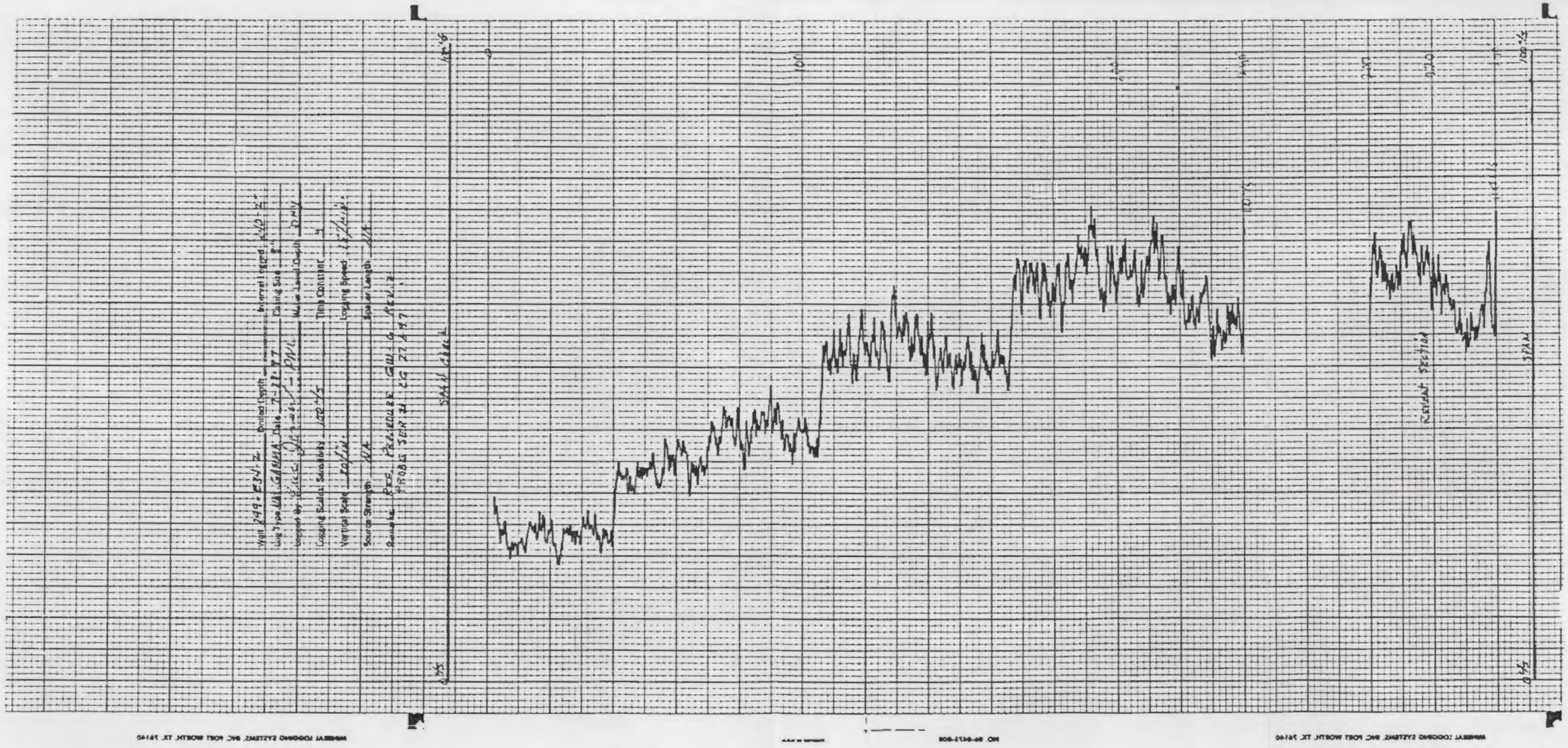
A-1800-186 (3/87)











4-A.1359

DRILL LOG	By R.A. HAGEN	Rig Cable Tool #4	Well Number 299-E34-2	Computer Number NA	Project or Work Order No. HCH-1915-1
	Date 7/18/87	68h-19154	Depth 0' To 5'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
						Drill rig is a Bucyrus Erie 60L mounted on skids - no truck chassis.
						Began drilling w/drive barrel - drive barrel is a piece of 16" casing. Drillers had to add water to keep sediments inside barrel. No moisture sample taken. Will begin hard tool drilling on 7/20.
	4-5'	D	Moist	SILTY SANDY GRAVEL: 55% gravel, 45% sand, 5% Silt. Sample is 2% LC, 15% SC, 15% VCP, 10% CP, 5% MP, 5% FP, 3% VFP, 5% VCS, 10% CS, 20% MS, 10% FS & VFS. Very poor sorting. Gravels are 60% basalt 25% granitic 15% quartzite & other. Sand is 70% basalt 15% granitic & felsic w/ 15% other rock types. Gravels are subangular & well rounded. Sands are angular & subrounded. Wet	1345	

REMARKS:

R.A. H 7/18/87

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)

4-A.1361

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
T White	Cable tool #4	2M (SW-1)	N/A	KEH-1985-1
Date 7/18/87	6815-19154	Depth 5' To 5'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				color 5Y 4/1 (very dark grey) no clay color determined. Unconsolidated. (description by TW)		
						Drilling spoil at 1400

REMARKS:

Pat White 7/18/87

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)

4-A.1362

DRILL LOG

By	Rig (Cable Tool)	Well Number	Computer Number	Project or Work Order No.
T. R Oster	B.E. 60L	RWE34-2	N/A	KEH 1915-1
Date	(ARL-17154)	Depth		Subcontract No.
7/20/87		0' To 12'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Unable to drive bailer open hole because it keeps caving in and won't stay in hole long enough adding water. Large fine bailer will not fit inside 16" casing - no smaller one on site	0530	Started to load tool bit.
					0720	Welding drive shoe on 16" casing
20'2½' of		16" casing		Driller is Don St. George	0935	Drilling started after setting 20'2½' of 16" casing with drive shoe.
					1950/1000	Drilling stopped/resumed
					1122	15 gallons H2O added
	11-12'	H	W	SANDY GRAVEL. 75% gravel, 22% sand, 3% s.lt. Gravels are 5% SC, 25% VCP, 35% CP, 5% mF, 5% FP. Sands are 3% VCS, 7% CS, 5% MS, 7% FS. Sample is poorly sorted. Gravel composition is 70% basalt, 20% qtzite, 10% granitics + rock fragments. Sand composition is 55% basalt, 35% qtz, 10% rock fragments and feldspar. Gravels are R-SA. Sands are A-SA. Wet color is 5Y 4/2 (olive gray). Dry color is 5Y 7/1 (Lt. gray). Strong rxn. to HCl. No consolidation. Gravels are less coarse/more abundant than previous sample	1230	Sample from bottom of bailer. Driller did not pull 10' sample when geologist was not present.

REMARKS:

Richard Bremner

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

A-6000 021 (5-85)

4-A.1363

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	BUCYRUS ERIE 60L	299-E34-2	N/A	KEH-1915-1
Date: 2/20/87	68K-14154	Depth: 12' 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
20'2 1/2"	12' of 16"	casing.			1250	Drilling stopped. Realigning rig as casing is slightly skewed. Cut off part of bit.

REMARKS:

Richard Premzic

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

A-6000-021 (5-85)

4-A-1364

DRILL LOG	By: N A Clemmons	Rig: Cuerpo, Ferie (corr.)	Well Number: 299-E-34-2	Computer Number: N/A	Project or Work Order No.: KEH-1715-1
	Date: 7/20/87	68K-1715-1	Depth: 12' To 20'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'2½" of 16" casing	14-15'	H	wet	SANDY GRAVEL: 75% gravel, 23% sand, 2% silt. 5% cobbles, 5% vcg, 22% cg, 30% mg, 10% fg, 2% vfg, 10% vcs, 7% cs, 2% ms, 2% fs, 1% vfs, 2% silt. Poorly sorted. Gravels - 60% basalt, 20% qtz. + qtzite, 15% granitic & other rk types, subangular to well rounded. Sand - 60% basalt, 20% qtz. + qtzite, 10% feldspar rk fragments, angular to subrounded. Wet - 5Y4/2 olive gray, dry 5Y7/1 lt gray. Moderate rxn w HCl. Gravels seem to be smaller than in last sample. Unconsolidated.	1415	
					1500	driller drilling 20-30 gal. H2O / hr
19'11"					1540	welding on 9'11" 16" casing
30'1½"					1640	started drilling again
	19-20'	H	wet	SANDY GRAVEL: 60% gravel, 27% sand, 5% silt, 5% cobbles, 7% vcg, 15% cg, 15% mg, 20% fg, 15% vfg, 7% vcs, 12% cs, 10% ms, 5% fs, 2% vfs, 3% silt. Very poorly sorted. Gravels 55% basalt, 20% qtz. + qtzite, 20% granitic & rk fragments, angular to well rounded. Sand 55% basalt, 25% qtz, 15% rk fragments, very angular to subrounded. Wet - 5Y4/2 olive gray, dry 5Y7/1 lt gray. Moderate rxn to HCl. Unconsolidated. Similar to dry gravel, more sand than last sample	1720	

REMARKS:

N A Clemmons 7/20/87

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)

4-A-1365

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chaumes	Bucyrus Erie 60T	299-E34-2	N/A	PCN 1115-1
Date: 7/20/87	CERCLA	Depth: 20' To 28'		Subcontract No: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30' 7" 2 1/2" Casing					1810	driller stopped for lunch
					1810	started drilling again
	20'-25'	H	wet	SANDY GRAVEL - 70% gravel, 28% sand, 2% silt, 5% sc, 7% vcp, 13% cp, 20% mp, 15% fp, 15% vfp, 7% vcs, 10% cs, 6% ms, 3% fs, 2% vfs, 2% silt Very poorly sorted Gravel - 70% basalt, 15% qtz + glass, 15% granite + rhyolite, 5% sandstone + limestone, angular to well rounded Sand - 75% basalt, 20% qtz, 5% rhyolite, angular to well rounded Wet - 2 gal/min, clear, very, dry - 1 gal/min Wt. gravel slight run to 1 lb Unconsolidated loose gravel Lesser than 2nd sample, also more basalt		
					2000	Driller adding 20 gal H2O/hr
					2100	getting casing ready to weld on to, stopped drilling
					2110	driller quit for the day
				M.A. Chaumes 7/20/87		

REMARKS:

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

A 6000-021 (5 85)

4-A.1366

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMO	BUCYRUS ERIE 60L	299-54-2	N/A	KE-14-5
Date: 7/21/87	CRA-19154	Depth: 28' 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
30' 1½" of 16" casing.						Driller is Don St. George
					0520	Adding 10' of 16" casing to top of previous 30' 1½" of 16" casing. Total casing is now 40' 1½" of 16" casing.
40' 1½" of 16" casing.						
					0700	Started drilling. Drove casing. Casing slipped down hole approximately 9'. 30' sample was taken from plug inside casing.
						↓
	29-30'	H	W	SANDY GRAVEL. 70% Gravels, 28% Sand, 2% silt.	0735	Sample from bottom of bailer.
				Gravels are 5% SC, 20% VCP, 30% CP, 15% MP, 5% FP. Sands are 8% VCS, 8% CS, 6% MS, 6% FS.		
				Sample is poorly sorted. Gravel composition is 65% basalt, 15% qtz-ite, 20% granitic & rock fragments. Sand composition		
				is 55% basalt, 40% qtz, 5% feldspar & rock fragments.		
				Gravels are R-SA. Sands are SR-A. Wet color is 5Y4/2		
				(olive gray). Dry color is 5Y7/1 (lt. gray). Moderate rxn		
				to 10% HCl. No consolidation. Very similar to previous		
				sample, less coarse gravels.		
					0750 approx	Stopped/Resumed drilling.

REMARKS:

Richard Premmi 7/21/87

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)

4-A.1367

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Prenzlc	Bucyrus Erie 60C	24A-L74-2	N/A	KH-9.5-.
Date 7/21/87	68K-19154	Depth 30' To 40'		Subcontract No. N.A.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40' 1½" of 8" casing					0820	Stopped drilling to work on broken bailer.
	34-35	H	W	SANDY GRAVEL. 30% Gravels, 65% Sands, 5% silt. Gravels are 2% CP, 15% MP, 10% FP, 3% VFP. Sands are 10% VCS, 20% CS, 25% MS, 10% FS. Sample is poorly sorted. Gravel composition is 65% basalt, 25% qtz. lc + qtz, 10% granitics. Sand composition is 40% basalt, 55% qtz, 5% feldspar + rock fragments. Gravels are SH-A. Sands are SH-A. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray) Moderate rxn to 10% HCl. No consolidation. Sample is very sandy compared to previous sample. Less coarse gravels.	0825	Sample from bottom of bailer. Started taking sample from plug in casing. Casing is still resting at approximately 38'.
					0830	Resumed drilling.
	39-40'	H	W	SANDY GRAVEL. 47% gravels, 50% sand, 3% silt. Gravels are 5% CP, 10% MP, 25% FP, 10% VFP. Sands are 8% VCS, 20% CS, 20% MS, 12% FS. Sample is poorly sorted. Gravel composition 75% basalt,	0910	Sample from bottom of bailer.

REMARKS:

Roland Prenzlc

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

A 6000-021 (5 85)

4-A.1368

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	BUCYRUS ERIE 66L	299-534-2	N/A	KEH-1915.1
Date: 7/21/87	68K-1954	Depth: 40' 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
40 1½"				20% qtz. rich metamorphics, 5% gravel, s.s. Sand composition is 45% basalt, 50% qtz, 5% feldspar & rock fragments, Gravels are SA-A. Sands are SR-SA. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/2 (ll. gray). Moderate-strong rxn. to HCl. No consolidation. Less sand/more gravels than previous sample, otherwise, very similar.		
					0910	Drilling stopped. Preparing to set 12" casing.
21'10" of 12" casing.					1100	21'10" of 12" w/shoe added.
42'9½" of 12" casing.					1150	20'11½" of 12" added
					1700	Drilling resumed. 10 gallons H_2O added.
53'3½" of 12" casing					1310	Drilling stopped. Adding 10'6" of 12" casing to previous 42'9½" of 12" casing. Total casing will be 53'3½" of 12".

REMARKS:

Richard Premzic

D - Drive Barrel H - 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)

4-A.1369

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M A Chamness	Cooper Eng. Co.	299-E34-2		PNL-1915-1
Date: 7/21/87	68K1915-1	Depth: 410' To 415'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
53'3½" of 12" casing					1500	started drilling again
					1520	Driller is using duty cycle is during casing ahead, this driller just cut through the plug at the bottom Casing is generally cleaner on its way down the hole
	411-45'	H	W	SANDY GRAVEL: 60% gravel, 37% sand, 3% silt. 2% vcp, 5% cp, 15% mp, 20% fp, 18% vfp, 20% vcs, 8% cs, 4% ms, 2% fs, 2% vfs, 3% silt. Poorly sorted. Gravel - 55% basalt, 20% qtz. + qtzite, 15% granitic + other rk types, angular to rounded. Sand - 45% basalt, 20% qtz., 20% feldspar, 5% other, angular to subrounded Wet - 5Y4/2 olive gray, dry - 5Y7/1 lt gray. Strong rxn w HCl Unconsolidated. Gravels seems to be getting smaller over the last sample or two.	1600	cutting = 20-20 gpl/1x 60

REMARKS:

M A Chamness 11/88

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

A-6000-021 (5-85)

4-A.1370

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	CF 60	299-E34-2		EFH-1115-1
Date		Depth		Subcontract No.
7/1/87	CME 75	45' To 55'	N/A	141

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
52' 2½" of 12" casing	49'-50'	H	W	SILTY SANDY GRAVEL: 50% gravel, 45% sand, 5% silt.	1715	
				2% vcp, 3% cp, 12% mp, 15% fp, 18% vfp, 18% vcs, 12% cs,		
				6% ms, 4% fs, 2% vfs, 8% silt. Very poorly sorted		
				Gravel - 60% basalt, 25% qtz + qtzite, 11% granitic + other,		
				angular to subrounded. Sand - 40% basalt, 35% qtz, 25%		
				feldspar + others, angular to subrounded. Wet - 5Y4/2, olive		
				gray, dry - 5Y 1/2, lt gray. Slurry ran in HCl. Unconsolidated.		
				More sand than last sample, larger gravel, more ss		
40' 7½" 43' 11"	ø 12"			mostly basalt, sand + basalt, more qtz - rich	1725	stopped drilling, preparing to install 4 on 10" 7½" 12" casing
					1810/1835	driller clipped wiring for winch/returned
					1850	started drilling
	51'-55'	H	W	SILTY SANDY GRAVEL: 45% gravel, 47% sand, 8% silt. 1% vcp,	1940	
				2% cp, 10% mp, 15% fp, 17% vfp, 25% vcs, 15% cs, 4% ms, 2% fs,		
				1% vfs, 8% silt. Very poorly sorted. Gravel - 60% basalt,		
				20% qtz + qtzite, 20% granitic + others, angular to subrounded,		
				occasional well rounded cobble < 1%. Sand - 40% basalt, 40% qtz,		
				20% feldspar + others, angular to subrounded. Wet - 5Y 4/2, olive		

REMARKS:

M A Chamness 7/2/87

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)

4-A.1371

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chawness	CE 60L	299-E34-2		
Date	68K 1115.4	Depth 5' To 60'	N/A	Subcontract No. N/A
7/2/87				

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
62'11" of	12"			gray; dry - 5Y7/1 lt. gray Moderate rxn in HCl. Unconsolidated.		
				Sandier than last sample, sand more qtz-rich.		
	59'-60'	H	U	SANDY GRAVEL: 50% gravel, 48% sand, 2% silt. 2% vcp, 3% cp,	2010	
				10% mp, 15% fp, 20% vfp, 25% vcs, 15% cs, 5% ms, 2% fs, 1% vfs,		
				2% silt. Moderately to poorly sorted. Gravel - 50% basalt,		
				25% qtz. + qtzite, 20% granitic + others; very angular to subrounded		
				sand - 45% basalt, 40% qtz, 15% feldspar + others, angular to		
				subrounded. Wet - 5Y4/2 olive gray; dry - 5Y7/1 lt. gray.		
				Slight rxn. in HCl. Unconsolidated, auger drilling. Slightly		
				more gravel + more basalt than last sample, but		
				still generally fine sand, sand still more qtz rich.		
110'6"					2020	stopped bailing, working
48'5"	of 12"					on 10'6" of 12"
					2110	driller quit for day
				M.A. Chawness 7/2/87		

REMARKS:

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

A 6000 021 (5-85)

4-A.1372

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	BUCYRUS ERIE 60L	299-C34-2	N-1	JEF-15
Date: 7/22/87	65K-19154	Depth: 61' 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
74'5" of 12" casing.						Driller is Don St. George
					0645	Complete previous days welding of 10'5" 12" casing.
					0700	Std. Rod Drilling.
	66-67'	H	W	SANDY GRAVEL. 45% gravel, 50% Sand, 5% silt. Gravels	0745	Sample from bottom of bailer.
				are 10% MP, 25% FP, 10% VFP. Sands are 5% VCS,		
				35% CS, 8% MS, 7% FS. Sample is Moderately sorted.		
				Gravel composition is 55% basalt, 30% qtzite + qtz,		
				15% Granitiest feldspar. Sand composition is 45% basalt,		
				40% qtz, 15% feldspar + rock fragments. Gravels are		
				SR-A. Sands are SR-SA. Wet color is 5Y4/2 (olive gray).		
				Dry color is 5Y7/1 (Lt. gray). Moderate rxn to 10% HCl. No		
				consolidation. More sand/smaller gravels than previous sample.		
					0745	10 gallons H_2O added
					0800	5 gallons H_2O added
						Drilling is easy.
	69-70'	H	W	SILTY SANDY GRAVEL. 42% gravel, 50% Sand, 8% Silt.	0815	Sample from bottom of bailer.
				Gravels are 3% VCP, 6% CP, 10% MP, 15% FP, 8% VFP		

REMARKS:

Richard Paesani

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

A-6000-021 (5-85)

4-A-1373

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMO JR	B.E. 60L	299-E34-2	N/A	KEH-1915-1
Date 7/22/87	68K-19154	Depth 70' To 75'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
74'5"	of 12"	casing.		Sands are 5% VCS, 35% CS, 7% MS, 3% FS. Sample		
				is moderately-poorly sorted. Gravel composition is 60% basalt,		
				25% glassy qtz, 10% granitics, 5% feldspar-rotten		
				Sand composition is 40% basalt, 55% qtz, 5% feldspar +		
				rock fragments. Gravels are SR-A. Sands are SR-SA		
				Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray).		
				Moderate rxn to 10% HCl. No consolidation. Very similar to		
				previous sample, gravels are slightly coarser.		
					0820	5 gallons H_2O added
					0835	5 gallons H_2O added
84'11"	of 12"	casing.			0845	Drilling topped. Adding 10'6" of 12" casing to previous 74'5" of 12" casing. Total 12" casing is now 84'11".
					0950	Drilling Resumed.
	74-75'	H	W	SANDY GRAVEL. 40% gravel, 55% sand, 5% silt.	1015	Sample from bottom of boiler
				Gravels is 15% MP, 10% FP, 15% VFP. Sand is		
				15% VCS, 25% CS, 12% MS, 3% FS. Sample is Moderately-		
				poorly sorted. Gravel composition is 60% basalt, 20% glassy qtz,		

REMARKS:

Richard L. Premo Jr.

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

A-6000-021 (5-85)

4-A.1374

DRILL LOG	By R.I. Prentice	Rig B.E. 60L	Well Number 299-E34-2	Computer Number	Project or Work Order No. KEH-915-1
	Date 7/22/87	LBK-19154	Depth 75' To 85'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84' 11" of 12" casing				20% granitics + feldspar. Sand composition is 40% basalt, 50% qtz, 10% feldspar + rock fragments. Gravels are SR-A. Sands are SR-SA. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray). Moderate rxn. to 10% HCl. No consolidation. Very similar to previous sample		
	79-80'	H	W	SANDY GRAVEL. 43% Gravel, 52% sand, 5% silt. Gravel is 2% VCP, 21% MP, 5% FP, 15% VFP. Sand is 25% VCS, 15% CS, 8% MS, 4% FS. Sample is Moderately-poorly sorted. Gravel composition is 65% basalt, 25% qtz-rich metamorphics, 10% granitics and others. Sand composition is 40% basalt, 50% qtz, 10% feldspar + rock fragments, Gravels are SA-A. Sands are SR-SA. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray). Mod-strong rxn. to 10% HCl. No consolidation. Very similar to previous sample.	1045	Sample from bottom of bailer.
	84-85'	H	W	SANDY GRAVEL. 32% gravel, 63% sand, 5% silt. Gravel is 10% MP, 12% FP, 10% VFP. Sand is 20% VCS, 25% CS, 10% MS, 8% FS. Sample is Mod-poorly sorted. Gravel	1120	Sample from bottom of bailer.

REMARKS:

Richard Prentice

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

A-8000-021 (5-85)

4-A.1375

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. FRENZIC	B.C. 60	299-E34-2	N/A	KEH-1615-1
Date: 7/22/87	68K-19154	Depth: 85' To 85'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84'11"	of 12"	casing.		composition is 60% basalt, 22% qtz. and metamorphics, 18% granites & feldspars. Sand composition is 40% basalt, 60% qtz, feldspar & rock fragments. Gravels are SR-A. Sands are SR-SA. Wet color is 5Y4/3 (olive). Dry color is 5Y7/1 (lt gray). Mod-strong rxn to 10% HCl. No consolidation. More sand and qtz/slight color change from previous sample.		
94'11"	of 12"	casing.			1120	Stopped drilling. Added 10' of 12" casing. Top of 84'11" Total 12" casing is now 94'11".
					1230	Drilling resumed.
					1235	10 gallons H_2O added.
					1300	Drilling stopped. Drillers called, meeting. Casing at approx. 90'. Need 90' sample. Drilling is being easy.

REMARKS:

Richard Prenzic 7/22/87

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)

4-A.1376

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	Cabot	299-E-24-2		KCH-915-1
Date	600 Tech	**Depth**		Subcontract No.
4/22/87		85' To 95'	N/A	N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
91'11" of 12" casing	90'	H	D	SANDY GRAVEL - 20% gravel, 65% sand, 15% silt, 1% cl, 5% mp, 10% fp, 11% vfp, 30% vc, 20% c, 8% m, 7% f, 2% vf, 5% silt. Poorly sorted. Gravel - 30% basalt, 20% qtz. + qtzite, 20% granitic + others, angular to subrounded. Sand - 35% basalt, 40% qtz, 25% feldspar + rk. frags, angular to subrounded. Wet 5Y 7/2 olive gray, dry - 5Y 7/2 lt. gray, moderate rxn in HCl. Unconsolidated. Similar to last sample.	1350	
91'11" + 11 1/2" = 103 1/2"					1445	building on 11'1/2" of 12" casing
	95'	H	D	GRAVELLY SAND - 15% gravel, 78% sand, 7% silt. 1% cl, 3% mp, 6% fp, 5% vfp, 20% vc, 25% c, 15% m, 10% f, 8% vf, 7% silt. Poorly sorted. Gravel - 70% basalt, 20% qtz., 10% rk. fragments, angular to subrounded. Sand - 25% basalt, 60% qtz, 15% rk. fragments, angular to rounded. Wet - 5Y 7/2, olive gray, dry - 5Y 7/2 lt. gray. Slight to mod. rxn in HCl. Unconsolidated. Changed from gravel to sand sand becoming more qtz. rich, and less sand + silt but increasing mica, mostly "golden" biotite.	1435	

REMARKS:

M. A. Chamness
4/22/87

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)

4-A.1377

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
W A Chambers	BE 60L	219 E 24 2		KEH-1815-1
Date		Depth		Subcontract No.
1/12/87	68K 1N54	92' To 100'	USA	

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
4.5" H2 at 12" Casing					1520	Started drilling again
					1600	Driller says these sediments could probably be drilled with core barrel. There are none on site yet though. Jim Butler (KEH) says they were ordered 1 8", 1 10" and 1 12" core barrel, but gave no date of arrival. Casing is following drill bit.
	99'-100'	H	W	GRAVELLY SAND: 25% gravel, 70% sand, 5% silt, 3% mf, 7% fp, 15% vlf, 28% vfs, 25% cs, 8% vcs, 4% vvfg, 3% silt. Ind. - poorly sorted. Gravel - 10% basalt, 30% qtz, 1 qtzite, 5% rk fragments; angular to subrounded. Sand - 35% basalt, 15% qtz, 20% C. Utype + others; angular to rounded. Wet - 5Y 4/2 olive gray, dry - 5Y 7/2 pl. gray. Moderately clayey on WL. Unconsolidated. Increase in gravel, decrease in amount of qtz + minerals in sand, increase in basalt.	1610	

REMARKS:

W A Chambers
1/12/87

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)

4-A.1378

DRILL LOG	By	Rig	Well Number	Computer Number	Project or Work Order No.
	M.A. Chamness	CME 600	USGS-4	N/A	FEH-0115-1
	Date	Last Drilled	Depth		Subcontract No.
	7/22/87		100' To 107'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
106' 11" of 12" casing	101' 105'	H	D	GRAVELLY SILT: 20% gravel, 40% sand, 2% silt, 5% vf, 10% fg, 12% vfg, 30% vcs, 25% cs, 10% ins, 2% fs, 2% vfs, 2% silt. Unconsolidated to poorly consol. Gravel — 60% basalt, 20% qtz + qtzite, 10% ck. fragments; angular to rounded. Sand — 40% basalt 35% qtz, 25% lithics + silt; angular to rounded. Wet - 5Y5/3 olive, dry 5Y7/2 lt. gray. Strong rxn w/ HCl Unconsolidated slight change in color, slight increase in gravel + basalt content, decrease in silt + qtz.	1150	
					1220	clean + drilling, cleaning tool scar, standing to vent 10" in
				We staying open at 101' because of material pressure on silt + fine sand		
					1805	clipped/returned fourtunel
21' 3½"					1825	10" shoe + casing = 21' 3½"
120' 11" 42 2¾"					1915	20' 11" of 10"
20' 10½" 63' 1"					1 10	20' 10½" of 10"
20' 9½" 83' 10½"					2015	20' 9½" of 10"
20' 7½" 104' 6"					2030	20' 7½" of 10"
					2115	drillers quit for day
				M.A. Chamness 7/22/87		

REMARKS:

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

A-6000 021 (5-85)

4-A.1379

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMAC	B.F. 60L	299-E34-2	N/A	KEH-9/5-1
Date 7/23/87	68K-19154	Depth 107' To 110'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104'6" of 10" casing.						Driller is Don St. George
					0630	Waiting for stem + bit to be steam cleaned.
					1030	Drilling started.
114'6" of 10" casing.					1037	Drilling stopped. Adding 10' of 10" casing to previous 104'6". Total 9" casing is now 114'6".
					1130	started drilling.
	109-110'	H	W	GRAVELLY SAND. 25% gravel, 70% sand, 5% silt. Gravel is 8% VFP, 6% FP, 11% VFP. Sand is 20% VCS, 25% CS, 15% MS, 10% FS. Sample is Mod-poorly sorted. Gravel comparison is 50% basalt, 30% gneissic metamorphics, 20% granitics + rock fragments. Sand comparison is 25% basalt, 60% qtz, 15% feldspar + other. Gravels are SR-A. Sands are generally SA. Wet color is 5Y4/3 (olive). Dry color is 5Y7/2 (lt. gray). Slight-mod. rxn to 10% HCl. No cementation. Very similar to previous sample.	1150	Sample from bottom of bailer.

REMARKS:

Richard Premac

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

Standing Water

A-6000-021 (5-85)

4-A.1380

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMUS	B.E. 60L	219-134-2	N/A	KEH-1915-1
Date: 7/23/87	68K-14154	Depth: 0 To 115'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
114'6" of 10" casing.						
	114-115	H	W	GRAVELLY SAND, 25% gravel, 68% sand, 7% silt.	1215	
				Gravel is 80% INP, 10% FP, 7% VFP. Sand is 20% VCS,		
				30% CS, 10% MS, 8% FS. Sample is mod-poorly sorted.		
				Gravel composition is 55% basalt, 25% metamorphics,		
				20% granitics + other. Sand composition is 25% basalt,		
				60% qtz, 15% feldspar + rock fragments. Gravels are		
				SR-A. Sands are SR-SA. Wet color is 5Y5/3 (olive).		
				Dry color is 5Y7/2 (LL gray). Very slight rxn to 10% HCl.		
				No consolidation. Very similar to previous sample		
125'4" of 10" casing.					1215	Stopped drilling. Adding 10'10" of 10" casing to previous 114'6" of 10" casing. Total 10" casing is now 125'4".
					1310	Resumed drilling.

REMARKS:

Richard Premus
7/23/87

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)

4-A.1381

DRILL LOG	By: M.A. Chamness	Rig: CE 600	Well Number: 299-E34-2	Computer Number: N/A	Project or Work Order No.: RFH-1915-1
	Date: 7/23/87	66K19154	Depth: 115' To 125'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125' of 10" casing	119'-120'	H	D	SANDY GRAVEL: 35% gravel, 60% sand, 5% silt. 8% mf, 10% f, 17% vf, 25% vc, 23% c, 7% vc, 3% f, 2% vf, 5% silt. Moderately to poorly sorted. Gravel - 55% basalt, 15% qtz. + qtzite, 30% granitic + others; angular to rounded. Sand - 35% basalt, 40% qtz, 25% feldspar + rk fragments; angular to rounded. Unit - 5Y4/3 olive, dry - 5Y 7/1 lt gray. Moderate rxn in HCl. Unconsolidated. More gravel + sand + slightly more basaltic than previous sample.	1400	
	120'-125'	H	D	SLIGHTLY SILTY GRAVELLY SAND: 25% gravel, 65% sand, 10% silt. 3% mf, 10% f, 12% vf, 20% vc, 26% c, 10% vc, 2% f, 11% vfs, 10% silt. Very poorly sorted. Gravel - 60% basalt, 25% qtz + qtzite, 15% igneous + others; angular to subrounded. Sand - 35% basalt, 40% qtz, 25% feldspar + others; angular to subrounded. Unit - 5Y5/3 olive, dry - 5Y 1/2 lt gray. Strong rxn in HCl. Unconsolidated. Less gravel than last sample, most of the larger gravels are basalt.	1425	
125' of 10" 10' 6"					1430	Stopped drilling, setting 10' 6" of 10" casing
125' of 10"						

REMARKS:

M. A. Chamness
7/23/87

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-6000-023 (5-85)

4-A.1382

DRILL LOG	By: P.A. Chamness	Rig: CME 750	Well Number: 299-E-21-2	Computer Number: DYA	Project or Work Order No.: 87H-015-1
	Date: 11/2/87	GRID: N154	Depth: 125' to 135'		Subcontract No.: DYA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125' 10"					1535	Lost [illegible]
	129'-130'	H	D	GRAVELLY SAND - 25% gravel, 72% sand, 3% silt, 3% mf, 7% f, 15% vf, 27% vcs, 25% cs, 10% ms, 6% fs, 4% vfs, 3% silt. Moderately to poorly sorted. Gravel - 65% basalt, 30% qtz. + qtzite, 5% green + others; angular to subrounded. Sand - 30% basalt, 15% qtz, 25% feldspar + ck fragments; angular to subrounded. Wet - 5Y5/3 olive, dry - 5Y7/2 lt gray. Slight rxn. to HCl. Unconsolidated, very friable, packed once bailer can push it more. Very little silt to guard to dust sample, overall seems to be well sorted with varying amount of gravel + silt.	1555	casing is following but bailer down. Not however says once basalt will not be ready until next week sometime and that they are to once located
					1620-0	stopped to remove cable
	134'-135'	H	D	SLIGHTLY SILTY GRAVELLY SAND - 10% gravel, 80% sand, 10% silt. 1% mf, 2% f, 6% vf, 30% vcs, 22% cs, 13% ms, 7% fs, 7% vfs, 10% silt. Moderately to poorly sorted gravel - 50% basalt, 25% qtz., 10% ck fragment, angular to subrounded. Sand - 25% basalt, 60% qtz, 15% feldspar + ck frags; angular to rounded. Wet - 5Y5/3 olive, dry 5Y7/2 lt gray. Mod - strong rxn in HCl.	1710	

REMARKS:

P.A. Chamness 11/2/87

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)

4-A.1383

DRILL LOG	By: M.A. Chamness	Rig: RF Inst.	Well Number: 299 E24 2	Computer Number	Project or Work Order No.: KEH 1915-1
	Date: 7/23/87	GSR MIS 21	Depth: 1-' To 145'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
122'11" 10" 116'2"	130'-135'	cont'd		Unconsolidated. Low gravel content gravel still generally small, sand fraction more plg + volc, more fine sands + silt than last sample.	1710	stopped, welding on 10" casing
					1715/1815	chips recovered from barrel
					1840	started drilling again
	135'-140'	H	(D)	SLIGHTLY GRAVELLY, SLIGHTLY SILTY SAND: 8% gravel, 80% sand, 12% silt. 3% lp, 2% vlp, 2% vvp, 20% cc, 18% vc, 5% vc, 5% vls, 12% silt. Poorly sorted. Gravel - 55% basalt, 25% qtz, 20% igneous + others; angular to subrounded. Sand - 30% basalt, 45% qtz, 25% feldspar + rk frags; angular to rounded. Wet - 5Y5/3 olive, dry - 1/1 lt grey. Mod. strong rxn in HCl. Unconsolidated, coarse silt following last + finer. 10% gravel, 15% silt + low gravel than last sample.	1900	
	140'-145'	H	(D)	SLIGHTLY SILTY GRAVELLY SAND: 15% gravel, 65% sand, 12% silt, 1% vlp, 5% lp, 9% vlp, 25% vc, 20% cc, 9% vc, 5% vls, 12% silt. Very poorly sorted. Gravel - 60% basalt, 15% qtz, 25% igneous + others; angular to subrounded. Sand - 20% basalt, 45% qtz, 25% feldspar and rk frags; angular to rounded.	1945	

REMARKS.

M.A. Chamness 7/23/87

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)

4-A.1384

DRILL LOG	By N.A. Chamness	Rig ER 601	Well Number 299-E34-3	Computer Number	Project or Work Order No. WEH-1915-1
	Date 7/23/87	681 0154	Depth 145' To 153'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
116'3"	111' 113'	cont'd		Wet - 5Y5/3 olive, dry - 5Y7/2 lt gray. Moderate rxn to HCl. Unconsolidated, same as above. Similar to previous sample, slightly more gravel.		
116'6"					1945	stopped, welding on 6" of 16" casing
116'9"						
					2015	started drilling again
	145'-153'	H	W	SLIGHTLY SILTY GRAVELLY SAND: 10% gravel, 80% sand, 10% silt. 5% Cf, 7% Mf, 25% VCS, 28% CS, 15% MS, 7% FS, 5% VFS, 10% silt. Mod - poorly sorted. Gravel - 60% basalt, 25% qtz, 15% igneous & others; angular to subrounded. Sand - 30% basalt, 15% qtz, 25% feldspar & lt. lines, angular to rounded. Although dried in headlights, wet - 5Y5/3 olive, dry - 5Y7/2 lt. gray. Slight rxn with HCl. Unconsolidated, same as above, raising & lowering bit. Similar to above sample.	2105	
					2120	Driller quit for day.
				N.A. Chamness 7/23/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1385

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
R.L. PREMO	B.E. 60L	299-E34-2	N/A	KEH-1915-1
Date 7/24/87	68K-19154	Depth 153' To 161'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
156'9" of 10" casing.						Driller is Don St. George.
					0515	Drilling started
					0545	stopped drilling. Preparing to weld.
	154-155'	H	W	GRAVELLY SAND. 12% gravel, 80% sand, 8% silt. Gravel is 40% EP, 8% VFP. Sand is 40% VCS, 25% CS, 10% MS, 5% FS. Sample is well-moderately sorted. Gravel composition is 55% basalt, 20% qtz, 25% granitics & other. Sand composition is 25% basalt, 60% qtz, 15% feldspar & rock fragments. Gravels are SA-A. Sands are SR-A. Wet color is 5Y4/3 (olive). Dry color is 5Y7/3 (Pale yellow). Slight-Mod cem to 10% HCl. No consolidation. Slightly more gravel than previous sample.	0615	Sample from bottom of bailer.
10'3/4"						
167'3/4" of 10" casing					0615	Adding 10'3/4" of 10" casing to previous 156'9" of 10". Total 10" casing is now 167'3/4".
					0730	Drilling resumed.
	160-161'	H	W	GRAVELLY SAND. 25% gravel, 70% sand, 5% S.H. Gravel is 10% EP, 15% VFP. Sand is 40% VCS, 20% CS,	0755	Sample from bottom of bailer.

REMARKS:

Richard L. Premo

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

A-6000-021 (5-85)

4-A.1386

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	B.E 60L	299-E24-2	N/A	KEA - UC...
Date: 7/1/87	68K-16-54	Depth: 161' To 165'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
167'4" of 10" casing.				7% MS, 3% FS. Sample is well-moderately sorted Gravel composition is 40% basalt, 15% qtz, 25% granites + other. Sand composition is 45% basalt, 40% qtz, 15% feldspar, rock fragments + other. Gravels are SA-A. Sands are SR-A. Wet color is 5Y4/3 (olive). Dry color is 5Y7/2 (lt gray). Slight-mod. rxn to 10% HCl. No consolidations. More gravels than previous sample.		
	164-165'	H	W	GRAVELLY SAND. 27% gravel, 68% sand, 5% silt. Gravel is 3% MP, 10% FP, 14% VFP. Sand is 20% VCS, 30% CS, 15% MS, 3% FS. Sample is moderately sorted. Gravel composition is 60% basalt, 25% qtz, 15% granites + other. Sand composition is 30% basalt, 40% qtz 30% feldspar, rock fragments and other. Gravels are SA-A. Sands are SA-A. Wet color is 5Y4/3 (olive). Dry color is rxn to 10% HCl. No consolidations. Very similar to previous sample.	0822	Sample from bottom of liner
					0822	Drilling stopped. Switching to 8" casing.

REMARKS:

Richard Premzic

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

A-6000-021 (5-85)

4-A-1387

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.L. PREMZIC	B.E. 60L	299-E34-2	N/A	KEH-1915-1
Date: 7/24/87	68K-14154	Depth: 165' To 165'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
167'3/4" of 10" casing						
21'3" of 8" casing.					1130	Adding 8" casing. 21'3" with drive shoe added.
42'2" of 8" casing.					1215	20'11" of 8" added
62'11" of 8" casing.					1245	20'9" of 8" added.
83'8" of 8" casing.					1320	20'11" of 8" added.

REMARKS:

Richard Premzic 7/24/87

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)

4-A.1388

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chauvenet	CME 75	231 EQH-2	N/A	KEH-1315-1
Date: 7/24/87		Depth: 165' To 172'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
2'-10.4" 8" csg						
120'-8" 114'-6"						
122'-2½"						
125'-3" 115'-11½"					1845/1845	stopped/restarted from lunch
129'-3" 164'-8"					1845/1930	drilled a little bit
140'-6" 177'-2½"					1930	reamed to 10 6" at 8"
					2020	started drilling again
	160'-165'	H	D	SLIGHTLY SILTY GRAVELLY SAND: 25% gravel, 10-15 mm, 20% silt, 5% cl, 17% mf, 23 vcs, 10% c, 12% ms, 6% fs, 4% vfs, 10% silt, poorly sorted. Gravel - 40% basalt, 20% qtz, qtzite, 10% green chlorite, angular to subangular. Sand - 40% basalt, 40% qtz, 20% feldspar + dk frags, angular to subrounded, wet 5Y5/3 olive, dry 5Y7/2 lt gray. Slight hyd. in HCl. Unconsolidated. Similar to last sample, slightly more silt, more basalt in sand fraction although the getting dust + chlorite is less. Least from clean dust ppt.	2115	driller stopped for day
				M.A. Chauvenet 7/24/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1389

DRILL LOG	By LA HAGEN	Rig Cable Tool	Well Number 299-E34-2	Computer Number NA	Project or Work Order No. KFH-1715-1
	Date 7/25/87	Cask-19154	Depth 172' To 180'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
177' 2¼" of		8"			0500	Began drilling
	174-175	H	W	SLIGHTLY SILTY GRAVELLY SAND. 25% gravel	0520	
				65% sand, 10% silt. Sample is trace of MP,		
				10% FP, 15% VFP, 25% VCS, 30% CS, 10% MS, trace		
				of FS. Sample is MS-PS. Gravels composed of		
				65% basalt, 25% metamorphics (gneiss, qtzite), 10%		
				clear. Sand is 25% BASALT, 65% qtz, 10% RF.		
				Gravel is R-SA; sand is A-SR. Wet color is		
				5Y 5/3 (olive); dry color is 5Y 7/2 (light gray). Moderate		
				HCl rxn on fines. No consolidation. Similar to		
				previous sample; little change from previous description.		
					0525	Stopped drilling -
						building up bit.
187 3¼" of 8"					0745	Added 10' 1" of
						8" casing.
	179-180'	H	W	GRAVELLY SAND. 28% gravel, 67% sand, 5% silt.	0930	
				Sample is 1% MP, 15% FP, 12% VFP, 20% VCS, 30% CS,		
				10% FS, 7% VFS. Sample is poorly sorted. Gravel is		

REMARKS:

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

A-6000-021 (5-85)

4-A-1390

DRILL LOG	By RA Hazen	Rig 68k-19154	Well Number 299-E34-2	Computer Number NA	Project or Work Order No. HFH-1915-1
	Date 7/25/89		Depth 180' To 184'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
187'3 1/4" of	8"			60% basalt, 20% qtz-sil, 10% metamorphics, 10% clay. Sand is 30% basalt, 60% qtz, 10% F.G. Gravel clasts are SR-SA; sand grains are A-SR. Wet color is 5Y 5/3 (olive); dry color is 5Y 7/2 (light gray). Moderate HCl rxn on dried fines. No consolidation. Very similar to previous sample.		
					1145	Sand is heaving in hole @ ~181-182'. Drive casing ahead ~3-4' and is drilling out plug.
					1208	Stopped drilling - returning water to temp.
187' 1 3/4" of 8"					1249	Cut off 1 1/2" of 8" casing - balled from driving (no drive head on 8")
					1300	Shift change - from Turk to OLin.
10'2"						
197'3 3/4"					1326	Welding on 10'2" of 8"

REMARKS:

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

A-6000-021 (5-85)

4-A.1391

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	B.E. Cook	299-E34-2	N/A	KEH-1915-1
Date: 7/25/91	(GSW 1154)	Depth: 184' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197 3/4"					1450	Started drilling again
at 8"	184'-185'	H	W	SLIGHTLY SILTY (GRAVELLY SAND: 6% gravel, 91% sand,	1455	
				8% silt. 1% mg, 9% fg, 18% vfg, 20% vcs, 18% cs, 8% ms, 5% fs, 3% vfs,		
				8% silt, Poorly sorted. Gravel - 65% basalt, 15% qtz. + qtzite,		
				20% igneous + others; angular to subrounded. Sand - 40% basalt,		
				40% qtz., 20% feldspar + rk frags, angular to rounded.		
				Wet - 5Y5/2 olive, dry - 5Y7/2 lt gray. Mod-strong rxn in		
				HCl. Unconsolidated. Slightly more silt than last sample		
				Measured water level in 299 E34-1 at 223.9'		
	189'-190'	H	W	SILTY SANDY GRAVEL: 30% gravel, 63% sand, 7% silt.	1600	
				16% fg, 20% vfg, 23% vcs, 18% cs, trace, 4% fs, 2% vfs, 7% silt,		
				Moderately to poorly sorted. Gravel - 60% basalt, 20% qtz. +		
				qtzite, 20% igneous + others; angular to subrounded. Sand -		
				40% basalt, 40% qtz, 20% feldspar + rk frags; angular to		
				rounded. Wet: 5Y4/2 olive, dry - 5Y7/2 lt gray. Slight to		
				moderate rxn. in HCl. Unconsolidated. Similar to last		
				sample, slightly more gravel.		

REMARKS:

M A Chamness
7/25/91

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

A-6000-021 (5-85)

4-A.1392

DRILL LOG	By: M.A. Chambers	Rig: CEMOL	Well Number: 299-E24-2	Computer Number	Project or Work Order No.: KEH-1915-1
	Date: 7/25/87	68K19154	Depth: 190' To 200'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197' 3¾" of 8"	191'-195'	H	W	SLIGHTLY SILTY GRAVELLY SAND: 25% gravel, 65% sand, 10% silt. 8% fp, 17% vlf, 25% vfs, 23% cs, 10% ms, 4% fs, 3% vs, 10% silt. Poorly sorted Gravel - 55% basalt, 25% qtz, 20% igneous + others; angular to subrounded. Sand - 35% basalt, 15% qtz, 20% feldspar + rk frags, angular to rounded. Wet - 5Y4/3 olive, dry - 5Y7½ lt gray. Moderate rxn in HCl. Unconsolidated. Less basalt + gravel, more silt than previous sample	1705	started drilling welding on 10'2" of 8"
10'2"					1705	
207'5¾"					1710/1810	lunch break
					1830	started drilling again
	191'-200'	H	W	SLIGHTLY SILTY GRAVELLY SAND: 23% gravel, 67% sand, 10% silt. 6% fp, 11% vlf, 25% vfs, 25% cs, 10% ms, 4% fs, 3% vs, 10% silt. Poorly sorted. Gravel - 50% basalt, 20% qtz + qtzite, 30% igneous + others; angular to subangular. Sand - 40% basalt, 40% qtz, 20% feldspar + rk frags, angular to rounded. Wet - 5Y4/3 olive, dry - 5Y7½ lt. gray. Slight rxn to HCl. Unconsolidated. Two coarse pebbles, possibly from gravel stringer, one with caliche on one side. Sample does not seem to have much $CaCO_3$ so it must be from prior to deposition. Similar to last sample.	1930	driller able to drill open hole up to 2' occas.

REMARKS:

M A Chambers 7/25/87

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)

4-A.1393

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	CME 60L	299-E27-2	N/A	KEH-1915-1
Date: 7/25/87	68K1915-1	Depth: 200' To 205'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204'5 3/4" of 8" casing	204'-205	H	W	SLIGHTLY SILTY GRAVELLY SAND: 27% gravel, 63% Sand, 10% silt. 12% fp, 15% vfp, 20% vcs, 22% cs, 11% ms, 6% fs, 4% vfs, 10% silt. Poorly sorted. Gravel - 55% basalt, 25% qtz., 20% igneous + other; angular to subangular. Sand - 40% basalt, 10% qtz., 20% feldspar + rk frags., angular to subrounded. Wet - 5Y4/3 olive, dry - 5Y7/2 lt. gray. Slight rxn to HCl. Unconsolidated. Similar to last sample, slightly more gravel.	2040	
					2050	stopped drilling, preparing to weld on 10'6" of 8" casing
					2110	quitting for day
				M.A. Chamness 7/25/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1394

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMO, JR.	B.E. 602	299-E34-2	N/A	KEH-1915-1
Date: 7/27/87	68K-19154	Depth: 205' To 215'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
207'5¼" of 8"		" casing		Driller is Dean St. George.	0530	Added 10'6" of 8" casing to previous 207'5¼" total 8" casing is now 217'11¾'. Driving casing.
217'11¾" of 8" casing						
217'8¾" of 8" casing					0655	3" of top of casing removed because it was belled.
					0705	Drilling started
	209-210'	H	W	SILTY SANDY GRAVEL, 47% gravel, 45% sand, 8% silt. Gravels are 7% CP, 12% MP, 16% FP, 5% VFP. Sands are 13% VCS, 16% CS, 8% MS, 8% FS. Sample is Poorly sorted Gravel composition is 65% basalt, 20% qtz+qtzite, 15% Feigneous + other. Sand composition is 40% basalt, 45% qtz, 15% feldspar + rock fragments. Gravels are SR-A. Sands are SR-A. Wet color is 5Y4/3, (olive). Dry color is 5Y7/3 (pale yellow). Mod-strong rxn to HCl. No consolidation. More gravels than previous sample, otherwise very similar.	0800	Sample from dust boiler
	214-215'	H	W	SILTY SANDY GRAVEL. 30% gravel, 40% sand, 30% silt. Gravel is 3% CP, 6% MP, 15% FP, 6% VFP. Sand is 4% VCS, 3% CS, 3% MS, 15% FS, 15% VFS. Sample is poorly sorted. Gravels composition is	0830	Sample from dust boiler

REMARKS:

Richard Premo Jr.

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

A-6000-021 (5-85)

4-A.1395

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	B.E. 60L	Z19-E34-2	N/A	SF-4-1915-L
Date: 7/27/87	68k-19154	Depth: 215' To 215'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
217'8	3/4" of 8" casing.			70% basalt, 10% qtz-bearing, 20% igneous & others. Sand composition is 15% basalt, 80% qtz, 5% feldspar & rock fragments. Gravels are SA-A Sands are R-SA. Wet color is 5Y4/3 (olive). Dry color is 5Y7/3 (pale yellow). Mod. rxn to 10% HCl No consolidation. Less gravels, less sand, much more silt than previous sample.		
+ 10 1/2'						
227'10	1/4" of 8" casing.				0830	Stopped drilling. Adding 10' 1 1/2" of 8" casing to previous 217'8 3/4" of 8" casing. Total 8" casing is 227'10" of 8".
					0935	Resumed drilling.
					?	Added on 10' of 8"
				Geologist unable to remain at well site during day shift, two samples were waiting at view, time of sampling unknown		Driller is still driving casing ahead.

REMARKS:

Richard Premzic
7/27/87

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)

4-A.1396

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M A Chrumes	CME 60C	299-E31-2	N/A	KEH-MIS-1
Date: 7/27/87	68K3154	Depth: 215' To 225'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
227'10¼" of 8" casing	215'-220'	H	W	SILTY SANDY GRAVEL: 50% gravel, 42% sand, 5% silt, 3% vcp, 12 cp, 20% mp, 8% fp, 7% vfp, 10% vcs, 18% cs, 7% ms, 6% fs, 4% vfs, 5% silt. Very poorly sorted. Gravel - 35% basalt, 40% igneous + other rk frags, 25% qtz + qtzite; angular to well rounded. Sand - 35% basalt, 45% qtz, 20% feldspar + rk frags, angular to subrounded. Wet - 5Y4/3 olive, dry - 5Y7/2 lt. gray. Slight - moderate rxn in HCl. Unconsolidated? More gravel w/ less basalt, than last sample	?	
	224'-225'	H	wet	SILTY SANDY GRAVEL: 35% gravel, 57% sand, 8% silt, 2% cp, 8% mp, 10% fp, 15% vfp, 17% vcs, 23% cs, 10% ms, 4% fs, 3% vfs, 8% silt. Very poorly sorted. Gravel - 35% basalt, 30% qtz + qtzite, 35% igneous + others; angular to well rounded. Sand - 20% basalt, 50% qtz, 20% feldspar + rk frag; angular to subrounded. Wet - 5Y4/3 olive, dry - 5Y7/2 lt gray. Slight rxn. to HCl. Unconsolidated? Less gravel than last sample.	?	
210'0"					~1200	welding on 10' of 8" casing
237'10½"						

REMARKS:

M A Chrumes 7/27/87

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)

4-A.1397

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chawners	BE60L	299-E31-2	N/A	KEH 1915 1
Date: 7/27/87	68K19154	Depth: 225' To 235'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
227'10¾" & 6" casing	229'-230'	H	W	SILTY SANDY GRAVEL: 45% gravel, 45% sand, 10% silt. 5% vcf, 15% cg, 15% mg, 6% fg, 4% vfg, 10% vcs, 15% cs, 10% ms, 6% fs, 4% vfs, 10% silt. Very poorly sorted. Gravel - 35% basalt, 30% qtz + qtzite, 35% igneous + others; angular to well rounded. Sand - 25% basalt, 15% qtz, 20% feldspar + vk. frags, angular to subrounded. Wet - 5Y4/1 dark gray, dry - 5Y7/2 lt. gray. Very slight rxn. w. HCl. Unconsolidated. More gravel than last sample.	1400	
	234'-235'	H	W	SILTY SANDY GRAVEL: 50% gravel, 15% sand, 5% silt, 2% vcf, 12% mf, 15% fg, 20% vfg, 24% vcs, 15% cs, 3% ms, 2% fs, 1% vfs, 1% silt. Poorly sorted. Gravel - 20% basalt, 40% igneous + vk. frags, 30% qtz; angular to rounded. Sand - 45% basalt, 45% qtz, 10% feldspar + vk. frags; angular to subrounded. Wet - 5Y4/2 olive gray, dry - 5Y6/2 lt. olive gray. No rxn. in HCl. Unconsolidated. Slight odor - fumes, sand more basaltic than last sample. Water level on tables at a max. of ~10'	1515	
110'6"					1530	cut of 2" of lolled casing, welding on 10'8"
248'4¾"						

REMARKS:

M.A. Chawners 7/27/87

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 (6-86)

4-A-1398

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M A Chamness	REGO	299-E34-2	N/A	KEH-1915-1
Date: 7/27/87	GEK 9154	Depth: 225' To 240'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
245' of 6 3/4" casing					1615	started drilling @ 225'
					1750	tagged sr bench
					1820	started drilling again
				Ft ~ 238'6" water level on bailer ~ 15'		
	239-240	H	W	SLIGHTLY SILTY SAND, 2% gravel, 65% sand, 15% silt, 2% vfp, 10% vcs, 28% cs, 30% ms, 10% fs, 5% vfs, 15% silt. Poorly sorted. Gravel - 50% basalt, 30% qtz, 20% igneous; angular. Sand - 30% basalt, 60% qtz, 10% feldspar & vl lithics; angular to subrounded. Wet - 5Y 6/1 olive gray, dry - 5Y 6/2 lt. olive gray. No res. in WL. Slightly consolidated based on fineness of cuttings & bounce of drilling tools. Definite change at ~238' from gravel to sand (water level ~ 15' on bailer	1915	
				M.A. Chamness 7/27/87		
				R.A. Hagen replaces Chamness	1955	
				Driller thinks he hit basalt at 241'. Bit is beginning to get chipped, slow drilling and casing won't drive anymore. Bailed material	2020	

REMARKS:

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

A-6000-021 (5-85)

4-A.1399

DRILL LOG	By RA HACKETT	Rig BE 60L KOEH-19154	Well Number 299-E34-2	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 7/27/87		Depth 240' To 241½'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
248'4 3/4" of 8"				is black MS-UFS w/occasional CP. Water		
				bailed is dark grey. Much qtz (~30%) in		
				bailed material, much of which is rounded. Driller		
				did not seem to drill long enough (w/ridged		
				bit) to produce this much sand-sized material		
				from basalt bedrock, but all other parameters		
				suggest we are in basalt.		
				@ 241½' - definitely in basalt - bailed	2052	Stopped drilling
				material will make a good sample for		~½' into basalt.
				analysis - very pure sample, course chips.		
243'4 3/4" of 8"				Sample of bailed material taken	2110	Cut of 5'0"
				and marked as 241½' - material		of 8" casing.
				was sieved (>2mm); some bulk material		3'2" of 8" stick-
				saved also.*		up above 16"
				Hole needs to be cleaned-out + geophysically		casing (=ground
				logged		surface)
					2115	End of work day
				RJ Hackett 7/27/87		

REMARKS:

* Basalt is fine-grained, with acicular and blocky microphenocrysts of plagioclase, dark grey to black on fresh surfaces. Looks like Elephant Mountain basalt. Some weathered surfaces. Sample taken for XRF. UNC

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

A-6000-021 (5-85)

4-A.1400

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Preszic	B.E. 60C	299-E34-2	N/A	KEH-9815-1
Date 7/28/87	68K-19154	Depth 241 1/2' To 241 1/2'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
243'4 3/4" of 8" casing						Driller - Don St. George
				D/B = 241.12' (steel tape) - 3' splice 238.12 + 2.3' end of tape 240.42 from ground surface (measured to top of 16" casing)	0650	
				D/W = 241.95' - 242' hold + (-.05 cut) (steel tape) - 3 splice 238.95 - 3.17 casing stickup (measured to top of 16" casing, taken to be ground surface) 235.78	0700	
				240.42 235.78 4.64' of water in well.		
				Bailed ~12-15 gallons of water and ~½ gallon of crushed basalt.	0715	
				Ran straightness test using a 20' bailer with elbow welded around both ends & the middle, making the bailer 6" in diameter	0725	
				Geophysically logged by Eric Jensen.	1000	

REMARKS:

Richard Premsic

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

A 6000-021 (5-85)

4-A.1401

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Premzie	B.E. 60L	299-E34-2	N/A	KEH-1915-1
Date: 7/28/87	68K-19154	Depth: 241½' To 241½'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
243'4 3/4" of 8" casing						
				Set 10'3" of 8" telescoping screen in well.	1215	
				D/B = 240.85'		
				steel tape +2.7		
				243.15'		
				- 3.00		
				240.15 D/B of screen from ground surface.		
				D/W = 238.55' 240.15 − 238.55 = 1.60' of water in well		
				(E-tape Ser. #11044)		

Richard Premzie 7/28/87

REMARKS:

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

A 6000-021 (5-85)

4-A.1402

DRILL LOG	By R A HAGEN	Rig Cable Tool 68K-19154	Well Number 299-E34-2	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 7/28/87		Depth 241 1/2' To 241 1/2'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
243'4	3/4' of	8"		Water level measured at 241'8" - 3'2" = 238'6".	1430	
				Since water level appeared to be rising 1 foot per night, the casing may be snug enough against the basalt to have cut off the water.		
				Rigging up to pull 8" casing to expose telescoping screen to ice formation.	1540	3'2" of stick-up above 16" casing
				Pulled casing back 8'9 1/2". (1 1/2' of overlap)	1608	
234'3	1/4" of	8"		Cut off 9'1 1/2" of 8" casing	1700	
				D/W = 226.33' - 2.79' (strik-up) = 223.54' (E-7 APE #11044)	1708	
				D/B (Bottom of telescopic screen) = 243'3 3/4" - 3' (splice) + 2'3 1/2" (cuts) - 2'9 1/2" (strik-up) = 239'10"	— may	have some sand on bottom of screen.
				∴ we have 16.29' of water - but D/W may not be static level - will check later.	1715	
					1730/1830	lunch break
				D/W = 226.31 - 2.79 = 223.52' (E-7 APE #11044)	1826	So water level must be static.
				Began developing well (first 2 bailer loads held ~13 gals each).	1835	water contains FS - MS - about 2 cups on bottom of bucket
				# of bailer loads of water removed = 34 by (~450 gal of water bailed in 60 min) (bailer held ~15 gal @ 1913 hrs - not drawing down aquifer) M.A. Chamness 7/28/87	1937	this works out to 7.4 gpm using 13 gal/bail (442 gal)

REMARKS: SL = down for Spin

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

A-6000-021 (5-85)

4-A-1403

DRILL LOG

By: R A HAGEN | Rig: Cable Tool | Well Number: 299-E34-2 | Computer Number: NA | Project or Work Order No.: HEH-1715-1

Date: 7/28/87 | 68K-19154 | Depth: 241 1/2' To 241 1/2' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
234'3	1/4" of	8"		Water still contains F-M sand, much basalt in sand. (~1 cup of sand in 5 gal H2O)	1937/1952	Stopped/resumed bailing
				# of bailer loads removed from 1952 to 2052 = 34 (442 gal, 7.4 gpm)	2052	(measured ~13 gal in
				# of bailer loads removed from 2052 to 2200 = 25		bailer @ 2033 hrs)
				25 bails = 325 gal in 53 min = 6.1 gpm	2104/2119	Stopped/resumed bailing
				borehole volume (for 16.3' of water column)	2125	Water contains abt
				is about 5.7 ft³, which is about 40.5 gal		1-2 Tblspoons of sand
				so 3 bailer loads of 13 gal each will		in a 5 gal bucket of H2O
				remove one borehole volume of water.		Sand is mostly FS,
				∴ bail ~9-10 times before taking water		some MS also.
				samples (remove 3 borehole volumes of water).		
					2147	Measured ~13 gal
						of water in bailer
					2200	Stopped bailing
				bailed a total of ~1200 gal of water in		(bailed for 2 hrs 55 min.)
				~3 hours for an average bailing rate		
				of 6.7 gpm		
				D/B = 243.75 - 3' + 2.29 - 2.79' = 240.25'	2218	depth to bottom of
				could not get D/W because too much water on		telescoping screen.
				casing walls.		

REMARKS:

End of workday @ 2230

R J A H 7/28/87

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 G000 021 (5-85)

4-A.1404

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMO	B.E. 60L	244-E34-2	N/A	KEH-1915-1
Date: 7/29/87	68K-19154	Depth: 241½ To 241½		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
234' 3/4" ø SS casing						Driller is Jon St. George.
				D/W = 223.68' from ground surface [E-tape #1044]	0630	
				D/B = 24095-.7 = 240.25 from ground surface [end of tape + splice]	0640	
					0800	Surging of well using an 8" diameter steel plate welded to the bottom of the drill bit. well is surged by moving bit up + down, sandy, ~2-3'. steel plate is just above the top of the 8" screen. Water is then bailed to remove any sands that have surged into the well.
				Water Sample (1-ℓ poly bottle) taken by Radiation monitor for radiological analysis from dark blanket. Analysis should be done this afternoon. Were advised by RSM to not bail anymore water until analysis were completed.	1000	

REMARKS:

Richard Premo 7/29/87

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 (5-85)

4-A-1405

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	B.E. 60L	299-E34-2	N/A	KEH-1915-1
Date: 7/29/87	68K-1915-4	Depth: 241½' To 241½'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
234'	3 1/4" of	8" casing.				
				Gore Pues came out to take samples of water. After several tries to	1420	
				get bailer down the well, we decided to tie the weights onto the		
				bottom instead of the top. The bailer was handled by several		
				people not wearing gloves, so we decided it should be rinsed		
				off in drinking water supplied for the workers and wiped off		
				with a rag.		
				Finished sampling well.	1900	
				M.A. Chamness 7/29/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1406

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
T.R. Oster	BE 600L	299-E34-2	N/A	KEH-1915-1
Date 7/30/87	#68K-17154	Depth 241½ To 241½		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 = 227.67 ' below land surface	0718	
				[E-tape Ser. #11044]		
				D/B = 240.95 - .70' = 240.25 ' below land surface (PNL 300' STEEL TAPE	0950	
					0940	Started surging well.
						well was bailed clean.
						Started afternoon by day shift d. Hec. ~130 gallons of H_2O removed.
					1345	Still surging well. ~130 gallons of H_2O bailed between 0940-1345 hrs.

REMARKS:

Richard Brennan
7/30/87

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)

4-A.1407

DRILL LOG

By	Rig	Well Number	Computer Number	Project o: Work Order No.
M.A. Chambers	CEL 6	299 E21 2.		KEH-1915-1
Date: 7/30/87	GBK1915-1	Depth: 241 1/2' To 241 1/2'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1530	welded on cross plate to
						tools to fit inside telescoping
						screen for surging.
					1700	started surging well
					1800/1830	stopped for lunch/started
					1930	hooked again, got some
						sand out - f-c sand -
						water still salty, 20 slot
						screen is not keeping most
						of the sand out. Pulled
						screen and cut slots longer
					2100	quit for day
				M.A. Chambers 7/30/87		

REMARKS:

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

A 6000 021 (5-85)

4-A.1408

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PRINZIC	B.E. 60 L	299-E34-2	N/A	KE4-C-5-1
Date 7/31/87	68K-19154	**Depth** 241½' To 241½'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
234'3"	4" of	8" cas'g.				
				p/B = 240.58' - .71 = 239.88' (steel tape) [end of type - spud]	0725	
				D/W = 223.77' [F. tape Sec. #11044]	0733	

REMARKS:

Richard Prinzic
7/31/87

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)

4-A.1409

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PRENTICE	B.F. GOL	299-E34-2	N/A	PF-19,5
Date 8/3/87	68K-19159	**Depth** 241.5' To 241.2'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 223.37 (E. Expe #1044)	0857	
				D/B = 240.65 - 2 = 238.65 (Steel Tape)	1205	

REMARKS:

Richard Prentice
8/3/87

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

A-6000-021 (5-85)

4-A.1410

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R L Premzic	B.E 60L	79 E34-2		SE-15
Date 8/4/87	68t 1915	**Depth** 24[illegible] - To 241 [illegible]	NA	**Subcontract No.** NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 223.29	0807	
				(Range for #1044)		
				D/B = 240.62 - 7 239.92	0815	
				(Steel tape)		

Richard Premzic
8/4/87

REMARKS:

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-6000-021 (5-85)

4-A.1411

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R. Oster	B.E. 60L	299-E34-2	N/A	KEH-1915-1
Date: 8/6/87	68K-19154	Depth: 241 1/2 To 241 1/2		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 223.31' below land surface (PNL 300' E-TAPE #11044)	0905	
				D/B = 240.70' - .70' = 240' below land surface (PNL 300' STEEL TAPE)	0910	

REMARKS:

Karen P. Oster
8/6/87

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 (5-85)

4-A.1412

DRILL LOG	By: M.A Chavarria	Rig: EE 602	Well Number: 299-E34-2	Computer Number	Project or Work Order No.: KEH-1915-1
	Date: 8/6/87	68K-1915-1	Depth: 241 1/2' To 241 1/2'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Setting pump & stillwell for pump test	1500	
				21' piece of pipe, 11 pieces, with 2'1½" of total stickup		
				from ground surface to top of joint, bottom of pump at		
				240' of stillwell pipe - 2'10" stickup = bottom of pipe at		
				237'2"		
				Michele Chavarria 8/6/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1413

DRILL LOG	By K.R. Oster	Rig B.E. Hoc.	Well Number 299 E34 2	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 9/17/87	#68K-19154	Depth 211½ To 211½		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Started Step drawdown test using 299-E34-1 as	0700	
				observation well. Pumped for 198min at rates between		
				8.4 and 51.6 gpm. Total drawdown = 226.88' - 226.69' =		
				.19'. Stopped test because clog in fuel filter on		
				generator was causing flow rate decrease.		
				Blew out fuel filter with compressed air - seems	1245	
				to have solved problem.		
				Started 8 hour pump test. Flow rate = 107 gpm	1320	
				Measured using bucket and actual rate is closer to		
				200 gpm. M.A. Chamness		

REMARKS:

Steven K. Oster
9/17/87

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	Rig	Well Number	Computer Number	Project or Work Order No.
R L PiEmzic	B.C. 60L	299-E34-2	N/A	[illegible]
Date 8/18/87	68K-19154	Depth 241½ To 245½		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Removed pump from well.	0900	
				Setting 4" stainless steel casing in well.	0910	
				20' 3½" screen attached to bottom of 20' section		
				of s.s. pipe. 20' section of s.s. is attached to 20 section		
				of ss pipe with centralizers on the bottom.		
				20' 3½" s.s screen		
				20' ss pipe		
				20' s.s pipe with centralizers		
				Very bad galling of threads between the 20' s.s.	1100	
				pipe with the centralizers + the 20' ss. pipe below		
				it. Both pipes were slightly dented from the pipe wrenches.		
				1 - 20' 3½" ss screen in well.	1155	
				10 - 20' s.s. pipe in well.		
				1 - 10' s.s. pipe in well.	order of placement in well.	
				1 - 2' s.s. pipe in well.		
				2 - 5' ss pipe in well.		
				247' of ss. pipe in well.		
				D/B = 237.8 - .7' = 237.1'	1450	
				1 - 50lb. sack of bentonite crumbles added down 8" screen	1500	

REMARKS: by mistake instead of sand. Will have to pull 4" stainless steel pipe & screen from well & clean out bentonite from inside of screen. Will alternate surging + bailing.

Richard Piemzic 8/18/87

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)

4-A.1415

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	EE&G	299-E-24-2	N/A	YEH 1715-1
Date: 8/6/87	68K19154	Depth: 241½' To 241½'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled 4" stainless steel bark out to clean out bentonite.		Chet Nuss' driller
				Used sand pump and surging tool alternately to get		
				bentonite out. Did this for approx. 3 hours, at which		
				time there was no more bentonite in the water or on		
				the sides of the sand pump.	2000	
				Picked up another new 20' section of 4" 20 slot st. steel		
				screen, since the other one will have to be steam		
				cleaned. Put 1' of 20-30 sand in the hole in case there		
				is still some bentonite on the bottom. Set the screen on		241'6"
				top of this, along with the rest of the 4" casing.		+ 2'0" tape
				Poured 3½ bags of 20-30 sand in the hole.		243'6"
						- 3'3"
				221'6"		240'3" LE bottom of screen
				+ 2'0" tape		4"
				223'6"		
				- 3'3" stickup		
				221'3" DE sand pack		
				M.A. Chamness 8/8/87		

REMARKS:

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

A-6300-021 (5-85)

4-A.1416

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMTIL	B.E. 60L	299-E34-2	N/A	KEA-1915-1
Date 8/10/87	68K-19154	**Depth** 241½' To 241½'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0730	welding casing pulls to pullback.
				D/B from 8/8/87 is 221'3" to top of sand pack.		
				D/B = 230.4'±2' = 232.4' − 11.5' (stickup) = 220.9'	0810	3' pullback. Bottom of casing at 227'.
				8" Casing bottom at 231'.	0820	2 sacks 20/70 sand added.
				227'10¼" weld is 4'9" above ground surface.	0830	~8' pullback. Cutting off stickup & rewelding pulling head.
				D/B = 223±2' = 225' − 9'9" (stickup) = 215'3" to sand	0915	
					0920	2 bags 20/30 sand added.
				D/B = 219'±2' = 221' − 8'3" (stickup) = 212'9" to sand	1125	~8' pullback.
Bottom of 8" at 214'3¾"					1130	5-5gall buckets of bentonite pellets added.
				D/B = 211'8"±2' = 213'8" − 8'3" (stickup) = 205'5"	1132	
				D/B = 202'7"±2' = 204'7" − 8'2" (stickup) = 196'4"	1145	3-50lb sacks of bent crumbles added.
Bottom of 8" at 202'7¾"				D/B = 201±2' = 203'	1345	~10' pullback.

REMARKS:

Richard Premtil

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

A-6000-021 (5-85)

4-A.1417

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	B.E 60L	299-E34-2	N/A	KEH-1915-1
Date 8/10/87	68K-19154	Depth 241½' To 241½'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
Bottom of 8" at	202'7¾	"		D/B = 183'+2' = 185'	1350	6-50lb sacks of bent. crumbles added.
					1530	197'3¾ weld is now showing.

REMARKS:

Richard Premzic 8/10/87

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)

4-A.1418

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	BE600L	299-34-2	N/A	WCH-1915-1
Date: 8/10/87	68K1915-1	Depth: 241½' To 241½'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Bentonite ums at 191', added 4 bags of bentonite crumbles DB 181'	1600	
				Pulled 8" casing ~10'		
				DB at 185'1", added 7 bags bentonite crumbles	1700	
				DB now at 168'0"		
				Pulled 8" casing ~10'		
				DB at 174'7", added 5 bags bentonite crumbles	1730	
				DB now at 160'7½"		
				welded pulling head on, pulled casing	1800	
				inside 12"		
					1915	lunch break
					1950	back on site
				finished pulling 8" casing out,		
				DB bentonite 166'9" from ground surface		
				got 10" puller head welded on, ready to grout		
				first thing in the morning.		
					2300	Driller moving grout equip. to site
				M.A. Chamness 8/10/87	2330	quit for day

REMARKS:

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

A-6000-021 (5-85)

4-A-1419

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R. Oster	BE 60L	299-E34-2	N/A	KEH-1915-1
Date 8/11/87	08K-19154	**Depth** 241½' to 241½'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Mixed 7½ bags Volclay grout (48 lbs ea) and 7 bags	0815	
				(2 lbs ea) of Volclay grout initiator with ~160 gallons		
				of water. Grout had a mud balance weight of		
				9.5 lbs per gallon before being pumped into well.		
				Measured D/Top of Volclay grout @ 122' below land surface	0855	
				(PNL 300' STEEL TAPE #5) Bottom of 10" casing is @ 165'6¾"		
				So have 43'6¾" Volclay grout overlap in 10" casing		
				All day struggle to pull casing back top weld is	1530	
				the 167'¾" weld		
166'6¾"		of 10" casing in hole.				
- 16'						Pulled 16' during day
160'1¾"						shift

REMARKS:

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 (5-85)

4-A.1420

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	RC Rig	[illegible]		KEH 1315-1
Date: 8/11/87	68K1515	Depth: 241½' To 241½'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
160'4¾"					1740	still pulling + pounding on 1st piece of 10" casing.
						pulling very hard, making slow progress
					1900/1930	lunch break
					2000	lights broke down couldn't do any more.
- 2'2"						Pulled 2'2" this shift
158'2¾"						
				M.A. Chamness 8/10/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1421

DRILL LOG	By K.R.Oster	Rig # BECOL 108K-19154	Well Number 299-E34-2	Computer Number N/A	Project or Work Order No. RCH-1915-1
	Date 8/12/87		Depth 241½ To 241½		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled 10" casing back to 148' 10" below ground surface. Measured D/Top of Volclay grout at 130' below ground surface (PNL 300' STEEL TAPE). There is 18' 10" of grout inside of 10" casing	1300	
						Pulled total of 5' of casing on this shaft

REMARKS:

Karen R. Oster
8/12/87

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)

4-A.1422

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	CME 60C	299-E24-2	N/A	KEH-1915-1
Date: 8/12/87	68K1151	Depth: 241½ To 241½		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				136'1"	1700/1130	Lunch break
				+ 2'		
				138'1"	2060	finally got casing
				- 2'10"		pulled back to next weld
136'3"	@ 10"			135'3" DB grout		at 136'3", which is
2'10"						2'10" above ground
133'5"	@ 10" below ground					surface
					2010	getting jars to pull
						casing better, moving
						grout equipment
				M.A. Chamness 8/12/87		

REMARKS:

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

A 6000-021 (5-86)

4-A.1423

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R.Oster	B.E. WOL	299-E34-2	N/A	KEH 1915-1
Date 8/13/87	#68K-19154	Depth 241½ to 241½		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain; Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Started riggin' down to move off site, this well will be completed using a crane to backfill the rest of the casing.	0715	

REMARKS:

Karen P. Oster
8/13/87

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 (5-85)

4-A.1424

DRILL LOG	By K.R. Oster	Rig Crane #17T-19959 Extractor	Well Number 217-E-34-2	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 8/25/87		Depth 211 1/2 To 211 1/2		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Measured D/Top of Volclay Grout @ 135.10' below land	0800	Volclay Grout Seal =
				surface (PNL 300' STEEL TAPE #5) Bottom of 10" casing is		136.7' - 166.75'
				at 146'3" - 3' (STICK-UP) ≈ 143'3". The overlap is 143.25' - 135.10'		below Ground Surface
				= 8.15'.		
				Pulled on casing for ½ hour and only pulled back 6"	0920	
				and puller top cracked. Measured D/Top Grout at		
				135.25'. Tapped casing down 3" to attempt to free		
				it.		
				Welding on new puller top reinforcements.	1000	
				Pulled casing back ~1' and tapped down ~1'	1030	
				to free it from formation		
				Pulling back on casing	1115	
				Pulled casing back ~1.5' and welded new puller	1400	
				top. Tapped casing back down ~1'		
				Pulling on casing.	1415	
				Bottom of casing is now 146'3" - 5'3" = 141' below land	1455	Stopped - broken
				surface. Measured D/Top of Volclay grout @ 136'7" below		pile extractor.
				land surface (PNL 200' STEEL TAPE.) Overlap = 5'5"		

REMARKS:

Karen R. Oster
8/25/87

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)

4-A.1425

DRILL LOG	By K.R.Oster	Rig Crane 17T-19759 + Extractor	Well Number 299-E34-2	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 8/28/87		Depth 241½ To 241½		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Bottom of 10" Casing = 141' below land surface Added 6 bags	0730	
				(100lbs ea) Bighorn Bentonite granules. started		
				pulling back casing.		
				Pulled casing back to 141' - 2.4' = 138.6' below land surface.	0845	
				Measured D/Top of Granular bentonite seal @ 122.4',		
				Overlap inside 10" Casing = 138.6' - 122.4' = 16.2'. Pounded		
				Casing down .2' to 138.8' below land surface.		
				started Pulling back casing.	0855	
				Extractor broke. total of 5.4' pulled to date.	1055	
				D/Bottom of Casing = 141' - 5.4' = 135.6' below land surface.		
				Measured D/Top of Granular Bentonite Seal @ 124.5'	1120	
				below land surface (PNL200' STEEL TAPE) Overlap of seal		
				is 135.6' - 124.5' = 11.1'		

REMARKS:

Karen P Oster
8/28/87

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)

4-A.1426

DRILL LOG

By	Rig Crane	Well Number	Computer Number	Project or Work Order No.
L R Oster	17T-19959	299-E34-2	N/A	KEH-1915-1
Date: 8/31/87	Extractor	Depth: 241½' To 241½'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Started Pulling casing and pounding down (once in a while).	0730	
				Pulled Casing back to 132'9" below land surface (135'10" weld is just below puller top.) Measured	1050	
				D/Top of Granular Bentonite @ 126.2' below land surface (PNL 200' STEEL TAPE). Added 6 bags		
				(100 lbs ea) Big Horn Bentonite (granules)		
				Measured D/Top of Granular bentonite @ 109.1' below land surface (PNL 200' STEEL TAPE.)	1055	
				Started Pulling casing again.	1100	
				Broke the extractor again.	1140	
				Fixed extractor and started pulling again.	1415	
				Pulled .4' and pin on extractor broke.	1515	

REMARKS:

Lauren P. Oster
8/31/87

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)

4-A.1427

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R. Oster	Crane IIT-19959 + Extractor	299-E34-2	N/A	KEH-1915-1
Date: 9/1/87		Depth: 241½' To 241½'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Started Pulling casing and Pounding it down	0715	
				Poured ~1.5 bags (100lbs ea) Bighorn bentonite	0830	
				(granules) between the 10" and the 12" casings and		
				Poured water on top this is done as an attempt to		
				slick down the sides of the 10" casing making it		
				easier to pull. (It does appear to be working)		
				Welding cracks in puller top.	0730	
				Started Pulling again	1015	
				Stopped Pulling	1155 - 1230	Lunch.
				Started Pulling.	1235	
				Welding cracks in puller top.	1300	
				Added ~4.5 more bags (100lbs ea) Bighorn bentonite	1400	
				to the annulus between the 10" and 12" casing and		
				then poured more water over it started pulling.		
				Compressor to hot to continue pulling - stopped for day	1500	
				Total Casing pulled today = 8.6'. Casing is pulled back		
				to 123.75' below land surface. No D/Top of Granular Bentonite		
				Seal measurement taken due to high stick-up of casing.		

REMARKS:

Karen R. Oster
9/1/87

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)

4-A.1428

DRILL LOG	By K.R. Oster	Rig Crane 17T-19959 w/ Extractor	Well Number 299-E34-2	Computer Number N/A	Project or Work Order No. KEH-1715-1
	Date 9/2/87		Depth 241½' To 241½'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Inspecting crane.	0700	
				Started pulling casing - Adding some water	0745	
				between the 10" and 12" casings.		
				Compressor to hot - stop to let it cool.	0845	
				Pulling casing	0900	
				Cut Casing off @ 125'4" weld leaving the bottom of	0945	
				the 10" casing @ 121' below land surface.		
				Measured D/Top of Granular bentonite @ 117.7' below land	0955	
				surface (PNL 200' STEEL TAPE). Added 11 bags (100 lbs ea) of		
				Bighorn bentonite (granules) and Measured D/Top of		
				Granular bentonite @ 86.3' below land surface (PNL		
				200' STEEL TAPE).		
				Started Pulling Casing again	1015	
				Compressor hot - stop to let it cool.	1145 - 1245	Lunch
				Resumed Pulling Casing - got the 10" free inside the	1245	
				12" and pulled all but last 2 sections from hole		
					1315	End Shift.

REMARKS:

Karen R Oster
9/2/87

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)

4-A.1429

DRILL LOG	By K.R. Oster	Rig Gravity III - 19759 Explorator	Well Number 299-E34-2	Computer Number N/A	Project or Work Order No. REH-1915-1
	Date 9/3/87		Depth 241½' To 241½'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Started pulling remaining 10" Casing.	0715	
				Finished removing 10" casing from hole. Measured	0800	
				D/Top of Granular bentonite @ 98.7' below land surface		
				(PNL 200' STEEL TAPE)		
				Added 15 bags (100 lbs ea) Bighorn bentonite	0805	
				(granules). Measured D/Top of granular bentonite		
				@ 71.7' below land surface (PNL 200' STEEL TAPE.)		
				Welding puller top onto 12" casing.	0810	
				Poured 1 bag (100lbs ea) Bighorn bentonite (granules) and	0900	
				~15 gals of H_2O between 12" and 16" casing and started		
				pulling.		
				Pulled 12" casing back to 91.3' below land surface.	0940	
				Measured D/Top of granular bentonite @ 77.7' below land	0950	
				surface (PNL 200' STEEL TAPE). Added 17 bags (100lbs ea)		
				of Bighorn bentonite (granules). Measured D/Top of		
				granular bentonite @ 46.7' below land surface (PNL		
				200' STEEL TAPE.)		
				Started pulling again	1030	

REMARKS:

Karen R. Oster
9/3/87

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)

4-A.1430

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.P Oster	# IT-14959 Crane Extractor	777 E34-2	N/A	KEH-A15-1
Date 9/3/87		Depth 241½' To 241½'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				top pulled off of casing.	1150-1235	Lunch
				Welding new Eaison puller top.	1240	
				Started pulling and pounding casing	1300	
				Casing pulls up ~2.5' then stops and after pounding		
				down pulls up to same point and then stops.		
				Stop to fix otter	1430	
				Pulling and pounding down again, adding 11to	1445	
				between 12" and 16" casings		
				Stopped pulling - Bottom of 12" casing ≈ 88.7'	1520	
				below land surface.		

REMARKS:

Karen P Oster
9/3/87

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)

4-A.1431

DRILL LOG	By K.R. Oster	Rig Crane 17T-19959 + Extractor	Well Number 299-E34-2	Computer Number N/A	Project or Work Order No. KEH-1715-1
	Date 9/4/87		Depth 241½' To 241½'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Started pulling casing and pounding down	0715	Added 15 gals H_2O between
				Pipe is moving maybe ½" an hour basically it is		12" & 16" casings
				stuck in the hole.		
				Broke pin on extractor - stopped to fix it.	0945	
				Pulling and pounding casing. Add water between 12" & 16" casing as its going.	1015	
					1150	Lunch break
				Pulling and pounding casing - Adding water between	1235	
				the 12" & 16" casing		
				The bottom weld exposed is the 84'11" weld	1520	End Shift.
				and it is now .5' above land surface so the		
				bottom of the 12" casing is at 84.9'-.5' = 84.4' below		
				land surface.		

REMARKS:

Karen R. Oster
9/4/87

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 6000.0

4-A.1432

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMTIC	AMERICAN CREST 175-1959	99 134-2	N/A	KEH-1915-1
Date: 9/8/87		Depth: 241 1/2' To 241 1/2'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled 6' and pounded it back down. Belled pulling head when pounding. Cutting off belled section.	0915	
				Still pulling casing with extractor.	1325	
				Switched to PACO extractor. Pulled one foot. 84'11"	1435	
				weld is 2'1¾" above 16" casing.		

Richard Premtic
9/8/87

REMARKS:

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

A 6000-021 (5-85)

4-A.1433

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	AMERICAN CRANE 175-19959	299-E34-2	N/A	KEH-19151
Date: 9/9/87		Depth: 241'h' To 241½'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulling + spreading casing w/ increasing — Switched bit to pulling extractor. D/B = 61.8 + 2.3 (Stickup) = 64.1'	1120	
				Have pulled ~1' today. 84" weld is 3' above 16" casing. Extractor is slowly leaking hydraulic fluid. Unable to tell if any has leaked inside the casing.		
				Pulled ~2'. THE 74'5" WELD IS 4' ABOVE GROUND (BIG HARD BOULDER)	1415	USING PACO
				D/B AFTER ADDING 5 100 LBS BAGS & 25 50 LBS. BAGS (BENTONITE CHIPS) = 31.3'		EXTRACTOR. APPLIED MORE PRESSURE W/ CHAIN & CASING
						ABOVE REF.
				Pulled ~12 feet	1500	Quit for the day.

Richard Premzic
9/9/87

REMARKS.

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

A 6000-021 (5-86)

4-A.1434

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	AMERICAN CRAWLER 137-19959	299 E34-2	N/A	KEH-1915-1
Date: 9/10/87		Depth: 2'11½' To 24'1½'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Cutting off 5 sticks of 63'11" weld. 63'11" weld is 5.6' above the ground.	0750	
				D/B = 43.8' Pulling casing with PACO extractor at this time.	0840	
				Casing pulled so 53'3½" weld is 4.3' above ground surface.	0905	
				D/B = 46' 20 - 50 lb. bags of bentonite crumbles added. D/B = 25.5'		
				Pulled 10'. 12" casing is free inside the 16" casing.	0915	
				ADDED 15 50 LBS. BAGS OF BENTONITE CRUMBLES;	1000	
				D/B = 19.4'		
				6' of the 12" casing was pulled inside the 16" casing where it	1005	
				stuck. 16" casing is now being pulled with the 12" casing.		
				D/B = 25.9'; ADDED 20 BAGS OF 50 LBS. BIG	1050	
				HEAD BENTONITE CRUMBLES D/B AFTER ADDING CRUM-		
				BLES = 6.3'		
				D/B = 9.9' after ~10' pull, adding 10 bags of	1130	
				50 lb. BIG HEAD BENTONITE CRUMBLES. D/B = 11.5' above ground surface.		
					1200	Lunch
				Completed pulling casing. Left 5' of 16" casing below ground prior to	1300	

REMARKS: pouring concrete. D/B = 3' below ground surface, Now awaiting concrete.

Richard Premzic 9/10/87

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)

4-A.1435

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness		299-E34-2		
Date: 12/9/87	none	Depth: To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				On 12/4/87, Steve Airhart came out to measure water levels and noted a constriction in the well at ~99' and apparently bentonite and no water in the bottom of the hole. Vern McGhan went out on 12/9/87 and videotaped the hole as far as he could, ~99', and found a few wrinkles between 80' and 90' and a crumpled section at 99', with the crumbled casing closing off at least ½ of the well diameter. Brought another, smaller, camera out and lowered through the crumpled section and found bentonite inside the screen, ~2½' from the top of the screen. The bentonite looks relatively dry and looks as though it was bentonite crumbles. Will probably try to surge out the hole and see if it is still usable.		
				M.A. Chamness 12/9/87		

REMARKS:

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

A-6000 021 (5 85)

4-A.1436

DRILL LOG	By: GV LAST	Rig: BUCYRUS ERIE 22W KAISER #3	Well Number: 299-E34-2	Computer Number: NA	Project or Work Order No.: KEH-1115-1
	Date: 12-11-87		Depth: To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLERS ARE LIN & LENNY CARDEN.	1345	
				RIG & EQUIPMENT WAS STEAM CLEANED AND		
				SET UP BY EARLY MORNING.		
				STARTED SWEDGING NW CASING AT 09:30. PROGRESS		
				IS SLOW (SWEDGE BOUNCES BADLY).		
				PULLED SWEDGE OUT. ESTIMATE CASING SWEDGED OUT TO 2 3/4".	1440	
				LENNY WENT TO LOOK FOR NEW SWEDGING TOOLS.		

REMARKS:

GV Last 12-11-87

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 (5-85)

4-A.1437

DRILL LOG	By: H. A. Clawson	Rig: CE 220 Kaiser #3	Well Number: NPR-E34-2	Computer Number: NA	Project or Work Order No.: KEH-1315-1
	Date: 12/14/87		Depth: To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Borrowed 4" stem, jars, and bailer from Westinghouse and steam cleaned them. Will try to make a new swedge using the 4" core barrel.	8:20	Drillers are Lin + Lenny Cordon
				Started swedging the hole again, seems to be working pretty well this time, have it swedged out to ~ 3 3/16" to 3 1/4".	12:10	
				Dawn Schatz came out and we used both the side-looking tool + the down-looking tool on the downhole camera. There does not appear to be any tears in the casing, although there is bentonite on the folds. The crumpled zone is ~2 1/4" high, immediately above the joint.	13:30	
				We now trying to get into or through the bentonite. What they are getting up out of the hole is dry, and seems to be solid. Cannot tell whether there is a plug or if the whole screen is filled. Will keep trying.	14:55	

REMARKS:

H. A. Clawson 12/14/87

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)

4-A.1438

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	CE 220	299-E34-2		KEH-1115-1
Date: 12/15/87	Kaiser #3	Depth: To	NA	Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Made another tool out of 2½" OD pipe to try to punch through bentonite. Finally succeeded, getting small 1½'-2' long "cores" of bentonite out and falling into water beneath. Made a bailer out of 2½" pipe and am in the process of trying to get as much bentonite as possible out of the hole. I will try to arrange to have the camera run down the hole to look at the screen to see whether it's gummed up with bentonite.	8am	
				M.A. Chamness 12/15/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1439

DRILL LOG	By: M.A. Chamness	Rig: B.E 220 Kaiser #3	Well Number: 299-E34-2	Computer Number: N/A	Project or Work Order No.: YEH-1715-1
	Date: 12/16/93		Depth: To		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Lin Gordon is driller that out here with downhole camera.		
				at 1015, but the camera would not fit all the way		
				through the constricted pit. Swedged out the hole a		
				little more, is now fairly open from top to bottom of		
				constriction instead of funnel shaped. Too much		
				bentonite on top of water to penetrate, but		
				we could see the bentonite above the water table, where		
				the plug had been. Will try to swedge the hole a		
				little more + bail more to clean out the bentonite		
				M.A. Chamness 12/16/93		

REMARKS:

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

A 6000-021 (5-85)

4-A.1440

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chawners	B.E. 22cl	299-E24 2		REH-715-1
Date: 12/17/87	Kaiser #3	Depth: To	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Borrowed a ~30' long 2 1/8" ds sand pump from BWIP's drilling + testing. A new rope socket will need to be poured and the hole cleaned out. Will try to run camera down hole tomorrow morning.	1115	
				M.A. Chawners 12/17/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1441

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	B.E 22W	299-E34-2		KEH 1915-1
Date: 12/18/87	Kaiser #3	Depth: To	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Ran the camera down the hole, and the water looks very clean, no turbidity, a few little chunks of mud or bentonite occasionally. But starting at ~223' and going to ~226' there is a lot of bentonite on the screen. Since this extends above and below the water level (at ~225'), I told Kaiser that that portion still needed to be cleaned off. They are drilling holes w/ a 1/2" or 3/4" tip (the airlift used during pump tests) and will lower that to the appropriate depths, hooked up to a water truck with pump to pressure jet water at the screen and clean the hole up. Will use the sand pump to pick up shell knocked loose.	1030	
				M.A. Chamness 12/18/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1442

DRILL LOG	By: W.A. Chauvenet	Rig: B.E 2200 Kaiser #3	Well Number: 299-E31-2	Computer Number: N/A	Project or Work Order No.: KEH 1915-1
	Date: 12/21/87		Depth: To		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pumped drilling water through ½" pipe with 12 holes drilled at the bottom on all sides. Moved it up and down inside the well to knock the bentonite off wall and the hole same to see if there is any bentonite in the water. Used ~ 1000 gal water	1000	
				Pulled sand from the sand pack and some chunks of bentonite out of the well with the PUMP sand pump. A lot of sand pack was bailed out and after ~ ½ hr. pieces of gravel and black sand were found with the white frac sand pack sand. Apparently there is a hole in the screen, not just the wrong size sand for the screen casing was stopped, so that no more sand pack will be removed. A camera will be run down hole tomorrow to see how well the jetting water worked and what the hole looks like.	1230	
				W.A Chauvenet 12/21/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1443

DRILL LOG	By: M.A. Chamness	Rig: B.E. 2200	Well Number: 299-E21-2	Computer Number: N/A	Project or Work Order No.: KEH-115-1
	Date: 12/22/87	Kaiser #3	Depth: To		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Could not get the PNL camera, which is 2 3/4" diameter past the swedged spot at 99'. Arranged to use the Westinghouse camera, which is a little smaller than 2" OD. It showed a lip at 99'. The bailer probably caught on one of the pieces of casing that had been swedged down and pulled part of it fork out. The camera lens picked up a little bentonite here and obscured part of the picture. We could see some bentonite on the screen before the lens became completely covered by bentonite, but it did not appear to be very thick and may not extend to the water table. Washed off the lens in the ground water, and the screen below the water table looked fine until the camera shorted out. Will recommend moving the drill rig off site and that the well is suitable.	930 200	
				M.A. Chamness 12/22/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1444

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
OC in Ames	#154	E-34-2		
Date 7-20-87		Depth 12' to 28'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
4"	15	H	W	Gravel w/little sand 3"-5" in size		
4"	20	H	W	" " "	1:00	Start Drilling
4"	25	H	W	" " "	3:40	Start welding
						30' casing
					4:40	Start Drilling
					8:55	Prepare to
						weld 40' casing
						(Beveled casing
						(40 gallons
						of water
						used)

REMARKS:

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

A-6000-021 (5-86)

4-A.1445

FIGURE 3.
DRILL LOG

By ST GEORGE | Rig 154" | Well Number 299E-34-2 | Computer Number | Project or Work Order No. | Subcontract No.

Date 7/21/87 | Depth 28' to 40'

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
28'		H	W		05⁰⁰ AM	START
10'	Add on		W			Add on 10'
				RUN 10' 16" CASING		16" CASING
38'	TOTAL	H	W	SAND & GRAVEL		
2					08⁰⁰	Change To
						12" CASING
					9:33	Shut down to find out Bit was cleaned
21'10				~~Ran 12" casing~~ Put Drive shoe on 10" pipe	9:45	
				Put 12" Bit on	11:00	
21'10				Ran 12" Casing	11:20	
20'11½						

REMARKS:

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

4-A.1446

FIGURE 3.
DRILL LOG

By: OLIN Amos | Rig: #154 | Well Number: 299 E-34-2 | Computer Number: | Project or Work Order No.:
Date: 9-21-87 | Depth: 40' To 62' | Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'6"	45	H	W	Sand & Gravel		
10'7½"	50	H	W	" "	2:00	cut Bit down + cut casing
10'6"	55	H	W	" "	1:30	START Drilling
	60	H	W	Vic. Sand	1:45	Add 10'6" casing
					5:00	Add 10'7½" casing
					6:45	START Drilling
					8:30	Add 10'6" casing
				Total casing ~~76~~ 74'5"		
						90 gallons of water used

REMARKS:

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

4-A.1447

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
ST George	154 #	299E-34-2		
Date 7/22/87		Depth 6.2' To 10		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	1'					
74	5"	H	W.	welded pipe on		
10.6				started drilling	6'45"	
94'11"				welded pipe on	725	
10'				started drilling	10:00	
94'11"				Welded 10' Pipe		

REMARKS:

D - Drive Barrel H - Hard Trail L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine Stainless Wire

4-A.1448

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Colin Ames	# 154	2099E-34-2		
Date 7-22-87		Depth 96' To 106'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'1"	95	H	W	Sand very coarse		
	100	H	W	"		Drill 16' of
	105	H	W	"		12"
						Set 104' of
	10"	casing				10"
	21'3½"	"				
	20'11"	"		Total 12" casing 106'		
	20'10½			Total 10" in hole 104'6"		
	20'9½					
	20'7½					

REMARKS:

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

4-A.1449

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Don St. Hauge	154	22E-34-2		
Date: 7-23-87		Depth: 106 To 115		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
16'6"						
10'				welded pipe & put tools on started		
114'6"				drilling	11:35	
16'6				welded pipe on		
125'4'						

REMARKS:

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

4-A.1450

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Al Mo 3	#	299E-34-2		
Date 7-23-87	154	Depth 115' To 153'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
125'	4"120	H	W	LE Sand		
10'6"	125	H	W	"		
10'5"	130	H	W	"		
10'6"	135	H	W	"		
	140	H	W	"		
	145	H	W	"		
	150	H	W	"		
				156'9" Total 10" in hole		

REMARKS:

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

4-A.1451

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Construtenega	154 M	22 E - 34 - 2		Subcontract No.
Date 7-24-87		Depth 153' To		

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
156'9"	153'				5:15	
10'3¾"				welded pipe on	6:30	
167¾"				167 '3/4"- 10" pipe in hole		
				started drilling	7:05	
8 1/3" x				8' pipe		
20'11						
20'9 x						
20'11 x						
20' 8 x						
20'3¾ x						
20'9 x						
20'9 x						
20' 7						

REMARKS:

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

4-A.1452

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C Haines		299C-34-2		
Date 7-24-97	154#	Depth 165' To 172'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	70'	H	W	Sand L.C.		
20'8"						Finish running
20'8½"						8" Ann. Cl. L.
20'9"						(Geo-hydro Pit)
20'9"						
10'6"						
				Total 8" in hole 177'2¼"		

REMARKS:

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

A 6000-021 (5-85)

4-A.1453

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Don W. Hunger	154	29E-34-2		
Date		Depth		Subcontract No.
7-25-87		173 To		

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
177'2	1/4"			started Drilling	5:00	
10'1"				welded 10'1" pipe on		
187'3	3/4					

REMARKS:

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

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Chavez	F154	LPC-34-2		
Date 1-25-87		Depth 155 To 205		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10 3"	185	H	W	Sand LC		
10 3"	190	H	W	"		Caliche
	195	H	W	"		20'
	200	H	W	"		
	205	H	W	"		
				Total 5" in hole 207' 5¾"		

REMARKS:

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

4-A.1455

1 of 5

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
E. F. St Amant	154	24 9E-34-2		
Date		Depth		Subcontract No
8-27-87		205' To		

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
205'5½"				210 2" thin Gravel & Sand	5:00	AM
10'8"				220 pea Gravel & Brown Sand		
217'8½"						
10'1½"						
~~227'10"~~						
227'7½"						
10'						
237'7½"						

REMARKS:

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

4-A-1456

2nd

145

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
7-27-87	#154	299E-34-2		
Date	Depth			Subcontract No.
O. Ames	227 To 241			

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'8"	30	H	W	Sand & gravel		
	35	H	W	" "		
	40	H	W	Basalt AT 240'		Drill 1' in
						Basalt
				Total casing in hole 243' c~~ounting~~ 3' stick up		

REMARKS:

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

A-6000 (02) (6-89)

4-A.1457

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Dean St George	134	299 E-34-2		
Date: 7-28-87		Depth: To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Bailed hole out		
				Welded plate on bit		
				ran 6" Bailer test		
				weld saw on pipe		
				set screen in hole		

REMARKS:

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

4-A.1458

2ND

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C Barnes	#154	299E-34-2		
Date 7-28-87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Start Bailing hole	6:35	
				Stop Bailing hole, put gear	10:00	motor clear
				away		

REMARKS:

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

4-A.1459

1st

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Don St George	154*	299 E-34-2		
Date 7-29-87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				welded plate on Bit	5:10	
				Static water level is 223' 8¼"	6:20	
				started Bailing hole and Sandpumping	6:30	
				gave water sample		
				Was told not to bail anymore water	9:30	
				out of hole till test comes back.	~~7:10~~	
				Bailed hole 10 Times	7:10	

REMARKS:

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

4-A.1460

1ST

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Dan St George	154	22SE-34-2		
Date: 7-30-87		Depth: To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Static water level is 223'6.7"		
				hole depth 240.25 feet		
				Started swing	935	
				Bailed hole 4 Bailers	10:46	to 10:55
				swing	10:57	to 11:30
				Bailed lots of x Bailers full	12:30	to 12:50
				swing	12:50	to 2:20
				Bailed 8 Bailers full	2:20	2:35
				swing	2:35	

REMARKS:

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

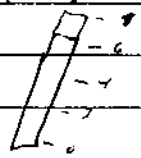
4-A.1461

2ND Shift

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
O. Amos	#154	299E-34-2		
Date 7-30-97		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Start Surging inside of screen	5:00	
				Bail hole & Bails	5:30	
				Surging Screen	5.45	very little
				Bail hole 12 Bails get lots of sand	7:00	sand coming out
				Bail Surge hole in Screen	7:30	
						Surging screen
						in 2' Intervals
				Start Bailing hole	4:30	



REMARKS:

D - Dove Bevel H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine

4-A.1462

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
O. Amos	# 154	E34-2		
Date 8/8/87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pull Stainless out of hole		1/2 Bag in
				Bail Bentonite out & Surge hole		Bottom of hole
				Install Stainless again & add		
				Sand		Add 3 1/2 Bags
						around screen
				(Had to run down power plant And lights)		
				Sand to 221' 2 1/2" From ground		
				(Ready to weld on ears & pull		10' of casing)

REMARKS:

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

4-A.1463

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
O. Amos	#154	E34-2		
Date 8-10-97		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pull 197' 8" casing &		
				Gear up to Pull 10" casing		
				Completed Pulling 8" Casing 197' ft.		
				Weld on Puller To START Pulling 10" CASing		

REMARKS:

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

4-A.1464

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
D. St. Hauge	154#	E34-2		
Date: 8-18-87		Depth: To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				pulling casing 10"		
				cut 9'8 of 10" casing off		
				next weld up 146		
				Pulling CASing		
		167				
		106				
		61				

REMARKS:

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

4-A.1465

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
O. Amos		E34-2		
Date 8-12-97		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				At Rig casing still not moving very good. Drive down 6" to 1' Mid hammer on it to try to loosen up casing	3:15	
				Drive clamps bolts Brake	9:00	
				Go Try To Find Some more or Some jars + rope socket		
						Pulled 5' casing

REMARKS:

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

A-6000 021 (5-85)

4-A.1466

WELL 299-E34-3

Battelle
Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project 200 Area RCRA Monitoring Wells
Location 200 EAST
Driller LINDON COPSON / Louis Watkins
Drilling Co. KAISER Eng. Hanford
Geologist R A HAGEN / R. L Premzic
K.R. Oster, S. Budziak, P. White, M.A. Chamness

Well Number 299-E34-3
Temporary Well Number NA
Coordinates N45 227 E30R 429
Casing Elevation 611.52'
Ground Elevation 609.48'

DRILLING METHOD

Rotary Air N/A Mud N/A
Cable Tool D N/A H ✓
Drilling Fluid Water from 200-E
Other Backhoe 0'-5'

COMPLETION DATA

Drilled Depth 213.89' below ground
Completion Depth 213' " "
Date Started 7/14/87 Completed 7/19/87
Static Water Level/Date 203.12' 8/10/87

CASING DATA

Type	Size		
Carbon steel - temporary	16"	+0'2½" to	-40'2¼"
Carbon steel - temporary	12"	ground surface to	-95'3½"
Carbon steel - temporary	10"	+0'5¾" to	-167'0"
Carbon steel - temporary	8"	+2'4½" to	-213'4"
Stainless Steel	4"	0 to	213'6" + 2.04' stickup

Approved By MAC Date 11/24/87

PERFORATIONS

Type
Depth - Schedule
N/A
App. By MAC Date 10/16/87

SCREEN

Type 8" Johnson, S.S. / 4" st. steel
Length 10'3" / 20'3½"
Slot Size 30 / 20
Depths 8" 203.5' / 213'
213.8' / 193'
App. By MAC Date 11/12/87

ANNULAR SEAL

Type	Interval	Volume
20/30 sand	213.6 - 184'	200 lbs.
bentonite pellets	184' - 177'	150 lbs.
granular bent.	177' - 165'	[illegible]
volclay grout	165' - 5' (5' to 3' bent.)	2305 gal. 5" (100%) Logs
cement	0'-5'	unknown

App. By MAC Date 11/24/87

GEOPHYSICAL LOGGING

Sondes	Interval	Date
nat. K	0' - 213'	7/28/87
caliper	0' - 213'	7/28/87
neutron	0' - 213'	7/28/87

Approved By MAC Date 7/29/87

AQUIFER TESTING

Type of Test development / recovery + slug test
Length of Test 5.1 hrs
Volume Pumped 13,600 gal
Drawdown 1.82'

Approved By Charles L. Cline Date 2/2/88

OTHER APPLICABLE ITEMS

RAH Steam Cleaning 7/14/87
RAH Storage of Const. Material 7/14
RAH Tool Lubricants
MAC Concrete Pad
Approved By M.A. Chamness Date 12/14/87

MAC Protective Steel Posts
MAC Safety Paint
✓ Straightness Test 7/27/87
✓ Well Development

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

Reviewed By J.K McKern Date 12-23-87

A-1800-187 (3/87)

PREFACE

This Inspection Plan identifies the inspections required and the responsible people to perform the inspections of the monitoring wells to be constructed under Project B-678.

The inspection of well construction activities is intended to provide assurance that the work performed by construction forces is in accordance with the approved contract documents. The degree of inspection is commensurate with the significance of the monitoring wells with regard to function and safety.

Inspectors

Listed below are the names of the individuals whose initials appear within this inspection plan.

Name	Initial	Organization	Job Title
John F. Keller	JFK	Kaiser Engineering Hanford	Superintendent
Michele A. Chamness	MAC	Pacific Northwest Laboratory	Scientist

The PNL project manager has reviewed the completed inspection plan and is satisfied that all the applicable inspections of the work were made during the construction of the wells.

G V Last
PNL Project Manager

1-13-88
Date

CONSTRUCTION INSPECTION SERVICES

Described herein are the inspection services to be provided and documented by PNL.

Pre-Award Submittal Review

	Item	Contract Reference	Initial	Date
1.	Verify contractor and drillers are licensed for well drilling in the State of Washington.	01100-1.2 01300-1.2.1A	JK	1-12-88
2.	Verify cable tool drilling experience is five years or more with drive barrel and hard tool.	01100-1.2	JK	1-12-88
3.	Verify documentation of ground-water monitoring wells drilled by contractor.	01100-1.2	JK	1-12-88
4.	Verify contractor submitted description of drilling method and equipment.	01300-1.2.1B	JK	1-12-88
5.	Verify contractor submitted resumes of personnel.	01300-1.2.1C	JK	1-12-88

Procurements

Verify materials to be furnished to the contractor are as described in the construction specification.

	Item	Contract Reference	Initial	Date
1.	Stainless steel screen (8 inch telescope size).	01100-1.5A	JK	1-12-87
2.	Stainless steel screen (4 inch).	01100-1.5B	JK	1-12-87
3.	Centralizers.	01100-1.5C	JK	1-12-87
4.	Stainless steel casing (4 inch).	01100-1.5D	JK	1-12-87

	Item		Contract Reference	Initial	Date
5.	Artificial sand packs.		01100-1.5E	JTK	1-12-88
6.	Bentonite pellets.		01100-1.5F	JTK	1-12-88
7.	Bentonite grout.		01100-1.5G	JTK	1-12-88
8.	Granular bentonite.		01100-1.5H	JTK	1-12-88
9.	Sack crete.		01100-1.5I	JTK	1-12-88
10.	Portland cement.		01100-1.5J	JTK	1-12-88
11.	Well cap.		01100-1.5K	JTK	1-12-88
12.	Brass survey marker.		01100-1.5L	JTK	1-12-88
13.	Sample jars.		01100-1.5M	JTK	1-12-88
14.	Hydrologic sampling equipment.		01100-1.5N	JTK	1-12-88
15.	Drive shoes.		01100-1.5O	JTK	1-12-88
16.	Carbon steel casing.	a. 16 inch	01100-1.5P	JTK	1-12-88
		b. 12 inch	01100-1.5P	JTK	1-12-88
		c. 10 inch	01100-1.5P	JTK	1-12-88
		d. 8 inch	01100-1.5P	JTK	1-12-88
17.	Guard posts.		01100-1.5Q	JTK	1-12-88
18.	Paint: primer		01100-1.5R	JTK	1-12-88
	finish enamel		02011-3.5I	JTK	1-12-88

Performance Submittals

	Item	Contract Reference	Initial	Date
1.	Verify submission and approval of construction schedule.	01300-1.2.2A	JTK	1-12-88
2.	Verify drilling logs are submitted daily.	01300-1.2.2B	JTK	1-12-88
3.	~~Verify submission and acceptability of flow meter certification.~~ DFC NO. 200-1	01300-1.2.2C		

ATTACHMENT 1

DESIGN/FIELD CHANGE		DFC No. 200-1
Task No. N/A	Project Title 200 Area Burial Ground Detection Monitoring	Final Approval Date 11/25/87

Documents Affected

1. Construction Specifications KEY-1914 (B-677) and (B-678)
2. Inspection Plan Construction Project KEH-1914 (B-677)

Description of Change

Line out and disregard any statements concerning flow meter certification. Specifically paragraph 1, 2.2C under performance submittals in the referenced construction specs. and item 3 under the performance submittals section of the referenced inspection plan.

Justification

See attached letter

Distribution

PNL
SP Airhart
MA Chamness
CS Cline
DR Dahl
TJ Gilmore
RM Smith
JS Wilbur

WHC
RE Clayton
C Hodge
RB Kasper
DM Tulberg

Remarks

None

Initiator/Author	Phone	Organization(s)	Date
G. V. Last GV Last	376-1054	Geosciences/PNL	11/25/87

Approvals

DR Raymond 11/25/87

Project Manager	QA
GV Last 11/25/87	DR Dahl 11/20/87

Well Number 299-E34-3

The remaining sections of this inspection plan shall be completed for each well.

Well Drilling Activities

	Item	Contract Reference	Initial	Date
1.	Verify wells are constructed in continuous operation.	01100-1.3	MAC	1/8/88
2.	Verify contractor uses approved water source.	01600-2.0	MAC	1/8/88
3.	Verify beveled edge is cut on temporary casing by contractor.	01600-2.1A	MAC	1/8/88
4.	Verify suitability of split spoon sampling equipment.	01600-2.2	N/A	
5.	Steam cleaning equipment.	01600-2.3	MAC	1/8/88
6.	Aquifer testing equipment.	01600-2.4	MAC	1/8/88
7.	Verify contractor has copy of WAC Chapter 173-160 "Minimum Standards for Construction and Maintenance of Water Wells" and the construction specification at the jobsite.	02011-1.2	MAC	1/8/88
8.	Verify contractor has a copy of all addendums and change orders at the jobsite.	02011-1.2	MAC	1/8/88

Monitoring Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify proper technique of cable tool drilling.	02011-3.1.1	MAC	1/8/88
2.	Verify steam cleaning is being done properly.	02011-3.1.2	MAC	1/8/88

Well Number 299-E34-3

	Item	Contract Reference	Initial	Date
3.	Verify contractor is handling and storing construction materials properly.	02011-3.1.3	MAC	1/8/88
4.	Verify bevel on casing and welding is done as specified.	02011-3.1.4	MAC	1/8/88
5.	Verify the contractor uses proper tool lubricants.	02011-3.1.5	MAC	1/8/88
6.	Verify only approved drilling additives are used.	02011-3.1.6	MAC	1/8/88
7.	Verify the proper disposal of drill cuttings and water.	02011-3.1.7	MAC	1/8/88

Well Testing

	Item	Contract Reference	Initial	Date
1.	Verify water-level measurements are taken. Note in log.	02011-3.2.1	MAC	1/8/88
2.	Verify the bottom of temporary casing is free of plugging material at end of each day. Note in log.	02011-3.2.1	MAC	1/8/88
3.	Verify ground-water samples are taken when needed.	02011-3.2.2	MAC	1/8/88
4.	Verify aquifer testing is done at each well.	02011-3.2.3	MAC	1/8/88
5.	Verify formation samples are taken as required.	02011-3.3	MAC	1/8/88

Well Number 299-E34-3

Borehole Construction

	Item	Contract Reference	Initial	Date
1.	Verify temporary casing is telescoped at no more than 100 feet intevals.	02011-3.4A	MAC	1/8/88
2.	Verify depth of well.	02011-3.4B	MAC	1/8/88
3.	Verify proper action is taken if overdrilling occurs.	02011-3.4C	MAC	1/8/88
4.	Verify acceptable passing of alignment test.	02011-3.4D	MAC	1/8/88
5.	Verify all temporary casing is removed from the well.	02011-3.4E	MAC	1/8/88

Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify position of 8 inch screen and pullback of casing to expose screen.	02011-3.5A	MAC	1/8/88
2.	Verify adequate well development.	02011-3.5B	MAC	1/8/88
3.	Witness aquifer test.	02011-3.5B	MAC	1/8/88
4.	Verify proper setting of 4 inch screen, casing, and centralizer.	02011-3.5C	MAC	1/8/88
5.	Verify proper placement of sand pack.	02011-3.5D	MAC	1/8/88
6.	Verify proper location and thickness of bentonite pellet seal.	02011-3.5E	MAC	1/8/88
7.	Verify proper mixing, placement, and location of Volclay bentonite-based grout.	02011-3.5F	MAC	1/8/88

	Item	Contract Reference	Initial	Date
8.	Verify proper concrete seal at top of well.	02011-3.5G	MAC	1/8/88
9.	Verify proper construction of concrete pad and placement of brass survey marker.	02011-3.5H	MAC	1/8/88
10.	Verify proper placement, construction, and painting of guard posts.	02011-3.5I	MAC	1/8/88
11.	Verify contractor cleans up site and properly stores excess materials.	02011-3.5J	MAC	1/8/88
12.	If abandonment of well occurs, verify proper abandonment.	02011-3.6	N/A	
13.	Verify contractor maintains the drill log daily.	02011-3.7		
14.	Prepare punchlist at construction completion for exceptions.		N/A	

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AS-BUILT DIAGRAM

Well Number 299-E34-3 Geologist R A HAGEN / R L PETERSEN Page 1 of 2
K. Oster, S. Sudbrink, P. White, M. Chamness

Reviewed by W L McLean Date 12-23-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill rate (ft/h)
Description	Diagram 1"=5ft		Diagram Litho.	Lithologic Description	
cement from 0'-3'		5		SILTY SANDY GRAVEL	NA
bentonite crumbles 3-5'		10		" " "	2.1
16" carbon steel casing		15		" " "	1.2
		20		" " "	1.7
		25			5.0
		30		sandy gravel	3.3
		35		silty sandy gravel	4.0
volclay grout 5'-165'		40		" " "	4.5
		45		" " "	5.6
		50			6.6
		55		Sandy Gravel	5.0
		60		" "	5.0
12" diam. temporary		65		silty sandy gravel	1.5
carbon steel casing		70		" " "	2.9
		75			4.1
		80		Sandy Gravel	3.1
		85			15.0
		90		silty sandy gravel	2.7
		95			4.3
10" diam temporary		100		SAND (AT 96')	5.
carbon steel casing		105		Slightly Gravelly Sand	6.0
3" carbon steel casing		110			4.3
		115		gravelly sand	8.5
4" diameter permanent		120			5.0
stainless steel casing		125		slightly gravelly sand	2.0
		130		gravelly sand	10.0

A-1800-186 (3/87)

Battelle
Pacific Northwest Laboratories

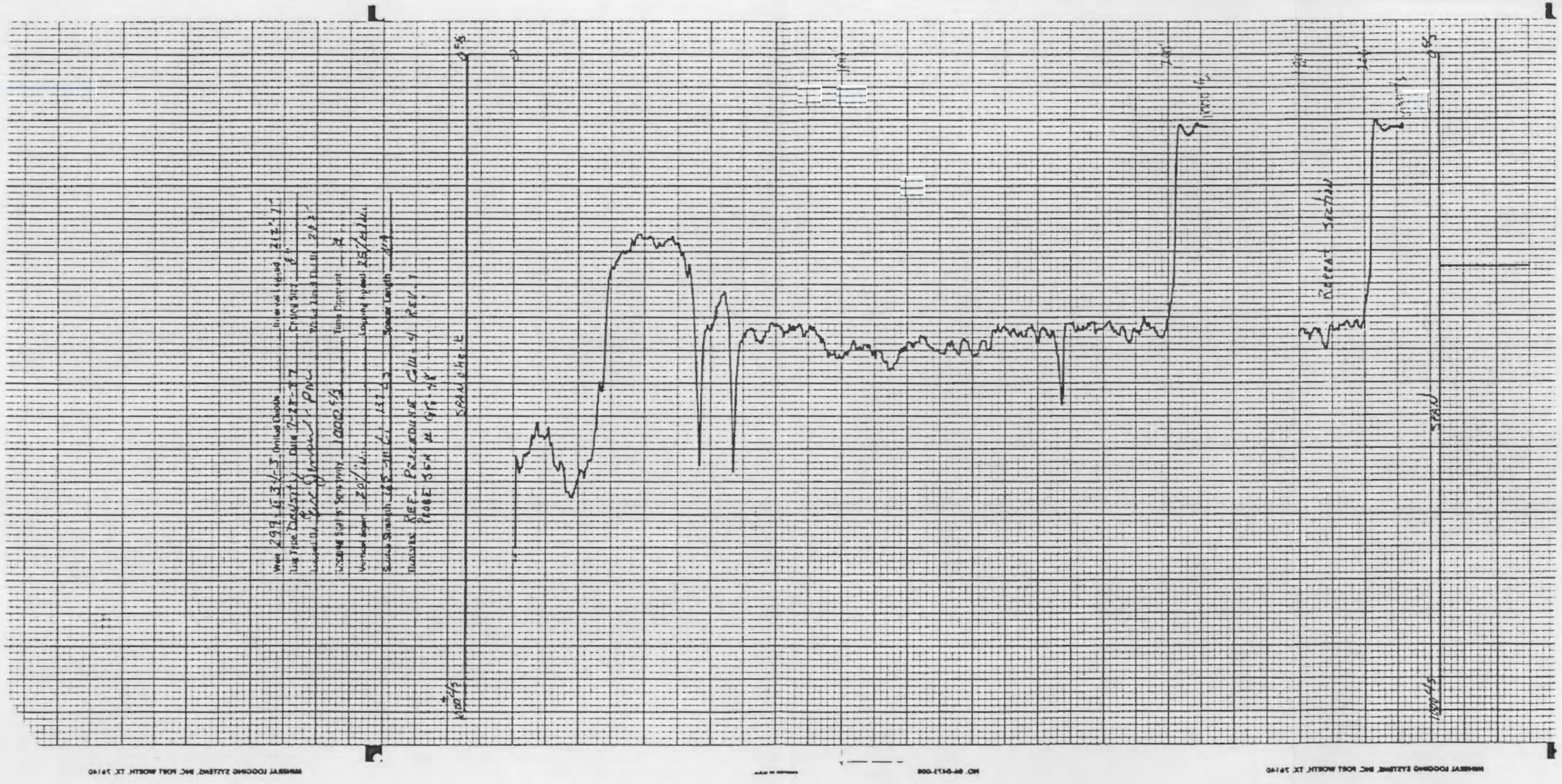
AS-BUILT DIAGRAM

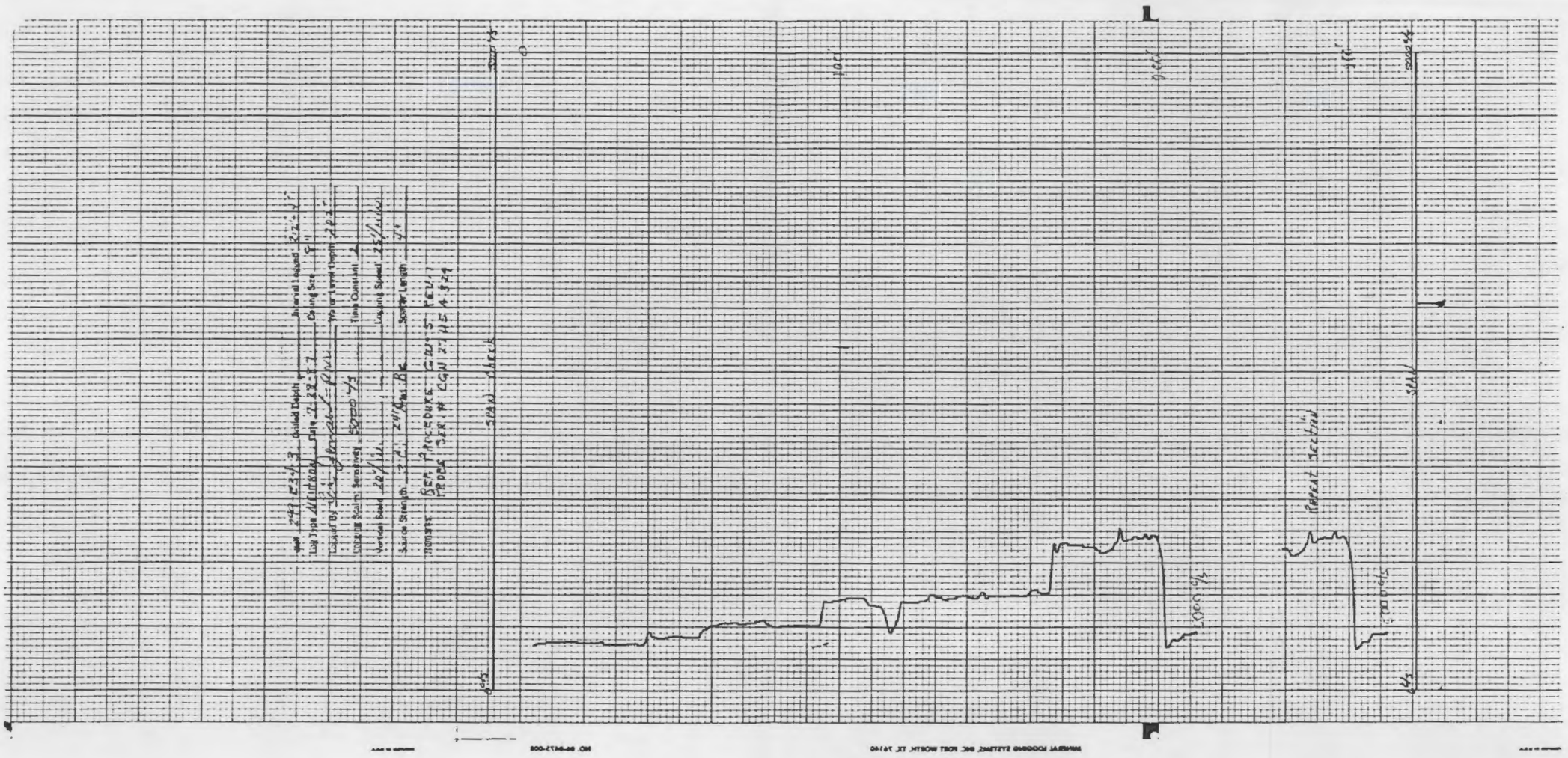
Well Number 299-E34-3 Geologist R.A. HAKEN/R.L. Prenzlow Page 2 of 2
K. Oster, S. Dudziak, P. White, M. Chamness

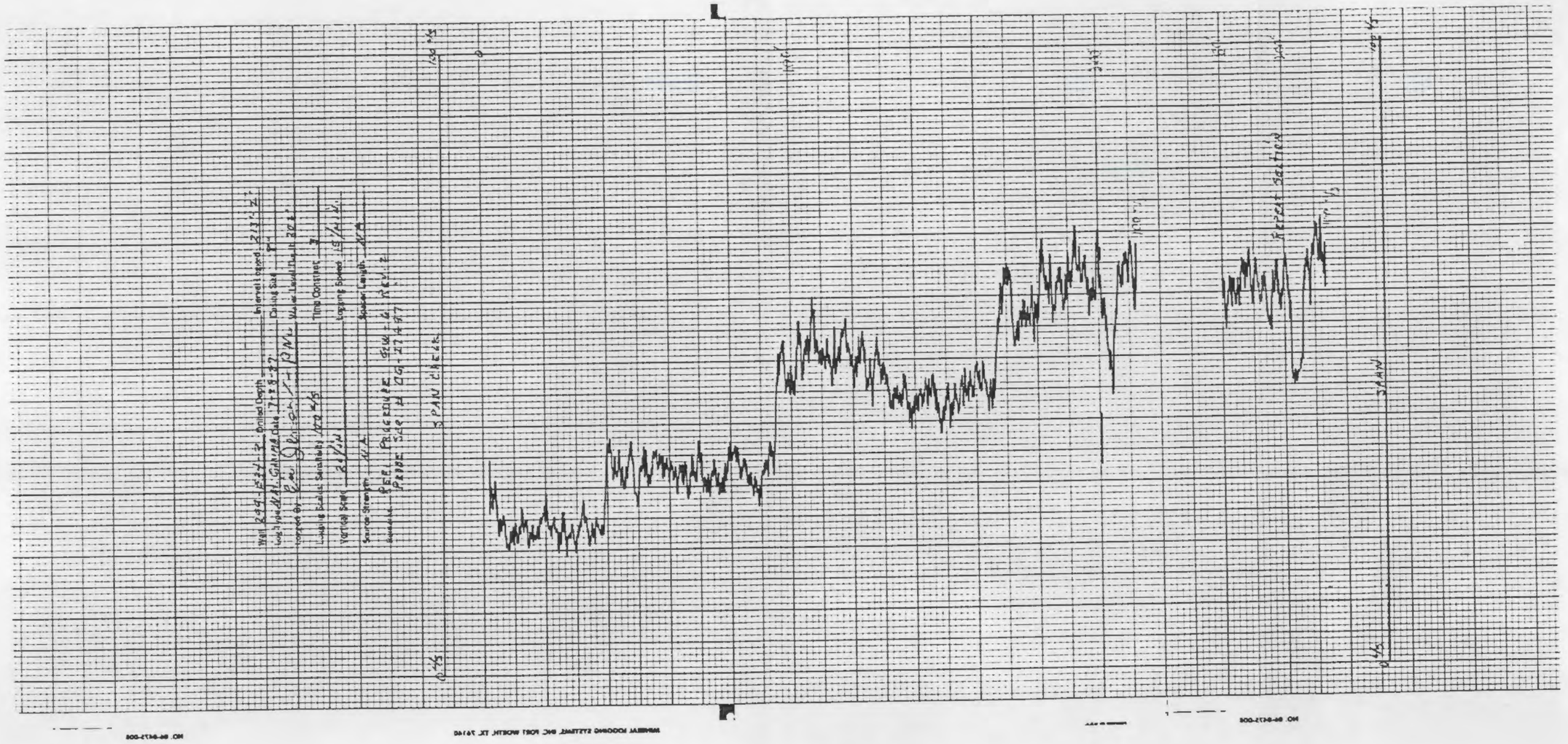
Reviewed by T.L. McLean Date 12-23-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill rate (ft/hr)
Description	Diagram		Diagram Litho.	Lithologic Description	
10" carbon steel casing		135		Slightly silty gravelly sand	0.6
		140		Sandy gravel	3.0
Volclay grout 5'-165'		145		" "	2.5
		150		" "	1.5
4" diameter permanent		155		" "	5.0
stainless steel casing		160		Silty sandy gravel	2.0
		165		" " "	3.3
bentonite granules 165'-177'		170		" " "	3.9
8" diameter temporary		175		" " "	6.7
carbon steel casing		180		Sandy gravel	2.5
bentonite pellets 177'-184'		185		Silt, sandy gravel	6.0
		190		" " "	2.5
4" st. steel 20 slot screen		195		Sandy gravel	2.0
20/30 sand, silica 184'-213.6'		200		gravelly sand	2.8
water level 203.01' 8/14/87		205		Silty sandy gravel	2.8
		210		sandy gravel	4.6
		214		Basalt at ~213'	
8" diameter 30 slot telescoping screen	TD = 213.89'		TD = 213.89'		

A-1800-188 (3/87)



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Log Type and Gamma Date 7218-22'
Run No. One
Logged Interval 7218-22'
Vertical Scale 2"/100'
Source Strength N/A
Remarks SEE PRODUCTIVITY PROFILE SEC 4 BLK 27 H&TC SURV
SPAN LINE
Interval Spec. 2"/100'
Casing Size 8 5/8"
Time Constant 3
Logging Speed 15"/min
Sonde Length 20'
GAMMA RAY CALIPER
Fracture Gradient
SPAN
0-45
0-45

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Premeau	68K-19150	299-E34-3	N/A	KE W-1915-1
Date: 7/14/87	Depth: 0 To 5'			Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0600	setting up rig
	5'				1245	5' hole from backhoe
					1330	Repairing for steam cleaning of tools.

REMARKS:

Richard Premeau 7/14/87

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)

4-A.1485

DRILL LOG	By R A. HAGED	Rig Cable Tool #2	Well Number 299-E34-3	Computer Number	Project or Work Order No. RCH-1915-1
	Date 7/14/87	68k-19150	Depth 5' To 5'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Steam cleaning tools + casing on-site.	1430	Drill rig is a
				Materials were steam cleaned previously, but		Bucyrus Erie 60L.
				the drillers had lain the parts on the		
				ground - had them reclean these materials		
20'4½"	of 16" casing			Set 1 piece of 16" diam. casing w/ shoe	1500	Casing set into 5'
				Note: shoe not milled on outside.		backhoe hole
				No drive barrels on site.		
					1514	Began drilling
						w/ hard tool
				Note: No 5' sample collected earlier,	1520	
				so I collected one from dump site of		
				backhoe excavation. Sample description follows:		
	4.5	Backhoe	D	SILTY SANDY GRAVEL. 45% gravel, 45% sand,		
				10% silt. Sample is 5% large cobble, 5% small		
				cobble, 5% VCD, 10% CD, 10% MD, 10% FD, 5% VCS,		
				5% CS, 10% MS, 10% FS, 15% VFS. Gravel is 80%		
				basalt, 20% metagranitics. Sand is 35% basalt, 45% rhyolite,		
				20% rock frags. Gravel clasts are rounded to subangular.		

REMARKS.

H A Chambers 7/14/87

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)

4-A.1486

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
RA HAGEN	Calle Tool #2	299-E34-3	NA	HFH-1915-1
Date 7/14/87	68k-19150	Depth 5' To 10'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'4"1/4" of 16" casing				Sand grains are A-SR. Dry color is 5Y 6/3 (pale olive). Moderate HCl rxn on sand/fines, strong HCl rxn on clasts coated w/ caliche. No sign of any consolidation.		
					1738	Stopped drilling - casing falling into bore as drilling proceeds; no need to drive it yet.
	5-10'	H	W	SILTY SANDY GRAVEL. 45% gravel, 40% sand, 15% silt. Sample is 1% VCP, 2% CP, 12% MP, 20% FP, 10% VFP, 5% VCS, 5% CS, 15% MS, 10% FS, 5% VFS. Sample is very poorly sorted. Gravel composed of 75% basalt, 15% qtzite, 10% granitics and/or metamorphics. Sand is 50% basalt, 40% qtz, 10% RF. Wet color is 5Y 4/1 (dark gray); dry color is 5Y 7/1 (light gray). Moderate to strong HCl rxn on dried fines. Caliche coats some gravel clasts. No consolidation. Less coarse gravel than previous sample. Gravel clasts are R-SA; sand is A-SR.	1752	Note: Sample labelled "5-10" because hole not bailed until this time.

REMARKS:

M.A Clements
7/14/87

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)

4-A.1487

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. A. Hagen	Calle To-1 #2 (68k-19150)	299-E34-3	NA	KEH-1915-1
Date: 7/14/87	Depth: 10' To 14'			Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'4¼" of 16"		Casing			1758	drillers gone to lunch
					1840	resumed drilling
					2022	Installed drive
						clamps and drove
						16" casing.
					2119	Stopped drilling
						@ 14' - bailed
						out well before
						shut down, so
						sample will be
						from 14-15'.
				RS A H 7/14/87		

REMARKS:

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

A-5000-021 (5-85)

4-A.1488

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Freimuth		299-E34-3	N/A	KEH-1915-1
Date: 7/15/87	68K-19150	Depth: 14' To 15'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'4¼" of 16" casing.						Driller is Louis Watkins
					0530	Drilling started.
	14-15'	H	W	SILTY SANDY GRAVEL, 45% gravel, 40% sand, 15% silt. Gravels are 30% VCP, 10% CP, 10% MP, 12% FP, 10% VFP. Sands are 5% vcs, 10% cs, 5% ms, 20% fs. Sample is poorly-very poorly sorted. Gravel composition is 65% basalt, 25% qtzmonz, 10% granitics. Sand composition is 70% basalt, 30% qtz. Gravels are R-SR. Sands are SR-A. Wet color is 5Y4/1 (dk gray). Dry color is 5Y7/1 (lt gray). Moderate-strong rxn to 10% HCl. No consolidation. Very similar to previous sample. Slight calcic coating on most gravel clasts.	0655	Sample from top of bailer.
30'4¼" of 16" casing					0905	stopped drilling. Welding 10' of 16" casing onto previous 20'4¼" of 16" casing. Total 16" casing is now 30'4¼".
					0905	20-25 gallons of H_2O have been added since 0530 hours.

REMARKS:

Richard Freimuth

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

A-6000-021 (5-85)

4-A.1489

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	68K-19150	299-F34-3	N/A	KEH-1915-1
Date: 7/15/87		Depth: 15' To 25'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30' 4 1/4" o.d. 16" casing.					1105	Drilling resumed.
					1115	5 gallons H2O added.
					1145	5 gallons H2O added.
	19-20'	H	W	SILTY SANDY GRAVEL. 60% gravel, 30% sand, 10% silt. Gravels are 5% VCP, 20% CP, 15% MP, 12% FP, 8% VFP. Sands are 3% VCS, 15% CS, 10% MS, 7% FS. Sample is poorly sorted. Gravel composition is 60% basalt, 30% qtz-rich metamorphics, 10% granites + feldspars. Sand is 55% basalt, 40% qtz, 5% rock fragments. Gravels are WR-SA. Sands are SA-A. Wet color is 5Y4/1 (dk. grey). Dry color is 5Y7/1. Moderate-strong rxn to 10% HCl. No consolidation. More coarse gravel than previous sample. Caliche coat on some gravel clasts that reacted to 10% HCl.	1150	Sample from top of bailer
	24-25'	H	W	SILTY SANDY GRAVEL. 50% gravel, 40% sand, 10% silt. Gravels are 5% VCP, 20% CP, 15% MP, 5% FP, 10% VFP. Sands are 5% VCS, 15% CS, 15% MS, 5% FS. Sample is poorly - very poorly sorted.	1250	Sample from top of bailer

REMARKS: 1125 - Water added to the west on bottom [illegible]

Richard Premzic

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

A 6000 021 (5-85)

4-A.1490

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	68k-19150	299-E34-3	N/A	KEH-1915-1
Date: 7/15/87		Depth: 25' To 25'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30' 4 1/4" of 16" casing.				Gravel composition is 85% basalt, 10% granitics, 5% qtz. Sand composition is 65% basalt, 30% qtz, 5% rock fragments. Gravels are SR-SA. Sands are SR-A. Wet color is 5Y4/1 (dk.gray). Dry color is 5Y6/1 (gray). Moderate reac to 10% HCl. No consolidation. Coarser gravels than previous sample.		

REMARKS:

Richard Premzic 7/15/87

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)

4-A.1491

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Cable Tool #2 (GPH 19150's)	299-E34-3	NA	HEH-1715-1
Date 7/15/87	Depth 25' To 35'			Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30'4 1/4" of 16"					1400	Added 10'1/2" of
40'4 3/4" of 16"						16" casing
					1515	Resumed drilling
	29-32'	H	W	SANDY GRAVEL. 60% gravel, 40% sand.	1535	Note: casing was
				Sample is 2% CP, 15% MP, 30% FP, 13% VFP,		driven ~4' ahead
				5% VCS, 10% CS, 10% MS, 15% FS, VFS. Sand is		of hole when sampled
				very poorly sorted. Gravel is composed of		
				60% basalt, 30% qtzite and metamorphics, 10% other.		
				Sand is 70% basalt, 20% qtz, 10% RF. Gravel		
				clasts are rounded to subrounded; sand grains		
				are subrounded to angular. Wet color is 5Y 4/1		
				(olive gray); dry color is 5Y 7/1 (light gray).		
				Slight-Moderate HCl rxn. No consolidation. Similar		
				to previous sample, less silt, finer gravel & sand.		
					1548	Resumed drilling
	34-35'	H	W	SILTY SANDY GRAVEL. 50% gravel, 40% sand,	1702	Drilled out plug and
				10% silt. Sample is 1% cobble, 1% VCP, 5% CP,		then sampled w/sand
				15% MP, 20% FP, 8% VFP, 5% VCS, 15% CS, 5% MS,		pump. Took sample from
						bottom of casing

REMARKS:

R.A. Hagen 7/15/87

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)

4-A.1492

DRILL LOG

By: R A Hagel | Rig: Cable Tool #2 (68k-M150) | Date: 7/15/87
Well Number: 299-E 34-3 | Depth: 351 To 35'
Computer Number: NA
Project or Work Order No.: KEH-1915-1
Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40' 4 3/4" at		16"		15% FS to VFS. Sample is very poorly sorted. Gravels are composed of 80% basalt, 15% metamorphics (mostly qtzite) and 5% plutonic (granitic). Sand is 25% qtz, 70% basalt, 5% RF. Gravel clasts are R-SA, sand grains are A-SR. Wet color is 5Y 4/1.5 (dark olive gray); dry color is 5Y 6/1 (gray). Moderate HCl reaction. Dried fines. No consolidation. Coarser than previous sample - slight color change also.		
					1800	Stopped drilling for lunch break. Drove 16" casing so there is ~2" of it sticking above surface.
					1845	Resumed drilling
					1856	Stopped drilling -
	39-40'	H	W	SILTY SANDY GRAVEL. 45% gravel, 45% sand, 10% silt. Sample is 1% VCP, 5% CP, 20% MP, 15% FP, 4% VFP, 3% VCS, 5% CS, 15% MS 15% FS, 7% VFS.	1905	Sample from bottom of sand pump.
					1908	Resumed drilling

REMARKS:

M.A. Chamness
7/15/87

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)

4-A.1493

DRILL LOG	By R A HACKETT	Rig Cable Tool #2 (68K-19150)	Well Number 299-E34-3	Computer Number NA	Project or Work Order No. HEH-1915-1
	Date 7/15/87		Depth 35' To 40'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40'4 3/4" of 16"		Casing		Sample is very poorly sorted. Gravel is composed of 65% basalt, 30% metamorphics (mostly gneiss), 5% granitics. Sand is 75% basalt, 25% gneiss. Gravel clasts are rounded to subangular. Sand grains are subangular to subrounded. Wet color is 5Y 4/1.5 (dark olive gray); dry color is 5Y 7/1 (light gray). Slight HCl rxn on dried fines. No consolidation. Very similar to previous sample.	1914	Stopped drilling -
21'5 3/4" of 12"					1920	Installed 21'5 3/4" of 12" casing w/shoe. Shoe not drilled down.
42'6 3/4" of 12"					1935	Added 21'1" of 12" casing.
					2049	Resumed drilling
					2052	Stopped drilling -
				Will add 10'6" of 12" casing tomorrow AM.		
				RAH 7/15/87	2115	Quit for the day

REMARKS:

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

A 6000 021 (5-85)

4-A.1494

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	68K-19150	219-534-3	N/A	KF-1915-1
Date: 7/16/87		Depth: 40' 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
42'6 3/4" of 12" casing.						Driller is Lewis Watkins
53' 3/4" of 12" casing					0530	10'6" of 12" casing welded to previous 42'6 3/4" 12" casing. Total 12" casing is 53' 3/4"
					0700	Started drilling
					0720	5 gallons H_2O added.
					0730	Driller says he's 1½' ahead of casing.
	44-45'	H	W	SILTY SANDY GRAVEL, 43% gravel, 47% sand, 10% s.lt. Gravels are 3% CP, 10% MP, 25% FP, 5% VFP. Sands are 20% VCS, 12% CS, 5% MS, 10% FS. Sample is moderately-poorly sorted. Gravel composition is 75% basalt, 20% qtz-rich metamorphics, 5% granitics. Sand composition is 50% basalt, 45% qtz, 5% rock fragments. Grains are R-SR. Sands are SA-A. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/2 (lt. gray). Moderate rxn. to 10% HCl. No consolidation. Very similar to previous sample.	0745	Sample from bottom of sand pump.
	49-50'	H	W	SILTY SANDY GRAVEL, 50% gravel, 45% sand, 5% s.lt. Gravels are 2% CP, 15% MP, 25% FP, 5% FP. Sands are	0830	Sample from bottom of sand pump

REMARKS:

Richard Premzic

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

A 6000-021 (5-85)

4-A.1495

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
R.L. PREMEAU	BUCYRUS ERIE 60L	299-E34-3	N/A	KEH-1915-1
Date: 7/16/87	68K-19150	Depth: 50' 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
53' 3/4"	of 12" casing.			25% VCS, 12% CS, 3% MS, 5% FS. Sample is moderately-poorly sorted. Gravel composition is 75% basalt, 20% qtz-rich metamorphics, 5% granitics. Sand composition is 47% basalt, 53% qtz. Gravels are SR-SA. Sands are SR-SA. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/2 (lt. gray). Moderate rxn. to 10% HCl. Two clumps (1-2" in diameter) of sand, silt & gravel found in sample bucket & cuttings. The clumps were easily broken apart with my fingers. Very similar to previous sample, less silt.		
63' 9½"	of 12" casing.				0930	Stopped drilling. Adding 10' 8¾" of 12" casing to previous 53' ¾" of 12" casing. Top of 53' ¾" 12" casing was hand beveled. Total 12" casing is 63' 9½"
					1030	Drilling resumed
					1030	RM stopped by to survey samples.
					1035	5 gallons H_2O added.

REMARKS:

Richard Premeau

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

A-6000-021 (5-85)

4-A.1496

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. TREMAIN	BUCYRUS ERIE 60L	299-E34-3	N/A	KEH-1915-1
Date: 7/16/87	68K-1950	Depth: 50' To 60'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
63' 9½" of 12" casing.						
	54-55'	H	W	SANDY GRAVEL. 65% Gravel, 32% sand, 3% silt. Gravels are 1% SC, 2% VCP, 27% CP, 20% MP, 10% FP, 5 VFP. Sands are 20% VCS, 8% CS, 2% MS, 2% FS. Sample is poorly sorted. Gravel composition is 80% basalt, 10% qtz-rich metamorphics, 10% granitics. Sand composition is 60% basalt, 40% qtz. Gravels are SR-SA. Sands are SR-SA. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray). Moderate rxn to 10% HCl. No consolidation. More and coarser gravels than previous sample.	1130	Sample from bottom of sand pump.
	59-60'	H	W	SANDY GRAVEL. 65% Gravel, 33% sand, 2% silt. Gravels are 2% VCP, 25% CP, 30% MP, 6% FP, 2% VFP. Sands are 10% VCS, 10% CS, 5% MS, 8% FS. Sample is poorly sorted. Gravel composition is 75% basalt, 15% qtz-rich metamorphics, 10% granitics. Sand composition is 50% basalt, 50% qtz. Gravels are R-A. Sands are	1230	Sample from bottom of sand pump.

REMARKS:

Richard L. Tremain

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

A 6000 021 (5-85)

4-A.1497

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	BUCYRUS ERIE 60L	299-E34-3	N/A	KEH-1915-1
Date: 7/16/87	68K-19150	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
63'9½" of 12" casing.				SA-A. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/2 (LT. gray). Moderate rxn. to HCl. No consolidation. Very similar to previous sample.	1230	Drilling stopped. Preparing well for additional casing.

REMARKS:

Richard Premzic 7/16/87

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)

4-A.1498

DRILL LOG	By R A HALEN	Rig GSL Tool #2 (68k-19150)	Well Number 299-E34-3	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 7/16/87		Depth 60' To 70'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
63'9½" of 12" casing				Driller is Lindon Carlon	1315	Addtl 10'6" of 12" casing.
74'3½" of 12" casing						
					1519	Resumed drilling
	64-65'	H	W	SILTY SANDY GRAVEL. 55% gravel, 35% sand, ≤10% silt. Sample is 1% VCP, 2% CP, 20% MP, 20% FP, 12% VFP, 8% VCS, 10% CS, 10% MS, 7% FS & VFS. Sample is very poorly sorted. Gravel is composed of 75% basalt, 10% qtzite, 10% other metamorphics, 5% granitics. Sand is 45% basalt, 45% qtz, 10% R.F. Gravel clasts are rounded to subangular, sand grains are SA-SR. Wet color is 5Y 3/2 (dark olive gray); dry color is 5Y 6/1 (gray). Moderate to strong HCl rxn on dried fines. No consolidation. Sample is slightly coarser than previous sample.	1542	Sample from bottom of sand pump bailer. Note: casing falling as drilling proceeds. hasn't driven casing since he began drilling @ 1519 hrs.
	69-70'	H	W	SILTY SANDY GRAVEL. 55% gravel, 35% sand, 10% silt. Sample is 1% VCP, 1% CP, 20% MP, 25% FP, 8% VFP, 5% VCS, 15% CS, 10% MS, 5% FS & VFS. Sample is very poorly sorted. Gravel is composed	1726	Sample from bottom of sand-pump bailer.

REMARKS:

N.A (Signature) 7/16/87

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)

4-A.1499

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
R A HAGEN	Cable Tool #2	299-E34-3	NA	HEIL-1915-1
Date 7/16/87	(68hr-19150)	Depth 70' To 75'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
74'3½" of 12" casing				at 75% basalt, 15% qtz-rich (mostly, glass), 5% alt. metamorphics, 5% granitics. Sand is composed of 55% basalt, 40% qtz, 10% RF. Gravel clasts are rounded to subangular. Sand grains are subrounded to subangular. Wet color is 5Y 3/2 (dark olive gray); dry color is 5Y 6/1 (gray). Moderate HCl rxn on dried fines. Nearly identical to previous sample.		Driller noted abundance of coarse gravel (small cobble) from 67-70'
						Coulnit drive casing.
					1800	Lunch break for drillers
84'9½" of 12"					1850	Added 10'6" of 12" casing
					1947	Resumed drilling
	74-75'	H	W	SILTY SAND & GRAVEL. 50% gravel, 45% sand, 5% silt. Sample is 1% small cobble, 2% VCP, 5% CP,	2024	Sample from bottom of sand pump bailer

REMARKS:

R A Hagen 7/16/87

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)

4-A.1500

DRILL LOG	By R A HAGEN	Rig Cable Tool #2 (68K-9150)	Well Number 299-E34-3	Computer Number NA	Project or Work Order No. HFH-1915-1
	Date 7/16/87		Depth 75' To 78'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84'9½" of	12"			20% MP, 10% FP, 12% VFP, 5% VCS, 15% CS, 10% MS, 15% FS. Sample is PS-UPS. Gravel is composed of 70% basalt, 10% qtz-rich (gneiss most), 15% other metamorphics, 5% granitics. Sand is 40% qtz, 50% basalt, 10% rock frags. Gravel clasts are rounded to subangular; sand grains are sub-angular to subrounded. Wet color is 5Y 3/2 (dark olive gray). Dry color is 5Y 6/1 (gray). Moderate HCl rxn on dried fines. No con-solidation. Slightly coarser gravels than previous sample - very similar material.		
					2117	Quit drilling for the day @ 78'
				R A H 7/16/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1501

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Prinzic	Bucyrus Erie 60L	299-E34-3	N/A	[illegible]
Date 7/17/87	6SK-19,50	Depth 78' To 85'		Subcontract No N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84'9½" of 12" casing.						Drive 1 foot ahead
					0600	Drilling started
	79-80'	H	W	SANDY GRAVEL. 65% gravel, 32% sand, 3% silt. Gravels are	0645	Sample from bottom of sand pump.
				40% LC, 3% VCP, 20% CP, 20% MP, 15% FP, 6% VFP.		
				Sands are 18% VCS, 10% CS, 5% MS, 2% FS. Sample		
				is poorly sorted. Gravel composition is 75% basalt, 15%		
				felsite, 10% granitics. Sand composition is 60% basalt,		
				40% qtz. Gravels are R-SA. Sands are SA-A. Wet		
				color is 5Y 3/2 (dk. olive gray). Dry color is 5Y 7/1 (lt. gray)		
				Very slight rxn to 10% HCl. No consolidation. More gravels and		
				coarser than previous sample.		
95'3½" of 12" casing					0645	Drilling stopped. Adding 10'6" of 12" casing to previous 84'9½" of 12" casing. Hand beveled top of 84'9½" 12" casing. Total 12" casing is 95'3½"
					0930	Drilling resumed. Casing falling as drilling proceeds.
	84-85'	H	W	SANDY GRAVEL. 30% gravel, 65% sand, 5% silt. Gravels are	0950	Sample from bottom of sand pump.
				3% CP, 12% MP, 6% FP, 9% VFP. Sands are 20% VCS,		

REMARKS:

Richard Prenzic

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

A-6000-021 (5-85)

4-A.1502

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	BUCYRUS ERIE 60L	299-E34-3	N/A	KEH-1915-1
Date 7/17/87	68K-19150	Depth 85' To 90'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
95'3½"	of 12" casing.			20% CS, 15% MS, 10% ES. Sample is Poorly sorted.		
				Gravel composition is 50% basalt, 15% qtzite, 5% granitics		
				Sand composition is 45% basalt, 50% qtz, 5% rock fragments		
				Gravels are SA-A. Sands are SR-SA, wet color is 5Y4/2		
				(olive gray). Dry color is 5Y7/1 (lt. gray). Slight-mod. rxn to 10% HCl		
				No consolidation. Sample contains much more sand and		
				gravels are not as coarse as previous sample.		
	89-90'	H	W	SILTY SANDY GRAVEL. 50% gravel, 45% sand, 5% s.-f.	1140	Sample from bottom of
				Gravels are 1% SC, 15% CP, 20% MC, 10% FP, 4% VFP.		sand pump.
				Sands are 18% VCS, 15% CS, 8% MS, 4% FS.		
				Sample is poorly sorted. Gravel composition is 85%		
				basalt, 10% qtz+metamorphics, 5% granitics.		
				Sands are 55% basalt, 45% qtz. Gravels are		
				R-SA. Sands are SR-SA. Wet color is 5Y4/2 (olive gray).		
				Dry color is 5Y7/1 (lt. gray). Slight-Moderate rxn. to 10% HCl		
				No consolidation. Coarser with more gravel / less sand		
				than previous sample.		
					1200/1210	Stopped drilling to untwist cable / Resumed drilling.

REMARKS:

Richard Premzic

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

A-6000-021 (5-85)

4-A.1503

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	BUCYRUS ERIE 60L	299-E34-3	N/A	KEH-11-5-1
Date 7/17/87	68K-19150	Depth 90' To 95'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
95'3½"	of 12" casing.					
	94-95'	H	W	SILTY SANDY GRAVEL. 30% gravels, 60% sands, 10% silt. Gravels are 5% CP, 10% MP, 10% FP, 5% VFP. Sands are 45% VCS, 10% CS, 5% ms. Sample is moderately-poorly sorted. Gravel composition is 75% basalt, 17% qtz-rich metamorphics, 12% granitics. Sand composition is 45% basalt, 55% qtz. Gravels are R-A. Sands are SR-SA. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray). Slight rxn to 10% HCl. No consolidation. More sand/less gravel than previous sample.	1300	Sample from bottom of sand pump
					1300	Stopped drilling. Preparing to add 10" casing.

REMARKS:

Richard Premzic 7/17/87

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-6000-021 (5-85)

4-A.1504

DRILL LOG	By R A HAGEN	Rig Cable Tool #2 (G&K-19150)	Well Number 299-E34-3	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 7/17/87		Depth 95' To 95'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
95' 3 1/2" of		12" casing			1425	Changing hard-hat
						bit to a smaller
						diameter bit.
21' 1 3/4" of 10"						Set 21' 1 3/4" of 10"
						casing w/shoe -
						shoe not milled on
						outside.
42' 4 3/4" of 10"					1530	Added 21' 3" of
						10" casing
63' 2 3/4" of 10"						Added 20' 10" of
						10" casing
83' 11 3/4" of 10"						Added 20' 9" of
						10" casing
104' 11" of 10" casing						Added 20' 11 1/4"
						of 10" casing
				Drillers are Lenny Corder and Olin	1928	Began drilling
					1944	Stopped drilling -
						changing bailer to
						one of smaller dia.

REMARKS:

R.A. Chamness 7/17/87

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)

4-A.1505

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A Aiken	Gilk Tool #2 (Gak-19150)	299-E34-3	NA	KFH-1915-1
Date: 7/17/87	Depth: 95' To 99'			Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104'11"	of 10"	casing			2010	Quit work for
						16 day @ 99'
				R A Aiken 7/17/87		

REMARKS:

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

A-6000-021 (5-85)

4-A,1506

DRILL LOG	By S Dudziak	Rig Cable Tool #2	Well Number 299-E34-3	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 7/18/87	60K-19150	Depth 99' To 100'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104'11" of 10" casing					530	Driller is Lewis; started drilling at 530 PM
				— CHANGE in Lithology (Driller, Lenny Cordin says change occurred last night at ~96')		
				he says it was sand when he first started drilling at 1928 last night		
	100'	H	Wet	~~SLIGHTLY SILTY~~ SAND; 3% VF to F	630	
				Pebbles, 90% Sand, 7% Silt		
				Sand: 30% VCS, 20% CS, 20% MS, 20% F to VF S; Moderately to poorly ~~Well~~ Sorted		
				Gravels are ~50% basalt, 50% white & colored rock fragments (quartzites, granitics)		
				colors are olive, yellow, orange		
				Sands are ~25% basalt, 45% quartz, 30% colored mins from rock frags - mainly colored qtz & felds; No micas are apparent		
				Unbroken gravels are mostly subangular		
				Sands are subangular to rounded (C to VC grains subang; M to VF grains more rounded)		

REMARKS:

S Dudziak 7/18/87

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)

4-A.1507

DRILL LOG

By: S Budziak | Rig: Cable Tool #2 68K-19150 | Date: 7/18/87

Well Number: 299-E34-3 | Depth: 100 To 105'

Computer Number: N/A

Project or Work Order No.: KEH-1915-1

Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
101'11"	11" of 10"	"		Wet Color 5Y 4/3 olive		
				Dry Color 2.5Y 7/2 Lt gray		
				Unconsolidated; Change from last		
				sample includes large reduction of gravel		
				& increase in sand, better sorting; wet color		
				is yellower		
+10'6"					640	- Driller is welding on 10'6" of 10" casing
115'5"						
					830	Started Drilling
	105'	H	Wet	SLIGHTLY GRAVELLY, ~~SLIGHTLY SILTY~~ SAND;	920	
				5% VF to F Pebbles, 90% SAND, 5% Silt		
				Sand: 40% VCS, 35% CS, 10% MS, 5% F to VFS		
				Well sorted; Gravels are ~60% basalt		
				40% colored rock frags; Sands are ~35% basalt		
				35% Clear Quartz, 30% colored rock frags (quartz		
				& feldspar) Gravels are SA to SR; Sand		
				is SA to R; Wet Color 5Y 4/2 Olive gray		

REMARKS:

S Budziak 7/18/87

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)

4-A.1508

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Calib Tool # 2	299-E34-3	N/A	KEH-1915-1
Date 7/18/87	68K-19150	Depth 105' To 110'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
115'	5" 105'	H	W	Dry Color 2.5Y 7/1 Light gray Unconsolidated, Similar to last Sample		
					920	- Stopped drilling to get tools & a new bailer
					1140	- Resumed drilling
	110'	H	W	SLIGHTLY GRAVELLY, ~~SILTY~~ SAND; 5% VF to F Pebbles, 86% Sand, 9% Silt	1250	
				Sand: 25% VCS, 35% CS, 16% MS, 10% F to VFS - Well Sorted		Moderately to poorly
				Gravels are ~ 65% basalt, 35% quartz & colored rock frags of quartzite & granitics		
				some Fe-stained; Sands are ~ 30%		
				basalt, 40% quartz, 30% colored mins from the		
				rock frags noted above (colored qtz & felds)		
				No micas are apparent; Gravels are		
				mostly SA but range from A to SR;		
				Sands are R to SA; Wet color		

REMARKS:

S Dudziak 7/18/87

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)

4-A.1509

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Dietrick	Cable Tool #2	299-E34-3	N/A	KEH-1915-1
Date 7/18/87	68K-19150	Depth 110' To 110'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
115'5"	110			is 5Y 5/3 Olive, Dry Color 2.5Y 7/1 "grg Unconsolidated; Pretty much the same as the last sample except a little finer grained		
+10'5"					1310	- Welding on 10'5" of 10" casing
125'10"						- Olin is now drilling

REMARKS:

S Dietrick 7/18/87

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)

4-A.1510

DRILL LOG

By: R A HAGEN | Rig: C.B.H. Tool #2 (GBK-17150) | Well Number: 299-E34-3 | Computer Number: NA | Project or Work Order No.: HFH-1915-1

Date: 7/18/87 | Depth: 110' To 120' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125'10"	of In				1450	Resumed drilling
	114-115'	H	W	GRAVELLY SAND. 20% gravel, 75% sand,	1505	Sampled w/ sand pump
				5% silt. Sample is 2% MP, 13% FP, 5% VFP,		
				20% VCS, 45% CS, 10% MS, trace of FS.		
				Sample is MS-PS. Gravel is composed of 75%		
				basalt, 20% metamorphics (including gneisses), 5%		
				granitics. Sand is 15% basalt, 15% RF, 70%		
				qtz. Gravel clasts are rounded to subangular; sand		
				grains are SR-SA. Wet color is 5Y 5/3		
				(olive); dry color is 5Y 7/3 (pale yellow) SL-M		
				HCl rxn on dried fines. No consolidation.		
				More gravel than previous sample, but otherwise same.		
	119-120'	H	W	GRAVELLY SAND. 15% gravel, 85% sand. Sample is	1605	Sampled w/ sand pump
				10% FP, 5% VFP, 10% VCS, 55% CS, 15% MS, 5%		
				FS. Sample is moderately sorted. Gravel is 70% basalt,		
				20% metamorphics, 10% granitics. Sand is 15% basalt,		
				15% RF, 70% qtz. Gravel clasts are SR-SA; sand is		
				A-SR. Wet color is 5Y 5/3 (olive); dry color is 5Y 7/3		

REMARKS:

M.A. Chambers 7/18/87

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)

4-A.1511

DRILL LOG	By RA HACED	Rig Cable Tool #2	Well Number 299-E34-3	Computer Number	Project or Work Order No. KFH-1915-1
	Date 7/18/87	(68H-19150)	Depth 120' To 125'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125'10"	at 10"			(pale yellow). Slight - mod. HCl rxn on dried fines.		
				No consolidation. Very similar to previous sample.		
				Two small pieces of caliche found - FP size.	1605	Stopped drilling
					1631	Resumed drilling
136'4"	at 10"	Casing			1650	Stopped drilling -
						added 10'6" of
						10" casing
					1750	lunch break
					1853	Resumed drilling
	120-125'	H	CJ	SLIGHTLY GRAVELLY SAND. 5% gravel, 95% sand.	1920	Sampled w/ sandpump
				Sample is TR of MP, 3% FP, 2% VFP, 15% VCS,		
				60% CS, 15% MS, 5% FS. Sample is well-moderately		
				sorted. Gravel is 70% basalt, 20% metamorphics, 5% qtz,		
				5% granites. Sand is 10% basalt, 80% qtz, 10% FF. Gravel		
				clasts are R-SA, sand grains are A-SR. Wet color is		
				5Y 5/3 (olive) - no dry color - rain. No HCl rxn because		
				of rain. No consolidation. Less gravel than previous sample		
				otherwise same.		

REMARKS:

M. A. Chamberlain
7/18/87

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)

4-A.1512

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.N. HAGEN	Cable Tool #2	299-E34-3	N/A	KEH-1915-1
Date: 7/18/87	(GRK-17150)	Depth: 125' To 132'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
126'4"	0 to					
	125-130	H	D	GRAVELLY SAND. 15% gravel, 85% sand. Sample	1950	Sampled w/sand pump
				is 10% vfp, 10% cp, 4% vfp, 35% vcs, 40% cs,		
				10% ms, trace of fs. Sample is moderately sorted.		
				Gravel is 80% basalt, 15% recrystallized, 5% granitics,		
				Sand is 30% basalt, 60% qtz, 10% ff. Gravel		
				clasts are R-SA, sand is A-SR. Wet color		
				is 5Y 4/3 olive. No dry color because of rain,		
				no HCl rxn either. No consolidation. Coarser sand,		
				more gravel, more basalt in sand than previous sample.		
	130½'			Driller noted CP-VCP clasts in sand.	2010	Material brought up w/bailer
				SAND becomes silty, clay @ ~131' - few clasts	2040	Start drilling
					2120	Quit drilling for
						the day @ 132'
				RJH 7/18/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1513

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	BUCYRUS ERIE 60L	299-E34-3	N/A	ISEH-915-1
Date: 7/20/87	68K-19150	Depth: 152' To 132'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
136'4" of 10" casing						Driller is Lee Mathis
					0530	Drilling started
146'9" of 10" casing.					0600	stopped drilling. Hallmg 10's of 10" casing to the top of 136'4" 10" casing. Top of 136'4" 10" casing was found. Total 10" casing is 146'9".
					0730	Drilling resumed. Hard drilling. Cobbles + gravel from drillers descriptions.
					0915	Drilling is difficult. Casing is moving up and down a couple of inches with the bit.
					0940	Bit lodged in casing due to cobbles between bit and casing. Driller is welding ears to casing to keep casing from moving so he can dislodge the bit.
					1010	Resumed drilling
					1115	Drilling stopped. Retool bit.
					1230	Drilling resumed.

REMARKS:

Richard Premzic 7/20/87

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)

4-A.1514

DRILL LOG	By LA HAKEN	Rig Cable Tool #2	Well Number 299-E34-3	Computer Number	Project or Work Order No. KFH-1915-1
	Date 7/20/87	(68k-19150)	Depth 132' To 135'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146'9"	of 10'	casing				Driller is Lindon
						Cordon -
				Driller thinks casing is setting on large gravel	1415	drilling procedure
				clasts @ ~134' and overlying sand is rising into bore		from Premier's coverage
				during drilling - bit acts as a pump, sucking in sand.	1450	Driller pulled casing
						back 2' + welded ears
						onto it to try to drill
						out plug.
					1508	resumed drilling
					1532	Stopped drilling
					1542	resumed drilling
					1650	Sands are heaving
						up into well - will
						try to drive casing
						ahead + then get
						sample.
	134-135'	H	W	SLIGHTLY SILTY GRAVELLY SAND. 15% gravel, 70% sand,	1718	Sampled w/ clast below
				15% silt. Sample is 1% VP, 10% FP, 4% VFP, 15% VCS,		Casing driven ahead
						1' before sampling.

REMARKS:

W.A Hakeem 7/20/87

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)

4-A.1515

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Calle Tool #2 (68K-19150)	299-E34-3	NA	KEH-1915-1
Date: 7/20/87		Depth: 135' To 135'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146'9"	@ 10"			30% CS, 15% MS, 5% FS, 5% VFS. Sample is very poorly sorted. Gravel is composed of 80% basalt, 15% metamorphics, 5% granitics. Sand is composed of 20% basalt, 70% qtz, 10% RF. Gravel clasts are SR-SA. Sand grains are A-SR. Wet color is 5Y 5/3 (olive). Dry color is 5Y 7/2 (lt. gray). Moderate HCl rxn on dried fines. No consolidation. Similar to previous sample, but w/much more silt and less basalt in sand. Not sure why this interval drilled slow, except for possibility of having seals - could there be perched water here? - Driller says no. He feels he was adding too much water and that caused the sands to heave.		
					1803	Drilling faster now, driller needs to be careful of how much water is added.
					1804	lunch break
					1840	Resumed drilling

REMARKS:

M.A. Chamness 7/20/87

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)

4-A.1516

DRILL LOG

By: R A HAGEN | Rig: Cable Tool #2 (68h-19150) | Well Number: 299-E34-3 | Computer Number: NA | Project or Work Order No.: KEH-19151

Date: 7/20/87 | Depth: 135' To 144' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146'9"	at 10"				1925	Casing is dropping into bore as drilling proceeds - drill rate incr.
	140-141'	H	W	SAND & GRAVEL. 70% gravel, 30% sand. Sample is 25% mF, 30% FP, 15% vFP, 5% vcs, 10% cs, 10% ms, 5% Fs. Sample is Moderately to poorly sorted. Gravel is composed of 75% basalt, 15% metamorphics, 10% granitics. Sand is 45% basalt, 45% qtz, 10% RF. Gravel clasts are R-SA; sand grains are A-SR. Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/1 (light gray). Slight HCl rxn on dried fines. No consolidation. Sharp change from previous sample - much more gravel and distinct color change. Sand fraction is very different w/ much basalt & less qtz. Change may have occurred higher, but was not sampled @ 135' because of heaving sands.	1929	Sampled w/ dart bailer - no open hole.
					2032/2039	Stopped/resumed drilling
					2048/2056	Stopped/resumed drilling
					2110	Stopped drilling for the day @ 144'

REMARKS:

7/20/87

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)

4-A.1517

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	BUCYRUS ERIE 60L	Z 99 E 74-3	N/A	RFM-19.5-1
Date: 7/21/87	68K-19150	Depth: 144 To 150'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146'9" of 10" casing.						Driller : Lower Watkins
					0530	Drilling started
	144-145'	H	W	SANDY GRAVEL. 68% Gravels, 30% sands, 2% silt.	0600	Sample from dart bailer. Mostly water.
				Gravels are 5% CP, 35% MP, 20% FP, 8% VFP. Sands		
				are 10% VCS, 10% CS, 3% MS, 7% FS. Sample is		
				moderately-poorly sorted. Gravel composition is 60% basalt,		
				35% qtzite, 5% granitics. Sand composition is 55% basalt,		
				40% qtz, 5% feldspar and rock fragments. Gravels are		
				SR-A. Sands are SR-SA. wet color is 5Y4/2 (olive gray).		
				Dry color is 5Y7/1 (lt. gray). No rxn to 10% HCl.		
				No consolidation. very similar to previous sample.		
157'1¾" of 10" casing.					0615	stopped drilling. Add 10'4¾" of 10" casing to top of previous 146'9" 10" casing. Total casing is now 157'1¾".
					0745	Resumed drilling.
					1045	5 gallons H2O added.
	149-150'	H	W	SANDY GRAVEL. 70% gravel, 28% sand, 2% silt.	1050	Sample from dart bailer
				Gravels are 10% CP, 25% MP, 20% FP, 15% VFP.		

REMARKS:

Richard Premzic

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

A 6000 021 (5-85)

4-A.1518

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	BUCYRUS ERIE 60L	299-E34-3	N/A	KEH-915-1
Date: 7/21/87	69K-19150	Depth: 150' To 155'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
157' 3/4" of 10" casing				Sand is 6% VCS, 8% CS, 10% MS, 4% FS. Sample is moderately-poorly sorted. Gravel composition is 60% basalt, 35% qtz.+e, 5% granitic + others. Sand composition is 60% basalt, 35% qtz, 5% feldspar + others. Gravels are R-SA. Sands are generally SA. Wet color is 5Y 4/2. Dry color is 5Y7/1 (lt. gray). No rxn to 10% HCl. No consolidation. Very similar to previous sample.		
	154-155'	H	W	SANDY GRAVEL. 75% gravels, 23% sand, 2% silt. Gravels are 20% CP, 30% MP, 15% FP, 10% VFP. Sands are 8% VCS, 7% CS, 5% MS, 3% FS. Sample is moderately-poorly sorted. Gravel composition is 70% basalt, 20% qtzite + qtz, 10% granitics + rock fragments. Sand composition is 60% basalt, 35% qtz, 5% feldspar + rock fragments. Gravels are SR-SA. Sands are SA-A. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray). No rxn to 10% HCl. No consolidation. Very similar to previous sample, less sand.	1150	

REMARKS:

Richard L. Premzic

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

A 6000-021 (5-85)

4-A.1519

DRILL LOG

By: R.L. PREMZIC
Date: 7/21/87
Rig: ISACHRUS ERIE 60 L 68K-19150
Well Number: 299-E34-3
Depth: 155' To 155'
Computer Number: N/A
Project or Work Order No.: KEH-1915-1
Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
157' 3/4" of 10" casing.					1150	Drilling stopped.
167' 5 3/4" of 10" casing.						Adding 10' 4" of 10" casing to Previous 157' 3/4" 10" casing. Total casing is 167' 5 3/4".

REMARKS:

Richard Premzic 7/21/87

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)

4-A.1520

DRILL LOG

By RA HAGEN | Rig Cable Tool #2 (68K-1918) | Well Number 299-E34-3 | Computer Number NA | Project or Work Order No HEH-1915-1

Date 7/21/87 | Depth 155' To 165' | Subcontract No NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
167'5	3/4" of	10"			1330	Resumed drilling
	159-160	H	W	SILTY SANDY GRAVEL. 50% gravel, 40% sand,	1600	Sampled w/dart bailer
				10% silt. Sample is 4% CP, 23% MP, 17% FP,		
				6% VFP, 5% VCS, 10% CS, 10% MS, 10% FS, 5% VFS.		
				Sample is very poorly sorted. Gravel composed of		
				70% basalt, 25% metamorphics (mostly qtzite), 5% granites.		
				Sand is composed of 50% qtz, 40% basalt, 10% RF.		
				Gravel clasts are SR-SA. Sand grains are A-SR.		
				Wet color is 5Y 3/2 (dark olive gray); dry color is		
				5Y 7/1 (light gray). Slight-moderate HCl rxn on		
				dried fines. No consolidation. Siltier and more		
				sand than previous sample, but I don't see a color		
				change - 155' sample was given a wet color of		
				5Y 4/2, but I think it should be 5Y 3/2, same as this sample		
	164-165'	H	W	SILTY SANDY GRAVEL. 55% gravel, 30% sand,	1735	Sampled w/dart bailer
				15% silt. Sample is 1% CP, 25% MP, 20% FP, 9% VFP,		
				8% VCS, 10% CS, 7% MS, 5% FS. Sample is very poorly		
				sorted. Gravel is composed of 80% basalt, 15% metamorphics		

REMARKS:

M.A Chamness
7/21/87

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)

4-A.1521

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
R A HAGED	CableTool #2	299-E34-3	NA	KFII 1715-1
Date 7/21/87	(68H-19150)	Depth 165' To 165'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
167'5¾" of 10"				5% granitics. Sand is 35% basalt, 60% gts, 5% RF. Gravel clasts are rounded to subangular. Sand grains are A-SR. Wet color is 5Y 4/2 (olive gray); dry color is 5Y 6/1 (gray). Strong HCl rxn on dried fines. No consolidation. Similar to previous sample, but distinct color change, stronger HCl rxn (caliche coatings found on one small pebble) and a little more silt.		
					1800	Stopped for lunch
					1848	Resumed drilling
					1903	Stopped drilling - changing drill stem and bucket to smaller diameters. Setting up for 8" casing.
					2110	End of workday
				RF A. Hg 7/21/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1522

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L FREMMIC	SUERRUS FRIE 60L	299-E34-3	N/A	KH-1915-1
Date 7/22/87	68K-19150	Depth 167' To 167'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
167'5 3/4" of 10" casing.				Total depth on last nights log should be 167'.		Driller is Louis Watkins.
					0637	Bryan welding on 8" casing after completing change of drill stem.
21'1 1/4"	of 8" casing				0800	Adding 21'1/4 of 8" casing with drive shoe.
41'11 1/4"					0900	20'10" of 8" added.
62'10 3/4"	of 8" casing.				0945	20'11 1/2" of 8" added.
83'7"					1030	20'8 1/4" of 8" added.
104'7 3/4"					1130	21' 3/4" of 8" added.
125'3 1/4"					1230	20'7 1/2" of 8" added.
					1300	Driller went to safety meeting. weld needs to be completed between the 21' 3/4" and the 20'7 1/2".

REMARKS:

Richard Fremmic 7/22/87

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)

4-A.1523

DRILL LOG

By: R A HAGEN | Rig: Cable Tool #2 (68K-19150) | Well Number: 299-E34-3 | Computer Number: NA | Project or Work Order No.: KEH-1915-1

Date: 7/22/87 | Depth: 167' To 170' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
125'3 1/4" of		8" casing			1425	Completed cuttd between 21'3/4" and 20'7 1/2" casing.
146'1 3/4" of		8" casing			1435	Added 21'1 1/2" of 8" casing
167'4 1/4" of		8" casing			1515	Added 20'11 1/2 of 8" casing
177'8 3/4" of		8" casing			1555	Added 10'4 1/2" of 8" casing
					1646	Began drilling
					1749	Stopped drilling - changing to a smaller bailer
					1800	Lunch break
	169-170	H	W	SILTY SANDY GRAVEL. 60% gravel, 35% sand, 5% silt. Sample is 1% cb, 19% MP, 30% FP, 10% VFP, 7% VCS, 13% CS, 10% MS, 5% FS. Sample is poorly sorted. Gravel is composed of 70% basalt, 25% metamorphics, 5% granitics. Sand is composed of 25% qtz, 65% basalt, 10% RF.	1845	Sampled w/ dart bailer

REMARKS:

M.A. Chamness 7/22/87

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)

4-A.1524

DRILL LOG

By: RAINEY | Rig: Cable Tool #2 (68K-19150) | Well Number: 299-E34-3 | Computer Number: NA | Project or Work Order No: KEH-1915-1

Date: 7/22/87 | Depth: 170' To 177' | Subcontract No: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
177'8 3/4" of 8" casing				Gravel clasts are R-SR; sand grains are A-SR. Wet color is 5Y 3/2 (dark olive gray); dry color is 5Y 6/1 (gray). Slight HCl rxn on dried fines. No consolidation. Overall similar to previous sample, but much less $CaCO_3$ and silt than at 165'.		
				SILT	1854	Resumed drilling
	174-175'	H	W	SANDY GRAVEL. 65% gravel, 30% sand, 5% silt. Sample is 2% CP, 20% MP, 33% FP, 10% VFP, 5% VFS, 10% CS, 10% MS, 5% FS. Sample is poorly sorted. Gravel is 80% basalt, 20% metamorphics. Sand is 30% qtz, 60% basalt, 10% RF. Gravel clasts are R-SR. Sand grains are A-SR. Wet color is 5Y 3/2 (dark olive gray); dry color is 5Y 6/1 (gray). Slight HCl rxn on dried fines. No consolidation. Very much like previous sample.	1936	Sampled w/dart bailer
187'8 3/4" of 8"					1950	Stopped drilling - added 10' 0" of 8" casing
				RS A. JG 7/22/87	2056	Resumed drilling
REMARKS:					2115	Stopped drilling for the day @ 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)

4-A.1525

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Preimesberger	BF. 60L	299-E34-3	N/A	KEH-1515-1
Date 7/23/87	68K-14150	Depth 177' To 185'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
187'8¼" of 8" casing.						Driller is Louis Watkins
					0545	Drilling started.
	179-180'	H	W	SANDY GRAVEL 60% gravel, 37% sand 3% s.ft.	0715	Sample from bottom of dart barrel.
				Gravel is 3% VCP, 17% CP, 12% MP, 20% FP, 8% VFP.		
				Sand is 8% VCS, 12% CS, 10% MS, 7% FS. Sample is poorly sorted.		
				Gravel composition is 25% basalt, 20% qtz-rich metamorphics,		
				5% granitics + others. Sand composition is 55% basalt,		
				35% qtz, 10% rock fragments. Gravels are SR-SA.		
				Sands are SR-SA. Wet color is 5Y 3/2 (dk. gray).		
				Dry color is 5Y 7/1 (lt. gray). Very slight rxn to 10% HCl.		
				No consolidation. Very similar to previous sample.		
	184-185'	H	W	SILTY SANDY GRAVEL. 55% gravel, 40% sand, 5% s.ft.	0805	Sample from bottom of dart barrel. Watery sample.
				Gravel is 2% VCP, 10% CP, 15% MP, 10% FP, 18% VFP.		
				Sand is 10% VCS, 15% CP, 10% MS, 5% FS. Gravel		
				composition is 75% basalt, 15% qtz-rich metamorphics,		
				10% granitics + others. Sand composition is 60% basalt,		
				35% qtz, 5% rock fragments. Gravels are SR-A.		
				Sands are SA-A. Wet color is 5Y 3/2 (dk. gray).		

REMARKS: Drill, Sand, Gravel composition logs.

Richard Preimesberger

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

A-6000-021 (5-85)

4-A.1526

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.J. PREMZIC	B.E. 60L	299-E34-3	N/A	KEA-1415-1
Date: 7/23/87	68K-19150	Depth: 185' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
187'8¾" of 8" casing				Dry color is 5Y7/1 (light gray). Very slight rxn to 10% HCl. No consolidation. Slight increase in sand vs gravel from previous sample.		
197'8¾" of 8" casing					0805	Drilling stopped. Adding 10' of 8" casing to previous 197'8¾" of 8". To be 18' casing is now 197'8¾"
					0930	Drilling resumed.
	190' (D)	H	W	SILTY sandy GRAVEL: 60% gravel, 35% sand, 5% silt. Sample is 2% VCP, 3% CP, 5% MP, 30% FP, 20% VFP, 10% VCS, 10% CS, 10% MS, 5% FS & VFS. Poor to very poor sorting. Gravels are 60% basalt, 20% quartzitic, 10% granitic, 10% other. Sands are 55% basalt, 30% quartz & feldspar, 15% other. Gravels are subangular to rounded sands are subangular to subrounded. Wet color 5Y4/2 (olive gray) dry color 5Y6/1 (gray). No HCl rxt Unconsolidated. Similar to last samples.	1130	Approximate time 190' sample was taken.

REMARKS:

Richard Premzic 7/23/87

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)

4-A.1527

DRILL LOG

By: P. White | Rig: BE 60L | Well Number: 20 E34-3 | Computer Number: N/A | Project or Work Order No.: KE11 1915-1

Date: 7/23/87 | 68K-19150 | Depth: 19.5' To 200' | Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	191-197'	H	W	SANDY GRAVEL: 45% gravel, 50% sand, 5% silt.	14.00	Approximate time
				Sample is 5% MP, 15% CP, 25% VFP, 20%		sample taken
203' 1½" of		8"		VCS, 15% CS, 5% MS, 5% FS + VFS. Poor	14.30	Welded 10' 7¾"
				sorting. Gravels are 60% basalt, 30%		of 8" casing
				quartzite, 5% granitic, 5% metamorphic +		
				other. Sands are 60% basalt, 35% quartz +		
				feldspar, 5% other. Gravels are subangular		
				to rounded. Sands are subangular to sub-		
				rounded. Wet color 5Y 4/2 (olive gray) dry		
				color 5Y 6/1 (gray). No HCl test. Unconsoli-		
				dated. Greater sand/gravel ratio than		
				last sample; overall fluid size smaller.	15.35	Resumed drilling
	199-200'	H	W	GRAVELLY SAND. 28% gravel, 67% sand, 5%	1720	
				silt. Sample is trace of small cobble, 1% VC-C Pebble,		
				7% MP, 11% FP, 8% VFP, 15% VCS, 32% CS, 10% MS,		
				5% FS. Sample is moderately sorted. Gravel is		
				composed of 55% basalt, 35% metamorphics, 10% granitics		
				Sand is 35% basalt, 55% qtz, 10% FF. Gravel clasts		

REMARKS:

H.A. Clemens
7/23/87

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)

4-A.1528

DRILL LOG

By: L A HALEN | Rig: Cable Tool #2 (68K-1915D) | Well Number: 299-E34-3 | Computer Number: NA | Project or Work Order No: KEH-1915-1

Date: 7/23/87 | Depth: 200' To 200' | Subcontract No: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
208'4½" of		8"		are R-SA; Sand grains are A-SR wet color is 5Y 4/3 (olive); dry color is 5Y 6/2 (light olive gray). No HCl rxn on dried sands. No consolidation. Much more sand than previous sample; distinct color change - all 1¢ coarsest gravels seen are metamorphics and granitics - no basalt.		
					1737	Stopped drilling - spudding clutch went out on drill rig.
					1740	Took lunch break
					1824	Resumed work - working on clutch
						Clutch needs new
					1845	plates. Shut down here and went
						to work on well
						299-E27-9.

REMARKS.

RJ Aff 7/23/87

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)

4-A.1529

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Rick Premazic	B.E. 60L	209-E34-3	N/A	KF-1115-1
Date 7/24/87	68K-1415C	**Depth** 200' To 200'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
208' 4½" of 8" casing.						D... St Louis Works.
					0630	Clutch still broken on rig, will not run this shift.

REMARKS:

Richard Premazic 7/24/87

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)

4-A-1530

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Cable Tool #2	299-E34-3	NA	HEH-1915-1
Date 7/24/87	68K-19150	Depth 200' To 205'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
208'4½" of	8"				1855	Began drilling -
						clutch fixed
				Bailed material @ 202' contains rare (medium brown color) clay clumps.	1930	Stopped drilling -
				Also noticed basalt chips that look similar		bit is intersecting
				to that seen in basalt bedrock sample at well 34-4.		a tight horizon -
				Material is much more gravelly than 200' sample.		grabs bit and back-
				Basalt chips @ 202' are similar to 34-4 basalt		up rig - shuts it down.
				sample in that they contain same type of clay(?)		Depth of bore = 202'
				vesicle fillings - and no rounded edges seen with	2005	Driller driving casing -
				this texture, only chips or flakes of basalt.		drove it ~1' then
				Driller thinks he's drilling in broken material, not		he stopped.
				necessarily bedrock.	2008	resumed drilling
					2043	Reached 204' now-
						drilling relatively well.
						Can drive casing
						ahead ~ 6".
	204-205'	H	W	SILTY SANDY GRAVEL. 35% gravel, 55% sand,	2102	
				10% silt. Sample is 5% VF, 20% F, 10% VFG, 10% MS,		

REMARKS:

M. R. Clawson
7/24/87

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)

4-A-1531

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Cable Tool #2	299-E34-3	NA	1915-1
Date 7/24/87	684-5150	Depth 205' To 205'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
208' 4 1/2" of	8"			(205 cont.) 30% CS, 10% MS, 5% FS. Sample is poorly sorted. Gravel is 60% basalt, 30% metamorphics (mostly qtzite), 10% granitics and other. Sand is 45% basalt, 45% qtz, 10% R.F. Gravel clasts are R-SA. Sand is A-SR. No colors too dark. No HCl test. No consolidation. Similar to 200' sample, but not to material from 200 - 204 - this interval was much coarser with silty sandy gravel predominating. Basalt chips could have been from a boulder ripped up from underlying basalt bedrock.	2105	Shut-down for the day
				R A Hagen 7/24/87		

REMARKS:

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

A 6000-021 (5 85)

4-A.1532

DRILL LOG

By: LA HAGEN | Rig: Cable Tool #2 (68K-1980) | Well Number: 299-E34-3 | Computer Number: NA | Project or Work Order No.: KEH-1915-1

Date: 7/25/87 | Depth: 205' To 210' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
208'4½" of		8"			0530	Began drilling
219'5½" of		8"			0630	Stopped drilling - added 11'1" of 8" casing
	210'	H	W	~~STIFF~~ SANDY GRAVEL, 45% gravel (VF to C Pebbles), 50% sand 5% silt Sand (20% VCS, 15% CS, 10% MS, 5% FS) Poor Sorting; Gravels are ~ 50% basalt, 50% qtz & granitics Sands are ~40% basalt 60% qz Gravels R to SA; Sands SA Wet Color 5Y 5/2 olive gray Dry Color 5Y 7/2 lt gray Unconsolidated. Somewhat more gravel than last sample, otherwise similar.	930	

REMARKS:

N.A. Chauvenet
7/25/87

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)

4-A-1533

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
M.A. Chamness	Cable Tool #2	299-E27-3	N/A	PEH-1915-1
Date: 7/25/87	68K19150	Depth: 210' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
219' 5½" & 8" casing					~1030	Hit water at 212', will measure with E-tape the next time the have to weld.
					11:30/12:15	changed over to sand pump. Driller thinks he hit basalt at 213' they will try cleaning out hole, but sand is running in water... casing + basalt.
					12:30	Changed drillers, Lyndon Carden is drilling now
				Stopped drilling to see where water would come to after 15 min. w/ only 1 gal. H_2O having been added. Looked like it might be as much as 1' of water. Cannot drive casing very easily, basalt surface may be sloped so that drive shoe is in basalt on one side + open to sand + gravel on the	1545	

REMARKS:

M.A. Chamness
7/25/87

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 6000-021 (5-85)

4-A.1534

DRILL LOG	By Cleanmers + Hage	Rig Cable Tool 68K-19150	Well Number 299-E34-3	Computer Number NA	Project or Work Order No. HEH-1915-1
	Date 7/25/87		Depth 214' to 214'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				other.		
				Decision was made to cease drilling. Still not able to find	1605	
				obviously freshly broken pieces of basalt flows in bailed samples.		
				Driller feels we may not be able to pull back casing if		
				it is driven any further. Will have well bailed dry & see		
				what the water does.	1700	
				Water level still rising quickly, at 202'7" from surface	1700	
				220.55'		
				6.1' stickup		
				214.75'		
				+ 2.2' point of tape		
				216.75'		
				- 3.0' [illegible]		
				213.75		
				Water level 202.15'	1705	
				D/W = 203.17' below surface (E-TAPE #11044)	1830	
				D/W = 203.16' below surface (E-TAPE #11044)	2044	
				∴ water level recorded is static.		
				D/B was @ 213.75' below surface (S-TAPE)		
				∴ about 10.6' of water in bore.		
				EJ A. Kg 7/25/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1535

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
R. L. PREMO	BE-60	299-E34-3	N/A	KEH-1415-1
Date: 7/27/87	68K-19150	Depth: 214' to 214'		Subcontract No: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
219 5/8" of 8" casing.						Driller: Louie Watkins
215' 8" 1/2 of 8" casing.						2'9" of 8" casing removed.
				D/W = 205.5' − 2.16' casing stickup, measured to 16' casing (believed to be ground surface), [E-tape ser. #11044] 203.34' D/w from ground surface.	0715	
				D/B = 216.75' (steel tape) − 3' 213.75' − 2.16' casing stickup 211.59 + 2.30 end of tape 213.89 D/B from ground surface	0740	
				213.89 − 203.34 = 10.55' of water in well		
				Straightness test performed by passing a 20' tether (with rebar welded around the ends and in the middle giving a 6" diameter) the length of the hole.	0800	
				10' 3" of 8" diameter telescoping screen was set into well.	0815	

REMARKS:

Richard Premo

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

A-6000-021 (5 85)

4-A.1536

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	B.E. 60L	299-E34-3	N/A	KEH-1915-1
Date: 7/27/87	65K-19150	Depth: 214' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
215'	1/2" of	8" casing		The top of the screen is 206.41' (steel tape). The bottom of the screen is 216.54' (steel tape). 203.55' & 213.68' respectively, from ground surface.	0815	
				Pulled back 8" casing 8.5' to expose screen.	1100	
				D/W = 203.3'	1200	
				{E-tape Ser.# H044}		
204'	11" of	8 casing			1215	Cut 10' 9 1/2" of casing
					1300	Bailed approximately 120-150 gallons of water from well.
				Estimate borehole volume of standing water is 25 gallons (~1/2 gallon). While bailing, some fine sand was emptied. Water cleared some while bailing but was still very murky.		

REMARKS:

Richard Premzic 7/27/87

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)

4-A.1537

DRILL LOG	By R A HAGEN	Rig Cable Tool #2	Well Number 299-E34-3	Computer Number	Project or Work Order No. KEH-1915-1
	Date 7/27/87	GRK-19150	Depth 214' To 214'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204'11"	of 8"	casing		Water samples taken by Russ Goic of PNL for water quality analysis. Samples taken with teflon bailer.	1330	1530
				Well left open - no tools in bore - for geophysical logging removal A.M.		
				Note: end of teflon bailer came off in hole - ball dropped out also - bolt laying at bottom of bore.		
				The 8" casing sticks up 24" above ice top of the 12" (considered to be at ground surface). The 16" CASING IS 2'4" above the 12", and the 10" CASING IS 6" above the 12".	1945	
				R & A Hagen 7/27/87		

REMARKS:

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

A-6000-021 (5-86)

4-A.1538

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMPIC	B.E 60L	299-E34-3	N/A	KEH-1915-1
Date 7/25/87	68K-1915U	Depth 214' To 214'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204' of 8" casing						
				Geophysically logged by Eric Jensen.	0730	
				D/W = 203.30'	0915	
				(E-type #11044)		
				D/B = 214.18'	0920	
				steel tape + 2.30' end of tape		
				− 3.00' splice		
				213.48' D/B from ground surface		
				213.48		
				203.30		
				10.18' of water in well.		
				Richard Prempic		

REMARKS:

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

A-6000-021 (5-86)

4-A.1539

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	BE 60L	299-E34-3		KEH-1915-1
Date: 7/28/87	6BK 19150	Depth: 214' To 214'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Ran irrigation pipe from well to pedestal road, ready for hook-up for pump test.		
				Got ready to install 25 hp pump used on E34-5 for pump step-drawdown test and found out the several of the plastic impellors were broken. The pump will have to be fixed or the next one in order (a 15hp pump I believe) used.		
				Decision was also made that no pump test will be done until result from complete suite of water analyses on E34-2 are back. That well will be sampled tomorrow (7/29/87) morning.		
				M.A. Chamness 7/28/87		

REMARKS:

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

A 6000 021 (5-85)

4-A-1540

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
JC L PREMZIC	B.H. 60C	299 C 34-3	N/A	KEH-1915-1
Date 7/29/87	6&K 1915 D	Depth 214' To 214'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204' of 8" casing						
				D/w - 203.39'	0805	
				[T-tape #11044]		
				D/B = 214.31' - .7 = 213.61' = D/B of S screen, (steel tape) (red/white tape split tape) from ground surface	0810	
				D/top of 8" screen = 204.08' - .7 = 203.38' to top of 8" screen, (steel tape) (end of tape split to) from ground surface	0815	
					0900	Working on end of bit attaching 6" diameter steel plate in preparing to surge inside screen.

REMARKS:

Richard Premzic 7/29/87

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)

4-A.1541

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. REMZIE	BE 60L	299 E34-3	N/A	KE-15
Date: 7/30/87	62K-19150	Depth: 214' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204' of 8" casing.						
					0850	well was surged for 1 hour using a 6" diameter surge block inside the 8" telescoping screen from 1380-1420 hrs. yesterday afternoon, 7/29/87. Shut down yesterday at 1500 hrs.
				D/W = 203.37'	0905	
				[E-type Sn. # 11044]		
				D/B = 212.54' - .7' = 211.84' [end of tape = splice]	0910	
					0930	Bailed ~100-120 gallons of H2O to remove surged sand.
				D/B = 214.28' - .7' = 213.58'	0950	
					1000	Started surging.
					1330	still surging. ~50 gallons bailed during this time, 1100-1330
				Richard Remzie 7/30/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1542

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chambers	BE 60L	299-E24-3	N/A	KEH-0115-1
Date: 7/30/87	68K 19150	Depth: 214' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1400	still surging well.
						When bailed get ~1
						pint of sand out.
					1700	quit surging well,
						does not seem to be
						improving. Was surging
						inside screen.
				M.A. Chambers 7/30/87		

REMARKS:

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

A-6000-021 (5-85)

4-A-1543

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
R.L. PREMLIC	B.E. 60L	299-134-3	N/A	KEH-1215-1
Date: 7/31/87	68K-191.0	Depth: 214' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DTB = 214.43' - .7 = 213.73'	0243	
				(steel tape) (add tape - solve)		
				DTW = 203.42'	0747	
				(E-tape sec. method)		

REMARKS:

Richard L. Premlic

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

A 6000 021 (5 85)

4-A.1544

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
E. L. PREMZIC	BE 60C	249-E74-3	N/A	KEW-17.5-1
Date: 8/3/87	(SK-19150)	Depth: 214' To 214'		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 = 203.07	0917	
				(L-type Sec. #11344)		
				D/B = 214.28 - .7 = 213.58	0917	
				(steel type)		

REMARKS:

Richard Premzic
8/3/87

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)

4-A.1545

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. I. FREEZE	R.R. 60L	299 E34-3	V.H	[illegible]
Date 8/4/87	68K-19150	**Depth** [illegible] To 214'		**Subcontract No.** N.H

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 208.04	(45')	
				(E-type No. #1044)		
				D/B = 214.38 - .7	(5')	

Richard Freeze
8/4/87

REMARKS:

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

A 6000-021 (5-85)

4-A.1546

DRILL LOG	By P. White	Rig BR 60L	Well Number 299 E31 - 3	Computer Number N/A	Project or Work Order No. KFH - 1915 - 1
	Date 8/4/87	WRK-1950	Depth 214' To 214'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Began step drawdown (George Last) ~	1700	
				Aborted step drawdown due to ~	1795	
				leakage around pump hose (set off		
				E-tape continuously).		
				Drillers put 5⅝" stainless pipe down	1930	
				hole to guide E-tape - test will		
				be restarted tomorrow.		
				Length of stainless pipe in hole = 210'5"	2215	
				D/W = 206'8" - 2'3" = 203'5" (E-tape		
				stick up ft 11044)		
				→ = 2.25'		

REMARKS:

N.A Chamness
8/11/87

4-A-1547

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

A 6000-021 (5-85)

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Freeze	B.E. 60L	-77-124-3	N/A	[illegible]
Date 3/5/87	681-19150	**Depth** 214' To 214'		Subcontract No. [illegible]

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/w = 223.15' (Could this be 203?	09[illegible]	
				(E-tape Ser. # 10998)		
				Richard Freeze 8/5/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1548

DRILL LOG	By T.R. Oster	Rig BE 60C	Well Number 299-E34-3	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 8/5/87	68K-19150	Depth 214' To 214'		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 = 205.35' - 2.25' = 203.10' below land surface (PNL 300' E-7A#6	0830	
				# 11044)		
				Performed pump test in afternoon.		

REMARKS:

M.A. Chamness 8/6/87

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)

4-A.1549

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R. Oster	B.E. 601	299-E34-3	N/A	KEH-1915-1
Date: 8/6/87	IAR 11130	Depth: 214' To 214'		Subcontract No.: N/A.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled pump, pipe and stilling well out of well	1100	
				D/W = 203.12' below land surface (PNL 300' STEEL TAPE # 11044)	1300	
				D/B = 214.35' - .70' = 213.65' below land surface (PNL 300'	1310	
				STEEL TAPE) 213.65' 203.12' 10.53' of water in well.		

REMARKS:

Karen P. Oster
8/6/87

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)

4-A.1550

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chambers	BE 60L	299-E34-3	N/A	YEH-1915-1
Date: 9/6/87	GBK 1915-D	Depth: 214' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				started running 4" stainless steel casing into well	1500	Louis is driller
				got 20'3½" of 4" 20 slot st. steel screen and at least 20' of casing put together. Driller quit shortly		
				after this.	1700	Louis stopped
				Put 160' of 4" st. steel casing together, for a total	2120	Lin Corder + our Areas started
				of 200'3½". They will need to add a 10' and a 5'		putting casing in well
				section at least to bring pipe to top of hole.		
					2315	quit for day
				M.A. Chambers 8/6/87		

REMARKS:

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

A 6000 021 (5-85)

4-A.1551

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. Mancic	B.L. 60L	[illegible]E34-3	N/A	[illegible]
Date 8/7/87	65K-19150	Depth 214' To 214'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				7' of stainless [illegible]	0700	
				200' 3½" of [illegible] type of screen. Section		
				was composed of a [illegible] section. 207' of stainless.		
				D/B (inside 4" stainless) measurement taken as driller thought he was	0955	
				resting on bottom. D/B = 201' + 2.5' = 203.5'		
				Footage indicates [illegible] pipe [illegible]		
				[illegible] 5' screen. This was proven true when		
				stainless was pulled up and lowered a foot below		
				its previous resting spot.		
				A 10' section of stainless was added & a 2' section	1110	
				removed from the 207' stainless previously in well. Total		
				stainless in well now is 215' with a 2' stick up.		
				D/B (inside 4") = 211.1 + 2.5 = 213.6'	1115	
				D/B = 205.20 + 2.5 = 207.7'	1120	1 sack 20-30 sand added
				D/B = 200.1 + 2.5 = 202.6'	1123	1 sack 20-30 sand added
				204'11" of casing has a 2' section welded on top	1130	
				making 206'11" of total 8" casing. 202'11" of		
				8" casing is below ground surface.		

REMARKS:

Richard Bremmer

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

A-6000-021 (5-85)

4-A.1552

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
E. L. PREMZIC	B.C. GOLF 68K-1915C	99 CM 3		REM-1915-1
Date: 8/7/87		Depth: 214' To 2.1		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1135	Re-started 2' above TD.
				200 lb of 4" below ground suction		
				D/B = was not made as steel tape broke while in the well. Instead stage after working casing up + down 1'.	1150	
	98'			D/B = 184' + 2.5' = 186.5'	1210	4 sacks of 20-30 sand added.
				D/B = 201' 12.5' = 203.5' - 9.67' = 193.83'	1230	13.10 Back 6' to weld 197' 8 3/4" weld.
					1240	1 sack of 20-30 sand added
				Problems pulling casing so put jars on drill string	1315	
				to help free the casing.		
				Still trying to pull casing last foot so they can	1520	
				cut off casing.		
				Cut off 9'3" of casing.	1530	

REMARKS:

Karen P. Oster
8/7/87

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 (5-87)

4-A.1553

DRILL LOG	By K. R. Poster	Rig B-61	Well Number 77 EBH-2	Computer Number N/A	Project or Work Order No. PFN-1115-1
	Date 5/8/87	[illegible]	Depth 214' To 214'		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 top of Sand Pack at 181'1", Bottom of [illegible]	[illegible]	Completion depth = 213'
				Casing is at 192'4", Overlap of sand pack is 2'3"		
			PNL300' STEEL TAPE #5 (BELOW 32°F)	Added 2 bags (100 lbs ea) of 20-30 U.S. Sieve	0900	
				size Colorado Silica Sand to hole, Measured		
				P/B of top of Sand pack at 181', Weld ears on	0920	
				and prepare to pull casing back.		
				Pulled 8" casing back to 183'5", Measured to (below ground surface)	1045	Artificial Sand Pack =
				top of Sand Pack @ 184' (below land surface) leaving 1" overlap of sand.		184' - 213' below
				(PNL300' STEEL TAPE #5)		ground surface.
				Poured 3 buckets (50 lbs ea) of 1/4" Volclay	1100	Bentonite Pellet
				tablets in hole. Measured to top of Pellet Seal		Seal 177' - 184'
				@ 177' below land surface (PNL300' STEEL TAPE #5)		below land surface.
				Poured 4 sacks Bentonite Crumbles in annulus Pulled	1245	
				8" casing back to 173' 2 1/4", Measured to (below land surface) top of granular		
				bentonite seal @ 171' below land surface (PNL 300'		
				STEEL TAPE #5).		
				Poured 4 sacks Bentonite Crumbles in annulus,	1410	
				Pulled 8" casing back to 163' below land surface		

REMARKS:

Karen Poster
6/8/87

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)

4-A.1554

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R. Oster	R.F. 100L	299-E34-3	N/A	Kell-1915-1
Date: 8/18/87	GBK-19150	Depth: 214' To 214'		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 to top of granular bentonite seal @ 167' below land surface (PNL 300' STEEL TAPE #5)		Granular Bentonite Seal = 167'-177' below land surface.
				Bottom of 10" casing is at 116' 5 3/4" leaving overlap of about 5 3/4" of granular bentonite inside the 10".		
				Pulled out 3 20' sections of 8" casing and cut them off. At end of shift left a 20' section in the air and are ready to cut 8" casing at the 62' 10 3/4" weld.	1530	

REMARKS:

Karen K. Oster
8/18/87

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)

4-A.1555

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P White	BE 60L	219 / 31 3	N/A	KAU-1915
Date 8/3/87	68R M150	Depth 214 To 214'		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 (Ligon crew) pulled remainder of 10" casing and prepared to pull 10".	16:00 hrs	

REMARKS:

N A Clemmons
8/3/87

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-0000-021 (5-85)

4-A.1556

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	PE 60L	299-E31-3		KEH-1115-1
Date: 8/8/87	6BK-19150	Depth: 214' To 214'	D/A	Subcontract No.: D/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				167' 5 3/4" Intact 10" casing - 5 3/4" stickup 167' 0" - 2' 3" pushed back 164' 9" of casing 10' in hole after setting 2 bags of bentonite crumbles.		
				casing is settling easily with this drilling		
				169' 1" + 2' 0" tape 171' 1" using FIOL tape #5 - 6' 0" stickup 165' 1" DB top of bentonite		
				M.A. Chamness 8/8/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1557

ORILL LOG	By K R Oster	Rig B.E. GOL #GBK-19150	Well Number 299-E34-3	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 8/10/87		Depth 214' to 214'		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 of 10" Casing is at 164'9". Mixed 5 bags (50 lbs ea) of	0920	
				Volclay grout with 5 bags (2 lbs ea) initiator		
				and ~110 gals of water. Weighed grout with	1045	
				mud balance at 9.45 lbs per gallon and		
				pumped in hole from 105'1" to 141.5'.		
				Measured D/B top of Volclay grout @ 141.5' below	1100	
				land surface (PNL 300' STEEL TAPE) There is 23'5"		
				of grout in hole at this time.		
				Pulled 10" casing back to 152'1" below land surface.	1325	
				Measured D/B of top of Volclay grout @ 149'3" below land		
				surface (PNL 300' STEEL TAPE). This leaves 2'10" of		
				Volclay grout in bottom of 10" casing.		

REMARKS:

Karen R Oster
8/10/87

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)

4-A.1558

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P. White	BE 600	299-E34 3	N/A	EEH-1515-1
Date: 8/10/87	A68K. 1950	Depth: 211' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Casing 152.1" below surface,		
				Top of grout 113'6". Grout weighed in	1615	
				at 9.4 on mud balance. There is 25'9"		
				of fresh grout in hole.		
				Pulled back and exposed 125'10" weld, now 3'6" above		
				12" casing. 125'10" − 3'6" = 122'4" to bottom of 10" from top of 12"		
				123'10" − 2'3½" tape = 126'1½" − 3'6" stickup from top of 12" = 122'7½" DB grout		
					1915	stopped for lunch
					1950	back on site.
				9.4 lb/gal mixing ~250 gal. grout, TT grout ~ 101', mixed another batch 9.6 lb/gal ~ 175 gal, brought DB grout up to 84' from top of 12" casing		

REMARKS:

M A. Chamness 8/10/87

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)

4-A.1559

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	BE 60L	299-E24 3		EFU 1115-1
Date	68K-19150	Depth	1 1/4	Subcontract No.
8/10/87		214' To 214'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				101' ~14' that went into the grout		Pulled 10" casing
				DB grout ~87'.		inside 12", pulling
				Having a difficult time tapping the top of the		most of the 10" out
				grout, there is often enough on the sides of the		
				casing to make the steel tape stick to the		
				side, giving the impression of being at the grout.		
				Pulled the rest of the 10" casing out.	2245	quit for day
				M.A. Chamness 8/10/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1560

DRILL LOG	By K.R. Oster	Rig B.E. 60L	Well Number 299-E27-3	Computer Number	Project or Work Order No. KEH-1915-1
	Date 8/11/87	#68K-19150	Depth 214' To 214'	N/A	Subcontract No. N/A.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Bottom of 12" casing is @ 95' 3½" below ground surface.	0805	
				Measured D/Top of Volclay grout at 107' 4" (Fill 300'	0805	
				STEEL TAPE). This leaves a 12' gap between grout and		
				bottom casing		

REMARKS:

Karen R. Oster
8/11/87

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)

4-A.1561

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P White	BE 60L	299 F 34 - 3	N/A	KE II 1915 - 1
Date 8/11/87	#68K - 1150	Depth 214' To 214'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pumped approx. 130 gal. of volclay grout at 9.7 #/gal (added 5 bags to some leftover from AM shift). Each bag = 50 lbs.	1650	
				Pumped 6 more bags of volclay @ 9.4 #/gal. Tried to measure D/B, but steel tape snapped (1111 #'s), leaving 2 weights + 54' of tape in the mud.	1700	
				Pumped 6 more bags @ 9.4 #/gal (~130 gals) D/B = 42'9" - 3'6" (stick up) - 2' = 37'3" (PNL #5)		
				Pumped 6 bags @ 9.45 #/gal (~130 gals) D/B approx. 8' below surface (grout)	1745	
				Began to pull back 12" casing - not coming easily.	1815	
					1900 1940	dinner break
				Pulled back 12" casing to 60' below ground surface.	2120	
				D/B grout = 22'6" - 2' - 4'9" = 15'9" below surface		

REMARKS:

Pat White 8/11/87

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)

4-A.1562

DRILL LOG	By P. White	Rig BE 60 L	Well Number 299-E34-3	Computer Number N/A	Project or Work Order No. RFH 1915-1
	Date 8/11/87	#62K-19150	Depth 214' To 214'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled back 13" casing to 69'9" below ground surface. Did not measure D/B because tools left in hole should be approx. 24' below ground surface.	2230	
					2310	Quit for day

REMARKS:

Pat White 8/11/87

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)

4-A.1563

DRILL LOG	By K.R.Oster	Rig BE 60L	Well Number 299-E34-3	Computer Number	Project or Work Order No. KEH-1915-1
	Date 8/12/87	#68K-19150	Depth 214' To 214'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled 12" Casing back to 57' below ground surface.	0815	
				Measured D/Top of Volclay grout @ 116' 3" below ground	0825	
				surface (PNL 300' STEEL TAPE). This gives 12'9" of		
				overlap of Volclay grout inside 12" pipe.		
				Mixed 6 bags Volclay grout (50 lbs ea) and 6 bags	1035	
				of initiator (2 lbs ea) with 150 gallons of water		
				to 9.45 lbs per gallon. Measured D/Top of Volclay		
				grout @ 41.5' below ground surface (PNL 300' STEEL		
				TAPE.)		
				Mixed 6 bags Volclay Grout (50 lbs ea) and 6 bags	1105	
				of initiator (2 lbs ea) with 150 gallons of water to		
				9.45 lbs/gallon: Measured D/Top of Volclay grout		
				@ 36' below ground surface (PNL 300' STEEL TAPE.)		
				Mixed 6 bags Volclay grout (50 lbs ea) and 6 bags	1130	
				of initiator (2 lbs ea) with 150 gallons of water to		
				9.4 lbs/gallon: Measured D/Top of Volclay grout		
				@ 25' below ground surface (PNL 300' STEEL TAPE)		

REMARKS:

Karen R. Oster
8/12/87

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)

4-A.1564

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R Oster	BE60C	299-E34-3	N/A	KEH-1915-1
Date: 8/12/87	# 68K-19150	Depth: 214' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Mixed 6 bags Volclay Grout (50lbs ea) and 6 bags of initiator (2lbs ea) with 150 gallons of water 109.4 lbs per gallon. Measure to top of Volclay grout @ 18' below ground surface. (nylon rope).	1300	
				Pulled 12" casing back to 38'6". Measured D/Top of Volclay grout at 19'10" below ground surface (PNL 300' STEEL TAPE).	1350	
				Pulled 12" casing out of hole. Measured D/Top of Volclay grout @ 25'2" below ground surface (PNL 300' STEEL TAPE.)	1450	

REMARKS:

Karen P. Oster
8/12/87

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)

4-A.1565

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P White	BE 60L	219-E34-3	N/A	RE II 1915-1
Date 8/12/87	11 62K-19150	Depth 214' To 214'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Welding puller head to 16" casing.	1630	
				Pulled back 5' of 16" casing to 35'5" below surface	1750	
				D/top of grout is 29' below surface (PNL 300' steel tape)		
				6' overlap blw grout and 16" casing		
				Pulled back casing to 28' below surface (exposed 30'4" weld).	1808	
				D/top of grout = 28'10" (? - past measurement must have been wrong). Top of grout is just below bottom of casing. Setting tremie pipe.	1845	
					Noon 1930	dinner break
				Pumped 6 bags of volclay grout (50 lbs. each) at 9.4 #/gal (approx 150 gals).	1940	
				Pumped 6 bags of volclay grout @ 9.4 #/gal	2000	
				D/top of grout 7' below ground surface (eyeball)		
				Welding puller head to 16" casing	2010	
				Pulled back 16" casing to 17' below ground surface.	2045	
				D/top of grout = 18'4" below surface. (PNL 300' steel tape)		
				Pumped 6 bags of grout @ 9.6 #/gal	2105	

REMARKS:

Pat White 8/12/87

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)

4-A.1566

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P. White	BE-60L	299-E34-3	N/A	E.E.H.-1915-1
Date: 8/12/87	#66K-19150	Depth: 214' To 214'		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/top of grout = 15'4"	2210	
				Pumped 6 bags of grout (150 gals) @ 3.4 #/gal		
				D/top of grout = ground surface	2230	
				Welded puller head back on 16" casing, pulled back final piece of 16" casing.		
				Having trouble pulling out the last few inches- cut off puller head & it pulled right out.	2330	
				D/top of grout approx 5' below ground surface (2' below top of drilled out borehole).		
					2345	Quit for day

REMARKS:

Pat White 8/12/87

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)

4-A-1567

DRILL LOG	By K.R.Oster	Rig BE60C	Well Number 299-E34-3	Computer Number	Project or Work Order No. KEH-1915-1
	Date 8/13/87	#108K-19150	Depth 214 To 214'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Measured D/Top of Volcanic gravel @ 5.42' below	0750	
				land surface (10' bottle measured tape)		
				* Note: Happened that we had to have the		
				shuffled with Intercept gravel		
				Prepare to mud down and demobilize rig	0800	

REMARKS:

Karen R. Oster
8/13/87

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 (5-85)

4-A.1568

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREPIZIC	none	299 E30 3	N/A	1EF 15-1
Date: 8/14/87		Depth: 214' To 214'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				5-100 lb. bags of Big Horn bentonite added to hole to keep dirt from sloughing in prior to pouring concrete.	1000	
				Concrete poured to complete well & pad.	1400	

REMARKS:

Richard Prepizic
8/14/87

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)

4-A.1569

DRILL LOG	By GORDON	Rig 150	Well Number [redacted] F34-3	Computer Number	Project or Work Order No.
	Date 7-13 87		Depth [redacted] 0 To 0		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Tear down Rig &	1:00pm	2:00pm
				Moved welder, propane tank		
				Blocks, Moved rig, Set up		
				Half mast blocked rig		
				Hauled tool Box		

REMARKS:

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

A-6000-021 (5-85)

4-A.1570

DRILL LOG	By Cordon	Rig	Well Number E-34-3	Computer Number	Project or Work Order No.
	Date 7/4/87	150	Depth 0 To 13		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'4½"	10'	H	W	6" minus Gravel		Casing 10' 6" SHOE
	13	H		Small Gravel		pulled casing
						twice to
						straighten

REMARKS:

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

A-6000-021 (5-85)

4-A.1571

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E34 - 3		
Date 7 15 87		Depth 13' To 27'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20½"	13	H	D		5:30	Start
+ 10'	15	H	W	medium to small gravel	7:30	
= 30½	20	H	W	medium gravel & sand w scattered cobbles	11:00	
	25	H	W	medium gravel w sand	12:30	

REMARKS:

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

A 6000 021 (5-85)

4-A.1572

DRILL LOG

By: Gordon
Date: 7/15/82
Rig: 150
Well Number: E34-3
Depth: 27 to 40'
Computer Number:
Project or Work Order No.:
Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30'4¼"	27'			Small - Gravel	1.30	Start
+ 2-½'	~~32'~~			" "	2.30	34½ welding
= 40-4¾	30'	H	W	" "	350	Sample
	35'	H	W	" "	5:20	Sample
	40'	H	W	" "	7:00	Sample
12"				? RM getting in 12" Casing		windy S.O.B.
21-5¾						
+ 21-1						
" 42'6¾"				Ready to weld on next 12"	9:15	Shut down
						CLEANED UP AREA

REMARKS:

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

A 6000 021 (5 85)

4-A.1573

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150'	E34-3		
Date: 7/16/87		Depth: 40' To 60'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
42 6/4"	40'	H		small gravel	5:30	start [illegible] welding
10'6"	45'	H	W	small gravel w scattered larger gravel	7:45	started drilling: 7:00
10'8"	50'	H	W	" "	8:30	
11.	55	H	W	" "	10:00	
63'9½"	60	H	W	" "	12:30	Ran out of pipe
					1:30	shut down

REMARKS:

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

A 6000 021 (5-85)

4-A.1574

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Gordon		E.34-3		
Date: 7.16.87	150	Depth: 60 To 78		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
63-9½	60				1:00	wait for Casing
10-6					1.45	set 12" casing
74-3½				1.45	3:12	Cutting & welding
10-6	65	H	W	60-67 Small Gravel	4.20	Sample
84-9½	70	H	W	67 to 70' LARGE Gravel	6.00	Sample
	75	H	W	70-75 3" Mixed	8.05	Sample
				Casing Started Going ahead of bit at 74' having Rough time getting plug out		

REMARKS:

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

A 6000 021 (5-85)

4-A.1575

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E3t-3		
Date: 7 17 87		Depth: 74 to 95		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84' 4½	75	H			6:00 AM	start drilling
+10'6"	80	H	W	Med sm. gravel & sand	6:45	Sample
95' ½	85	H	W	med - small gravel & sand	9:50	Sample
	90	H	W	small gravel	11:40	sample
	95	H	W	small gravel	1:00	Stopped Drilling 12" to change over to 10" Tools
					7:15	finished working 10" casing shut down

REMARKS:

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

A-6000-021 (5-85)

4-A-1576

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E34-3		
Date: 7 18 87		Depth: 95 To 112 + 112 − 130		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104'11"	95	H			5:45	start 10" Drilling
+8'6"	100	H	W	VC sand	6:00	sample
	105	H	W	" "	9:20	sample
	110	H	W	" "	12:50	sample
				Swing sh. FT (cc 1-2 Hetic 5)		
10'5"	115			VC Sand		
10'6"	120			VC Sand	1:00	Start Drilling
	125			VC Sand	1:30	Start welding
	130			Gravel, Sand & cobbles	2:30	Start Drilling
					5:00	Start welding
total Casing				Drilled From 112' - 132'	7:00	Start Drilling
136'4"					9:15	Head in
~~tbg~~						

REMARKS:

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

A 6000-021 (5-85)

4-A.1577

DRILL LOG

By: Watkins
Date: 7 20 97
Rig:
Well Number: E34-3
Depth: 130 To 135
Computer Number:
Project or Work Order No.:
Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
136 4"	132'	H		still cobbels no samples taken at	5:30	start
10's	135'			135	6:30	well casing
					7:30	start drilling
					8:30	Tools stuck in hole
					9 11:00	Tools still stuck
					12:30	modified B.t
					..	started drilling
					1:30	shift change

REMARKS:

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

A 6000 021 (5-85)

4-A.1578

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Cordon	150	E34-3		
Date 7/29/87		Depth 135 To 144		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Gram Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146'4"				Cannot drill out plug in Casing pulled casing back 18" welded on lugs on top of 16" casing to Hold 10" & drill out plug	1:50	Start Drilling
					3:20	Drilling
	135'	H	W	Sand	5:20	Samples
	140'	H	W	Sand & Gravel	7:30	"
	144'	H	W	" " Still Has 6'9010" plug	9:20	Stopped Drilling

REMARKS:

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

A 6000 021 (5-85)

4-A.1579

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E34-3		
Date 7 21 87		Depth 144 To 155		Subcontract No

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146' 9"	[illegible]	H			5:30	start
10' 4 3/4"	145	H	W	med gravel & sand	6:00	sample
10' 4"	150	H	W	med to small gravel & sand	6:15	weld casing
	155	H	W	" " (12:15 sample)	7:45	start drilling
					12:45	weld casing
Total					1:15	change shift still welding
167' 5 3/4"						

REMARKS:

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

A-6000 021 (5-85)

4-A.1580

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R L Cordon		E34-3		
Date 7/24/82	150	Depth 155 To 167		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calicle, Etc.	Time	Drilling Comments
167-5½	155				1:15	welding
					1:50	Start Drilling
	160	H	W	Sand Gravel & clay	4:00	Sample
	165	H	W	" " "	5:30	Sample
	167	H		" " "	6:30	---
				6:30		WENT AFTER WRENCHES TOOK OFF 10" Bit & Stem Spoiled over Mast Cable Strung up Stem for 8" Bit

REMARKS:

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

A-6000-021 (5-85)

4-A.1581

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E34-3		
Date 7 22 87		Depth 167 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125 3/4					5:30	finish stringing Tools
					7:00	weld 8" casing
					1:00	shut down safty meeting
					1:30	punch out go home

REMARKS:

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

A-6000-021 (5-85)

4-A.1582

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
RL Cordon	150	E34-3		
Date 7/22/87		Depth 167 To 178		Subcontract No.

	Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	125-3/4		H		Welded 4 joints Casing	1:00	Safety meeting
+	21-1/2		H		Welded 1 joints 5.15-7.5#	1:45	welding 8" casing
+	20-11/2		H			4:45	Finished welding
+	16-4/2		H	W	Alluvial + Sand		
=	177-8/4	178	H	W	" "	6:00	
+	10'	175	H	W	" "	7:30	
=	187-8/4		H	W			
					Top Hack 190'		Lower
					about 2' above pipe		casing
					when lift is at bottom		Loaded
					of pipe		Lin

REMARKS:

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

A-6000-021 (5-85)

4-A.1583

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E3C-3		
Date 7 23 87		Depth 178 To 194		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
188'					500	repeat trial hole on Rig
4/10'	180	H	W	small gravel		
total	185	H	W	med gravel		Lead Bit-10' on pickup
177 3/4"	190	H	W	small to med. gravel & cobbles	5:45	start drilling
					7:00	Sample
					8:05	sample
					8:30	Weld casing
					9:30	start drilling
				11:30 Sample	1:30	shut down

REMARKS:

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

A 6000 021 (5-85)

4-A.1584

DRILL LOG

By RL Gordon | Rig | Well Number E54-3 | Computer Number | Project or Work Order No.
Date 9/23 '87 | 15(") | Depth 194 To 200 | | Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
177-8½'	194				12:00	Start Drilling
+ 10.7½	195	H	W	Medium Gravel ¼" Minus	2:00	Sample
= 208-4½'	196	H	W	" " 6" " 2:30	3:20	welding
					3:20	drilling
					3:30	Greased Rig
					3:40	drilling
	200	H	W	Sand + 3" minus	5:30	Sample
					5:45	Spudding clutch (Vapor-ET)
				6:30 Spudding Clutch needs clutch plates will not work went to run 22 W —	6:45	— —

REMARKS:

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

A 6000 021 (5-85)

4-A.1585

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E39-3		
Date 7/24/87		Depth ~~200~~ 300 To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				~~Rep~~ Dismantle spudding clutch	5:00	
				no drilling waiting on parts	~~12:15~~	
				go to work on 22 W	12:15	to 1:30
				and finish shift		

REMARKS:

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

A 6000 021 (5-85)

4-A-1586

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
RL Cordon		E34-3		
Date 7/24/89		Depth 200 To 205		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
258'4½"	200			Large Gravel 50% Basalt & Sand	7:00	pm Start Rig
					7:30	Adjusting Water
						Circulate
		~~H~~				
	205	H	W	Sand Clay & Gravel	9:15	Sample
				Can drill ahead if you want Also to Rock P		

REMARKS:

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

A-6000 021 (5 85)

4-A.1587

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
LE Watkins	150	E34-3		
Date 7 25 87		Depth 205 To 214		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
208'4½	205	H			5:30	Start drilling
+ 11'1"	210	H	W	Large gravel, clay & sand	6:30	Well casing welder needs work (Tune up)
219-5½						
					8 00	start drilling
					9:40	sample
						Drills hard
						may be basalt
						Still cutting sand undershot
						~~start down~~
				BAILED HOLE 30 min	1:30	~~Re~~ shifted gears

REMARKS:

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

A-6000-021 (5-85)

4-A.1588

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Corder	152	E54-3		
Date: 7/24/87		Depth: 214 To 214'6"		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
219.5'	214			Basalt Bed getting Sand & Gravel	1:15	Start
				under Casing - DRIVE CASING 1"	2:00	drilling
				Drive Casing 1½"	3:00	Drive Casing 1.5"
				Still getting Sand & Gravel	3:25	drilling
				But Bottom of hole in Hard Rock	3:30	Baling
					3:50	well decision
					4:00	Baling
				Went to 22w at 4:50	4:15	measure water
						Feed
						water coming
						in about
						1' Each 1½ min

REMARKS:

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

A-6000-021 (5-85)

4-A.1589

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L E Lehtinen	150	E34-3		
Date: 7-22-87		Depth: — To —		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
204'11"	213.85	R		MO drilling	5:00	Break down tools - drill
						set screen
						pull casing
						cut casing
						Bail / test
					1:30	change shifts
			N.L. Cordova 7/22-87		1:30	" "
				1:30 To 3:45 Boiling & Helping	3:45	
				take water samples		

REMARKS:

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

A 6000 021 (5-85)

4-A.1590

DRILL LOG	By Watkins	Rig	Well Number E34-3	Computer Number	Project or Work Order No.
	Date 7-27-90	150	Depth — To —		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
213.84	H			Surge well	500	fabricate
						too Lg &
						Surge well
						prior to sample

REMARKS:

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

A-6000-021 (5-85)

4-A.1591

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R L Cordon	#150	E34-3		
Date 7/30/87		Depth 2 to 7-14		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Surging well w/ AC	1:00	Surging well
				about 1 quart	1:20	Bailed
					2:15	Surging
				about 1 pint — gpm	3:30	Bailed
					3:45	Surging
				cuft fluid	4:40	Bailing
					5:00	go to 22 w

REMARKS:

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

A 6000 021 (5 85)

4-A.1592

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Ams + Co. Inc.	17	EU-3		
Date: 8-6-87	150	Depth: To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Set 160' (Stainless 4")		9:00 - 11:30

REMARKS:

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

A-6000-021 (5-85)

4-A.1593

DRILL LOG	By RL Cooke	Rig	Well Number E32-3	Computer Number	Project or Work Order No.
	Date 8/8/82	150	Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled 140' x 8" Casing		
				Rigged up & pulled 7' x 10" Casing		
				Put in 2 trays Crumbles		

REMARKS:

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

A 6000-021 (5-85)

4-A.1594

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Watkins	150	E34-3		
Date 8/12/87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				pulled 69' 12" casing		
				poured 5 batches grout		
				To within 18' of top or ground		
				level		
				started pulling 16"		

REMARKS:

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

A-6000 021 (5-85)

4-A.1595

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Conlee-Hamblen	130	634-3		
Date 8/13/87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Reamed up 12¼" pulled & Mixed		
				To pull 16" Casing		
				Pulled 12¼" x 16" Casing		
				Pumped 280 Gallons of Mud		
				Pulled 100' x 16" Casing		
				Pumped 282 Gallons of Mud		
				Pulled last 20' of 16" Casing		
				Moved Grouter to #3		

REMARKS

D - Dive Burnt H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine ____Standing Water

A 6000 021 (5-85)

4-A.1596

DRILL LOG	By Watkins	Rig 150	Well Number E34-3	Computer Number	Project or Work Order No.
	Date 8 13 87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				disassembled Rig and		
				transported to slab yard for steam		
				cleaning B/50 skid same		
				for other B50's mounted on skids		
				picked up tools afterward		
				finished day pulling pump from		
				other well ???		

REMARKS:

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

A 6000 021 (5-85)

4-A.1597

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
O. Ames		299-E34-3		
Date 1-5-88		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Developed well # 299-E34-3		water clear
				Start Bailing	12:30	getting sand from
				Done Bailing	2:00	The sand pack
				Bailed approx. 250 gals.		Cleaned up good
				Set up time	15 min.	

REMARKS:

D - Drive Barrel H - Hand Auger A - Auger M - Mudrotary B - Bucket VA - Vacuum Auger C - Cuttings P - Other T - Vacuum Truck Deviation Meter

4-A.1598

WELL 299-E34-4

Battelle
Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project: 200 Area RCRA Monitoring Wells
Location: 200 East
Driller: Leany Codon + Mike Arnold
Drilling Co.: Kaiser
Geologist: S Dudziak / MA Chamness
R Haass, K. Oster, R Prenzic

Well Number: Z99-E34-4
Temporary Well Number: N/A
Coordinates: N41,391 W49,419
Casing Elevation: 587.56'
Ground Elevation: 585.17'

DRILLING METHOD

Rotary Air: N/A Mud: N/A
Cable Tool: D N/A H X
Drilling Fluid: water (200E)
Other: backhoe 0-4'

COMPLETION DATA

Drilled Depth: 177' (below ground)
Completion Depth: 177' (below ground)
Date Started: 7/18/87 Completed: 8/19/87
Static Water Level/Date: 175.58' 7/20/87
dry 12/2/87

CASING DATA

Type	Size	Stickup		
Carbon steel	12"	0' + 0'	to	84'8"
Carbon steel	10"	0' + 8 1/2"	to	135'2 1/2"
Carbon steel	8"	0' + 1'9 3/4"	to	174'8 3/4"
stainless steel	4"	0 + 2.39'	to	176'10 5/8"

Approved By: MAC Date: 11/20/87

PERFORATIONS

Type:

Depth		Schedule
	-	
N/A	-	
	-	

App. By: MAC Date: 11/22/87

SCREEN

Type: 4" stainless steel
Length: 20'
Slot Size: 20 slot
Depths: 177' - 157'
App. By: MAC Date: 11/22/87

ANNULAR SEAL

Type	Interval	Volume
20/30 sand	177'-154'	15 cu. yds.
bentonite pellets	154'-132'	3 [illegible]
bent. crumbles	132'-94'4"	150.5 cu. ft.
volclay grout	94'4"-132'2"	1285 gal
Cement	0'-4'	unknown

App. By: MAC Date: 11/23/87

GEOPHYSICAL LOGGING

Sondes	Interval	Date
natural γ	0' - 177'	7/18/87
neutron	0' - 177'	7/18/87
gamma gamma	0' - 177'	7/18/87
	-	
	-	
	-	
	-	

Approved By: MAC Date: 7/18/87

AQUIFER TESTING

Type of Test: N/A
Length of Test:
Volume Pumped:
Drawdown:

insufficient water

Approved By: MAC Date: 7/18/87

OTHER APPLICABLE ITEMS

- ✓ Steam Cleaning
- MAC Storage of Const. Material
- MAC Tool Lubricants
- MAC Concrete Pad
- MAC Protective Steel Posts
- MAC Safety Paint
- RAH Straightness Test 7/18/87
- MW Well Development 7/29-30/87
- TV Downhole TV Inspection
- WH Well Abandonment
- ✓ Complete As-Built Diagram, Driller's and Geologist's Logs

Approved By: MA Chamness Date: 12/4/87

Reviewed By: [signature] Date: 12-28-87

A-1800-187 (3/87)

PREFACE

This Inspection Plan identifies the inspections required and the responsible people to perform the inspections of the monitoring wells to be constructed under Project B-678.

The inspection of well construction activities is intended to provide assurance that the work performed by construction forces is in accordance with the approved contract documents. The degree of inspection is commensurate with the significance of the monitoring wells with regard to function and safety.

Inspectors

Listed below are the names of the individuals whose initials appear within this inspection plan.

Name	Initial	Organization	Job Title
John F. Keller	JFK	Kaiser Engineering Hanford	Superintendent
Michele A. Chamness	MAC	Pacific Northwest Laboratory	Scientist

The PNL project manager has reviewed the completed inspection plan and is satisfied that all the applicable inspections of the work were made during the construction of the wells.

G V Last — 1-13-88

PNL Project Manager — Date

CONSTRUCTION INSPECTION SERVICES

Described herein are the inspection services to be provided and documented by PNL.

Pre-Award Submittal Review

	Item	Contract Reference	Initial	Date
1.	Verify contractor and drillers are licensed for well drilling in the State of Washington.	01100-1.2 01300-1.2.1A	JZK	1-12-88
2.	Verify cable tool drilling experience is five years or more with drive barrel and hard tool.	01100-1.2	JZK	1-12-88
3.	Verify documentation of ground-water monitoring wells drilled by contractor.	01100-1.2	JZK	1-12-88
4.	Verify contractor submitted description of drilling method and equipment.	01300-1.2.1B	JZK	1-12-88
5.	Verify contractor submitted resumes of personnel.	01300-1.2.1C	JZK	1-12-88

Procurements

Verify materials to be furnished to the contractor are as described in the construction specification.

	Item	Contract Reference	Initial	Date
1.	Stainless steel screen (8 inch telescope size).	01100-1.5A	JZK	1-12-87
2.	Stainless steel screen (4 inch).	01100-1.5B	JZK	1-12-87
3.	Centralizers.	01100-1.5C	JZK	1-12-87
4.	Stainless steel casing (4 inch).	01100-1.5D	JZK	1-12-87

1

	Item		Contract Reference	Initial	Date
5.	Artificial sand packs.		01100-1.5E	JTK	1-12-88
6.	Bentonite pellets.		01100-1.5F	JTK	1-12-88
7.	Bentonite grout.		01100-1.5G	JTK	1-12-88
8.	Granular bentonite.		01100-1.5H	JTK	1-12-88
9.	Sack crete.		01100-1.5I	JTK	1-12-88
10.	Portland cement.		01100-1.5J	JTK	1-12-88
11.	Well cap.		01100-1.5K	JTK	1-12-88
12.	Brass survey marker.		01100-1.5L	JTK	1-12-88
13.	Sample jars.		01100-1.5M	JTK	1-12-88
14.	Hydrologic samoling equipment.		01100-1.5N	JTK	1-12-88
15.	Drive shoes.		01100-1.5O	JTK	1-12-88
16.	Carbon steel casing.	a. 16 inch	01100-1.5P	JTK	1-12-88
		b. 12 inch	01100-1.5P	JTK	1-12-88
		c. 10 inch	01100-1.5P	JTK	1-12-88
		d. 8 inch	01100-1.5P	JTK	1-12-88
17.	Guard posts.		01100-1.5Q	JTK	1-12-88
18.	Paint: primer		01100-1.5R	JTK	1-12-88
	finish enamel		02011-3.5I	JTK	1-12-88

Performance Submittals

	Item	Contract Reference	Initial	Date
1.	Verify submission and approval of construction schedule.	01300-1.2.2A	JTK	1-12-88
2.	Verify drilling logs are submitted daily.	01300-1.2.2B	JTK	1-12-88
3.	Verify submission and acceptability of flow meter certification.	01300-1.2.2C		

DFC NO. 200-1

ATTACHMENT 1

DESIGN/FIELD CHANGE		DFC No. 200-1
Task No. N/A	Project Title - 200 Area Burial Ground Detection Monitoring	Final Approval Date 11/25/87

Documents Affected

1. Construction Specifications KEY-1914 (B-677) and (B-678)
2. Inspection Plan Construction Project KEH-1914 (B-677)

Description of Change

Line out and disregard any statements concerning flow meter certification. Specifically paragraph 1, 2.2C under performance submittals in the referenced construction specs. and item 3 under the performance submittals section of the referenced inspection plan.

Justification

See attached letter

Distribution

PNL
SP Airhart
MA Chamness
CS Cline
DR Dahl
TJ Gilmore
RM Smith
JS Wilbur

WHC
RE Clayton
C Hodge
RB Kasper
DM Tulberg

Remarks

None

Initiator/Author	Phone	Organization(s)	Date
G. V. Last G.V. Last	376-1054	Geosciences/PNL	11/25/87

Approvals

DR Raymond 11/25/87

Project Manager	QA
G.V. Last 11/25/87	DR Dahl - 11/30/87

Well Number 299-E34-3

The remaining sections of this inspection plan shall be completed for each well.

Well Drilling Activities

	Item	Contract Reference	Initial	Date
1.	Verify wells are constructed in continuous operation.	01100-1.3		
2.	Verify contractor uses approved water source.	01600-2.0	MAC	1/8/88
3.	Verify beveled edge is cut on temporary casing by contractor.	01600-2.1A	MAC	1/8/88
4.	Verify suitability of split spoon sampling equipment.	01600-2.2	N/A	
5.	Steam cleaning equipment.	01600-2.3	MAC	1/8/88
6.	Aquifer testing equipment.	01600-2.4	MAC	1/8/88
7.	Verify contractor has copy of WAC Chapter 173-160 "Minimum Standards for Construction and Maintenance of Water Wells" and the construction specification at the jobsite.	02011-1.2	MAC	1/8/88
8.	Verify contractor has a copy of all addendums and change orders at the jobsite.	02011-1.2	MAC	1/8/88

Monitoring Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify proper technique of cable tool drilling.	02011-3.1.1	MAC	1/8/88
2.	Verify steam cleaning is being done properly.	02011-3.1.2	MAC	1/8/88

Well Number 299-E34-4

Item		Contract Reference	Initial	Date
3.	Verify contractor is handling and storing construction materials properly.	02011-3.1.3	MAC	1/8/88
4.	Verify bevel on casing and welding is done as specified.	02011-3.1.4	MAC	1/8/88
5.	Verify the contractor uses proper tool lubricants.	02011-3.1.5	MAC	1/8/88
6.	Verify only approved drilling additives are used.	02011-3.1.6	MAC	1/8/88
7.	Verify the proper disposal of drill cuttings and water.	02011-3.1.7	MAC	1/8/88

Well Testing

Item		Contract Reference	Initial	Date
1.	Verify water-level measurements are taken. Note in log.	02011-3.2.1	N/A	
2.	Verify the bottom of temporary casing is free of plugging material at end of each day. Note in log.	02011-3.2.1	N/A	
3.	Verify ground-water samples are taken when needed.	02011-3.2.2	N/A	
4.	Verify aquifer testing is done at each well.	02011-3.2.3	N/A	
5.	Verify formation samples are taken as required.	02011-3.3	MAC	1/8/88

Well Number 299-E34-4

Borehole Construction

	Item	Contract Reference	Initial	Date
1.	Verify temporary casing is telescoped at no more than 100 feet intevals.	02011-3.4A	MAC	1/8/88
2.	Verify depth of well.	02011-3.4B	MAC	1/8/88
3.	Verify proper action is taken if overdrilling occurs.	02011-3.4C	MAC	1/8/88
4.	Verify acceptable passing of alignment test.	02011-3.4D	MAC	1/8/88
5.	Verify all temporary casing is removed from the well.	02011-3.4E	MAC	1/8/88

Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify position of 8 inch screen and pullback of casing to expose screen.	02011-3.5A	N/A	
2.	Verify adequate well development.	02011-3.5B	N/A	
3.	Witness aquifer test.	02011-3.5B	N/A	
4.	Verify proper setting of 4 inch screen, casing, and centralizer.	02011-3.5C	MAC	1/8/88
5.	Verify proper placement of sand pack.	02011-3.5D	MAC	1/8/88
6.	Verify proper location and thickness of bentonite pellet seal.	02011-3.5E	MAC	1/8/88
7.	Verify proper mixing, placement, and location of Volclay bentonite-based grout.	02011-3.5F	MAC	1/8/88

	Item	Contract Reference	Initial	Date
8.	Verify proper concrete seal at top of well.	02011-3.5G	MAC	1/8/88
9.	Verify proper construction of concrete pad and placement of brass survey marker.	02011-3.5H	MAC	1/8/88
10.	Verify proper placement, construction, and painting of guard posts.	02011-3.5I	MAC	1/8/88
11.	Verify contractor cleans up site and properly stores excess materials.	02011-3.5J	MAC	1/8/88
12.	If abandonment of well occurs, verify proper abandonment.	02011-3.6	N/A	
13.	Verify contractor maintains the drill log daily.	02011-3.7		
14.	Prepare punchlist at construction completion for exceptions.		N/A	

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E24-4 Geologist M.A. Chamness + S. Lindsey, E. Fragoso, K. Freeman, K. Oster Page 1 of 2

Reviewed by [illegible] Date 12-29-97

Construction Data		Depth in Feet	Geologic/Hydrologic Data		
Description	Diagram		Diagram Litho.	Lithologic Description	
cement 0'-21.5'		4'		silty sandy gravel	--
		10'		" " "	1.1 /hr
		15'		silty gravelly sand	0.36 /hr
		20'		gravelly sand	3.3'/hr
		25'		SL SILTY SL GRAVELLY SAND	10'/hr
		30'		Gravelly silty sand	10'/hr
		35'		Silty sandy Gravel	7.5'/hr
		40'		" " "	2.5'/hr
		45'		" " "	3.3'/hr
		50'		" " "	3 /hr
		55'		" " "	2.5'/hr
		60'		" " "	1/ /hr
		65'		Gravel	1.3'/hr
bentonite annulus 21'-74'4"		70'		"	2. /hr
		75'		silty sandy gravel	4.3'/hr
		80'		" " "	3.3'/hr
12" screen steel		85'		" " "	2'/hr
		90'		sl. slightly silty gravelly sand	3 /hr
10" carbon steel casing		95'		" " " "	2.5/hr
		100'		Silty sandy gravel	2.2/hr
Volclay grout 94'4"-122'2"		105'		" " "	1.5/hr
		110'		" " "	2.3/hr
8" carbon steel casing		115'		" " "	4.4'/hr
		120'		" " "	2.0/hr
4" stainless steel casing		125'		" " "	5'/hr
		130'		" " "	2.5/hr

A-1800-186 (3/87)

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

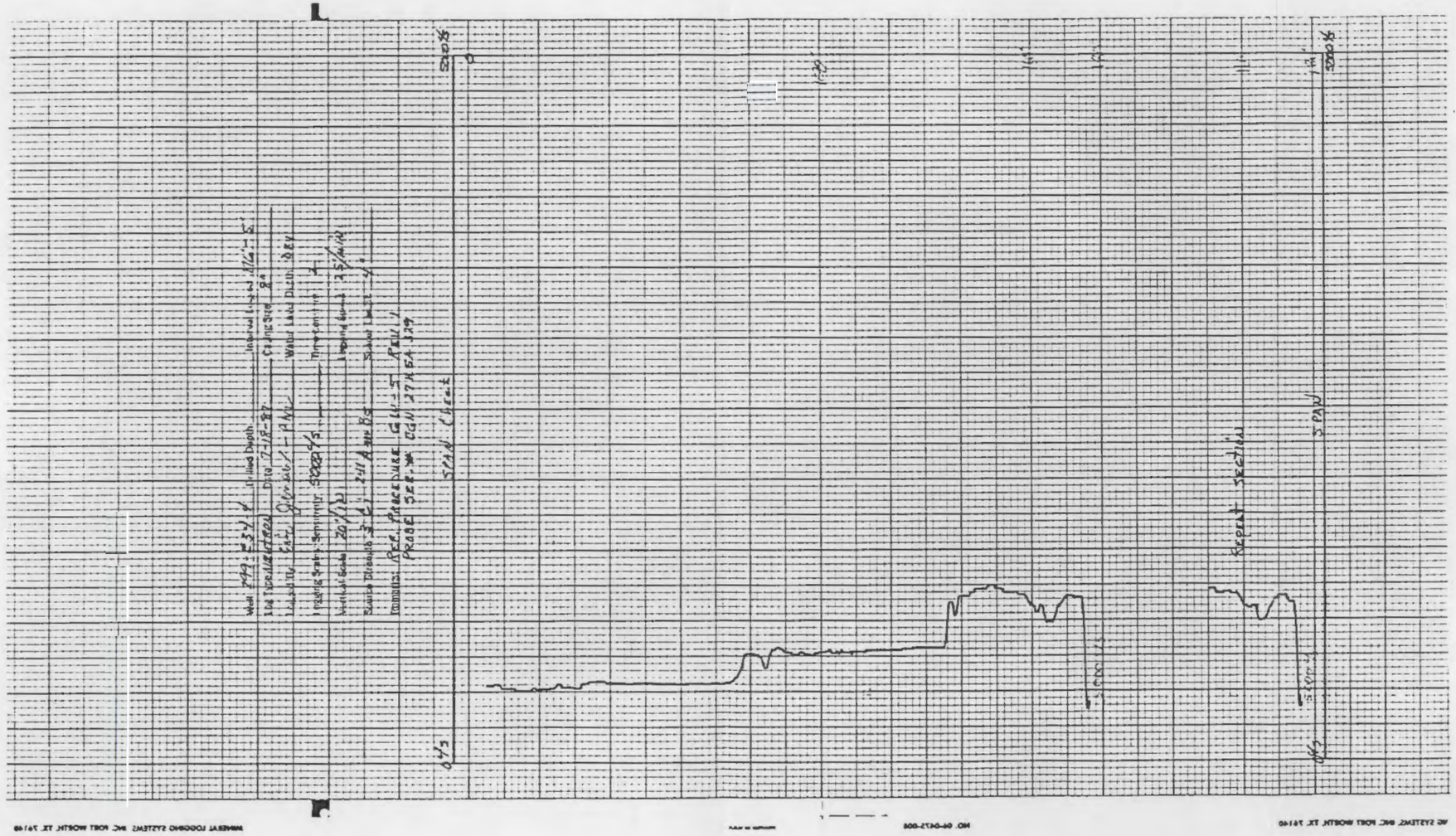
Well Number 299-E34-4 Geologist M.P. Charvat + S. Lindsey
K. Oster, R. Tremaine Page 2 of 2

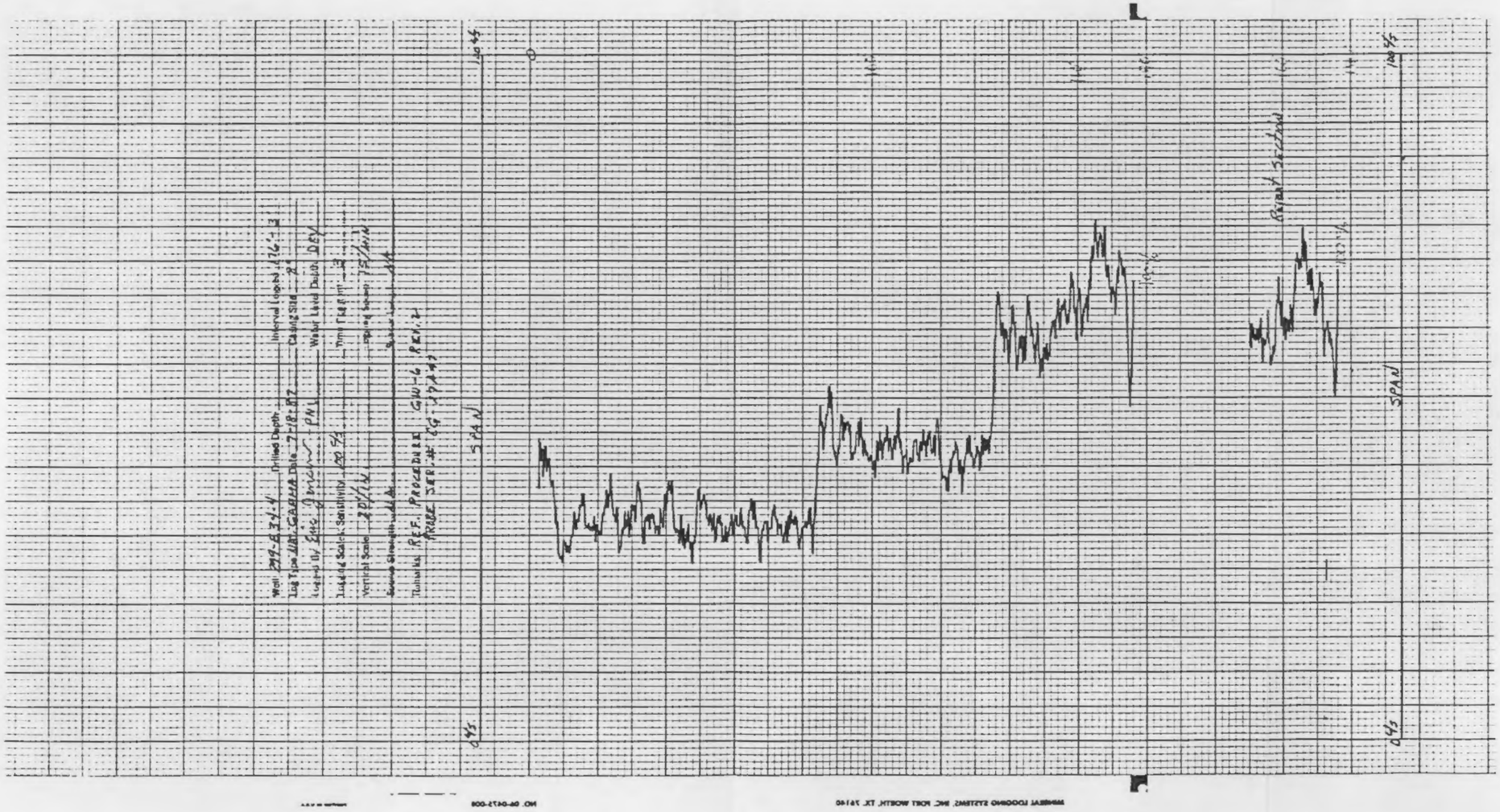
Reviewed by W.K. McGhan Date 12-28-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		
Description	Diagram		Diagram Litho.	Lithologic Description	Drill rate (ft/hr)
volclay grout from 132'-0" to 124'4"					
10" carbon steel casing		135		silty sandy gravel	2.5'/hr
8" carbon steel casing		140		" " "	4.0'/hr
Benseal crumbles 132'2"-149'		145		Sandy gravel	2.2'/hr
volclay pellets from 149'-124'		150		silty sandy gravel	1'/hr
		155		sandy gravel	1.7'/hr
4" sch 40 slot screen		160		silty sandy gravel	5'/hr
#2/20 silica sand placed 154'-132'		165		" " "	2.7'
		170		Gravelly sand	5.4
water level 175.58' 7/20/87		175		" " "	16.7
	TD = 177.1'	177'1"		Basalt 175 1/2'	

A-1600-186 (3/87)

Well 249-651-1 Drilled Depth
Log Type DENSITY Date 12-18-87
Logging Engineer RM
Logging Equipment 4200 SP
Vertical Scale 20/1"
Source Strength 125 mc Ci 137 Cs
Remarks: REPEAT SECTION
PROBE SER # 66-78
SPAN CHECK
REPEAT SECTION
SPAN


REPEAT SECTION


Well 295-E-37-4
Log Type VIB-GAMMA Date 7-18-82
Logged by Schl. Driscoll PNL
Logging Scale Sensitivity 20 SA
Vertical Scale 20'/in
Recorded Elevation
Tubing No. REFL. PROCEDURE GW-6 REV. 2
PROJECT SER. # 66-19243
Interval Logged 276'-3
Casing Size 24
Water Level Depth DRY
Time Elapsed —
Speed Scan 15'/min
Base Level DRY
SPAN
DRY
Primary Section
SPAN
DRY

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Buckyrus Erie # 68K19153	299-E34-4	N/A	KEH 1915-1
Date: July 8, 1987		Depth: 0' To 4'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				- Tools Stopped [illegible]' before [illegible]	1600	Cable Tool Rig Buckyrus Erie # 68K19153 set up at site ready for drilling - backhoe to 4'
0'	0-4'	Back-hoe	Dry	SILTY, SANDY, GRAVEL; 30% LG Caliche, 10% SM cobbles, 20% Gravel, 15% Sand, 25% Silt; VPS; Gravels [illegible]; Qzites & Metamorphics covered w/ Caliche; Sand [illegible]; 60% basalt 40% quartz; Cobbles are subrounded, Sand subangular Dry color is 10YR 5/2 Grayish Brn, Strong Rxn NCL Unconsolidated	1630	

REMARKS:

S Dudziak 7/8/87

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)

4-A.1617

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudrick	Buckeye's Erie # 68K19153	299-E34-4	N/A	KEH 1915-1
Date: 7/9/87		Depth: 4' To 4'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
					5 30	- Hole has been
						backfilled with
						sand; currently
						drilling w/drive
						barrel, has been
						pouring water on
						surface to make
						material more
					8 00	- hole has been
						caving
					8 30	- Casing is no longer
						drilling; is waiting
						casing; Preparing to
						set 12" in hole.
					10 45	- Most of the well-related
						work has stopped.
						A platform was just
						brought in to set up
						at the well.
					11 30	Started handtooling
						No casing is set
						yet; Added ~2 gals
						water

REMARKS:

S Dudrick 7/9/87

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)

4-A.1618

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	GSK-19153	299-E34-4	N/A	KEH 1915-1
Date 7/9/87		Depth 4 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
0'	10'	H	Wet	SANDY SILTY GRAVEL;	1300	
				10% M Pebbles, 30% Broken F. Pebbles, 15% VF Pebbles		
				10% C Sand, 10% M Sand, 20% Silt; VPS		
				Gravels are ~ 70% Basalt, 30% Quartzite		
				Sand is ~ 85% basalt, 15% Quartz,		
				Broken grains are angular, Unbroken clasts are		
				subrounded to subangular, Dry color 2.5Y6/2		
				light grayish tan; Slight Rxn HCl		
				A little more basalt than 0-4' Sample		
				S. Dudziak 7/9/87		
					1205	welding on 12" drive
						shoe, shoe has not
						been milled, may be
21'3¾"	10'					hard to pull back.
						Setting casing in 21'3¾"
					1405	started drilling
					1415	added ~8 gal H2O
					1430	added 5 gal H2O
					1445	added 5 gal H2O
					1500	added 5 gal H2O

REMARKS:

M.A. Chamness
7/9/87

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)

4-A.1619

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M A Chamness	LBK M53	299-E24-4	N/A	KEH-1115-1
Date: 7/9/87		Depth: 10' To 19'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
21'2 3/4"					1100	~20 gal H_2O added to
						fast hole
					1700	~15 gal H_2O added in
						last hour, driller stopped
						to tighten bolts
					1715	started drilling again
					1800	~15 gal H_2O added since 1100
21'3/4"	15	M	wet	SILTY GRAVELLY SAND: 25% gravel, 60% sand,	1845	
				15% silt. Change at 11' from gravel to sand, as units		
				in sample may be from cave. 5% m gravel, 5% f gravel,		
				15% vf-g, 10% vcs, 15% cs, 20% ms, 10% fs, 2% vfs, 15% silt.		
				poorly sorted. Gravel 60% basalt, 10% qtz, 30% others. Sand		
				75% basalt, 20% qtz, rest feldspar & others. Dry color		
				10YR 6/3, grad, slight rxn w HCl, not consolidated	1930	heavy rain driller stopped until it passes over
110'6"					2000	drilling started again
21'3/4"	19'				2015	auguring at 10'6"
					2100	driller quit for the day
				MA Chamness 7/10/87		

REMARKS

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

A 6000-021 (5 85)

4-A.1620

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie 68K 19153	299-E34-4	N/A	KEH 1015-1
Date: 7/10/87		Depth: 19 To 25'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
31'9 3/4"				Driller is Lenny	6[20]	- Driller is welding on casing & finishing up from last night
					6[30]	Lenny started drilling. Added ~5 gals of H2O at ~19'
					6[40]	Added 5 gals water
	20'	11	W	GRAVELLY SAND;	6[45]	
				10% F Pebbles (max size 1 inch), 20% VCS, 45% CS, 10% MS, 10% FS, 5% Silt; Moderately Composition of Gravels: 85% basalt, 15% quartz & Feldspar; Comp of Sand: 90% Basalt, 10% Quartz & Light Colored Rocks; Unbroken gravels are subrounded to subangular; Sand is subangular & Subround; Dry Color 10YR 6/2 gray; No Rxn HCL Unconsolidated		
					6[50]	- Added 5 gal H2O
	25'	H	W	SLIGHTLY GRAVELLY SLIGHTLY SAND; 7% F Pebbles	7[15]	
				10% VCS; 30% CS; 20% MS, 15% FS, 8% VFS, 10% Silt		

REMARKS:

S Dudziak 7/10/87

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)

4-A.1621

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Failing 1250 Cable Tool	299 - E34 - 4	N/A	KLA 1915 - 1
Date 7/10/87	# 68K19153	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
31' 9¾"	25'	H	W	M Sorting ; Gravels . 80% basalt ; 20% Felds & Qz ; Sands : 75% basalt 25% Qz & Light Mins ; Subangular grains for both gravels & sand ; Dry Color 10YR 6/2 pale brown gray No fines , Unconsolidated Finer Material ~~like~~ at 20' & a little more qz in the sands	7:15	
					7:43	- Hole is staying open ; easy drilling
						Lenny is drilling 4' ahead of this page
	30'	H	W	GRAVELLY SILTY SAND ; 20% F to VF Pebbles ; 20% VCS , 20% CS , 15% MS , 10% FS 15% Silt ; M Sorting ; Gravels are 80% basalt , 10% mix Quartz & Felds , 10% Colored Qz & Felds (orange & grn) ; Sand is 70% Basalt 30% Quartz & light colored mins , Gravels & Sand ~~are~~ subangular ; Color Dry 10YR 6/2 pale brown gray	7:43	

REMARKS:

S Dudziak 7/10/87

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)

4-A.1622

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bu Lyons	299-E31-4	N/A	[illegible]
Date 7/16/87	[illegible] 68K.19153	Depth 30 To 35'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
31'9¾"	30'	H	W	No Rxn HCl ; Slightly consolidated	7⁴⁵	
				(ie. hole is staying open)		
				Sand is coarser around sides, last sample,		
				but there must be a fair amt of fines		
				for the hole to stay [illegible]		
					7⁴⁵	Added 5 gals H_2O
					7⁴⁵	Stopped drilling
						started welding
+10'7½"						a piece of 10' 7½"
						12" casing
42'5¼"						
					9²⁵	Casing has started drilling
					9⁴⁰	- added 15 gals H_2O
						- 5 min gals H_2O
					10⁰⁰	- Rig is down for repairs
					10¹⁵	- Drilling has resumed
	35'	H	W	SILTY SANDY GRAVEL ; 35% F to VF Gravel	10²⁵	
				20% VCS, 10% CS, 15% FS, 5% VFS, 15% Silt		

REMARKS:

S Dudziak 7/10/87

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)

4-A.1623

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie 61 68X19153	299-E31-4	N/A	KEH 1915-1
Date 7/10/87		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
42'5¼"	35'	H	W	Poor Sorting; Gravels are ~85% basalt	10:25	
				~15% Light colored misc (white, rust, pink)		
				Sands are ~50% basalt ~50% Quartz		
				and feldspars (a lot more Qz than 30' sample)		
				Gravels are subangular to angular; Sand		
				is subangular, Dry Color 10YR 7/1 light gray; Slight Rxn in HCL		
				Slightly more silt; More Qz in		
				the sand than last sample & its also		
				gravelly.		
					11:15	- Added 5 gal H2O
					11:25	Rig is down for repair
					12:30	- Began Drilling
	40'	H	W	SANDY, SILTY GRAVEL; 45% Gravel,	13:10	- Drilling is harder;
				15% VCS, 15% CS, 5% FS, 20% Silt		coarser matl
				Poorly Sorted; Gravels are ~80% basalt		
				20% Quartz & Folds; Sand is ~60% basalt		
				40% Quartz (& very dirty from high % of silt)		
				Gravels are angular (many are broken)		

REMARKS:

S Dudziak 7/10/87

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)

4-A.1624

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. Dadjick	Buckyrus Inc 68K19153	299-E34-4	N/A	KEH 1915-1
Date: 7/10/87		Depth: 40' 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
42' 5¼"	40'	H	W	Sand is subangular; Dry Color 10YR 7/1	13:10	
				Slightly Consolidated		
				Much coarser than last sample		
				(harder to drill)		
				Suzanne Dadjick 7/10/87		

REMARKS:

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

A 6000 021 (5-85)

4-A.1625

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M. A Chambless	Bucyrus Erie 60K1315	29-1-31-4	N/A	1611 1315.1
Date: 7/10/87		Depth: 46' 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
22'10"	41'				1400	working on 10¾" at 22' casing
					1530	start drilling
					1550	building mud
					1620	started drilling ahead
					1707	15 gal H2O added start here
22'10"	46'	H	wet	SILTY, SANDY GRAVEL: 75% gravel, 20% sand, 5% silt, 3% cobbles, 5% vp, 5 +, 17% mp, 25% fp, 20% vfp, 8% ves, 5% c, 5% m, 1% f, 1% vf, 5% cht. Very poorly sorted Gravel 60% basalt, 30% vol basalt, 10% plu. Sand 60% basalt, 20% qtz, 10% vol basalt. Gravel well rounded to angular, angular most basalt, some quartz. Sand subangular to very angular. Wet color 5Y 4/1 (dark gray), dry 5Y 6/1 (gray). Silt was to wet determined. Coarser than the last sample I ran I guess lead to be more angular than the others.	1715	15 gal H2O added since 1707
					1744	drilling ahead [illegible] check
					1750	drilling ahead open
					1811	Added 15 gal H2O since 1730

REMARKS:

M. A. Chambless 7/10/87

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)

4-A.1626

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	Cyprus CW 1153	299-E34-4	1YA	
Date: 7/16/87		Depth: 45' To 51'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
7" 11 1/4"	50'	H	W+1	SILTY SAND / GRAVEL - 60% gravel, 32% sand, 8% silt.	1950	~15 gal H2O added
				1% cobble, 2% vcp, 5% cp, 11 mp, 17% lp, 25% vlp, 2% vc,		1900
				9% c, 10% m, 8% f, 8% vf, 8% silt Very poorly sorted.		
				Gravel is basalt, rock fragments, tuffaceous sand		
				30% basalt, 20% qtz, 10% white Gravels subangular to		
				angular, sand subangular to angular. Color: 2.5Y 4/2 (dark		
				grayish brown) wet, 2.5Y 6/2 (lt. brownish-gray) dry. Very		
				slight reaction w/ HCl. Unconsolidated. Gravels smaller than		
				above, sand fine grained & poor cell retention.		
					2035	Driller quit for day
				M.A. Chamness 7/16/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1627

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dadrjat	Bucyrus Erie 22 #69K19153	229 - E 34 - 4	NA	KEH 1915-1
Date 7/11/87		Depth 51' To 55'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
52'11¼"	50'			Driller is Lenny	6:30	
+ 10'6¾"					6:50	Lenny is setting 10'6¾" of 12" casing
63'6"						
					8:30	Lenny is drilling, Unsure of when he started because I have been at E34-5 helping w/completion
	55'	H	D	SILTY SANDY GRAVEL, 75% Gravel 10% C to VC ; 5% M to F ; 10% Silt Poor sorting (gravels range from VF Pebbles to Medium C Pebbles) gravels are ~ 90% Basalt, 10% schist Rock Clasts & quartzite Sand is ~ 70% basalt, soil and ; Moderate gravels are rounded , sand subangular Dry Color 10YR 6/1 Gray will not [illegible]	10:00	

REMARKS:

S Dadrjat 7/11/87

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)

4-A-1628

DRILL LOG

By: S Dudziak | Rig: Bucyrus Erie 22 | Date: 7/11/87 | 68K19153

Well Number: 299-E34-4 | Depth: 55' To 60'

Computer Number: N/A

Project or Work Order No.: KEH 1915-1

Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
63'6"	60'	H	W	SANDY SILTY GRAVEL ; 75% GRAVEL	10:45	
				10% F to VFS ; 15% SILT ; Poor Sorting		
				Gravels are ~90% basalt with ~10%		
				light mins including qz & feldspars		
				colors are mostly white & orange to maroon		
				Size of gravels range from f pebble to		
				Very coarse pebble (most gravels are broken)		
				Sands are ~50% basalt ~50% quartz		
				& very dirty from large % of silt		
				Unbroken gravels are subrounded to subangular		
				Sands are too fine-grained to determine roundness		
				Dry color 10YR 6/1 Gray		
				Unconsolidated ; Becoming siltier &		
+10'7"				the sand fraction is much finer		
74'1"					12:30	Lenny is welding on
						10'7" of 12" casing

REMARKS:

S Dudziak 7/11/87

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)

4-A.1629

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M A. Chambers	Burgess Fitz 68K1915	299-E34-4	N/A	KEH 1915-1
Date 7/11/87		Depth 60' 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
74' 1"					1115	driller started again
					1500	20 gal H_2O added since 1120
	60'	H	wet	GRAVEL: 80% gravel, 17% sand, 2% silt, 3% cg, 22% mg, 25% fg, 20% vfg, 5% vcs, 7% cs, 1% ms, 2% fs, 2% vfs, 3% silt. Moderately sorted. Gravel is basalt, 25% qtz, 15% rock frags. Sand 60% basalt, 25% qtz, 10% lithics etc. Gravel ang. to rounded, sand ang. to subrounded. Wet color 5Y4/2 (olive gray), dry color 5Y7/1 (light gray). Slight rxn in HCl. Unconsolidated slightly more gravel and sandier than previous sample. Poss basaltic	1530	
					1600	20 gal H_2O added since 1500
					1700	15 gal H_2O added since 1600
	70'	H	wet	GRAVEL: 80% gravel, 17% sand, 2% silt, 3% vcg, 5% cg, 12% mg, 20% fg, 25% vfg, 7% vcs, 5% cs, 1% ms, 2% fs, 2% vfs, 3% silt. Moderately sorted. Gravel 55% basalt, 25% qtz, 20% rock frags. Sand 60% basalt, 25% qtz, 10% lithics etc. Gravel well rounded to angular, sand subrounded to angular. Wet 5Y4/2 (olive gray), dry 5Y7/1 (light gray). Slight rxn in HCl. Unconsolidated. Gravel is larger than previous sample, basaltic.	1715	

REMARKS:

M A Chambers
7/11/87

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)

4-A-1630

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chambers	Bucyrus Erie 60K, 1983	299-E34-4	N/A	PFP MIS-1
Date 7/14/87		Depth 70' To 75'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
74'1"					1745	stopped for lunch
					1815	started drilling again
140'1"					1820	welding on 10'7" of 12"
84'8"					1955	started drilling again
	75'	11	wet	SILTY SANDY GRAVEL : 45% gravel, 20% sand, 5% silt,	2025	
				2% vcg, 3% cg, 15% mg, 25% fg, 30% vfg, 5% vcs, 10% cs, 10% ms,		
				3% fs, 2% vfs, 5% silt. Poorly sorted. Gravel 50% basalt,		
				20% qtz, 15% rock fragments; Sand 65% basalt, 25% qtz,		
				10% rock fragments etc. Gravel well rounded to angular,		
				sand subangular to subrounded. Wet 5Y4/2 (olive gray)		
				and 5Y7/1 (lt. gray) in zone in HCl. Unconsolidated.		
				A little low plasticity, granule matrix, Poor Layer		
					2045	Driller quit for day
				M.A. Chambers 7/14/87		

REMARKS:

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

A 6000 021 (5 85)

4-A.1631

DRILL LOG

By: R Premzic | Rig: Bucyrus Erie # 60RK 1913 | Date: 7/13/87

Well Number: 299-E 34-4 | Depth: 75' To 85'

Computer Number: N/A

Project or Work Order No.: KEH 1915-1

Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84'8" of 12" casing					600	Driller is Lenny
					0600	Drilling started
	80'	H	W	SILTY SANDY GRAVEL, 65% gravels, 30% sand, 5% silt. Gravels are 5% VCP 20% CP, 20% MP, 15% FP, 5% VFP. Sands are 8% VCS, 15% CS, 5% MS, 2% FS. Sample is poorly sorted. Gravel composition is 80% basalt, 15% qtz, 5% granitic fragments. Sand composition is 70% basalt, 25% qtz, 5% other. Gravels are WR-SA. Sands are SR-SA. Wet color is 5Y4/1 (dk gray). Dry color is 5Y7/1 (lt gray). Very slight rxn. to 10% HCl. No consolidation. More sands/smaller gravels than previous sample.		
	85'	H	W	SILTY SANDY GRAVEL, 50% gravel, 45% sand, 5% silt. Gravels are 5% VCP, 15% CP, 20% MP, 20% FP. Sands are 18% VCS, 17% CS, 6% MS, 4% FS. Moderately-poorly sorted. Gravel composition is 65% basalt, 30% qtz, 5% granitics & rock fragments. Sand composition is 60% basalt,	0830	

REMARKS:

Richard Premzic

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-6000-021 (5-85)

4-A.1632

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
E.L. PREMTIC	BUCYRUS ERIE	299-E34-4	N/A	[illegible]
Date: 7/13/87	68K-19153	Depth: 85 To 85		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84'8"	of 12"	casing.				
				40% gravels are R-A. Sands are WR-SA wet color is 5Y4/1 (olive gray). Dry color is 5Y7/1 (lt. gray). Slight-moderate reac. to 10% HCl. No consolidation. More sand/less gravels than previous sample.		
					8 30	Drillers started putting 10" casing in hole
21'3½"	of	10" casing				1st piece is 21'3½"
+ 20'11½"						
42'3"					10 30	added 20'11½" of casing 10"
+ 20'9½"					11 30	added 20'9½"
63'½"						of 10" casing
+ 21'½"						
84'1"					12 40	added 21'½"
						of 10" casing

REMARKS:

S Budgick 7/13/87

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 (5-86)

4-A.1633

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
N A Chamness	Bucyrus Erie 45R-0113	299-E34-4	N/A	RFH-PIS-1
Date: 7/13/87		Depth: 85' To 90'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
84'E of 17"						
84'1 of 10"						
10'4"						
0 to 5' of 18"						
					1605	started drilling again
					1635	stopped to fix rig
					1700	started drilling again.
					1720	driller stopped for lunch
	90'	H	wet	SILTY GRAVELLY SAND: 25% gravel, 60% sand,	1800	started drilling again
				15% silt. 2%vcg, 2%cg, 2%mg, 5%fg, 2%vfg, 25%vc, 15%c,	1820	
				10%m, 5%f, 2%vf, 15% silt. very poorly sorted. Gravel		
				60% basalt, 20% qtz, 10% rock fragments. Sand 10% basalt,		
				10% qtz, 20% rock fragments. Gravel very angular (pink basalt		
				(some larger pieces) to subangular Sand angular to sub-		
				rounded. Unit 5Y4/2 (olive gray), dry 5Y6/2 (lt. olive gray)		
				Moderate cem-to HCl. Unweathered Tuff and Dry basalt		
				like earlier samples. Most of the angular basalt gravel		
				may be from larger pieces, although driller says it drills		
				like for sand.		

REMARKS:

N A Chamness
7/13/87

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 (5-85)

4-A.1634

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chauvez	Kaiser	VEH-MW-1	N/A	VEH-015-1
Date		**Depth**		**Subcontract No.**
7/13/87		90' To 94'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
94' 5"	10"				1900	adding on 10' 3/4"
& 10' 3/4"					2000	Started drilling again
104' 8/4					2070	stopped to log on way
				M.A. Chauvez 7/13/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1635

DRILL LOG

By: S Dudziak | Rig: Bucyrus Erie 68K 19153 | Date: 7/14/87

Well Number: 299-E34-4 | Depth: 91' To 97'

Computer Number: N/A

Project or Work Order No.: KEH-1915-1

Subcontract No: N/A

Total Casing	Depth	Drill. Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
101'8" of 10"					5:30	Lenny is drilling
	95'	H	Wet	SLIGHTLY SILTY GRAVELLY SAND; 20% Gravel (mostly f to vf pebbles but sample is dominantly broken), 20% VCS 25% CS, 10% MS, 10% FS, 10% VFS, 5% Silt Medium Sorting; Gravels are broken & consist of 70% basalt, 30% granitics & quartzites orange, olive & white in color; Sands consist of 40% basalt, 35% quartz, 25% colored rock frags; Gravels are angular & broken. Sands are subangular; unconsolidated Color (dry) is 10YR 7/1 Light Gray	6:30	
	~97'			Drilling is harder; Lenny says he's into gravels	7:50	

REMARKS:

S Dudziak 7/14/87

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)

4-A.1636

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie 68K/3153	299-E34-4	N/A	REH-1915-1
Date: 7/14/87		Depth: 97' To 103'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10"/8¼" @ 10'	100'	H	WET	SILTY SANDY GRAVEL; 50% Gravel (ranges from VF Pebbles to C Pebbles) 18% VCS 12% CS, 5% FS, 5% VFS, 10% Silt Poor Sorting; Gravels consist of 70% basalt, 30% quartz, granitics & colored rock; Sands consists of 50% basalt, 50% quartz & colored rock frags. Gravels are rounded to subangular (most are broken). Sands are subangular. Dry color 5Y 7/1 Light gray Slightly consolidated Gravellier than 95' sample & also more silt	845	
10' 10"/8¼"					1040	Stopped drilling is welding 10' of 10" pipe on
					1250	Started drilling again (Olin is drilling)

REMARKS:

S Dudziak 7/14/87

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)

4-A.1637

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
W. A. Chambers	Bucyrus Erie 22W	299-E-27-11	N/A	KEH-BHS-1
Date: 11/4/87	(602-1352)	Depth: 105' To 106'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
114'8"					1510	Have cuttings + some H_2O
						on last trip + bars,
						but can't get it'
						sample + driller says it'
						contaminated with dirt in
						the rig, hole, water +
						drilling mud, may not be
						accurate. Sand + Silt to
						make it clean
					1505	driller making "spark" adobe
					1535	started drilling again
	106'	H	wet	SILTY SANDY GRAVEL: ~ around 40% sandy, 10% silt	1630	finally get sample, still
				5% vcg, 5% cg, 10% mg, 12% fg, 18% vfg, 5% vcs, 10% cs, 15% ms,		hard drilling, not filling
				10% fs, 5% vfs, 10% silt. Very poorly sorted. Gravel 50% basalt,		much, became easier
				25% qtz + qtzite, 5% rock fragments, angular to subangular		to drill around 106'
				(mostly broken?). Sand 45% basalt, 40% qtz + qtzite,		Still adding ~20 gal
				15% feldspar etc., angular to subrounded. Wet = 5Y2/2		H_2O / hr
				(dark olive gray), dry = 5Y7/1 (lt gray). No rxn in HCl.		
				May be clay in cuttings, but probably was just fine		
				gravel around 105' and not cemented. Similar to last		
				sample, except for gravel layer ~102' - 105.5'		

REMARKS:

W. A. Chambers
7/14/87

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)

4-A.1638

DRILL LOG	By: M.A. Chrisness	Rig: Gardner Denver	Well Number: 299-E-34-4	Computer Number: N/A	Project or Work Order No.: RCH-1115-1
	Date: 7/14/87		Depth: 106' To 110'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
114'8¾"					1800	Drilling ahead 106 to 110
						H2O / lb
					1805	stopped for break
					1825	starting again
	110'	H	Wet	SILTY SANDY GRAVEL: 45% gravel, 40% sand, 5% silt, 5% vcp, 10% cp, 10% mp, 10% fp, 20% vfp, 15% vcs, 10% cs, 8% ms, 4% fs, 3% vfs, 5% silt. Very poorly sorted. Gravel 45% basalt, 45% qtz. + qtzite, 10% rock fragments, angular to subrounded, most pieces are probable basalt. Sand 50% basalt, 40% qtz, 10% rock fragments + feldspar, angular to subrounded. Wet - 5Y 4/2 (olive gray), dry - 5Y 7/1 (lt. gray). No rxn in HCl Unconsolidated. Similar to sample at 106', slightly less basalt	1845	
114'8¾"						
+ 10'9¾"					1935	welding on 10'9¾" at 10'
125'5½"					2030	started drilling
						again

REMARKS:

M.A. Chrisness 7/14/87

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)

4-A-1639

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M. A. Chambers	Bucyrus 6 1/2 68K RIG 2	299-E-27-4	N/A	KEH-1915-1
Date 7/11/87		Depth 110' To 115'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125 5/8"	115'	H	WET	SILTY SANDY GRAVEL: 45% gravel, 45% sand, 10% silt, 3% vcp, 5% cp, 7% mp, 12% fp, 18% vfp, 8% vc, 12% c, 15% m, 5% f, 5% vf. Poorly sorted. Gravel — 50% basalt, 25% qtz + qtzite, 15% rock fragments, angular to rounded, Sand - 45% basalt, 45% qtz, 10% feldspar etc., angular to subrounded, wet 5Y4/2 (lt. olive gray), dry 5Y7/1 (lt. gray). Up to 1 1/2 inch to 1/16 inch. Uncemented/distal. Pieces of sand w/ almost no gravel in the sample, may be alternating layers of sand and sandy gravel. Less gravel than before	2050	
					2115	driller quit for day
				M. A. Chambers 7/11/87		

REMARKS:

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

A-6000-021 (6-85)

4-A.1640

DRILL LOG

By: S Dudziak | Date: 7/15/87 | Rig: Bucyrus Erie 68K19153 | Well Number: 299-E34-4 | Depth: 115 To 125 | Computer Number: N/A | Project or Work Order No.: KEH-1915-1 | Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125'5 1/2"					530	Lenny is Driller
					700	Added 5 gals of water
	120'	H	Wet	SILTY SANDY GRAVEL; 60% Gravels (VF to C Broken Basalts), 12% VCS, 8% CS 10% F to VFS, 10% Silt, VP Sorting Gravels composed of 65% basalt, 20% Quartz & Quartzite, 15% [illegible] Sand [illegible] 70% basalt, 30% Quartz & feldspar; Gravels are mostly broken, Unbroken basalt clasts are angular to subangular, Unbroken Quartzite clasts are rounded; Dry color 5Y 7/1 Light Gray	720	
	125'	H	Wet	SILTY SANDY GRAVEL; 55% Gravel (Ranges from VF to [illegible]); 5% VCS 5% CS, 5% MS, 15% F to VFS, 15% Silt VP Sorting; Gravels consist of 80% basalt	830	

REMARKS:

S Dudziak 7/15/87

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 (5-86)

4-A.1641

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dadziak	Failing Unit # 68K19153	299-E34-4	N/A	KEH-1915-1
Date 7/15/87		Depth 125' To 130'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125 5½"	125'	H	Wet	20% Quartz and Colored Fragments Sands consist of 65% basalt, 35% quartz & colored rock frags; Unbroken gravels are Subangular to Subrounded (basalts are more angular; qz is more rounded), Sands are subangular Dry color 5Y 7/1 Light gray Sample is a little silttier than last,		
+ 10'6½"					8 35	Stopped drilling
136'						Started welding on 10'6½" casing
					10 15	Started drilling
					11 10	Added ~ 15 gal water
136'	130'	H	Wet	SILTY SANDY GRAVEL; 70% Gravel (gravels range from VF to VC Pebbles); 5% C to VC S	12 15	

REMARKS:

S Dadziak 7/15/87

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)

4-A.1642

DRILL LOG

By: S Dudziak | Rig: Bucyrus Erie 68K 19153 | Date: 7/15/87 | Well Number: 299-E 34-4 | Depth: 130' To 130' | Computer Number: N/A | Project or Work Order No.: KEH-1915-1 | Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
136'	130'	H	wet	5% MS 10% F to VFS, 10% Silt; VP sorting; Gravels are ~60% basalt, 40% Quartz & Rock frags which include granitics & quartzites; Gravels are becoming a little more colorful (orange, olive maroon); Sands are very dirty & consist of 65% basalt, 35% quartz & colored frags Gravels are Rounded to subangular (a lot more rounded than the last sample) Sands are Subangular to subrounded; Dry color is 5Y 7/1 Light gray Slightly consolidated Gravels are a little more rounded & have a little more color than last sample	1300	Olin is drilling now

REMARKS:

Suzanne Dudziak 7/15/87

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)

4-A.1643

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chambers	Bucyrus Erie 60RK/T15-E	29N-E34-4	N/A	WEH 1115-1
Date 7/15/87		**Depth** 130' To 135'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
126'	135'	H	d	SILTY SANDY GRAVEL: 50% gravel, 45% sand, 5% silt.	1405	Sample taken at bottom
				2% vcp, 8% cp, 10% mp, 15% fp, 15% vfp, 8% vcs, 15% cs,		
				15% ms, 4% fs, 3% vfs, 5% silt. Very poorly sorted.		
				Gravel: 50% basalt, 35% qtz, 10% qtzite, 15% rock fragments,		
				rounded to subangular. Sand: 55% basalt, 40% qtz, 5% rock		
				fragments, subrounded to subangular. Wet 5Y 4/2 (olive gray)		
				dry 5Y 6/2 (lt. olive gray). No rxn to HCl. Unconsolidated		
				Secondary: the same as bulk sample.	1405	Started washing 5" line to
21'3"	of 8"					21'3" of 8" stator
120'9¾"					1620	20'9¾" of 8" auger
42'3¼"	of 8"				1710	20'10½" " "
120'10½"	of 8"					
62'11¼"	of 8"					
					1800	stopped for lunch
					1830	started drilling
120'7½"	of 8"				1835	adding on 20'7½"
82'6¾"						

REMARKS:

M.A. Chambers 7/15/87

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)

4-A.1644

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	Bucyrus Erie	299-E31-1	N/A	KEH-1915-1
Date: 7/15/87	08K1915 3	Depth: 135' To 135'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
82' 6 3/4"	of 8"					
20' 8 3/4"					1915	drilling on 20' 8 3/4" of 8"
103' 3 1/2"						
+ 21' 1/4"					2040	drilling on 21' 1/4" of 8"
124' 4 3/4"						
					2110	driller quit for day
				M.A. Chamness 7/15/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1645

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus E-1 "68K1915 3	299 - E31 - 4	N/A	KEH - 1915 - 1
Date: 7/16/87		Depth: 135' to 140'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
124'4	3/4"					
				Lenny in at 6:00	600	- Adding on
+20'10	3/4"					20'10 3/4" of 8"
145'3	1/2"					casing
					700	- Lenny started drilling
	140'	H	wet	SILTY SANDY GRAVEL; ~65% gravel (ranges in size from VF to M pebbles but most gravels are broken); 12% C to VCS; 8% MS; 7% F to VFS; 8% Silt; Very poorly sorted; Gravels composed of ~60% basalt, 15% clear to white qz and feldspar, 25% colored rock frags (orange, maroon, green) Sand composed of ~65% basalt, 35% quartz & colored rock frags. Gravels are angular to subrounded; sands are mostly subangular; Dry color 5Y 7/1 light gray	810	

REMARKS:

S Dudziak 7/16/87

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)

4-A.1646

DRILL LOG

By: S Dudzick | Rig: Bucyrus Erie 60K19153 | Date: 7/16/87
Well Number: 299-E34-4 | Depth: 140' To 145'
Computer Number: N/A
Project or Work Order No.: KEH-1915-1
Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
145' 3½"	140'	H	W	Am not testing w/ HCl due to CN^-; Moderately consolidated (pipe is not following easily during drilling) Similar to last sample	night	- Added ~ 20 gal H_2O
	145'	H	W	SILTY SANDY GRAVEL; 65% gravel (ranges from VF to C Pebbles) 15% C to VCS, 8% MS, 7% F to VFS, 5% Silt; Very poorly sorted Gravels composed of 70% basalt, 30% quartz and colored rock frags (granites, quartzites) Sand is ~ 50% basalt, 50% quartz & colored mins; Gravels are mostly broken; Unbroken gravels are subrounded to subangular; Sands are mostly subangular; Dry color 5Y 7/1 Light gray Moderately consolidated; Similar to last sample	10 25	
+ 10' 4"					10 30	- Added 10' 4" of casing
155' 7½"					11 15	- Began drilling

REMARKS:

S Dudzick 7/16/87

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)

4-A.1647

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie # 68K 19153	299-E34-4	N/A	KEH-1915-1
Date: 7/16/87		Depth: 145' To 145'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
155' 7½"					12:30	- Initial reports H_2O
					1:00	- Olin is now drilling
						Drilling very slow, only ~3" since lunch

REMARKS:

Suzanne Dudziak 7/16/87

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)

4-A.1648

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A Chavarria	Failing	299-E34-4		RCH-MIS-1
Date 7/16/87	68K19153	Depth 145' To 155'6"	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
155'7½" of 9"	150'	H	W	SILTY SANDY GRAVEL: 60% gravel, 35% sand, 5% silt. 1% vcp, 4% cp, 12% mp, 15% fp, 18% vfp, 5% vcs, 15% cs, 10% ms, 3% fs, 2% vfs, 5% silt. Poorly sorted. Gravel - 60% basalt, 25% qtz + qtzite, 15% igneous + other rock frags, angular to rounded. Sand - 45% basalt, 10% qtz + qtzite, 15% rock frags etc, angular to subrounded. Wet 5Y4/2, olive gray; dry 5Y 7/1, lt. gray. Slight rxn. in HCl. Unconsolidated. Similar to last sample, gravel may be smaller since there are more rounded fragments, and slightly more basalt.	1615	adding [illegible] gal H2O / hr
					1755	difficult to take sample, water not staying in hole long enough to make rund
155'7½" 10'6" 166'1½"					1805	driller stopped for lunch
					1825	started welding 10'6" of 8" ca
	155'6"	H	W	SANDY GRAVEL: 75% gravel, 23% sand, 2% silt. 2% vcp, 5% cp, 7% mp, 25% fp, 20% vfp, 5% vcs, 10% cs, 4% ms, 2% fs, 2% vfs, 2% silt. Moderately sorted. Gravel - 60% basalt, 20% qtz. + qtzite, 20% igneous, angular to rounded. Sand - 45% basalt, 35% qtz. + qtzite, 20% rock fragments.	1940	

REMARKS:

M.A. Chavarria 7/16/87

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)

4-A.1649

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M A Chamness	Bucyrus Erie.	299-E24-4	N/A	KEH-1115-1
Date: 7/16/87	UBK 1153	Depth: 155'6" To 160'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
Hole 16"	155'6"	H	W	continued - Wet 5Y4/2, olive gray, dry 5Y7/1, lt. gray. No rxn. to HCl. Unconsolidated. Because he could not get sample, driller drove casing ahead slightly. At 155', the sample tested was a m-c sand, ~ 45% basalt, 35% qtz + 20% other. This may have been a layer of sand (w/o gravel) ~1' thick at 155' or may have been caused somehow by driving casing. It had not been drilling like sand, but more like gravel. More and larger gravel than last sample.	2010	casing starting to follow down the hole
	160'	H	W	SILTY SANDY GRAVEL: 70% gravel, 25% sand, 5% silt. 2% vcp, 3% cp, 12% mp, 2 1/2% fp, 2% vfp, 9% vcs, 7% cs, 4% ms, 2% fs, 2% vfs, 5% silt. Poorly sorted. Gravel - 50% basalt, 30% qtz. + qtzite, 20% rock fragments, angular to subrounded. Sand - 50% basalt, 40% qtz, 10% other, angular to subrounded. Wet - 5Y4/2, olive gray, dry - 5Y7/1 lt. gray. No rxn. to HCl Unconsolidated Less gravel than above	2030	adding ~ 10-15 gal H2O /hr
					2115	Driller quit for day.

REMARKS:

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

A 6000 021 (5-85)

4-A.1650

DRILL LOG

By: S Dudziak | Date: 7/17/87 | Rig: Bucyrus (Ser. 68K19153) | Well Number: 299-E34-4 | Depth: 160' To 165' | Computer Number: N/A | Project or Work Order No.: KEH-1915-1 | Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
166' 1½"					5⁴⁵	Driller is Lenny
					6⁴⁰	Lenny is at ~ 164½'
	165'	H	Wet	SILTY SANDY GRAVEL; 45% Gravel, 42% Sand, 13% Silt; Gravels are broken & range from VF Pebbles - C Pebbles; Sand: 15% VCS, 10% CS, 7% MS, 10% F to VFS Poorly Sorted; Gravels are ~ 60% basalt, 40% qzite & colored rock frags, Sand is ~ 60% basalt, 40% qz & colored minerals (orange, olive, maroon); Unbroken gravels are subangular to rounded; Sand is subangular to rounded (NOTE: Color of fines appear a lot lighter & more olive-yellow than the last time I logged a sample at 145') Wet Color 5Y 4/2 olive gray Dry Color 5Y 6/2 Light olive gray	6⁵⁰	- Stopped drilling

REMARKS:

S Dudziak 7/17/87

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)

4-A.1651

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie 60K19153	299-E34-4	N/A	KEH-1915-1
Date: 7/17/87		Depth: 165' To 165'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
166' 1½"	165'	H	WET	Slightly consolidated (can't drill ahead very fast - hard drilling) I can only note changes I see from the last time I logged (at 145'). It appears there is a slight change in color to more olive-yellow than at 145'. Also, the rock frags are a bit more colorful (ie. less "white" minerals & more "colored" minerals) Percent of Basalt vs Colored Rock frags are about the same; but even still, the sample seems more colorful than at 145'		
+ 10'4"					655	- welding on 10'4" of 8" casing
176'5½"						
					745	- Started drilling
					750	- Added 15 gals H_2O

REMARKS:

S Dudziak 7/17/87

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)

4-A.1652

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie 68K19153	299-E34-4	N/A	KEH 1915-1
Date 7/17/87		**Depth** 165' To 170'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176' 5½"						
	167'	1	No Sample	Change in lithology; See Description for 170' Sample		
	170'	H	Wet	GRAVELLY SAND; 20% Gravel, 77% Sand, 3% Silt; Gravel ranges from VF - C Pebbles (dominantly VF to F pebbles); Sand: 40% VCS, 20% CS, 10% MS, 7% F to VFS; Medium sorting Gravels are ~45% basalt 55% quartzite & colored rock frags (these include granitics and Fe-stained qz & felds; Fe-staining is very apparent) Sand is ~35% basalt, 30% qz, 35% colored mins (orange, maroon, olive) - again grains are Fe-stained; Gravels are subrounded to subangular, Sand is mostly subangular; Wet Color 5Y 5/3 Olive Dry color 2.5Y 7/2 Light gray	840	- Drilling is easier Lenny said he started getting wet sand at 167'

REMARKS:

S Dudziak 7/17/87

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)

4-A.1653

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie 68K 19153	299-E34-4	N/A	KEH-1915-1
Date: 7/17/87		Depth: 170' To 175'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176'5½"				Unconsolidated; Less Gravel, More Sand; Yellower in color; Better Sorting than 165' sample		
	175'	H	Wet	GRAVELLY SAND; 15% Gravel; 82% Sand, 3% Silt; Gravel ranges from VF to M Pebbles, Sand: 40% VCS, 25% CS, 11% MS, 6% F to VF Sand; Medium sorting; Gravels are ~50% basalt, 50% quartz & colored rock frags (similiar to those described in last sample) Sand is ~35% basalt, 40% quartz, 25% Colored Rock frags; Gravels are SR to SA Sands are mostly SA; Wet color 5Y 4/3 olive Dry Color 2.5Y 7/2 Light gray Unconsolidated - Similar to last sample	925	

REMARKS

S Dudziak 7/17/87

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)

4-A.1654

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie 68K 19153	299-E34-4	N/A	KEH-1915-1
Date: 7/17/87		Depth: 175 To 175½'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176' 5½"	175½'	H	None	- Drillers believe we've hit basalt	1000	
				- will have crew drill at least ½' further to make certain we are into basalt		
				- driller is changing tools to a button bit; have instructed them not to drive casing any further	1030	
	175½'	H	Chips	- Picked up chips put them in sample jar	1045	
				Depth to bottom w/ Steel Tape #1:	1155	
				176' - 2' ¼" - surface casing 173' 11¾" + 1' 7" + tape add-on 175' 6¾" → Depth to bottom		

REMARKS:

S Dudziak 7/17/87

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)

4-A.1655

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus 66K 19153	299-E34-4	N/A	KEH-1915-1
Date 7/17/87		Depth 175½ To 175¼		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Checking for water w/ E-Tape		
				176' 10½"		
				-2' ¼" — casing stickup		
				174' 10¼" → depth where e-tape buzzed but this may just be from wet cuttings in hole		
				Lenny baiked out hole	1215	
				E Tape reading. 177 3½"	1310	
				-2' ¼" casing stickup		
				175' 3¼" → where e-tape buzzed; which is essentially the bottom of the hole		

REMARKS:

S Dudziak 7/17/87

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)

4-A.1656

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	Bucyrus Erie	299-E34-1	N/A	KEH 1715-1
Date: 7/17/87	68K1153	Depth: 175'6" To 177'1"		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176'5½"		H	U	NO SAMPLE TAKEN - Sediments heaved into hole, boiled it out, and the boiled material had some pieces of slightly clayey, sandy silt, moderately consolidated, brown w/ some grayish streaks. The rest of the sediment was open w/ sand. Since it heaved in, the depth is unknown, except I know it is probably deeper than the 8" set sample.	1430	
					1805	driller stopped for lunch
					1825	driller back on rig
				Hole down to 177'1", still gravelly sand to sandy gravel but becoming more basaltic. 1'9¾" of stick up on 8" casing. Took some of the sediment to get basalt chips for XRF analysis.	1900	driller moved to E34-3
				Used E-tape to double-check for water, none found. Basalt chips are [illegible]	1915	to help.
				[illegible]		
				M.A. Chamness 7/17/87		

REMARKS:

4-A.1657

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-6000-021 (5-85)

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A Haren	Cable Tool #3	299-E34-4	NA	HFH-1915-1
Date: 7/18/87		Depth: 177' To 177'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
116' 6 5/8"				Performed straightness test using 20½' long bailer w/ rebar welded around its perimeter in 3 places, making it 6" in diameter. Bailer came up w/ ~3' of water on its end. Will get a water level measurement on well later.	1457	
				Began breaking down rig & tool stem.	1500	
				D/W meas @ 177.35 - 1.85 stick-up (meas. the difference in elev. between the 8" & 12" casing. 12" is believed to be at ground surface)	1545	
				D/W = 175.50 feet below surface (E-TAPE SN no. 11044).		
				D/W = 177.42' - 1.85' ave stick up = 175.57' below surface @ 2101 hrs meas. w/ E-TAPE (SN no. 11044)		
				D/W = 177.33' - 1.85 (stick up) = 175.48' below surface @ 2110 hrs meas. w/ E-TAPE (E-TAPE w/ 3' splice).		

REMARKS:

R A Haren 7/18/87

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)

4-A.1658

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMRIC	NONE	299-E34-4	N/A	REH-1915-L
Date 7/20/87		Depth 177' To 177'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176'	1/2" of	8" casing.				
				D/B = 177.14'	0750	
				(Steel Tape #1) + 1.63' Excess tape + weights		
				178.77		
				− 1.85' casing stickup		
				176.92 D/B below ground surface.		
				D/w = 177.41'	0800	
				(E-tape Ser. No. 1044) − 1.85 stickup		
				175.58 D/w below ground surface.		
				Richard Premsis 7/20/87		

REMARKS:

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

A 6000 021 (5-85)

4-A.1659

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L. A. Hinrichs	(NONE)	299-E34-41	NA	RFH-1715-1
Date: 7/20/87		Depth: 177' To 177'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/B = 176.52' + 2.32 − 1.85' = 176.99' S-TAPE, w/3' splice @ 1840 HRS.		
				↑ means below surface		
				D/W = 177.45 − 1.85' = 175.60' (E-TAPE, S/N no. 1041) @ 1845 HRS.		
				(1.39' of water in well)		
				176.52 (bkd)		
				+0.8 (c-t)		
				177.32		
				− 1.85 (stick up)		
				175.47' below surface @ 1850 hrs. w/S-TAPE w/3' splice		
				− compare this to 175.48' measured w/same S-TAPE		
				on 7/18/87.		
				R/S A.H. 7/20/87		

REMARKS:

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

A-6000-021 (5-85)

4-A-1660

DRILL LOG	By: 1.R Oster	Rig: N/A	Well Number: 299-E31-4	Computer Number: N/A	Project or Work Order No.: KEH-1915-1
	Date: 7/21/87		Depth: 177' To 177'		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 = 175.52' below land surface (PNL300'E-TAPE #11044)	0945	
				D/B = 175.25 + 1.63' = 176.88' below land surface (PNL200'	0950	
				STEEL TAPE #1)		
				176.88 -175.52 1.36' of water in well.		

REMARKS:

Karen P. Oster
7/21/87

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)

4-A.1661

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	NONE	249-E34-4	N/A	KEH-19.5-1
Date: 7/22/87		Depth: 177' To 177'		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 = 175.63' (L-tape Ser.# 11044) below ground surface.		0705
				D/B = 175.28' + 1.63' = 176.91' (steel tape #1) below ground surface.		0700
				176.91 175.63 1.28' water in well.		

REMARKS:

Richard Premzic 7/22/87

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)

4-A.1662

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R Oster	N/A	299-E34-4	N/A	KEH-1915-1
Date: 7/23/87		Depth: 177' To 177'		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 = 175.43' below land surface (PNL 300 E-TAPE #11044)	0831	
				D/B = 175.28' + 1.63' = 176.91' below land surface (PNL 200' STEEL TAPE #1)	0836	
				176.91' - 175.43' = 1.48' of water in well		

REMARKS:

Karen R. Oster
7/23/87

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)

4-A.1663

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R L PREMMIC	PUSH CRANE	299-E34-4	N/A	KEH-1415-1
Date: 7/24/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'3 3/4" (Screen)				set 1 20' length of 20-slot stainless screen (4")	1153	
20' (Casing)				set 1 20' length of stainless casing (4")	1100	
20'		"		set 1 20' length of stainless casing w/centralizers (4")	1108	
20'		"		set 1 20' length of stainless casing (4")	1200	Lunch break
20'		"		set 1 20' length of stainless casing (4")	1245	
20'		"		set 1 20' length of stainless casing (4")	1255	
20'		"		set 1 20' length of stainless casing (4")	1302	
20'		"		set 1 12' length of stainless casing. 12' length consists	1313	
10				of a 10' section with a 2' section screwed to the top		
5						
2		"		Set 1 2' length of 4" S.S casing	1502	No lubricants used
179'		"		Note: There's ~16' of stick-up after setting		in casing assembly.
				casing on bottom - a 20' joint must have		Workers using clean
				been added earlier that was not recorded.		gloves.
				They removed the last 20' section just added,		
				and will set a 5' & 2' section instead.		
				So the total to be set (in order) will be 8x20' (incl. screen),		
				1x10', 1x2', 1x5', 1x2'.		

REMARKS:

Richard Premmic

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

A-6000-021 (5-85)

4-A.1664

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAKEN	P+H UTILITY CRANE	299-E34-4	NA	KEH-1115-1
Date 7/24/87		Depth 177' To 177'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Set a 5' + 2' section of casing (previously screwed together). 2' section is on top of 5' section	1543	
				2 1/2' of stick-up above surface.		
				Stopped work - went to well 299-E34-6 to begin the annular fill process.		
				D/B = 176' 5" + 2' 3 1/2" = 178' 8 1/2" (top of 8")	1653	Used S-TAPE
				Added 1 BAG OF 20-30 SAND	1653	w/ 3' splice.
				D/B = 172' 2" + 2' 3 1/2" = 174' 5 1/2" (top of 8")	1655	Measurements made
				4' 3" of sand in well. No casing pulled.		to top of 8".
						Sand added w/o
				Quit work for the day.	1700	use of tremie pipe
				RF A H 7/24/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1665

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R L PREMEAU	Warner Swasey crane	299-E34-4	N/A	KFH-1915-1
Date 7/29/87		Depth 177' To 177'		Subcontract No N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176 5½				2.27' of 8" casing with beefed up ears welded to the top of	1100	
				the previous 8" casing.		
				174' 7"	1315	
				+ 7' 3½		
				176' 10½"		
				- 4' 2" casing stickup		
				172' 8½" D/B (sand)		
1'8"					1320	
1'8"				177' 3"	1320	1'8" pullback
174' 7½				+ 2' 3½"		
				179' 6½"		
				- 5' 4½" stickup		
				173' 9" D/B (sand)		
				Sand is Colorado Silica, 20/30. No tremie pipe used.	1325	3 bags sand added
- 5'3"					1330	5' 3" pullback
169' 6½"				173' 10"		6' 11" total
				+ 2' 3½"	1335	
				176' 1½" stickup		
				- 11' 1½"		
				165' 1½" D/B (sand)		

REMARKS:

Richard Premeau 7/29/87

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)

4-A.1666

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chambers	Wilmer Sweezy Crane	Z99-E34-4	N/A	KEH-1915-1
Date: 7/29/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
169'6½"					1340	46 bags sand added
-5'9"					1345	5'9" pulled back
163'9½"						6'11"
						12'8" total
				167'5 3/4"		
				+ 2'2½"		
				169'9 1/4"		
-11'8"				- 5'8"		added 2 bags of sand
159'1½"				164' 1 1/4 D/B sand		pulled 1'8" casing
						+ 12'5"
				168'8 3/4" 9'10" of casing		17'4" total
				+ 2'3½" on stage 9'10" of sand		
				171'0 1/4"		
				9'10" of casing & pulling sand		
				161'2 1/4 D/B sand		
						adding 5 bags of sand
-5'						pulled back 5' casing
154'1½"				147'2 3/4"		+ 17'4"
				+ 2'3½" tops		22'4" total
				149'7 1/4"		
				- 2'1" stickup		
				147'6 1/4" D/B sand		

REMARKS:

M A Chambers 7/29/87

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)

4-A.1667

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	UDI 2000 S	299-E24-4	N/A	KEH-1715-1
Date: 7/29/87	Crew: S	Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
154' 1½"				155' 10¼"		
- 4' 8½"				+ 2' 3¼" tape		
+99.25"				158' 1½"		
				- 3' 3" stickup		
				154' 10½" T.B sand		
						pulled back 4' A'1'
				1 gal. of bentonite pellets should be ~0.56 cu. ft. worth between		+32' 4"
5' 2"				11" + 8" casing. Therefore will add 2 buckets of 5 gal. each		27' ½" total
27' 2"						pulled back 5' 2"
						32' 2½"
						added 7 bags of bentonite
						crumbles to bring bentonite
						up to bottom of 10" casing
					1715	Pulled back 8" casing
						until it was free inside
						the 10" casing.
					1800	Stopped by the day.

REMARKS:

M.A. Chamness 7/29/87

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)

4-A.1668

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L.L. PREMZIC	Warner Swasey Crane	299-E34-4	N/A	[illegible]
Date: 7/30/87		Depth: [illegible]' To 137'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
136'	of 10'				1045	Completed removal of the 8" casing from well. Adding bentonite crumbles to 10" casing.
				D/B (Bentonite Crumbles) = 134'11 3/4" + 2'3 1/2" = 137'3 1/4" steel tape	1050	
				10" casing stickup = 8" 136'(of 10") − 8"(stickup) = 135'4" of 10" casing below ground surface.		
				137' 7 1/2" − 135' 4" = 1' 11 1/4" of open hole between 10" casing & top of bentonite crumbles.		
				3 bags bentonite crumbles added.	1310	9" pullback

REMARKS:

Richard L. Premzic
7/30/87

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)

4-A.1669

DRILL LOG	By: M.A Chamness	Rig: Gardner Denver	Well Number: 299-E34-9	Computer Number: N/A	Project or Work Order No.: PEH-1715-1
	Date: 7/30/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				139'8"		
				+ 2'3½" tape		
				141'11½"		
				− 5'6½" stickup		
				136'5" TB bentonite		
				125'3/4" 136'0" of 10"	1145	added 4 bags of
				+ 2'3½ − 1'5½" of stickup		bentonite crumbles
				127'9¼" 134'6½"		
				5'6½"		
				121'9¾" TB bentonite	1150	
				Put down clamps on a chain so that they can ground +		
				pull at the same time and hopefully keep the casing from		
				getting stuck. Tried it out and the 10" casing came free		
				either being stuck. Spent the rest of the afternoon moving		
				4 casing pipe over, 4 putting sliders + fillers for the 4 casing		
				pipe.		
					1640	Left for the day
				M.A. Chamness 7/30/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1670

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L PREMZIC	Warrior Swasey Crane	Z 99-E34-4	N/A	KEF [illegible]
Date: 7/31/87		Depth: 177' To 177'		Subcontract No.: N.A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				set five 21' sections of tremie pipe in well, 105' total	0900	
				Moved crane to E34-6 to assist other crane using the extractor	0930	
				for pullback. Crane needs a dynometer before it can be		
				used to pull back on casing at 34-4.		

REMARKS:

Richard Premzic
7/31/87

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 (5-85)

4-A.1671

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M A Chamness	Wayne Zuber's	221 U-171-1	N/A	FFA 172 1
Date: 7/31/87		Depth: 137' To 137'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
136'10"					1500	Got diameter
						hooked up, tried pulling and
						got 3½" pulled back, are
						waiting to have welder
						they have to keep the
						degenerate or not the
2'10"	stickup					have or not
122'2"	of 10"			138'½" 136'0" of 10"	1525	started pulling overcore
	casing in			+ 2'3½" top - 3'10" stickup		hoping pressure below
	hole			140'5" 132'2" of casing in hole		
				- 7'10¾" stickup		90,000 lbs
				132'2" to bentonite		
					1545	Pulled back 1'10½"
						+ 3½"
						2'2" total for day
						stopped pulling casing, getting
						set up to grout tomorrow
					1650	quit for day
				M.A. Chamness 7/31/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1672

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R. Oster	Warner Swasey Crane	299-E34-4	N/A	KEH-1915-1
Date 8/1/87		**Depth** 177' to 177'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
132' 2"	of 1/2"			below land surface from yesterday D/B Top of bentonite = 132' 2 1/4"		
				below land surface.		
				132' 2" - 132' 2 1/4" = 1/4" gap between		
				bottom of casing and Top of bentonite granules.		
				Working on grout pump fittings.	1015	
				Began mixing Volclay grout to 9.4 or more pounds/gal.	1300	

REMARKS:

Karen R. Oster
8/1/87

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

4-A.1673

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	Wayne Stanley crane	299-E34-1	N/A	1611-1
Date: 8/1/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
142' 2" of 10" casing in hole				Have been trying to get valclay grout to proper density since 1300, can only get it up to 9.1 lb/gal w/ 9 bags of valclay for supposedly 200 gal H_2O. The ratio should be 25 gal / bag according to the directions on the bag. Are quitting for the day.	1600	
				M.A. Chamness 8/1/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1674

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Prentice	Warren Survey Crane	299-C34-4	N/A	KEH-1915-
Date 8/3/87		**Depth** 177' To 177'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
137'2"	1 10" cut			Mud balance is reading 9.15 lb/gal.	0810	
Ladow ground surface						
				D/B = 137.85' + 2.3' = 140.15' − 7.95' = 132.20' (Steel tape) stick up	0825	
				1 1/2 bags of volclay grout added to mixture from	0950	
				8/1/87. Mud balance reads 9.2 lb/gal. "Western		
				POWR-GROUTER" is too small to mix properly. Will		
				await new pump to help mix grout properly. Moved		
				crane off hole.		

Richard Prentice
8/3/87

REMARKS:

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

A-6000-021 (5-85)

4-A.1675

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	AMERICAN CRANE	299-E34-4	N/A	KEH-1915-1
Date: 8/10/87	12T-19959	Depth: 177' To 177'		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 = 132.3'	1440	
				Mud balance is 9.4 lbs/gal.	1440	Mixing — 150-175 gallons of grout + water.
132.2" of (numbers deled		10" in 7/31/87)	hole.			
					1445	Pumping grout down hole.
				D/B = 97'-5' + 2.3' = 94.3'	1500	
					1505	Pulling tremie pipe.

REMARKS:

Richard Premzic 8/10/87

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)

4-A.1676

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M. A. Chamness	American Crane 177	299-E34-4	t.b/n	RCH-1915-1
Date: 8/10/87		Depth: 117' To 177'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
132'2"	at 10" in	hole				pulled back 11'7 3/4"
- 11' 7 3/4"						
120' 6 1/4"	of 10" in	hole		cut off casing at 125'5 1/2" weld		
				10'1" ^		
				+ 2'3 1/2" tape		
				108' 8 1/2"		
				- 11' 10 3/4" stickup		
				10' 9 3/4" DB grout		
				0		
				Pouring in another 160 gal. grout, at 9.4 lb/gal	1720	
				0		
				60'7"		
				+ 2' 3 1/2"		
				63' 1/2"		
				This ⇒ - 1' 11"		
				= 1 1/2" LP grout		
				measurement appears to have been wrong.		
				Tape probably got hung up on grout inside of casing.	1800	pulled back 16' 3 1/2"
120' 6 1/4"				0		Cut casing at 104' 8 1/4"
- 16' 3 1/2"				108' 3"		
104' 2 3/4"				- 10" sticking to top of 12" casing		weld, 10" above
				107' 9"		
				+ 2' 3 1/2" tape		12" casing
				110' 1/2" DB grout, measured after		
				grout had set up 6 hrs.		
				Good measurement.		

REMARKS:

M. A. Chamness 8/10/87

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)

4-A-1677

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
J.S. Wilbur	Rig # American Crane 12T-19959	299-E34-4	NA	KEH-1915
Date 8/11/89		Depth Completion work back pulling 10" To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				There is a ~5' gap between the bottom of the 10" casing	8:55	D/T of grout @ 8:50
104' 2 3/4" of 10" carbon				and the top of the grout. They will have to grout before		is 108.77' from ground-
steel casing are in the				attempting to pull any casing. A American Crane 12T-19959		surface. There is 104' 2 3/4"
hole.				w/ a vibratory pile extractor are being used to remove		of 10" in the hole
				pipe from the hole		
						Driller wanted to know
				Operators move grout equipment to well site and set up	9:15	were the 12" casing was
				to grout hole. 40' of trimmie pipe placed in the hole		at (84'8"). Mud tank
				No H20 truck @ to fill mud tank,	9:25	holds 150 gals which
				Truck arrives @	9:45	is ~37' of fill in the
				Added ~160 gals of volcky 6.5 sacks of grout; wt. 9.5,		12" casing.
				completed grouting @ 10:10.	10:10	
				D/T of grout 107.4' raised grout level 1.3' w/160 gals	10:20	
				Added ~160 gals of volcky grout 6 sacks of material @	11:10	
				9.4 wt. D/T ~96' from ground surface		

REMARKS:

J. Wilbur 11/29/89

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

A-6000-021 (5-85)

4-A-1678

DRILL LOG	By T.S. Hilbur	Rig American Crane	Well Number 299-E34-4	Computer Number NA	Project or Work Order No. KEH-915
	Date 8/11/87		Depth Completing back pulling casing To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Added ~160 gals of volday grout @ 9A Wt., D/T of grout 94'7", 6 Sacks of materials used.	11:42	Review of the geologest logs shows that 100'–115' depth gravels; drillers were using ~35 gal hr H_2O to drill, very porous material.
				Added ~160 gals of voldag grout @ 9.5 Wt. D/T of grout 92.3", 6 Sacks of materials used.	12:05	
				Added ~400 gals – KEH has brought ~1060 gal water tank to mix grout in. This 400' mix should bring grout w/in 25' of the ground surface in 12" & 8" casing's – mixed – 16.5 sacks of material Wt. 9.3, D/T of grout is 86.3'.	13:35	
				Added ~325 gals of voldag grout, mix 13.5 sacks of materials, 9.5 Wt D/T of grout @ [see below]	15:00	
				Drillers is removeing 20' of trimme pipe from the hole to "Make the mud go down easer" – D/T of grout 77' below ground surface		
				Started back pulling 10" casing – appears to be letting on the bottom 12"	16:00	

REMARKS:

T. Sisk 11/29/87

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)

4-A.1679

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	American Comp. 197-17959	299-E24-4	N/A	KEH-1915-1
Date: 8/11/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				97'6"		Pulling 10" inside of
				- 11' 11" sticky		12", tool = 104' 2 3/4"
				92' 1"		
				+ 2' 2 1/2"		to 84' 1" + other world
				94' 11 1/2" TE grout		was cut off
2' 1 1/2" of 12"		hole		Pulled the rest of the 10" out. There is 10'5" of gap		
				between bottom of 12" casing and top of grout. This hole		
				has been taking a lot of grout. Need to be careful for		
				the next 10'-20' to try to avoid having too large of		
				gaps.		
					1700	quit for day
				M.A. Chamness 8/11/87		

REMARKS:

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-6000-021 (6-85)

4-A.1680

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	AMERICAN CRANE	299 E34-4	N/A	KF-1915-1
Date: 8/12/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
89'8" of 12" casing in the ground				D/B = (ground) 92+2' = 94' [Steel tape #5]	0730	
				Instructions from George last to use bentonite crumbles instead of valclay grout to stabilize of grout to the formation.	0745	
				3-50lb sacks of bentonite crumbles added. D/B = 89+2' = 91'	0750	
				3-50lb sacks of crumbles added. D/B = 87.6'+2' = 89.6'	0755	
				3-50lb sacks " " D/B = 85.6'+2' = 87.6'	0805	
				6-50lb sacks " " D/B = 80.0'+2' = 82'	0815	
				3-50lb sacks " " D/B = 78'+2' = 80'	0820	
81'8" of 12" below ground surface.				3' pull back. D/B = 86.5'+2' - 7.3' stickup = 81.2'	1045	Pull back with crane & vibrator. Casing pulls very easily.
				5-50lb sacks of crumbles added. D/B = 81.7'+2' - 7.3' stickup = 76.4'	1050	
79'8" of 12" below ground surface.				32" pullback. D/B = 85.0'+2' - 9.8' = 77.2'	1105	
				9-50lb sacks of crumbles added. D/B = 77.4'+2' - 9.8' stickup = 69.6'	1115	
				7' pullback. D/B = 86'+2' - 16' stickup = 72'	1150	
72'10" of 12" below ground surface.				6-50lb sacks of crumbles added. D/B = 80'+2' - 16' stickup = 66'	1155	
					1200	Lunch break
69'8" of 12" below ground surface.				~3' pullback. Cutting off stickup & reattaching vibrator.	1245	

REMARKS: 74'1" weld is 4'5" above ground surface. D/B = 66.3'

Richard L. Premzic

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

A-6000-021 (5-85)

4-A.1681

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P. L. PREMZIC	AMERICAN CHIEFTAIN	299-E34-4	N/A	RFA-C.5-1
Date: 8/12/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
44' 8" of 12" surface.		below ground		8-50lb sacks of crumbles added.	1325	
				D/B = 56'2" + 2 = 58'2"	1330	
				2-50lb sacks of crumbles added. D/B = 54.1' + 2 = 56.1'	1332	
58' 8" of 12" surface.		below ground		10' pullback. 63'6" weld is 4'10" above ground surface	1343	
				D/B = 57.7' + 2' = 59.7' one foot of open hole.	1403	cutting off stickup
				17-50lb. sacks of crumbles added. D/B = 141.4 + 2 = 143.4'	1420	
48' 8½" of 12" below ground surface.				10' pullback. 52'11¼" weld is 4'3" above ground surface	1432	
				D/B = 45.4' + 2' = 47.4'	1500	
				15-50lb. sacks of crumbles added. D/B = 30.4' + 2' = 32.4'	1510	
38' 6¼" of 12" below ground surface.				10' pullback. 42'5¼" weld is 3'11" above ground surface	1530	

REMARKS:

Richard Premzic
8/12/87

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)

4-A.1682

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	American crane 177-17959	299-E34-1	N/A	YEH-1115-1
Date: 8/12/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				138' 10"	1550	
				+ 2' (mp) 140' 10"		
				- 3' 10" stickup 137' DE bentonite crumbles	1600	Added 17 bags bentonite
28'6¼"	of 12" below ground			21' 6½"		crumbles
				+ 2' (top) 23' 6½"		
				- 3' 10" stickup 19' 8½" DE bentonite crumbles		
				21' 2"		
				+ 2' =3' 2"		
				21' 10" - 2' 10" 18' 0" DE bentonite crumbles after putting back ≈ 8"	1620	
27'1¼"	of 12" below ground			21' 9¾" weld now 4' 8½" above ground	1650	
				25' 9"		
				+ 2' 27' 9"		
				- 4' 8½" stickup 23' 1½"	1710	added 11 bags bentonite
				DE bentonite 8' 7½" from ground surface		crumbles
				21' 3¾" weld at ground surface, DE bentonite at 20' 9" + 2' = 22' 9" → 10' 6" → 12' 3"	1730	

REMARKS:

M.A. Chamness 8/12/87

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)

4-A.1683

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	American crane.	299-E24 4	N/A	YE4-1115-1
Date: 8/12/87	197-199[illegible]	Depth: 177' To 117'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
21'3 3/4"					1745	final cut, 21'3 3/4"
11'4"						weld exposed, now 4'4"
16'11 3/4"	of 12" b	low ground				above ground. Did not
						cut casing off, so I
						could not measure top
						of bentonite
				M.A. Chamness 8/12/87		

REMARKS:

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

A-6000-021 (5 85)

4-A.1684

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMEAU	AMERICAN CRANE	299-E34-4	N/A	KEH-1915-1
Date: 8/13/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
16' 11 3/4" of 12" below ground	surface.			21' 3 1/4" weld. is 4'± above ground surface. D/B = 12.7+2=14?	0800	
				13 1/2 bags of crumbles added. D/B is at ground surface.	0810	
					0905	Extractor is running. Difficult time pulling. Pulled 1'.
				Used backhoe to dig a hole 9' deep along the side of	0950	
				the 12" casing to relieve pressure on casings. Casing was		
10' 11" of 12" below ground	surface.			then pulled using the extractor 6'. Pulling is easy now.		
				Backfilling hole dug by backhoe. D/B = 14+2-11 (stickup) = 5'	1000	
				5 bags of crumbles added. D/B = 9.1'+2-11 (stickup) = .1'	1015	
				pulled all of the 12" casing from the well. Dirt sloughed	1030	
				in over the top of the bentonite crumbles when drive		
				shoe cleared the hole. Will need to dig out hole prior		
				to pouring cement.		
				American Crane moved to 299-E27-10.	1555	
				Richard Premeau 8/13/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1685

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L PREMZIC	NONE	299-E34-4	N/A	KE4-95-1
Date: 8/14/87		Depth: 177' To 177'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				2-10 lb. bags of Dry Form Bentonite mixed Cold to keep	0930	
				drill from sloughing in prior to pouring concrete.		
				Concrete poured to complete well and pad.	1330	

REMARKS:

Richard Premzic
8/14/87

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)

4-A.1686

1" = 2'

DRILL LOG	By L. Amo	Rig	Well Number 299-E-34-4	Computer Number	Project or Work Order No.
	Date 7-9-87	#153	Depth To 19'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
21'3"		H	W	SAND & Cobbles	2 pm	START HARD
	14'	H	W	wet into Black Sand		TOOL
	19'			Sand (Black) med. coarse	8:00	Prepare to weld
10'6"					8:30	Start welding

REMARKS:

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

A-8000 021 (5-85)

4-A-1687

1ST

DRILL LOG	By Lenny R Cordon	Rig #153	Well Number 999E-34-4	Computer Number	Project or Work Order No.
	Date 7-10-97		Depth 19' To [redacted]40'		Subcontract No

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
21-9¾						
12-6⅝	20-21	HT	W	Silty Sand		@ 5:30 - Finished
10 7⅛	25-26	HT	W	Silty Sand		welding 12" casing
	30-31	HT	W	Silty sand + gravel		(from 20 to 31')
	35-36	HT	W	L gravel + VL sand		7:40 welded on
	39-40	HT	W	L gravel + VL sand		12" casing from
						(31 to 40')
				Finished 8hr shift at 40'		
				Total casing {4½'-5¾"}		
				1' Above geound.		
				Lenny R Cordon		

REMARKS:

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

A-6000-021 (5-85)

4-A.1688

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
OLIN AMOS	#153	299E 34-4		
Date: 7-10-97		Depth: 40' To 51'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'6"	45	H	W	Large gravel & cobbles	1:00	AT Rig set
	50	H	W	Large gravel		casing ready to
						weld
					1:30	weld 12" casing
				Casing (52-11 3/4 - Total)		From 442' - 53'
					3:00	Start Drilling
					9:00	Finish 51'

REMARKS:

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

A 6000 021 (5-85)

4-A.1689

Corbon

DRILL LOG	By Watkins	Rig # 153	Well Number 799 E-34-4	Computer Number	Project or Work Order No.
	Date 7-11-87		Depth 50 To (61')		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
52'	11-3/4"	H	WL			7.40 - Finished
10-7	55-56	HT	W	Cemented sand & Gravel		welding on 12"
10-7	60-61	HT	W	" " "		casing. Between.
						52-60'
				{74-1 3/4 = 12" Casing Total}		

REMARKS:

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

A 6100-021 (5-85)

4-A.1690

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Olin	22/W	299E-34-4		
Date 7-11-87	# 153	Depth 61' To 75'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
107'	65	H	W	Gravel (med)		
	70	H	W	Sand + Large gravel	1:00	Finish welding
	75	H	W	" "		74'
					2:00	Start drilling
					6:30	Start welding
						84'
					8:00	Start Drilling
				(84' 8 3/4" Total casing)		60 gallons of water USED

REMARKS:

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

A-6000-021 (5-85)

4-A.1691

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L. Corchon	22-W	29E-34-4		
Date 2/13/87	#153	Depth 75' To 85'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84' 8 3/4"		H	W			5:00 - 8:30
	75-81	H	W	(Cemented) sand + M gravel		Drilled + sampled
	81-85	H	W	" " " " "		to 85'. Installed 10"
10" casing						casing to 84'
21-3½					8:30	Started setting
+20-11½				84.1" Total		10" casing.
(42' 3")				of 10" casing.		
+20-9½						
(63-0½)						
+21-7½						
(84-1)						

REMARKS:

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

A 6000-021 (5-85)

4-A.1692

DRILL LOG

By Olin
Date 7/13/87

Rig #153

Well Number 99E-34-4
Depth 85' to 94'

Computer Number

Project or Work Order No.

Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'4"	90	H	W	cemented Sand & gravel		
10'3¼"					1:00	Start welding
						84' 10" casing
				Weld & Set in 20' 10" casing		And set in
				~~Drill~~ Total 10" in hole 104'8¼	2:30	Start welding
						95' casing
					3:30	Start Drilling
						Trim Bit
					6:30	Start welding
						105' casing
					9:00	Start Drilling
				Use 40 gallons of water		

REMARKS:

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

A 6000 021 (5-85)

4-A.1693

10" casing 125-5½

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Lenny Carden	#153	299E-30/-4		
Date 7/15/87		Depth 115' To 133'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125-5½						
10-6½						
136-0						
[redacted]	120-121	HT	W	{Cemented} sand + M gravel		
[redacted]6	125-126	HT	W	{ " } " " "		
[redacted]	130-131	HT	W	{ " } " " "		
				136' of 10" casing Total		

REMARKS:

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

A-6000-021 (5-85)

4-A.1694

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Olin Ames		299-E34-4		
Date: 7-15-87		Depth: 133' To 135'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	134-135'	H	W	Cemented Sand & gravel		
8" casing						
21'3"					1:00	Start Drilling
20'9¾"					2:00	gear up & get
20'10½"						ready to run 8"
20'7½"						casing
21'1¼"					3:30	Start Setting
20'8¾"						8"
				Total 8" casing 124' 4¾"		

REMARKS:

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

A-6000-021 (5-85)

4-A.1695

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Lenny Cordon	#153	29E-31-4		
Date 7/16/87		Depth 135' To 145'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104-4¾	110-141	HT	W	Cemented sand & gravel		5:00 - 6:00
00-103/4	144-146	HT	W	" " "		welded on 8" casing
145-3½						from 104 to 104
10-4				155'-7½" of 8" casing Total		Installed, made up
155-7½						8" Tools.
						6:00 - 7:00
						Drilled, sampled
						& installed 8"
						casing to 145'

REMARKS:

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

A-6000 021 (5-85)

4-A.1696

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Glenn Amos	H 153	29E-34-4		
Date 7-16-87		Depth 145' To 160'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'6"	150-151	H	W	Sand & Gravel 3"-4" in size		
	155-156	H	W	Sand & Gravel & cobbles		
	160-161	H	W	Sand & Gravel 2"-3" in size		
					1:00	Start Drilling
					6:30	weld 10'6" piece of casing on
				Total 8" Casing 165' 11½"		
						used about 50 gallons of water
					9:00	Stop Drilling

REMARKS:

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

A-6000 021 (5-85)

4-A.1697

DRILL LOG

By L. CorDon | Rig 153 | Date 7-17-87

Well Number E34-4 | Depth 160' To 176'-6"

Computer Number

Project or Work Order No.

Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
165'	11½"	HT				175'-5" Solid
10	4					Basalt Drilled
176'-3½"						into Basalt 1'
	164-165	HT	W	Cemented sand + gravel		Solid. (on water)
	170-171	HT	W	Coarse sand + gravel		
	174-175	HT	W	Sand with (Basalt chunks)		
				176'-3½" of 8" casing Total		

REMARKS:

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

A-6000-021 (5-85)

4-A.1698

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Glen Ramos	H 75-3	E34-4		
Date: 7-17-97		Depth: 176' To 177'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1:00	Start welding Spade
					1:45	Start Drilling
				pulled casing back 4"		into Basalt
				with casing Line Then set	6.30	T.D. Hole AT
				it Back down waiting For		177' clean
				word on what to do		hole and get
						ready to set
						screen
					7:00	Geologist Say
						we need a pack to.
						For screening
						Talk to Lenny
						Drill 4' on (6)
					8:00	Back AT Rig
					Finish	weldingSpade on
						16" Bit

REMARKS:

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

A 6000-021 (5 85)

4-A.1699

WELL 299-E34-5

Battelle
Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project 200 Area RCRA Monitoring Wells
Location 200 EAST
Driller Lin Gordon, Lenny Gordon, Louie Watkins
Drilling Co. Kaiser
Geologist R.A. Hagen, R. Primus, K.R. Oster, T. Gilmore, M.A. Chamness, S. Cadziak, S. Teel,

Well Number 299-E34-5
Temporary Well Number N/A
Coordinates N46 741 W50 014
Casing Elevation 599.79'
Ground Elevation 599.01'

DRILLING METHOD

Rotary Air N/A Mud N/A
Cable Tool D N/A H ✓
Drilling Fluid WATER from 200E
Other N/A

COMPLETION DATA

Drilled Depth 192'
Completion Depth 190' 6 3/4"
Date Started 6/27/87 Completed 8/15/87
Static Water Level/Date 182' 8" / 7/11/87

CASING DATA

Type	Size	shckup		
CARBON STEEL	16"	+11"	to	59' 7 1/4"
CARBON STEEL	12"	+ 1' 3 1/2"	to	145' 9 3/8"
CARBON STEEL	8"	+3' 0"	to	190' 11 1/2"
Stainless steel	4"	+ 1178'	to	190.5'

Approved By MAC Date 11/24/87

PERFORATIONS

Type
Depth / Schedule
N/A
App. By MAC Date 11/24/87

SCREEN

Type	ONE 8" steel	4" stainless
Length	10' 5"	20' 3 3/4"
Slot Size	30	20
Depths	8" 180.5'	170.5'
	4" 190.5'	190.5'

App. By MAC Date 11/24/87

ANNULAR SEAL

Type	Interval	Volume
20/40 sand	190.5'-182'	12-50 lb sacks
3/8" pellets	182'-179'	33-50 lb sacks
Volclay clay	179'-169.5'	2270 lbs
cement	169.5'-2'	unknown

App. By MAC Date 11/24/87

GEOPHYSICAL LOGGING

Sondes	Interval	Date
Natural gamma	0'-192'	7/13/87
Neutron	0'-192'	7/13/87
Gamma gamma	0'-192'	7/13/87

Approved By MAC Date 11/24/87

AQUIFER TESTING

Type of Test development / constant discharge
Length of Test 2 hrs
Volume Pumped 3200
Drawdown 1.47'
pump broke 25 min. into constant discharge test.
Approved By _____ Date 7/21/88

OTHER APPLICABLE ITEMS

- ✓ Steam Cleaning
- ✓ Storage of Const. Material
- ✓ Tool Lubricants
- MAC Concrete Pad
- MAC Protective Steel Posts
- MAC Safety Paint
- ✓ Straightness Test 7/11/87
- MAC Well Development
- ✓ Downhole TV Inspection
- ✓ Well Abandonment
- ✓ Complete As-Built Diagram, Driller's and Geologist's Logs

Approved By M.A. Chamness Date 12/4/87

Reviewed By T.L. McLean Date 12-22-87

A-1800-187 (3/87)

PREFACE

This Inspection Plan identifies the inspections required and the responsible people to perform the inspections of the monitoring wells to be constructed under Project B-678.

The inspection of well construction activities is intended to provide assurance that the work performed by construction forces is in accordance with the approved contract documents. The degree of inspection is commensurate with the significance of the monitoring wells with regard to function and safety.

Insoectors

Listed below are the names of the individuals whose initials appear within this inspection plan.

Name	Initial	Organization	Job Title
John F. Keller	JFK	Kaiser Engineering Hanford	Superintendent
Michele A. Chamness	MAC	Pacific Northwest Laboratory	Scientist

The PNL project manager has reviewed the completed inspection plan and is satisfied that all the applicable inspections of the work were made during the construction of the wells.

G. V. Last
PNL Project Manager

1-13-88
Date

CONSTRUCTION INSPECTION SERVICES

Described herein are the inspection services to be provided and documented by PNL.

Pre-Award Submittal Review

	Item	Contract Reference	Initial	Date
1.	Verify contractor and drillers are licensed for well drilling in the State of Washington.	01100-1.2 01300-1.2.1A	JK	1-12-88
2.	Verify cable tool drilling experience is five years or more with drive barrel and hard tool.	01100-1.2	JK	1-12-88
3.	Verify documentation of ground-water monitoring wells drilled by contractor.	01100-1.2	JK	1-12-88
4.	Verify contractor submitted description of drilling method and equipment.	01300-1.2.1B	JK	1-12-88
5.	Verify contractor submitted resumes of personnel.	01300-1.2.1C	JK	1-12-88

Procurements

Verify materials to be furnished to the contractor are as described in the construction specification.

	Item	Contract Reference	Initial	Date
1.	Stainless steel screen (8 inch telescope size).	01100-1.5A	JK	1-12-87
2.	Stainless steel screen (4 inch).	01100-1.5B	JK	1-12-87
3.	Centralizers.	01100-1.5C	JK	1-12-87
4.	Stainless steel casing (4 inch).	01100-1.5D	JK	1-12-87

	Item		Contract Reference	Initial	Date
5.	Artificial sand packs.		01100-1.5E	JTK	1-12-88
6.	Bentonite pellets.		01100-1.5F	JTK	1-12-88
7.	Bentonite grout.		01100-1.5G	JTK	1-12-88
8.	Granular bentonite.		01100-1.5H	JTK	1-12-88
9.	Sack crete.		01100-1.5I	JTK	1-12-88
10.	Portland cement.		01100-1.5J	JTK	1-12-88
11.	Well cap.		01100-1.5K	JTK	1-12-88
12.	Brass survey marker.		01100-1.5L	JTK	1-12-88
13.	Sample jars.		01100-1.5M	JTK	1-12-88
14.	Hydrologic sampling equipment.		01100-1.5N	JTK	1-12-88
15.	Drive shoes.		01100-1.5O	JTK	1-12-88
16.	Carbon steel casing.	a. 16 inch	01100-1.5P	JTK	1-12-88
		b. 12 inch	01100-1.5P	JTK	1-12-88
		c. 10 inch	01100-1.5P	JTK	1-12-88
		d. 8 inch	01100-1.5P	JTK	1-12-88
17.	Guard posts.		01100-1.5Q	JTK	1-12-88
18.	Paint: primer		01100-1.5R	JTK	1-12-88
	finish enamel		02011-3.5I	JTK	1-12-88

Performance Submittals

	Item	Contract Reference	Initial	Date
1.	Verify submission and approval of construction schedule.	01300-1.2.2A	JTK	1-12-88
2.	Verify drilling logs are submitted daily.	01300-1.2.2B	JTK	1-12-88
3.	Verify submission and acceptability of flow meter certification.	01300-1.2.2C		

DFC NO. 200-1

ATTACHMENT 1

DESIGN/FIELD CHANGE		DFC No. 200-1
Task No. N/A	Project Title 200 Area Burial Ground Detection Monitoring	Final Approval Date 11/25/87

Documents Affected

1. Construction Specifications KEY-1914 (B-677) and (B-678)
2. Inspection Plan Construction Project KEH-1914 (B-677)

Description of Change

Line out and disregard any statements concerning flow meter certification. Specifically paragraph 1, 2.2C under performance submittals in the referenced construction specs. and item 3 under the performance submittals section of the referenced inspection plan.

Justification

See attached letter

Distribution

PNL
SP Airhart
MA Chamness
CS Cline
DR Dahl
TJ Gilmore
RM Smith
JS Wilbur

WHC
RE Clayton
C Hodge
RB Kasper
DM Tulberg

Remarks

None

Initiator/Author	Phone	Organization(s)	Date
G. V. Last GV Last	376-1054	Geosciences/PNL	11/25/87

Approvals

DM Raymond 11/25/87

Project Manager	QA
GV Last 11/25/87	DR Dahl 11/30/87

Well Number 299-E34-5

The remaining sections of this inspection plan shall be completed for each well.

Well Drilling Activities

	Item	Contract Reference	Initial	Date
1.	Verify wells are constructed in continuous operation.	01100-1.3		
2.	Verify contractor uses approved water source.	01600-2.0	MAC	1/8/88
3.	Verify beveled edge is cut on temporary casing by contractor.	01600-2.1A	MAC	1/8/88
4.	Verify suitability of split spoon sampling equipment.	01600-2.2	N/A	
5.	Steam cleaning equipment.	01600-2.3	MAC	1/8/88
6.	Aquifer testing equipment.	01600-2.4	MAC	1/8/88
7.	Verify contractor has copy of WAC Chapter 173-160 "Minimum Standards for Construction and Maintenance of Water Wells" and the construction specification at the jobsite.	02011-1.2	MAC	1/8/88
8.	Verify contractor has a copy of all addendums and change orders at the jobsite.	02011-1.2	MAC	1/8/88

Monitoring Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify proper technique of cable tool drilling.	02011-3.1.1	MAC	1/8/88
2.	Verify steam cleaning is being done properly.	02011-3.1.2	MAC	1/8/88

Well Number 299-E34-5

	Item	Contract Reference	Initial	Date
3.	Verify contractor is handling and storing construction materials properly.	02011-3.1.3	MAC	1/8/88
4.	Verify bevel on casing and welding is done as specified.	02011-3.1.4	MAC	1/8/88
5.	Verify the contractor uses proper tool lubricants.	02011-3.1.5	MAC	1/8/88
6.	Verify only approved drilling additives are used.	02011-3.1.6	MAC	1/8/88
7.	Verify the proper disposal of drill cuttings and water.	02011-3.1.7	MAC	1/8/88

Well Testing

	Item	Contract Reference	Initial	Date
1.	Verify water-level measurements are taken. Note in log.	02011-3.2.1	MAC	1/8/88
2.	Verify the bottom of temporary casing is free of plugging material at end of each day. Note in log.	02011-3.2.1	MAC	1/8/88
3.	Verify ground-water samples are taken when needed.	02011-3.2.2	MAC	1/8/88
4.	Verify aquifer testing is done at each well.	02011-3.2.3	MAC	1/8/88
5.	Verify formation samples are taken as required.	02011-3.3	MAC	1/8/88

Well Number 299-E34-5

Borehole Construction

	Item	Contract Reference	Initial	Date
1.	Verify temporary casing is telescoped at no more than 100 feet intevals.	02011-3.4A	MAC	1/8/88
2.	Verify depth of well.	02011-3.4B	MAC	1/8/88
3.	Verify proper action is taken if overdrilling occurs.	02011-3.4C	MAC	1/8/88
4.	Verify acceptable passing of alignment test.	02011-3.4D	MAC	1/8/88
5.	Verify all temporary casing is removed from the well.	02011-3.4E	MAC	1/8/88

Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify position of 8 inch screen and pullback of casing to expose screen.	02011-3.5A	MAC	1/8/88
2.	Verify adequate well development.	02011-3.5B	MAC	1/8/88
3.	Witness aquifer test.	02011-3.5B	MAC	1/8/88
4.	Verify proper setting of 4 inch screen, casing, and centralizer.	02011-3.5C	MAC	1/8/88
5.	Verify proper placement of sand pack.	02011-3.5D	MAC	1/8/88
6.	Verify proper location and thickness of bentonite pellet seal.	02011-3.5E	MAC	1/8/88
7.	Verify proper mixing, placement, and location of Volclay bentonite-based grout.	02011-3.5F	MAC	1/8/88

	Item	Contract Reference	Initial	Date
8.	Verify proper concrete seal at top of well.	02011-3.5G	MAC	1/8/88
9.	Verify proper construction of concrete pad and placement of brass survey marker.	02011-3.5H	MAC	1/8/88
10.	Verify proper placement, construction, and painting of guard posts.	02011-3.5I	MAC	1/8/88
11.	Verify contractor cleans up site and properly stores excess materials.	02011-3.5J	MAC	1/8/88
12.	If abandonment of well occurs, verify proper abandonment.	02011-3.6	N/A	
13.	Verify contractor maintains the drill log daily.	02011-3.7		
14.	Prepare punchlist at construction completion for exceptions.		N/A	

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E34-5 Geologist R. A. HAGEN Page 1 of 2

R. Fremgic, K. Oster, T. Gilmore, M. Chamness, S. Teel, S. Cudnale

Reviewed by W. L. McShane Date 12-28-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		drill rate (ft/hr)
Description	Diagram (2" = 1 ft)		Diagram Litho.	Lithologic Description	
cement 0'-15'		5		Silty sandy gravel	1.0
		10		" " "	3.2
16" temporary carbon steel casing		15		" " "	2.5
		20			3.0
		25		Silty Gravelly Sand	6.6
		30		Silty Gravelly Sand	4.0
		35		Silty sand	5.4
		40		Silty Gravelly Sand	2.1
		45		" " Gravel	2.7
		50		Sandy Gravel	1.7
		55		Silty Sandy Gravel	3.5
		60		" " "	3.0
12" temporary carbon steel casing		65		Gravel	3.0
		70		Silty Sandy Gravel	2.5
		75		Gravel	3.0
		80		"	3.1
		85		Sandy Gravel	2.5
		90		Gravel	2.5
		95		Sandy Gravel	4.3
		103		Silty sandy gravel	4.2
		105		Sandy "	2.9
		110		Silty Sandy Gravel	2.4
		115		" " "	3.6
		120		" " "	3.1
		125		" " "	3.5
		130			

4-1800-186 (3/87)

Battelle
Pacific Northwest Laboratories

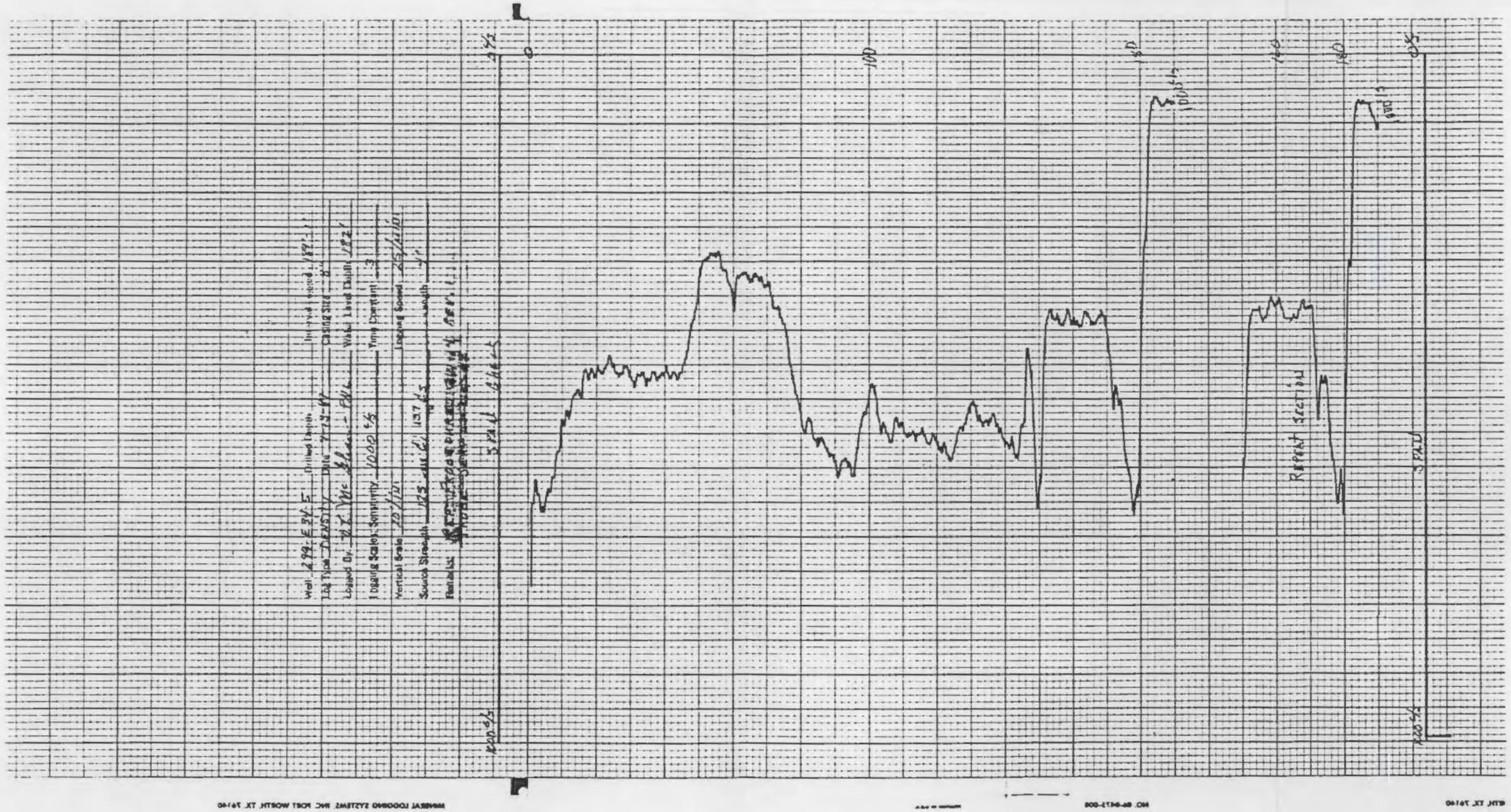
AS-BUILT DIAGRAM

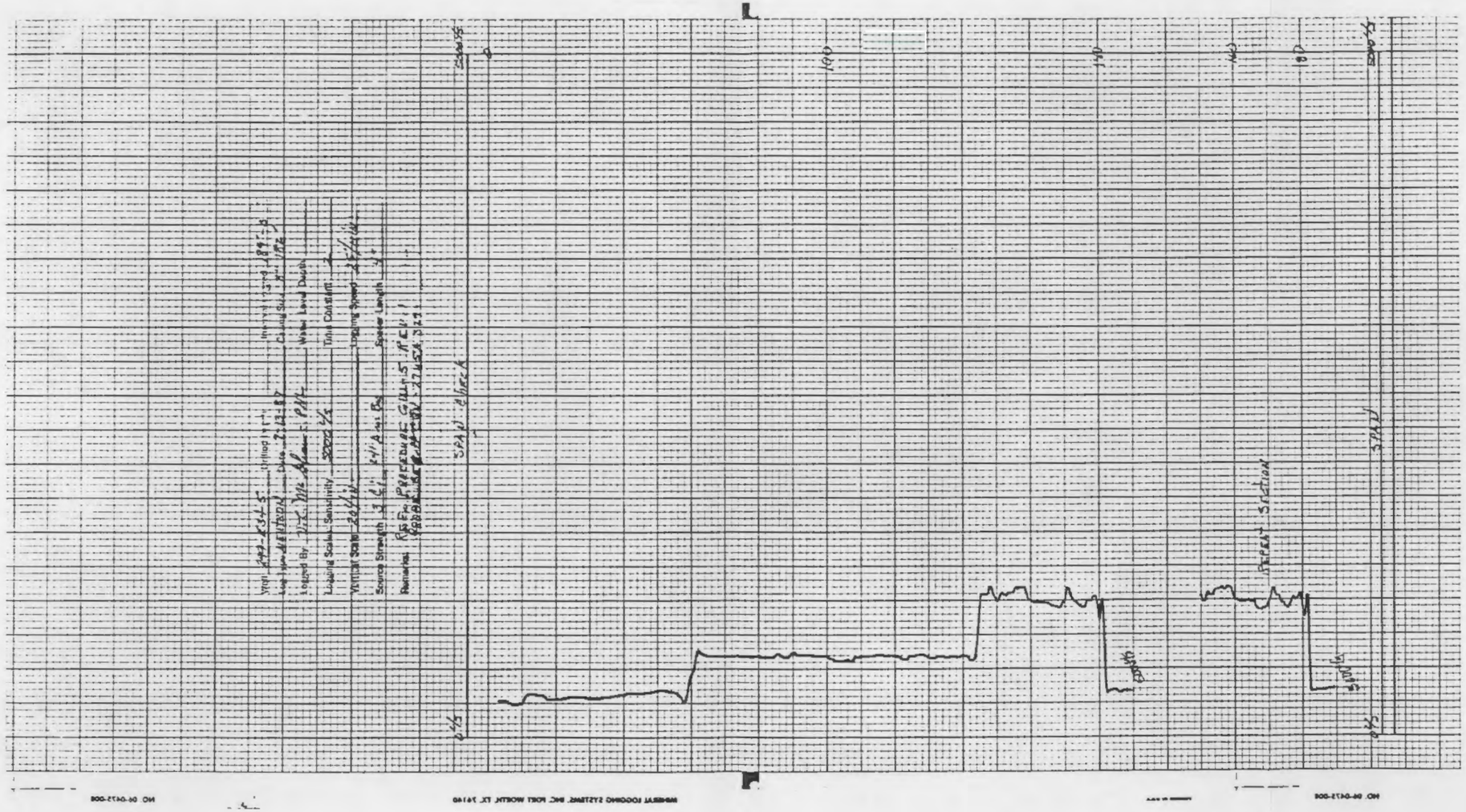
Well Number 299-E34-5 Geologist R. Fecht, L. Hazen, K. Oster, T. Grimore, M. Chamness, J. Ludwick, S. Teel Page 2 of 2

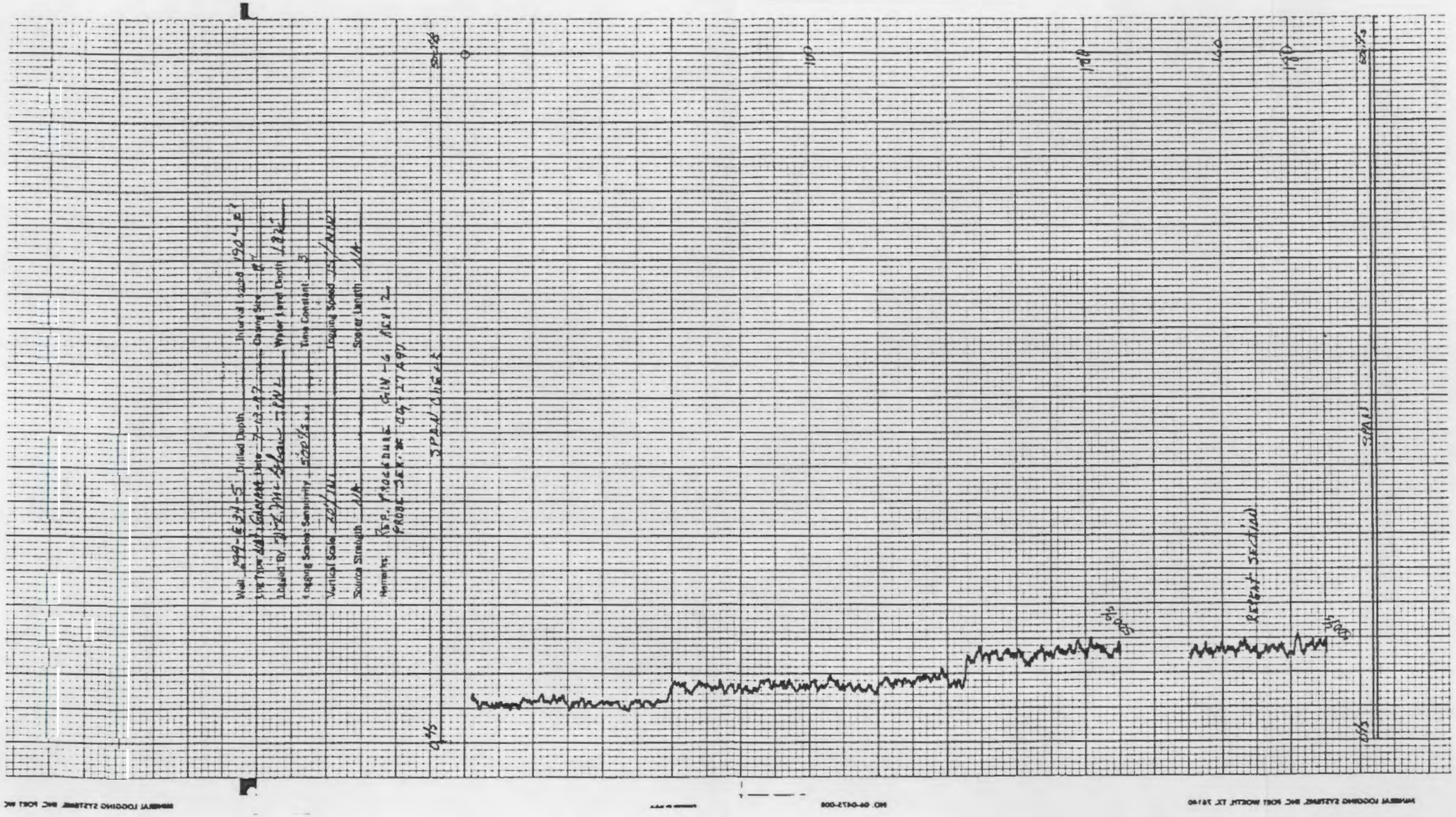
Reviewed by W. E. McMahon Date 12-29-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill rate (ft/hr)
Description	Diagram		Diagram Litho.	Lithologic Description	
12" carbon steel casing		135		Sandy Gravel	6.3
8" carbon steel casing		140		" "	5.4
natural sand ~106'-146'		145		" "	2.5
bentonite crumbles 146'-158'		150		SLIGHTLY SILTY GRAVELLY SAND	4.2
		155		Silty sandy gravel	7.1
Centralizers		160		Sandy Gravel	6.0
20/40 silica sand from 190.5'		165		" "	5.2
to ~ 158'		170		Slightly Silt. Gravelly Sand	5.1
4" 20 slot ss steel screen		175		Silty, sandy gravel	2.5
water level 182'8", 7/11/87		180		" " "	15.0
8" telescoping S.S. Screen		185			5.0
30 slot		190		gravelly sand	3.3
	TD = 190.5		TD = 190'6"	Basalt at ~190'	

A-1600-186 (3/87)


Well 294-E-24-5
Log Type Density
Logged By W.C. Wire Line - Fluid
Density Sensitivity 1000 cps
Vertical Scale 20 ft/in
Source Strength 125 mc
Remarks
Repeat section
3 PASS


Date 2-13-87
Water Level Depth
Time Constant
Sweep
Source Strength
Remarks
Source Length
Surface Reflection
Bottom
Bottom


Well #29-E-31-S
Drilled Depth
Date
Elevation
Logged By
Logging Service
Vertical Scale
Source Strength
Remarks
Interval Logged
Casing Size
Water Level Depth
Time Constant
Logging Speed
Scaler Length
PROD. SEC. 36
SPEED CHANGE
PRESENT SECTION
START

DRILL LOG	By HAGEN	Rig Cable Tool #2 Buc. Erie 60L	Well Number 299-E34-5	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 6/26/87		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
				Continued to set up rig from yesterday.		Drill rig is a
				Drove rig onto pad + began set-up on 6/25.		Bucyrus Erie 60L
				4 pieces of 16" casing steam cleaned prior		
				to its arrival on site, but 3 of these required		
				additional steam cleaning on site. Extra		
				hand tools + drill stems also steam cleaned on site today.		
				Drive shoe welded onto 16" casing. Note		
				that shoe was not milled down.		
				All 16" casing now on site was sand blasted		
				to remove grime lining casing.		
				[signature] 6/26/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1719

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
R A HAGEN	Cable Tool #2 (68k-19150) Bucyrus 60L	299-E34-5	N/A	HEH-1915-1
Date: 6/27/87	Depth: 0' To 5'			Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION (% Each Grain Size, Color, Roundness, Caliche, Etc.)	Time	Drilling Comments
				Geologist arrives on site.	0602	Driller is Ted Kudrna
	4.5'	Backhoe	SM	SILTY SANDY GRAVEL. 55% gravel, 40% sand, 5% silt. Sample is 5% large cobble (perhaps some boulders), 10% small cobble, 25% VCP, 10% MP, 5% FP, 5% CS, 20% MS, 15% FS. Sample is poorly sorted. Gravel composed of 50% basalt, 20% granitics, 30% metamorphics. Sand composed of 20% basalt, 70% qtz, 10% other. Gravel clasts are rounded to subrounded; sand grains are rounded to subangular. Dry color is 2.5Y 4/2 (dark grayish brown). Mod-strong HCl rxn on sand. No consolidation. Caliche coats most gravel clasts.	0815	No casing in hole - hole dug by backhoe to set 16" casing.
						Using Crisco vegtable oil as tool lubricant.
				Driller Ted Kudrna fell off tailboard ties into backhoe excavation and dislocated his shoulder (left?) He was taken by ambulence to Kadlec Hospital. He dislocated shoulder when he fell into drill stem that was sitting over excavation; the ties were too short to cover 16 hole. Rig shut down for the day.	0900	

REMARKS:

R J A 6/27/87

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)

4-A.1720

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	CABLE TOOL #2	299-E34-5	N/A	KEH-1915-1
Date: 6/29/87	68K-19156	Depth: 5' To 10'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
						DRILLER IS LEN SORDEN
20' 6¼" of 16" casing					0829	set 20' 6¼", 16" casing into excavated hole
					0830	Drilling started Drilled for 2 minutes
					0840	Drilling resumed. Drilled for 2 minutes.
					0903	Drilling resumed. Drilled for 10 minutes
					0921	20 gallons of water added. Drilling Resumed.
					1044/1050	Drilling stopped/Drilling resumed
					1105/1110	Drilling stopped, 20 gallons of water added/Drilling started
					1144	20 gallons of water added.
					1200	stopped drilling for lunch.
					1245	Resumed drilling.
					1310	20 gallons of water added.
	10'	H	W	SILTY SANDY GRAVEL. 45% Gravel, 40% sand,	1315	Sample from bailer
				20% silt. Gravel is 35% LP, 10% FP, 10% EP, 17% VFP.		
				Sand is 5% VCS, 10% CS, 20% MS, 5% FS. Sample		
				is poorly sorted. Gravels are 40% basalt, 20% metamorphics,		
				10% granitic. Sand is 45% basalt, 45% qtz, 10% other.		
				Gravels are sub-rounded to sub-angular. Sands are sub-rounded		

REMARKS:

Richard Premzic

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

A 6000 021 (5-85)

4-A.1721

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R L. PREMZIC	CABLE TOOL #2	299-E34-5	N/A	KFH-915-1
Date: 6/29/87	68K-19150	Depth: 10' To 15'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'6¼" of 16" casing.				to sub-angular. Dry color is 5Y6/1 (Gray). Wet color is 5Y4/1 (dark gray). Slight moderate HCl rxn. No consolidation. Sample differs from previous sample in the amount of gravel and sand. They are ~equal		
					1335	20 gallons Water added.
					1450	20 gallons water added
	15'	H	W	SILTY SANDY GRAVEL. ~5% gravel, 40% sand, 15% silt. Gravel is 20% CF, 10% MF, 5% FF, 10% VFF. Sand is 5% VCS, 5% CS, 20% MS, 10% FS. Sample is poorly sorted. Gravels are 60% basalt, 25% metamorphics, 10% granitic, +5% other. Sands are 40% basalt, 50% qtz, 10% other. Gravels are rounded-subangular. Sands are rounded-subangular. Dry color is 5Y6/1 (Gray). wet color is 5Y4/1 (dark gray). Slight rxn. to HCl. No consolidation. Greater composition of gravels and larger size than previous sample.	1450	Sample from bailer
					1605	Drilling stopped for welding.

REMARKS:

Richard Remzic

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

A-6000-021 (5-85)

4-A.1722

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L. L. PRENTICE	CABLE TOOL #12	299-E34-5	N/A	[illegible]
Date 6/29/87	68K-19150	**Depth** 15' To 17'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'6¼" of 16" casing.						
20'6¼" of 16" casing.					1630	10'.00 of 16" casing was tack welded on the top of the 20'6¼" casing. The total casing length is 30'6¼". The casing will be welded by a certified welder in the morning. Drilling is stopped for the day.

REMARKS:

Richard Prentice
6/29/87

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)

4-A-1723

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	CABLE TOOL #2	29T-E34-5	N/A	KEM-1915-1
Date: 6/30/87	GSK-19150	Depth: 17' 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
30' 6¾" of 16" casing						
					0930	on site to witness completion of welding of the 16" casing by a certified welder.
					0950	Drilling started (Organics water added)
	20'	H	W	SILTY SANDY GRAVEL. 50% gravel, 40% sand, 10% silt. Gravel is 15% CS, 10% MP, 25% F. Sand is 10% CS, 15% MS, 15% FS. Sample is poorly sorted. Gravels are 60% basalt, 30% metamorphics, 5% granitics, 5% other. Sand is 40% basalt, 50% qtz, 10% other. Gravels are SR-SA. Sands are R-SA. Wet color is 5Y3/1 (very dark gray). Dry color is 5Y7/1 (light gray). slight mud/mole rxn. to HCl. No consolidation. Greater composition of gravels than last sample.	1005	Drilling stopped. welding of drive shoe at this time
					1120	Drilling resumed.

REMARKS:

Richard Premzic

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

A-6000 021 (5 85)

4-A.1724

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Breniman	CME 55 LC-2 ASK-1050	299-E34-5	N/A	[illegible]
Date 1-30-87		Depth 20' To 25'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'6¼" to 16" casing					1150	[illegible] of 4½ drill rod
					1300	Drilling stopped. It was noticed that additional [illegible] from joint of 4½ drill rod ~30' up.
	25'	H	W	SILTY GRAVELLY SAND. 25% gravel, 60% sand, 15% silt. Gravel is 5% C, 8% M, 12% F. Sand is 30% VCS, 30% MS, 20% FS, 12% VFS. Sands are poorly sorted. Gravels are 80% basalt, 20% granitics. Sands are 80% basalt, 15% qtz., 5% other. Gravels are SR-A. Sands are R-SA. Wet color is 5Y 4/1 (gray). Dry color is 5Y 6/2 (light olive gray). Moderate rxn. with HCl. No consolidation. Smaller and less gravels, more sand and finer than previous sample.	1310	Sample taken from the bottom of the hole.
					1345	Drilling resumed after [illegible] of rods.
					1415	Drilling stopped. Additional 10' of 16" casing welded onto previous 20'6¼" 16" casing.
30'6¼" to 16" casing	25'					

REMARKS:

Richard Breniman

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

A 6000 021 (5/85)

4-A.1725

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. Peterman	CME 75	217-134 S	N/A	[illegible]
Date	6610 Ford	Depth 25 To 32'		Subcontract No. N/A
6/30/87				

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40'6¾" of 10" casing						
					1650	Drilling resumed after setting 40' of 10" casing and [illegible]
	30'	H	W	SLIGHTLY GRAVELLY SILTY SAND. 5% gravel, 70% sand, 25% silt. Silt & Gravel is 1% CP, 3% MP, 1% FP. Sand is 5% VCS, 50% MS, 15% FS. Sample is well sorted. Gravel are 85% basalt, 25% volcanophics, 5% quartzites, 5% other. Sands are 80% ugtz, 2% basalt, 10% other. Gravels are SA. Sands are R-SA. Dry color is 5Y 6/2 (light olive gray). Wet color is 5Y 4/2 (olive). Moderate-Strong rkn to HCl. No carbonate. Sample has more sand and finer sands with less gravels than previous sample.	1705	Can't take from here to 30'.
					1730	Drilling stopped for the day. Depth is 32'

REMARKS:

Richard Peterman

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

A-6000-021 (5-85)

4-A.1726

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Prentice	CME 55	299-E34-5	N/A	KI-CS-1
Date: 7/1/87	#2 68K-19150	Depth: 32' 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
40' 6¼ 16" Casing	of					Dr. RC + Lenny Condon
					0745	Drilling started. 5 gallons H_2O added to move from dust bailer.
	34-35'	H	W	SILTY SAND. 2% Gravel, 73% Sand, 25% Silt. Gravel is 15% MP, 1% FP. Sand is 5% CS, 58% MS, 10% FS. Sample is very well sorted. Gravel composition is 70% basalt, 20% granites, 10% metamorphics, and composition is 60% ry 17, 30% basalt, 10% other. Gravels are SR-A. Sands are R-SA. Wet color is 2.5Y 4/2 (olive). Dry color is 5Y 7/2 (light gray). Moderate strong rxn to HCl. No consolidation. Sample has more + finer sands than last sample. Less gravels.	0825	
					0910	5 gallons of H_2O added. Drilling rate has increased due to penetration of sand zone.
	39-40'	H	W	SILTY GRAVELLY SAND. 25% Gravel, 60% Sand, 15% Silt. Gravel is 5% CP, 5% MP, 15% FP. Sand is 15% CS, 20% MS, 25% FS. Sample is medium to	0920	Sample from dust bailer. While bailing ~10-20 gallons of sediment from the hammer fell down the outside of the casing.

REMARKS:

Richard Prentice

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

A 6000-021 (5-85)

4-A.1727

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
DL PRENTICE	CME 55	[illegible] 184 S	N/A	[illegible] 115-6
Date 7/1/87	68K-19.50	Depth 40' 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
40' 6¼" of 16" casing						
				Well sorted. Gravel composition is 80% basalt, 35% metamorphics, 15% granitics. Sand composition is 70% qtz, 20% basalt, 10% other. Gravels are SR-SA. Sands are R-SR, sort is W is 5Y4/2 (olive) Dry color is 5Y7/2 (light gray). Strong rxn to HCl. No consolidation. More gravels in this sample than previous sample.		
10' 6¼" of 16" casing					0925	Drilling stopped. Additional 10' of 16" casing welded on to previous 40' 6¼" 16" casing. The top of the 40' 6¼" 16" casing was hand beveled. The bottom of the 10' section had been factory beveled.
					1137	Drilling resumed after welding of 10' 16" casing. Wood platform added around casing.
					1247	10 gallons H_2O added.
				Drilling rate has slowed. Samples from the bentonite appear to have more gravel in them.	1310	15 gallons H_2O added.

REMARKS:

Richard Brennan

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

A-6000 021 (5-85)

4-A.1728

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. IRIZARRY	CME 750 #2	399 134-S	N/A	KE-[illegible]-015-1
Date: 7/1/87	68K-19150	Depth: 40' 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
50' 6" of 16" Casing						
	44-45'	H	W	SILTY SANDY GRAVEL, 50% Gravel,	1355	sample from dart bailer
				42% Sand, 8% silt. Gravel is 18% CP, 7% MP,		
				20% FP, 5% VFP. Sand is 15% CS, 20% MS, 7% FS.		
				Sample is Poorly Sorted. Gravel composition is 70%		
				basalt, 20% qtz-rich metamorphics, 10% granitics.		
				Sand composition is 65% qtz, 30% basalt, 5% other.		
				Gravels are R-sr. Sands are R-sr Wet color		
				is 5Y4/2 (olive). Dry color is 5Y 7/1 (light gray)		
				Moderate rxn to HCl. No consolidation. Greater		
				gravel content and larger size of gravels than previous		
				sample. Wet much silt. Minor discoloration of dry fines from HCl.		
					1512	1 sack of Benton-Fe with 4 gal. of H2O added on top.
	49-50'	H	W	SANDY GRAVEL. 75% Gravel, 23% Sand, 2% silt.	1545	Sample from dart bailer
				Gravel is 5% VCP, 30% CP, 15% MP, 25% IP.		
				Sand is 8% VCS, 5% CS, 15% FS. Sample is		
				poorly sorted. Gravel composition is 45% basalt,		
				35% metamorphics (qtz rich), 10% granitics.		

REMARKS:

Richard Irizarry

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

A-6000 021 (5 85)

4-A.1729

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	CABLE TOOL #2	299-E34-5	N/A	K-11-1915-1
Date: 7/1/87	68K-1915C	Depth: 50' 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
50' 6" of 16" casing.						
				Sand composition is 50% basalt, 40% gabbro, 10% other. Grains are R-SR. Sands are R-SR. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (light gray). Moderate reaction to HCl. No consolidation. Sample has a greater percentage of gravel and the gravel is larger than the previous sample. Slight color change (graying) than previous sample. Green stain/discoloration & dry fines from HCl.		
60' 6" of 16" casing.					1345	Drilling stopped. Additional 10' of 16" casing welded to previous 50' 6" of 16" casing. Top of 50' 6" 16" casing was hand beveled. Bottom of 10' 16" casing was factory beveled.
					1741	All activity on site has ceased for the day. Total depth is 50'.

REMARKS:

Richard Premzic 7/1/87

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)

4-A.1730

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PARMZIE	CME 750 4x4	299134 S	N/A	KAF 715-1
Date 7/2/87		Depth 50' To 5'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
6.0' 6¼" HF 16" Casing						Driller: London Gordon.
					0735	Drilling started. Weather is overcast with a slight chance of rain. Ground is moist from rain last night.
					0900	10 gallons H2O added.
					1017	10 gallons H2O added.
					1237	5 gallons H2O added.
	54.55'	H	W	SILTY SANDY GRAVEL, 72% gravel, 24% sand, 4% silt. Gravels are 3% SC, 5% L, 25% EC, 2% NF, 5% SR. Sands are 2% SC, 8% L, 9% E, 3% NF. Sample is poorly sorted. Induration is 70% hard, 2% moderately hard, 5% crumbly. Sand composition is 50% basalt, 45% qtz, 5% lithics. Gravels are 60% basalt, 40% qtz. Sands are 85% basalt, 15% qtz. Dry color is brown (10YR 4/3) to dark yellowish brown (10YR 4/2). Carbonate coats 10% of gravels and 20% of sands. Sample is poorly sorted. The size of the gravels is larger than the sands.	1035	Sample from drive bottom.
						5'

REMARKS:

Richard Parmzie

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

A-6000-021 (5-85)

4-A.1731

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P.L. CREAMER			N/A	
Date		Depth		Subcontract No.
7-2-87		0' To 60'		

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
11' 7/8" of 11" casing						
	59.60'	H	DRY	SILTY SANDY GRAVEL - 60% gravel, 35% sand, 5% silt. Gravel ave 18% QC, 20% MP, 22% LS, 40% SS. Sand is 10% VCS, 7% CS, 7% MS, 11% FS, 65% subangular medium sorted, fine grained quartz 65% subrounded 20% subangular 15% frosted, 100% clear Sands subangular, 55% clear, gravels are R-SH, Sands are 35% pink feldspar (K-spar). Unable to obtain dry cuttings due to wet ground conditions. No reaction with HCl. Sample has increased finer sands with smaller and less gravels than previous sample.	1155	Drilling lowered to place 12" casing.
						12" casing with drive shoe, 21'7" of 12" added.
					1330	21'½" of 12" added.
					1415	21'½" of 12" added
74'9 3/8" of 12" casing.					1525	11' 3/8" of 12" added Total of 12" casing added 74'9 3/8"
					1555	Drilling activity stopped for the day.

REMARKS:

Richard Creamer 7/2/87

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 6000 021 (5 85)

4-A.1732

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. Teel	CME 700 4x2	299-534-5	N/A	[illegible]
Date: 7-6-87	68K-19150	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
74' 9 5/8" of 12" casing					0520	Driller arrived on site
					-	finishing welding on
						casing set on 7/2
				Driller is Kinden Cordon	0555	Begin drilling
					0620	Stopped drilling
						- building up bit
					1440	Started drilling
	64-65	H	Wet	GRAVEL Trace CP, 10% MP, 50% FP, 25% VFP,	0750	Stopped drilling
				1% VCS, 8% CS, 2% MS, 3% FS, 1% VFS,		
				5% silt and clay. Poorly sorted. (Gravel) - 80%		
				basalt, 15% qtz, 5% other. (sand) - 85%	0816	Started drilling
				basalt, 10% qtz, 5% met. and other minerals.		
				Gravels appear to be rounded; sands are gen. sub-angular		Drill rate ≈ 2.5 ft/hr
				to rounded w/ some rounded grains. Wet color: 5Y 4/1		
				(dark gray). Dry color: 5Y 7/1 to 5Y 6/1 (lt. grey to gray)		
				No reaction to 10% HCL, Unconsolidated. More	0900	Stopped drilling -
				gravel / less sand than previous sample.		- building up bit

REMARKS:

Steve Teel
7-6-87

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)

4-A.1733

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
S. Teel, T. J. Gilmore	Cable Tool #2	299-E31-5	NA	KEH-1915-1
Date: 7-6-87	68K-19150	Depth: 65' To 70		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
74'9 3/8" of 12"					0955	Started drilling
						Bit has been periodically
						jamming-up inside casing
						all morning.
					1025	Stopped drilling -
						building-up bit
					1045	Began drilling
					1105	Added 5 gal water
						Total water today =
				75 15 10		35 gal.
	69-70	H	Wet	SILTY SANDY GRAVEL, Trace coarse pebble, 50% MP,	1110	
				15% FP, 10% VFP, 1% VCS, 4% CS, 8% MS, 2% FS	1115	T. Gilmore begins
				10% VFS, silt, and clay. Very poorly sorted. (Gravels)		logging
				85% basalt and mafic-rich; 15% qtz and qtz-rich.		
				(sands) 80% Basalts and 20% silica-rich; Subangular to		
				Subrounded; Wet color, 2.5Y 4/2 (dk gy brn) Dry color,		
				2.5Y 6/2 (lt brn gy); slight to no reaction to HCl;		
				Poor consolidation.		

REMARKS:

T. Gilmore

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

A-6000-021 (5-85)

4-A.1734

DRILL LOG	By T Gilmore	Rig cable tool #3	Well Number 299-E34-5	Computer Number NA	Project or Work Order No. KH 1715-1
	Date 5/6/87	68k - 19150	Depth 70' To 80'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
84 85'7½	of 12"	casing tool			1315	Welding casing
						9' 11¾ of 12" used
						~15gal H_2O added (Monitor well)
	75'	H	Wet	GRAVEL; 85% Gravel, 12% Sand, 3% Silt; Tr Cobble, 30% Mp Vole, 30% Fp Vole, 20% VF pebble, Tr VCS, 5% CS, 5% MS, 2% F-VF Sand, Tr Silt; Subr - well rounded, Gravels contain 70% Basalt, 30% Silica-rich; Sands contain 85% Basalts, 15% Silica-rich grains, Moderately well sorted; Wet color 2.5Y 4½/1 (dk gybrn) Dry 2.5Y 5/3 (lt brngy) Slight to no rxn in HCl; Slight cementation; Sample contains more gravels and is better sorted than previous sample	1420	
	80'	H	Wet	GRAVEL: 80% Gravel, 18% Sand, 2% Silt; 10% Mp 40% Fp, 30% VFp, 3% VCS, 5% CS, 5% MS, 5% F-VF S, 2% Slt Moderately-well sorted Gravels contain 75% Basalts, 25% Silica-rich grains; Sands contain 75% Basalts and 25% Silica-rich grs; Subrounded to Subangular; Wet color 2.5Y 4½/1 (dk gybrn)	1520	

REMARKS:

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

A-6000-021 (5-86)

4-A.1735

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
TG Lucero	CME 55 #1	299-E34-5	1111	[illegible] 1715-1
Date	Depth			Subcontract No.
7/6/87	68ft 1950	53' To 80'		[illegible]

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
44' 9 5/8" OD				80' cont. Dry color 5 Y 5/2 (lt brn gy); Slight to No rxn in HCl, Slight consolidation; Sample is overall slightly finer grained than previous		
42" casing					1625	Lft'g casing

REMARKS:

- TGLucero

D - Drive Barrel 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)

4-A.1736

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PRENTICE	CAMEL TOOL # 2	299 E34-5	N/A	111 0115-1
Date: 7/7/87	68K 19150	Depth: 50' To 90'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
94'9 5/8" of 12" casing						Driller is Linden Corden.
					0530	10'2 1/4" of 12" casing welded to top of previous 84'9 5/8" of 12" casing. Total 12" casing is 94'11 3/8"
94'11 3/8" of 12" casing						
					0600	Drilling started.
	84-85'	H	W	SANDY GRAVEL. 78% Gravel, 22% Sand, [illegible] Silt. Gravels are 2% SC, 15% CP, 50% MM, 25% FP, 16% VFP. Sand are 5% VCS, 7% CS, 8% MS, 32% FS. Sample is Poorly - very poorly sorted. Gravel composition is 69% basalt, 31% silica-rich metamorphics. Sand composition is 55% basalt, 45% qtz. Gravels are WR-SA. Sand are R-SA. Wet color is 5Y4/1 (dkyg). Dry color is 5Y7/1 (light gray). Very slight rxn to HCl. No consolidation. Sample is very similar to previous sample.	0630	Sample from dust bailer
					0735	5 gallons H_2O added
					0747	5 gallons H_2O added
					0800	5 gallons H_2O added
	89'90'	H	W	GRAVEL. 83% Gravel, 17% Sand. Gravels are	0830	Sample from dust bailer

REMARKS:

Richard Prentice

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

A-6000 021 (5-85)

4-A.1737

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMITT	CABLE TOOL # 2	299-E34-5	N/A	KEH-1915-1
Date: 7/7/87	618-1950	Depth: 90' To 95'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
94'11 7/8" of 12" casing.						
				5% VCP, 30% CP, 40% MP, 8% FP. Sands are 8% VCS, 5% CS, 3% MS, 1% FS. Sample is moderately sorted. Gravel composition is 55% basalt 35% granitic metamorphics, 10% quartzites. Sand composition is 60% basalt, 40% felsic. Gravels are SR-A. Sands are SR-SA. Wet color is 5Y4/1 (dk gray). Dry color is 5Y7/1 (lt gray). Very slight rxn to HCl. No consolidation. Sample has more gravel and is more angular than previous sample.		
100'2 3/8" of 12" casing.					0925	Drilling stopped. 10'7" of 12" casing welded to the top of the previous 94'11 7/8" of 12" casing. Total of 94'11 7/8" 12" casing was installed.
					1040	Drilling resumed.
					1105	5 gallons H_2O added.
	94-95'	H	W	SANDY GRAVEL, 70% gravels, 28% sands, 2% silt. Gravels are 5% CP, 40% MP, 15% FP, 10% VFP. Sands are 7% VCS, 8% CS, 10% MS, 3% FS. Sample	1127	Sample from dart bailer.

REMARKS:

Richard Premitt

D - Drive Barrel 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)

4-A.1738

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. I. Reimzic	Kaell 100L #2	299-E34-5	N/A	15-A-51
Date: 7/7/87	48K-19150	Depth: 95 To 103'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
102' of 12" casing						
				is poorly sorted. Gravel composition is 65% basalt, 20% qtz. rich metamorphics, 15% granitics. Sand composition is 55% basalt, 45% qtz. Gravels are SR-SA. Sands are SR SA. Wet color is 5Y4/1 (dk gray). Dry color is 5Y7/1 (lt. gray). Very slight rxn to HCl, no consolidation. Slightly more sand/less gravel than previous sample.		
					1145	5 gallons H_2O added.
					1230	10 gallons H_2O added
	102-103'	H	W	SILTY SANDY GRAVEL. 55% Gravel, 40% sand,	1317	sample from dart bailer.
				5% silt. Gravel is 5% CP, 15% MP, 20% FP,		A sample was bailed at 100' but there was not enough cuttings to fill the sample jars.
				10% VFP. Sand is 15% VCS, 10% CS, 8% MS, 7% FS.		
				Sample is Poorly sorted. Gravel composition is 60%		
				basalt, 20% qtz-rich metamorphics, 20% granitics.		
				Sand composition is 65% basalt, 35% qtz. Gravels		
				are SR-A. Sands are SR-SA. Wet color is 5Y4/1		
				(dk grey). Dry color is 5Y7/1 (lt. gray). No rxn to		

REMARKS:

Richard Reimzie

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

A-6000-021 (5-85)

4-A.1739

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Preimesberger	CABLE TOOL #2	29 E 34-5	N/A	KL-1915-L
Date: 7/7/87	68k-1950	Depth: 103 To 104'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
105'2¾" of 12" casing.						
				HCl. No consolidation. More sand less gravel with gravel grains smaller than previous sample. The dart bailer only had a small amount of cuttings in it.		
116'5⅜" of 12" casing					1320	Drilling stopped. 10'10½" of 12" casing welded to the top of the previous 105'2¾" of 12" casing. Top of 105'2¾" 12" casing was hard beveled.
					1415	Drilling resumed. 5 gallons H2O added
					1441	5 gallons HCl added
					1443	Drilling stopped
	104-105'	H	W	SANDY GRAVEL. 55% Gravel, 43% Sand, 2% silt. Gravels are 5% LP, 20% LM, 25% FP, 5% VFP. Sands are 18% VCS, 12% CS, 8% MS, 5% FS. Sample is poorly sorted. Gravel composition is 65% basalt, 20% qtz-rich metamorphics, 15% granitics. Sand composition is 60% basalt, 40% qtz. Gravels are SR-A. Sands are SR-SA. Wet color is 5Y4/1 (dk gray).	1520	Drilling Resumed Sample from dart bailer

REMARKS:

Richard Preimesberger

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

A-6000 021 (5-85)

4-A.1740

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMATIC	CABLE TOOL Rig	C99-E34-5	N/A	RFH-1915-1
Date 7/7/87	CBK-19150	Depth 105' To 107'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
116'5" of 12" casing.						
				Dry color is 5Y7/1 (lt gray). No ice to melt.		
				No consolidation. Sample is very similar to prev. 041		
				sample. Less silt.		
					1600/1630	Drilling stopped/resumed
					1645	Drilling stopped for the day

REMARKS:

Richard Premazzi 7/7/87

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 (5-85)

4-A.1741

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	CME 75 #2	299-E34-5	N/A	KH-1915-1
Date: 7/8/87	68K-1915 D	Depth: 107' To 110'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
116' 5/8" of 12" casing						Drilling is Loden Cordero.
					0508	Drilling started.
	109-110'	H	W	SILTY SANDY GRAVEL. 55% gravel, 30% sand, 15% silt. Gravels are 5% CP, 30% MP, 15% FP, 5% VFP. Sands are 3% VCS, 10% CS, 15% MS, 2% FS. Sample is poorly sorted. Gravel composition is 70% basalt, 25% qtz.-rich metamorphics, 5% granitoids. Sand composition is 65% basalt, 35% qtz. Gravels are SR-SA. Sands are SR-SA. Wet color is 5Y4/1 (dk gray). Dry color is 5Y7/1 (lt. gray). Very slight rxn. to 10% HCl. No consolidation. Sample has more silt, fine sands and coarser gravels than previous sample.	0535	Sample from dual baler.
115' 11 7/8" of 12" casing					0645	Drilling stopped. The top 1" of the 116' 5/8" 12" casing was cut off due to gouges in the top of the casing from the drive head. Total 12" casing is now 115' 11 7/8".
126' 5 7/8" of 12" casing.					0700	10' 6" of 12" casing welded to the top of the previous 115' 11 7/8" of 12" casing. The top

REMARKS

Richard Premzic

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

A-6000-021 (5-85)

4-A-1742

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Bramlette	CABLE TOOL #2	C99 1 33-5	N/A	[illegible]
Date: 7/8/87	681-19.50	Depth: 110 To 130'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
116' 5 5/8" of 12" casing.						of the 115'6 5/8" 12" casing was hand bailed, so the 12" casing is now 116'5 5/8"
					0755	Drilling resumed.
	114-115	H	W	SILTY SANDY GRAVEL. 50% gravel, 30% sand, 20% silt. Gravels are 15% CP, 35% MP, 10% FP. Sands are 5% VCS, 15% CS, 7% MS, 3% FS. Sample is moderately-poorly sorted. Gravel composition is 65% basalt, 20% qtz-rich metamorphics, 15% granitics. Sand composition is 65% basalt, 35% qtz. Gravels are SR-SA, sands are SR-R. Wet color is 5Y4/2, (dk. gy-dy). Dry color is 5Y7/1 (lt gray). Very slight rxn to 10% HCl. No consolidation. Very similar to previous sample, more silt.	0850	Sample from dart bailer.
					0930	5 gallons H_2O added.
					1000	5 gallons H_2O added.
	119-120'	H	W	SILTY SANDY GRAVEL. 65% Gravel, 25% Sand, 10% silt. Gravels are 15% CP, 30% MP, 17% FP, 3% VFP. Sands are 8% VCS, 6% CS, 6% MS, 5% VFS. Sample	1012	Sample from dart bailer.

REMARKS:

Richard Bramlette

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 6000 021 (5 86)

4-A.1743

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
C. J. O'Ferrall	GABLE #2	299134-5	VH	
Date: 7/8/91	(BK-1930)	Depth: 120 To: 1		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
126'5⅝" of 12" casing						
				is moderately-poorly sorted. Gravel composition is		
				70% basalt, 25% qtz-rich metamorphics, 5% granitics.		
				Sand composition is 30% basalt, 70% light, granitic		
				are SR-SA. Sands are SR-SA. Wet color is 5Y4/2		
				(dk gray). Dry color is 5Y7/1 (lt. gray). No rxn to		
				10% HCl. No consolidation. Very similar to previous sample.		
				Less silt/larger gravels.		
136'6⅜" of 12" casing					1055	Drilling stopped. 10¼" of 12" casing welded to top of the previous 126'5⅝" 12" casing. Top of the 126'5⅝" 12" casing was hand beveled. Total 12" casing is 136'6⅜".
					1145	Drilling resumed.
	124-125	H	W	SILTY SANDY GRAVEL. 75% Gravel, 20% Sand	1205	Sample from dark bulk.
				5% silt. Gravel is 15% CP, 30% MP, 20% FP,		
				5% VFP. Sand is 8% VCS, 5% CS, 4% MS, 3% FS.		
				Sample is poorly sorted. Gravel composition is 80% basalt,		
				10% qtz-rich metamorphics, 10% granitics. Sand composition		

REMARKS:

Richard Brennan

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

A-6000-021 (5-85)

4-A.1744

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. PRENTICE	CABLE TOOL #2	C-99-E 34-5	N.P.	[illegible]
Date	68K-19150	Depth 125' To 130'		Subcontract No.
7-18-85				[illegible]

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
136' 6 3/8" of 12" casing						
				is 65% basalt, 35% qtz. Grains are SR-SA. Sands are SR-SA. Wet color is 5Y4/1 (dk. gray). Dry color is 5Y7/1 (lt. gray. very slight con. to 10% HCl. No consolidation. Sample has larger and more gravels than previous sample.		
	129-130'	H	W	SILTY SANDY GRAVEL. 55% Gravel, 40% sand, 5% silt. Grains are 7% CS, 15% MG, 25% FG, 8% VFG. Sands are 15% VCS, 10% CS, 10% MS, 5% VFS. Gravel composition is 70% basalt, 20% qtz-rich metamorphics, 10% granitics. Sand is 60% basalt, 40% qtz. Gravels are SR-SA. Sands are SR-A. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray). Slight moderate rxn. to 10% HCl. No consolidation. Sample has more sands but otherwise very similar to previous sample.	1350	Sample from chert bailer
147' 3/8" of 12" casing					1555	Ran 19.5' [illegible] ed. 10.6' of 12" casing welded to the top of the previous 136' 6 3/8" 12" casing. Top of the 172' 3/8" 12" casing was hand beveled.

REMARKS:

Richard Prentice

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

A-6000-021 (5-85)

4-A.1745

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Bramlett	CABLE TOOL #2	24-E-34-5	N/A	REM-915
Date: 7/8/87	6&K-10,50	Depth: 120' To 135'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
14" 7/8 12' ea	0' ng.					Ran 2 casings to 147 7/8'.
					1455	Drilling resumed.
					1505	5 gallons H_2O added
	134-135	H	W	SANDY GRAVEL. 57% gravel, 40% sand, 3% S.H.	1517	sample taken last hole
				Gravels are 5% CP, 15% MP, 25% FP, 12% VFP.		
				Sands are 20% VCS, 10% CS, 5% MS, 5% FS		
				Sample is moderately-poorly sorted. Gravel composition is		
				70% basalt, 15% quartz-qtz metamorphics, 15% granitics.		
				Sand composition: 65% basalt, 35% qtz. Gravels are		
				SR-SA. Sands are SR-SA. Wet color is 5Y4/2 (olive gray).		
				Dry color is 5Y7/1 (lt. gray). Moderate rxn to 10% HCl.		
				No consolidation. Very similar to previous sample.		
					1520	5 gallons H_2O added
					1547	Drilling stopped. Tightened Clutch
					1605	Drilling started
					1610	5 gallons H_2O added.
					1618	5 gallons H_2O added.

REMARKS:

Richard Bramlett

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

A-6000-021 (5-85)

4-A.1746

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	CABLE TOOL #2	299-E34-5	N/A	RH-1915-1
Date 7/8/87	65K-1950	Depth 135 To 141'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
147' 7/8" of 12" casing						
	139-140'	H	W	SANDY GRAVEL. 65% gravel, 33% Sand, 2% silt. Gravels are 5% CP, 30% IM, 20% EP, 10% VAP. Sands are 8% VCS, 12% CS, 10% MS, 3% FS. Gravel composition is 65% basalt, 30% qtz-rich metamorphics, 5% granitics. Sand composition is 60% basalt, 40% qtz. Gravel is generally SA. Sand is SR-SA, wet color is 5Y4/2 (olive gray), Dry color is 5Y7/1 (lt. gray) moderate rxn to 10% HCl. No consolidation. More gravels than previous sample.	1630	Sample from dust bailer
					1650	Drilling stopped for the day. Ending footage is 141'.

REMARKS:

Richard Premzic 7/8/87

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)

4-A.1747

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Bremzic	CABLE TOOL #2	299-C34-5	N/A	KE4-195-1
Date 7/19/82	65°-195°	Depth 141' To 145'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
147'8" of 12¾" casing						Driller is Louis Watkins
					0530	Drilling started
					0625/0635	Drilling stopped / Reamed
	144-145'	H	W	SANDY GRAVEL. 50% gravel, 45% sand, 5% silt.	0720	Sample from discharge line
				Gravels are 1% SC, 1% VCR, 3% CR, 10% AR, 15% FR, 20% VFR. Sands are 10% VCS, 12% CS, 20% MS, 3% FS. Sample is poorly sorted.		
				Gravel composition is 55% basalt, 25% granitic		
				melamorphics, 20% granitics. Sand composition is 50% basalt		
				50% qtz. Gravels are SR to R. Sands are SR to SA.		
				Wet color of sample is 5Y 4/2 (olive gray). Dry color is		
				2.5Y 7/2 (lt gray). Moderate rxn to 10% HCl. No consolidation.		
				Sample more sandy & less gravelly with some cobbles than		
				previous sample. Percentage of basalt in sample is less.		
					0730	Drilling stopped. Switching from 12" casing to 8" casing.
					0840	Driller stated water was standing over the top of the bailer when he bailed before drilling this morning.

REMARKS

Richard Bremzic

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

A-6000-021 (5-85)

4-A.1748

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. EMZIC	CABLE TOOL #7	299-E34-5	N/A	LF-1915-1
Date: 7/9/87	68K-19150	Depth: 145 To 145'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
147 7/8" of 12" casing					0840	After bringing drilling equipment about water in the hole, it was determined that ~2½ gallons of water was removed from the well during pumping while water has come from, will bail again after placement of 8" casing.
21'1" of 8" casing					0930	Bottom casing with drive shoe, 21'1" of 8" added
42' of 8" casing					0945	20'11" of 8' added
62'9" of 8" casing					1000	20'4" of 8' added
83'10" of 8" casing					1055	21'1" of 8" added.
104'9¾" of 8" casing					1220	20'11¾" of 8" added
126'1¼" of 8" casing					1310	21'4" of 8" added.
147'3¼" of 8"					1350	20'11" of 8" added
					1412	Completed welding - soldering new mandrel on rope socket & making up tools to resume drilling
				D/W meas @ 145.5' w/ E-TAPE from top of 8" (Sec. 11044)	1428	
				~2.5' of stick-up of 8" casing (D/B = 145', so have ~2' of water in bore). This must be water added to bore by driller & not perched water.		

REMARKS:

Richard Brenzic

D - Drive Barrel H - 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)

4-A.1749

DRILL LOG	By R.A. Hagen	Rig Calla Tool #2 (68k-19150)	Well Number 299-E34-5	Computer Number NA	Project or Work Order No. HEll-1915-1
	Date 7/9/87		Depth 145' To 150'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
147' 3/4" of 8"					1550	Added 10' 3" of
157' 3/4" of 8" casing						8" casing
					1653	Resumed drilling
					1702	Stopped drilling
					1724	Resumed drilling
					1754/1756	Stopped/resumed drilling
	149-150'	H	W	SLIGHTLY SILTY GRAVELLY SAND. 25% gravel, 65%	1822	stopped drilling
				sand, 10% silt. Sample is 1% VCP, 1% CP, 3% MP,	1834	Resumed drilling
				15% FP, 5% VFP, 10% VCS, 40% CS, 10% MS, 5%		(150' sample taken from
				FS. Sample is poorly sorted. Gravel is composed of		bottom of sand pump)
				60% basalt, 30% metamorphics, 10% rock frags. Sand		
				is 40% basalt, 50% qtz, 10% other rock frags. Gravel		
				clasts are rounded to subangular - sand grains are		
				angular to subrounded. Wet color is 5Y 4/2 (olive gray)		
				dry color is 5Y 7/1 (light gray). Slight HCl rxn on		
				dried fines. Material shows no consolidation. Sharp		
				increase in sand content compared to previous sample.		
					1847/1855	Stopped/resumed drilling

REMARKS:

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

A-6000-021 (5-85)

4-A.1750

DRILL LOG	By R A HAGEN	Rig CME Tool #12 (68K-7150)	Well Number 299-E34-5	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 7/9/87		Depth 150' To 155'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
157'3 3/4" of 8"						
	154-155	H	W	SILTY SANDY GRAVEL. 45% gravel, 45% sand, 10% silt. Sample is 1% CP, 4% MP, 25% FP, 15% VFP, 5% UCS, 20% CS, 10% MS, 10% F-UFS. Sample is poorly sorted. Gravel is composed of 65% basalt, 30% metamorphics, 5% granitics. Sand is composed of 40% basalt, 50% qtz, 10% other. Gravel clasts are rounded to subangular; sand grains are angular to subrounded. Wet color is 5Y 4/2 (olive gray); dry color not determined because of rainy weather - same reason for not determining HCl rxn. No consolidation. Less sand than previous sample, otherwise very similar.	2020	
167'7 3/4" of 8" casing					2025	Stopped drilling - added 10'4" of 8" casing.
				RJ A Hg 7/9/87	2100	End of workday

REMARKS:

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

A 6000-021 (5-85)

4-A.1751

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
[illegible]	[illegible]	[illegible]		[illegible]
Date: 7/10/[illegible]		Depth: [illegible] To 165		Subcontract No. N A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
6 1/2"	0 ft & [illegible]			Driller [illegible] Water [illegible]	0920	Clear [illegible]
						Water level 7.28'
					0935	Start H2O also
					0945	Drilling started.
					0950	Water flow 30 Mud
					1000	Start to [illegible]
	69-110		W	SANDY GRAVEL. 30% gravel, 65% sand, 5% [illegible]	0710	Sample from [illegible]
				gravels are 2" [illegible] SR, SUBRD, 20% VFP. Sands are		
				35% VCS, [illegible] SR, SUBRD, SPHS. Sample is moderately		
				well sorted. Gravel composition is [illegible]		
				[illegible] Sand composition is		
				50% basalt, 50% [illegible] Sample is		
				Sample was SD GY [illegible] 5Y4/2 (olive gray). Dry color		
				is 5Y7/2 (lt gray) Slight reaction to 10% HCl, no consolidation.		
				Sample is much more sandy/better sorted/smaller gravels		
				than previous sample.		
					0720	Getting H2O added
	110-165	11		SANDY GRAVEL, 55% gravel [illegible]	0805	Sample [illegible]

REMARKS:

Richard Brennan

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

A-6000-021 (5-85)

4-A.1752

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
[illegible] Ramirez	[illegible]	[illegible]		
Date	Depth	To 170'		Subcontract No.
[illegible]	[illegible]			

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
[illegible]	4 of 8" casing					
				[illegible] SAND, [illegible]		
				are 0% VCS, 10% CS, 15% MS, 35% FS, Sample is		
				moderately sorted, mineral composition is 20% basalt,		
				20% qtz, [illegible] is 60% [illegible] & light [illegible]		
				SA-A. Sand [illegible] wet color is 5YR 4/2 (dk grayish		
				Dry color is 5Y 7/2 (Light gray) Slightly cemented 0% HCL No		
				reaction. Sample is very similar to previous sample.		
178' 1¼" of 8" casing.					807	Pull [illegible] 10's of 8"
						casing. Stick up is the top of 5" casing. Top of
						167' 7¾" of 5" casing. Top of
						167' 7¾" of casing was found
						below. Total 8" casing is
						now 178' 1¼".
					0905	Tools are removed.
						Driller has added come-along
						to help casing advance.
	169'170'	H	W	SLIGHTLY SILTY [illegible] SAND, 20% gravel, 60% sand	1040	Completion depth is
				15% silt, 6 is [illegible] 2½", 19% VFS. Sample is		
				25% VCS, 15% CS, 15% MS, 7% FS, 3% VFS.		

REMARKS:

Richard Ramirez

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

A-6000-021 (5-85)

4-A.1753

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	CABLE TOOL F2	C90-E34-5		
Date 7/10/87	Est. 1150	Depth 170' To 175'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
178' 11"	of 8" casing					
				Sample is poorly sorted. Gravel composition is		
				65% basalt, 20% qtz, 5% metamorphics, 10%		
				granitics. Sand composition is 20% basalt, 45% qtz.		
				Gravels are SA. Sands are SR SA. Wet color is		
				5YR 6/2 (pale grey). Dry color is 5Y 7/1 (lt. grey). Moderate rxn to		
				10% HCl. No consolidation. Sample has more silt/fine sands		
				than previous sample.		
					1125/1145	20' of 8" casing/casing shoe
						Hacked down clamps.
	174/175'	II	W	SILTY SANDY GRAVEL. 35% gravel, 50% sand, 15%	1210	Sample from topsoil bailer.
				silt. Gravels are 3% MS, 6% CS, 12% VCP. Sands		
				are 17% VCS, 10% CS, 5% MS, 15% FS. Sample		
				is poorly sorted. Gravel composition is		
				25% basalt, 60% qtz, 5% metamorphics, 10% granitics.		
				Sand composition is 20% basalt, 45% qtz. Gravels		
				are SR SA. Sands are SR SA. Wet color is 5YR		
				6/1 (lt. grey). Dry color is 5YR 7/1 (lt. grey). Moderate rxn to 10% HCl.		

REMARKS:

Richard Premzic

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

A 6000.021 (5.85)

4-A.1754

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
E. L. PRUNZIC	CABLE TOOL #2	299-E34-5	N/A	[illegible]-1915-1
Date: 7/10/87	68K-19150	Depth: 175' To 175'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
175' 1/4" of 8" casing						
				No [illegible] [illegible] to previous sample,		
				core silt.		
188' 7 1/4" of 8" casing					1210	Drilling stopped at 188' 7 1/4" [illegible] 8" casing [illegible] of the previous 175' 1/4" of 8" casing [illegible] 13' 6" 8" casing was cut and beveled. Total 8" casing is 188' 7 1/4".
					1335	Drilling resumed

Richard Prunzic 7/10/87

REMARKS:

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

A-6000-021 (5-85)

4-A.1755

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
RA HAGEN	Gille Tool #2	299-E24-5	NA	HEH-1915-1
Date: 7/1/87	GSK-M150	Depth: 175' To 185'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
188'7½" of 8" casing				Driller is Linden Corzine		
	179-180	H	W	SILTY SAND & GRAVEL. 40% gravel, 50% sand, 10% silt. Sample is 5% MP, 25% FP, 10% VFP, 10% VCS, 25% CS, 10% MS, 5% FS. Sample is poorly sorted. Gravel is composed of 70% basalt, 15% meta, 15% granitics; sand is 35% basalt, 55% qtz, 10% other. Gravel clasts are subrounded to subangular; sand grains are angular to subrounded. Wet color is 5Y 4/1 (olive gray); dry color is 5Y 7/1 (light gray). Moderate HCl rxn on dried fines. Unconsolidated. Little change from previous sample.	1355	Sampled w/ dart bailer
	184-185	H	W	SILTY SANDY GRAVEL. 55% gravel, 40% sand, 5% silt. Sample is 1% CP, 5% MP, 34% FP, 15% VFP, 10% VCS, 20% CS, 10% MS, trace of FS+VFS. Sample is moderately sorted. Gravel is 60% basalt, 25% meta., 15% granitics. Sand is 40% basalt, 50% qtz, 10% FP. Gravel is R-SA; sand is A-SR. Wet color is 5Y 4/1 (olive gray) dry color is 5Y 7/1 (light gray). Mod. HCl rxn. Unconsolidated. Very	1458	Driller noted that casing is not "falling" into bore starting @ ~184' - either coarser material or maybe more consolidated. Drill rate will decrease now, at least because of the use of drive clamps.

REMARKS

N.A (Chemistry Blanks)

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

A-6000-021 (5-85)

4-A-1756

DRILL LOG	By R.A. HAGEN	Rig Gille Tool #2 B.E. GOL (GFH-MISO)	Well Number 299-E34-5	Computer Number NA	Project or Work Order No. KFH-1915-1
	Date 7/14/87		Depth 185' To 190'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
188' 7 1/4" of 8"		casing		Similar to previous sample.		
					1540	Stopped drilling
199' 1 1/4" of 8"		casing			1547	Added 10' 6" of 8" casing
					1650	Resumed drilling
	189-190	H	W	GRAVELLY SAND. 25% gravel, 70% sand, 5% silt. Sample is 1% CP, 2% MP, 15% FP, 2% UFP, 15% VCS, 35% CS, 15% MS, 5% FS. Sample is MS-PS. Gravel is 75% basalt, 25% metamorphics, 5% granitics. Sand is 65% basalt, 30% qtz, 5% RF. Gravel clasts are R-SA; sand grains are SA-R. Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/1 (light gray). Moderate HCl vxn on dried fines. No consolidation. Less gravel than previous sample, but each size fraction is similar to the sample before.	1741	Sampled w/dart bailer.
					1745/1835	Stopped/resumed drilling
				Material bailed at 191-192 looks very similar to previous samples, but driller says he's altered ~6" - unless reamer	1910/1925 1925	stopped/resumed drilling Driller thinks he hit basalt @ 191-192.

REMARKS: hard tool can't drill large enough hole to allow casing, so sand enters into hole from above.

Says there is water in well now.

R.A. Hagen 7/14/87

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)

4-A.1757

DRILL LOG

By R A. HAGEN | Rig Cable Tool #2 (68k-19150) | Well Number 299-E34-5 | Computer Number NA | Project or Work Order No. HEH-1915-1

Date 7-10-87 | Depth 190' To 192' | Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
199' 1¼" of 8"				191-192' material looks nearly identical to the 190' sample. I do notice basalt flakes in the sand fraction, but is this present elsewhere and went un-noticed?		
					2015	Stopped drilling - casing will not drive - top of casing is belled from trying to drive it.
193' 11½"					2021	Cut off 5' 1¾" of 8" casing sticking up.
				D/B means to be 190½' below surface using S-TAPE	2030	
				D/W means to be 182.65' below surface (186.00' to top of drive clamp). So there is a minimum of 8' of water in well.	2050	
				Grab samples of cuttings from bottom of bore taken for possible analysis.	2103	
				RJA KE 7/10/87		

REMARKS

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

A-6000-021 (5-85)

4-A.1758

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMEAU	CABLE TOOL #2	299-E34-5	N/A	RFI-1915-1
Date: 7/11/87	68K-19150	Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193'11½" of 8" casing.						
				D/W with E-tape from top of casing is 185'8 3/8"	0600	D/W = 185'8 3/8" E-tape - 3' above surface casing 182'8 3/8" D/W below surface
				D/W with steel tape (old) 185' 185 Cut 0.60' 0.60		
				185.6'		
				Depth to water 189' - 3' above surface casing 182.6' 182'7¼"	0615	D/W = 185.6' steel tape - 3.0' above surface casing 182.6' or 182'7¼" D/W below surface
				Depth to bottom 194'2" Add on to tape + 2'3¾" for depth to bottom 196'5¾" - 3' 193'5¾"	0620	D/B = 194'2" + 2'3¾" add on to tape for D/B. 196'5¾" - 3' above surface casing 193'5¾" D/B below surface
				Note: Steel tape has 1' spliced out from 191'-191' Depth to bottom is 193'5¾"		191'-191' "
				- Drilled water table well to 195'		195'

REMARKS:

- 10" [illegible] at 193'5¾" w/4 189'5¾" w/ST

Richard Premeau

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

A-6000-021 (5-85)

4-A.1759

DRILL LOG

By: S Dudrick
Date: 7/11/87
Rig: Failing #68K19150
Well Number: 207_E21-5
Depth: 190' To 190'
Computer Number: N/A
Project or Work Order No: KCH-1915-1
Subcontract No: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193'11½" of 8"		casing		– Drillers preparing to set casing	8:30	
				Drillers performed straightness test (checked OD on Title III)	12:00	
				– Checked depth one more time with steel tape to be certain of bottom	12:10	
				– Bottom checked at 190' with Steel Tape		
				– Straightness tool which was pulled out of hole also showed about 10' of water above bottom so that helped confirm the measurement		
				– Drillers will now lower telescoping 8" screen into hole		
				– Measured bottom of screen w/steel tape		
				194'2½"		
				– 4' from spliced tape		
				190'2½"		
				+ 2'3¾" add on		
				– 192'6" / 39 stick up from ground surface / 189'6"		

REMARKS:

Signature: Suzanne Dudrick 7/11/87

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 (5-85)

4-A.1760

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Buckeye Erie # 68K 19150	299-E34-5	N/A	KEH-1915-1
Date 7/11/87		Depth 190' To 190'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				- Bottom of screen measured at 189'6"	1240	
				- Pulled back about 1' of casing then I checked screen depth to make sure it wasn't hitting up to 8" casing	1245	
				- Screen checked out fine; driller is continuing to pull 191' of casing is in ground		
				- Will pull back 10' of 8" casing that will give us:		
				top of screen 179'6"		
				then end of pull casing should be at 181'		
				→ Rationale for this is that we need at least 1' overlap so that when we pump it will keep sand from coming into the screen from above		
				189'6"		
				191' begin pull	1300	- Pull is finished

REMARKS:

Suzanne Dudziak 7/11/87

Driller will start welding on cap

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

A-6000-021 (5-85)

4-A.1761

DRILL LOG

By: R A HAVEN | Rig: Cable Tool #2 (68k-19150) | Well Number: 299-E34-5 | Computer Number: NA | Project or Work Order No.: HEH-1915-1

Date: 7/11/87 | Depth: 190' To 190' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION (% Each Grain Size, Color, Roundness, Caliche, Etc.)	Time	Drilling Comments
193'11½" of	8"			D/B = 193'7" (measurement) − 3' (splice loss) + 2'3¾" (excess on tape + weight) − 2'4" (stick-up) = 190'6¾" (D/B from surface)		Operator is Lin Cordon
						Depth to bottom of screen.
				Note: previous D/B measurements made by S. Dudeck + D/B (E-TAPE) are in error because she subtracted 4' (because of the tape splice) instead of 3' - therefore, add 1' to her measurements to get correct value.		
				D/B meas. w/ S-TAPE - measured after screen installed + casing pulled back		
				D/W = 185' - 2'4" (stick-up) = 182'8" below surface		
				(meas w/ E-TAPE, ser. no. 11044)		
183'6¼" at 8'				Accounting for the 2'4" of stick-up above ground surface means the bottom of the 8" casing is at		cut off 10' 5¼" of 8" casing after pulling back. 2'4" of stick-up
	(~8" of overlap between screen + casing)			181' 2¼" below surface. Top of screen is @ 180'6".		
				Began developing well w/ sand bailer	1417	
				Stopped / resumed bailing	1432/1440	
				Completed development at the direction of Pat Youngman - he decided to develop well using step pump test.	1530	
				Water is very dirty still - fine sand.		

REMARKS

K A. 7/11/87

No other well work will be done today - no pump on-site to install. Began breaking down rig to move off-pad. Will bring in a crane to pull casing + complete well.

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

A-6000-021 (5-85)

4-A.1762

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudziak	Bucyrus Erie 66K-1950	299-E34-5	N/A	KEH-1915-1
Date: 7/13/87		Depth: 190' to 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				- tools cannot be pulled out of hole yet for wt. Mass & Samplers	5 30	
				- Cable to tools is broken & must be fixed before tools can be pulled		
				Tools are out of hole	7 00	
				DTW (steel tape)		
				Hold - 185		
				0.09		
				185.09'		
				- 2.25'		
				182.84 DTW		
				- Finished bailing 3 b-whole volumes	8 30	
				- S Wilbur took 3 samples w/ bailer	8 35	
				dropped bailer down a second time for		

REMARKS:

S Dudziak 7/13/87

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 (5-85)

4-A.1763

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S Dudrick	Burtgins Erie # 68K-19150	299-E34-5	N/A	KE11-1915-1
Date 7/13/87		Depth 110' To 170'		Subcontract No N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				more samples and the bottom of the bailer came off along w/ the plastic which held in the sample.		barb
				A decision was made to sample with the drillers bailer; the bailer was scrubber with fresh water until it was as clean as possible; Bailer full was dumped into a clean container and samples were taken from that at:	10:10 / 10:20	
				- Hole was geophysically logged by V McGhan	10:30	
				- A piece of the bailer latch was recovered at the site, there's still one piece in the well	11:00	- Drillers are hauling down 299

REMARKS

S. Dudrick 7/13/87

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-8000-021 (5-85)

4-A.1764

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	CABLE TOOL #2	299-E34-5	N/A	KEH-1915-1
Date: 7/14/87	65K-1915	Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193'11"		of 8" casing.				
				Steel tape is hitting something in the hole at	0635	
				reading on the tape of: 181.23' tape reading		
				.65 length of weights		
				1.00 excess on tape		
				182.88'		
				-2.33' casing stickup		
				180.55 Depth to obstruction from ground surface		
				D/W = 185.00' tape reading (hold) (cut)		
				0.00'		
				-2.33'		
				182.67' D/W		
				D/B 191.44' tape reading	0710	
				.65 length of weights		
				1.00 error on tape		
				193.09'		
				-2.33' casing stickup		
				190.76 D/B from ground surface		
		[model # 51453				
		Serial # 11044]		E-tape was attempted but a repeatable number could		
				not be obtained. Some resistance felt by the steel		cont'd-
				tape was felt by the E-tape at: 183.00 E-tape		
				-2.33 casing stickup		
				180.67 Depth to obstruction from ground surface.		

REMARKS:

Richard Premzic 7/14/87

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)

4-A.1765

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	CABLE TOOL #2	299-E34-5	N/A	HEH-1915-L
Date 7/14/87	6PK-19156	**Depth** 190' To 190'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193'11½" of 8" casing						
			cont'd.	The obstruction at ~150' seems to affect the readings on the E-tape. One steady reading was obtained at 185.05', -2.33' casing stick-up = 182.72. This reading is suspect since another steady reading could not be obtained.		

REMARKS:

Richard Premzic 7/14/87

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-6000 021 (5-85)

4-A.1766

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
A. A. Wilcox	NONE	299-E34-5	NA	AEH 1915-1
Date: 7/14/87		Depth: 190 To 190		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
SAME				D/W meas. w/ E-TAPE (7/10/87) 185.00 - 2.50 (stick up) =		182.50' below surface.
				measurement made @ 1946 hrs		
				D/W meas w/ STEEL TAPE (#1) 185 (hold) - 0.02 (cut) + 2.50 (stick up) =		182.48' below surface
				measurement made @ 1951 hrs		
				Note: last (TEMPORARY not @ 1955 hrs) may		
				cause chalk-line mark to lower as moisture		
				evaporates. - E-TAPE can be more accurate.		
				D/B meas. w/ STEEL TAPE (#1) = 191.47 + 1.63 - 2.50 =		190.60' below surface
				∴ 8.10' of water in well		
				RJS A.H. 7/14/87		

REMARKS:

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

A-6000-021 (5-85)

4-A-1767

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. TREMAIN	NONE	299-E34-5	N/A	KEH-1815-1
Date: 7/15/87		Depth: 190' To 19[illegible]		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193' 11½" of 8" casing.				D/W = 185.02' (casing stick-up) - 2.33 = 184.69' (PNL 300'E-TAPE #11044) — check subtraction - should be 182.69'	0803	
				D/B = 191.45' (casing) - 2.33 = ~~189.12'~~ + 1.63' (excess stpet weight) = 190.75' (PNL 200' STEEL TAPE #1)	0807	
				D/W = 185.00' - 2.33 = 182.67' + 1.63' = 184.20' (PNL 200' STEEL TAPE #1)	0815	
				Note slight obstruction at 181.23' (on steel tape) in the well. tapes go past it but a resistance is felt.	—	This is top of 8" telescoping screen - RAH 7/16/87

REMARKS:

Richard Tremain 7/15/87

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)

4-A.1768

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	NONE	294-E34-5	N/A	KEH-1915-1
Date: 7/16/87		Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193' 11½" of 8" casing						
				D/B — 191.45' (steel type #1)	0655	
				41.65 excess type + weights		
				193.10		
				- 2.33 casing stickup		
				190.77' D/B from ground surface		
				D/w — 185.02	0705	
				(E-type Serial #11044) - 2.33 casing stickup		
				184.69' Dtw from ground surface		
				Check subtraction -		
				Should be 182.69' below surface		
				OBSTRUCTION @ 181.2' is top of 8" telescoping screen - RAH 7/16/87		

REMARKS:

Richard Premzic 7/16/87

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)

4-A.1769

DRILL LOG	By K.R. Oster	Rig N/A	Well Number 299-E34-5	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 7/17/87		Depth 190' To 190'		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 = 182.55' below ground surface (PNL 300'-E-TAPE # 11044)	0705	
				D/B = 188.82' + 1.63' = 190.45' below ground surface (PNL 200'	0710	
				STEEL TAPE # 1)		

REMARKS:

Karen R. Oster
7/17/87

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)

4-A.1770

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R Oster	N/A	299-E34-5	N/A	KEH-1915-1
Date 7/18/87		Depth 190' To 190'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
				D/W = 182.49' below land surface (PNL 300' E-TAPE #11044)	0940	
				D/B = 188.72' + 1.63' = 190.35' below land surface (PNL 200' STEEL	0945	
				TAPE #1)		

REMARKS:

Karen P. Oster
7/18/87

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)

4-A.1771

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	NONE	299-E34-5	N/A	KEH-1915-1
Date: 7/20/86		Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193' 11½"	of 8" casing.			D/W = 185.12 (E-Tape Ser. No. 11044) -2.33 casing stickup 182.79 D/W from ground surface.	0815	

Richard Premzic

REMARKS:

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

A-6000-021 (5-85)

4-A-1772

DRILL LOG	By: K.R Oster	Rig: N/A	Well Number: 299-E34-5	Computer Number: N/A	Project or Work Order No.: KEH-1115-1
	Date: 7/21/87		Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				No D/B measurement today due to pumping well for aquifer test.		
				D/W = 183.04' below land surface (PNL300'-E-TAPE #10797)	0800	
				Pump on for aquifer test.	0800	
				Pump off - pump silting up.	0845	

REMARKS:

Karen K. Oster
7/21/87

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)

4-A-1773

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Peeples	NINE	299-E34-5	N/A	KEA-915-1
Date 7/22/87		Depth 190' To 190'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				NO D/B measurement due to pump in well.		
				D/W = 185.10 (Eagle, Ser. No. 11044)	0715	
				-7.33 coring stickup		
				182.77' from ground surface		

REMARKS

Richard Peeples 7/22/87

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)

4-A-1774

DRILL LOG	By RA HAGEN	Rig P+H DRILLING	Well Number 299-E34-5	Computer Number NA	Project or Work Order No. HEH-1915-1
	Date 7/23/87		Depth 190' To 190'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193'11½" of		8" casing		D/B meas. by Oster to be 190.45' below surface.		
				SET 1 20' length of 20-slot screen (4")	1553	(Screen meas. 20' 3¾" overall)
				SET 1 20' length of 4" casing (stainless)	1602	
				SET 1 20' length of 4" casing w/centralizer	1612	NO LUBRICANTS USED
				SET 1 20' length of 4" casing (stainless steel)	1619	ON JOINTS
				Set 1 " " " " " "	1629	Using clean gloves
				Set 1 " " " " " "	1634	when handling casing.
				Set 1 " " " " " "	1640	
				Set 1 " " " " " "	1645	
				Set 1 " " " " " "	1650	
				Attached a 2' section of 4" SS casing to	1655	
				a 10' section of same.		
				Set 1 12' length (10' + 2' together) of S.S.	1705	
				casing. TOTAL S.S. CASING IN WELL IS 192'.		
				Approx. 2' of S.S. casing stick-up above surface.		
				Stopped work on well. Will set screen	1712	
				+ casing on well 299-E34-4 tomorrow AM.		
				Set 5' diam. SS. cap on well.		

REMARKS:

RJ A. Hagen 7/23/87

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)

4-A-1775

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
K.R. Oster	N/A	299-E34-5	N/A	KEH-1915-1
Date: 7/23/87		Depth: 170' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				T/W = 182.32' below land surface (PNL 300's TAPE # 11044)	0820	
				D/B = 188.82' + 1.03' = 190.45' below land surface (PNL 200'	0834	
				STEEL TAPE #1).		

REMARKS:

Karen R. Oster
7/23/87

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)

4-A-1776

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Wagner Subs Crane	299-E31-5	NA	DrEH-1915-1
Date 7/27/87		Depth 190' To 190'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
183'6"	1/4" of	8" casing		Crane set-up over well	1500	Welded ears onto
				D/B = 186'11" + 2'3 1/2" - 4'2" (stick-up)		casing stick-up
				D/B = 185'1 1/2" below surface (top of sand)		~2' of 8" casing
						added to top of
						183'11 1/2" string for
						pull back
				Cut off ears put on earlier. will weld	1600	
				on heavier plate and beef up top of		
				casing @ ears + add gussets so as		
				not to repeat Saturday's events on		
				well 34-6. will not pull any casing today.		
				Will use a Wagner + Swasey Crane, mounted on		
				rubber tires (w/4 hydraulic jack supports).		
				R A Hagen 7/27/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1777

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.J PREMZIC	NONE	299-E34-5	N/A	KEH-1915-1
Date 7/24/87		Depth 190' To 199'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193' 11½"	of 8" casing			D/B = 193' 10" + 2' 3½" − 3'(splice) = 193' 1½"	1635	Splice in tape logging
192' of	stainless steel casing in well.			Added 1 BAG of 20-30 Sand	1637	at 187'.
				D/B = 185' 3" + 2' 3½" = 187' 6½" (top of 8")	1639	All measurements made
				∴ 5'7" of sand in annulus. No casing		to top of 8"
				pulled back. More footage gained in well		casing.
				because of 8" telescoping screen present.		Sand added w/o
						use of tremie pipe.
				Note: Weights (stainless steel) at end of S-tape #1		
				came off after tape lowered into well. No lost in hole.		
				tape lost - ring holding weights broke off		
				from tape and lies at extreme bottom of		
				hole. Weights came off before Sand was added.		
				Quit work here - wait to well 34-4 to		
				add 1 bag of sand.		
				RJ A. 7/24/87		

REMARKS:

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

A-6000-021 (6 85)

4-A-1778

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Prfenzie	Warner Swasey	294-E34-5	N/A	KEN-1915-1
Date 7/28/87	Crane	Depth 190' To 190'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
183' 6¼" of 8" casing.				1 bag of sand added + 20" of pullback had occurred before geologist arrived on site.	1025	20" pullback
185' 2¼" of 8" casing.				D/B = 177' 9½" + 2' 3½" = 180' 1" D/B from ground surface. casing stickup = 5.8'		20¼" of 8" casing welded to top of previous casing. This section contains the beefed up ears + gussets, will use this section on all pullback jobs. Total casing is now 185' 2¼" of 8" casing.
				2 bags sand added. Sand is 20-30 Colorador.	1040	25" pullback 45" total
				D/B = 183' − 8' casing stickup = 175' + 2' 3½" = 177' 3½" D/B from ground surface		
				5 bags sand added.	1050	
				D/B = 161' 6" − 8' casing stickup = 153' 6" + 2' 3½" = 155' 9½" D/B from ground surface.		

REMARKS:

Richard Prenzie

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

A-6000-021 (5-85)

4-A.1779

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZLE	B.E. 60C	209-E 34-5	N/A	KFH-1915-1
Date: 7/28/87	Warner Swasey Cirgo	Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
185'2¼" of 8" casing.				D/B = 172'9" ; 178'1¼ weld − 15'1" casing stickup ; −9'6" stickup 159'8" (168'7¼ D/B of 8" casing) + 2'3½" (drill tape) 161'11½" 178'7¼" 161'11½" 6'7¾" of sand above casing	1105	45 degree pullback 5'1" pullback 8'10" total pullback
				3 bags of sand added. Couldn't backup casing 3'6". Casing will not move now. Will attempt to add drilling water between 8" & 12" casing in an attempt to lubricate sands.	1115	
					1155	Lunch break
					1350	~15 gallons of H2O added between 8" & 12" casing. Began pulling.
				Richard Premzle 7/28/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1780

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAKEN	Warner Swasey Crane IIT-19983	299-E34-5	NA	KEH-1915-1
Date 7/28/87		Depth 190' To 190'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				167'7 3/4" weld exposed just above the 12" casing (~ 1'½' above surface). Bottom of 8" casing @ ~ 166'. Depth to top of sand is unknown, but must be ~ 152-155'. Pulled back so weld is 8" above top of 12" casing - cut off stick-up @ 167'7 3/4" Bottom of 8" is @ ~ 165'½'	1425	Want top of sand @ 165.5' weld.
				D/B = 155'½' + 2'3" = 157'9" - 2' (stick-up) = 155'9" to top of sand from surface (S-TAPE)	1500	
				Welded pull head back onto 8" casing @ 167'7 3/4" weld.	1508	
				TRIED PULLING CASING BACK, BUT IT WOULDN'T BUDGE (STRETCHED TAUGHT). No change in casing depth.	1520	
				Quit work for the day - crane operator had to leave for the day.	1620	
				R & A K 7/28/87	1628	

REMARKS:

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

A-6000-021 (5-85)

4-A.1781

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMUIC	NONE	299-E34-5	N/A	KEH-1915-1
Date: 7/29/87		Depth: 190 To 190'		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(Bkgnd) = 158.6' + 2.3' - 5.15' = 154.75' to steel tape (end of tape; stickup)	1140	

REMARKS:

Richard Premuzic
7/29/87

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)

4-A.1782

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chauness	B-61 2200	299-E31-5		KEH-1165-1
Date: 8/10/87	GBK17153	Depth: 170' To 190'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Bottom of 8" casing at ~166' according to last log on 7/28/87.		
				DB bentonite ? at 153'6" from ground surface measured today.	1700	
						Pulled 8" back, having problems with the guide on the mast, so they quit for the day
					1800	
				M.A. Chauness 8/10/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1783

DRILL LOG	By J.S. Wilbur	Rig Rig # BE 22N	Well Number 299-E34-5	Computer Number	Project or Work Order No. KEH-1915
	Date 8/11/87	68K 19153	Depth Completion work back pulling To	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Driller is repairing guide for cable tool rig.		
				Starts pulling 8" casing @, pull a total of 9.5' of 8".	10:00	
				D/B of 8" 154' from the ground surface. D/T	11:03	
				crumbles (dry bentonite) 158' below ground surface, a		
				4' gap between the top of crumbles & the bottom of 8"		
				casing.		
				7-50lb sacks of bentonite crumbles added. D/B of crumbles	1115	
				is 141' below ground surface.		
				Pulled 8" until free inside the 10". D/B of crumbles	1345	
				is 147'. Bottom of 10" is 147' 7/8".		
				Pulling all of 8" from well.	1400	
				It was noted at this time there was no record in logs	1445	
				of any bentonite pellets added to well. Pat Dungan,		
				drilling consultant, stated that 2-5 gallon buckets of		
				pellets were added to the well on the day the casing was		
				last pulled. That day was 7/28/87.		
				All 8" casing pulled from well. 3-50lb. sacks of	1525	
				crumbles added. D/B = 144 ± 2 = 146'		

REMARKS:

Richard Brannigan 8/11/87

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)

4-A.1784

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chawners	BE 220	299-E34-5	N/A	WGH 015-1
Date	**Rig**	**Depth**		**Subcontract No.**
8/11/87	GEX1153	110' To 190'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				setting 126' of tremie pipe, welding pulling head e.t., waiting for grout equipment to get here.	1630	
					1700	Pulled to break.
				Made ~110 gal of 9.1 lb/gal volclay grout and ~110 gal of 9.5 lb/gal grout.		
				107' + 2' 3½" tape 109' 3½" - 2' dropped with grout 107' 3½" - 3½" stickup from top of 12" casing 102' DB grout.		
115' 4⅛"	8'	12" casing in hole from ground surface		109'8" + 2' 3½" tape 111' 11½" - 8" stickup 111' 3½" DB grout	2015	Pulled 8' of 12' casing, puller head broke, started fixing it
127' 4⅛"					2315	quit for day
				M.A. Chawners 8/11/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1785

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PRENTICE	B.F 22W	299-E34-5	N/A	KE [illegible]
Date: 8/12/87	68K-19153	Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulling casing	0845	
126 5/8" of grout	10" below surface			~10' pulled. 126 5/8 weld is at ground surface.	0930	
				D/B of grout = 114.5' + 2' = 116.5' Are awaiting grouting equipment. Set tremie pipe in hole		
				Grouting equipment arrives.	1400	
				Mixing Grout. Mud balance reads 9.4 lbs/gal.	1437	
				Adding 400 gallons of grout, 16 bags of bentonite.		
				D/B grout = 32' + 2' = 39'	1518	

Roland Brannigan
8/12/87

REMARKS:

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

A 6000 021 (5 83)

4-A.1786

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	8720	299-E24-5	N/A	WCH 015-1
Date 8/12/87	681 - 8152	**Depth** 90' To 130'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1600	welders pulling head on
					1700	pulling casing
126' 7/8"				2	1820	pulled 12'4" of 10" casing
17' 1						cut casing at 105'2 3/8"
111'	at 10" casing					weld
				107'8" top	2130	Pulled 10'8" of casing
				2'		(measured from top of
				109'8"		16"), cut casing at
105'2 3/8"				1' 1/2" stickup		105'2 3/8" weld, 1'1/2"
1' 1/2"				108' 7/8" DB grout		stick up 16".
103'11 7/8"				There is a 4'2 5/8" gap between top of grout and		
				bottom of 10" casing		
				M.A. Chamness 8/12/87		

REMARKS:

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

A-6000-021 (5-86)

4-A.1787

DRILL LOG	By K.L. PREMZIC	Rig B.F. 22W	Well Number 399534.5	Computer Number	Project or Work Order No. KE[illegible]
	Date 8/13/87	68K-19153	Depth 93 To 190'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104'1 7/8" of casing below ground surface.				105'2 3/8" weld is 1'½" above ground surface	0755	
				D/B = 107.3 +2' - 1.3 slack = 108.1'	0915	
				Mixing grout. 350 gallons mixed. (13 sacks of volclay grout) Mud balance is 9.4 lb/gal.	0925	
				Grout pumped downhole via tremie pipe.	0930	
				D/B = 100 +2 = 102'	0945	
				Mixing grout. 14 sacks, 350 gallons, mixed + added. Mud balance is 9.4 lb/gal	1045	
				D/B = 105 +2 -1 slack = 106' (Measurement may be slightly off,		
				Tape could have been sticking to the side of the casing.		
				Logs show the hole is >50% gravels from 40-105'.	1230	
				This would account for loss of grout to the formation.		
				Decision by Chuck Cline to use Bentonite crumbles instead		
				of volclay grout for completing the rest of the well.		
				23 -50 lb sacks of crumbles added. D/B = 68.5 +2 = 70.5'	1245	Attaching pulling head. Preparing to pull.
92'7 7/8" of 10" casing below ground surface.				94'11 3/8" weld is 2'4" above ground surface.	1435	Pulled 10' of casing off pulling head. Will add grout next, on top of crumbles
				D/B = 77' +2' = 79'		
				Mixing grout. 11 sacks, 225 gallons mixed and added. Mud	1520	
				balance is 9.43 lb/gal. D/B = 21.5' +2' = 23.5'		

REMARKS:

Richard Premzic

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

A-6000-021 (5-85)

4-A.1788

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	B.E. 22W	299-E34-5	N/A	[illegible]
Date: 8/13/87	68k-19153	Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
92' 7 5/8" of 10" casing				94' 11 7/8" weld is 2' 4" above ground surface.	1540	
below	ground surface.			Mixing grout. 4 sacks, 100 gallons, mixed and added. Grout	1540	
				is now at ground surface.		
					1550	Pulling tremie pipe.

REMARKS:

Richard Premzic

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

A-6000-021 (5 85)

4-A.1789

DRILL LOG	By: M.A. Chamness	Rig: BE 2265	Well Number: 299-E24-5	Computer Number	Project or Work Order No.: KFH 1715-1
	Date: 8/13/87	60K-7122	Depth: 195 To 175'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
92'7 3/8"				27'5 1/2"	1815	pulled 11'3 1/4" of 10"
11'3 1/4"				+ 2' tape		
81'4 1/8"	of 10" casing below 16"			29'5 1/2"		casing. Cut seam at
		casing		- 1'4 1/2" stickup from top of 16"		
				28'1" DB grout from top of 16"		81'9 1/8" weld
					2120	
74'8 3/8"	weld					
- 1'5 1/2"						
73'2 7/8"	of 10"	from top of				
	16" casing					
				23'5"		
				+ 2' tape		
				25'3"		
				- 1'3 1/2" stickup of 16"		
				23'11 1/2" DB grout from top of 16"		
65'8"	weld			54'5 1/2"	2215	
- 11'6"	stickup			+ 2'		
67'8 1/2"				56'5 1/2"		
				- 11 1/2"		
				55'6" DB grout from top of 16"		
				Exposed 12'7 1/2" weld, cutting off at weld, did not		
				quite finish.	2315	quit for day
				M.A. Chamness 8/13/87		

REMARKS:

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

A-8000-021 (5-85)

4-A.1790

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	B.E 22W	299-E34-5	N/A	KEH-1915-1
Date 8/14/87	68K-19153	**Depth** 190' To 190'		**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' of 12" below ground surface				D/B = 55.5' + 2 = 57.2'	0840	
				Pulling all of 12" casing from hole.	0900	
				Mixing Grout. 14 sacks, 350 gallons mixed & added.	1030	
				D/B = 15' + 2 = 17'		
					1100	Preparing to pull pipe
48' 11 1/4" below ground surface.				~10' pulled. 50' 6 1/4" weld is 1' 7" above ground surface.	1500	
				D/B = 27' + 2' = 25'	1515	
					1600	Re welding pulling head.

REMARKS:

Richard Premzic
8/14/87

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)

4-A-1791

1.

DRILL LOG	By M.A Chauness	Rig CE22 W	Well Number 299-E34-5	Computer Number	Project or Work Order No. REH-1915-1
	Date 8/14/87	68K-915-3	Depth 110' To 110'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40'6¼"				39'1½"	1700	Pulled casing, 40'6¼"
-1				+2'		weld now 1' above
39'6¼"	below	ground	surface	41'1½"		ground.
				-1' stickup		
				40'1½" DB grout		
				Mixed two batches of grout each at 7.1 ft/gal., at ~140 gal/	0800	
				each.		
				Grout is 1' below ground surface		
20'6¼"				9'4"	2045	cutting casing at 20'6¼"
-2'6"				+2'		weld
28'4½"	below	ground	surface	11'4" top		
				-2'6" stickup		
				8'10" DB grout		
20'6¼"				10'7"	2155	cut casing at 20'6¼" weld
				+2'		right at ground surface
				12'7" DB grout		
-2'3"				16'3"	2345	Pulled 2'3" of casing
18'3½"	below	ground	surface	+2' top		
				18'3"		
				-5'4" stickup		
				12'11" DB grout		

REMARKS:

M.A Chauness 8/14/87

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)

4-A.1792

DRILL LOG	By AIRHART	Rig BE 22W	Well Number 299-E34-5	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 8-15-87	68K-1915-3	Depth 190' To 190'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Mixed 8.5 bags Volclay grout & 8.5 bags	0800	
				initiator w/ 160 gallons H_2O. Slurry density		
				= 9.5 lbs/gal. Pumped slurry down hole		
				D/grout = +1' above ground surface	0805	
				Pulled remaining 16" surface casing out of hole	0930	
				D/grout = 1.5' below ground surface		
				Tearing down rig.	1300	
				S.P. Auvil		

REMARKS:

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

A-6000-021 (5-85)

4-A.1793

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R L. Preimesberger	None	299-E34-5	N/A	KEH-1915-1
Date: 8/19/87		Depth: 190' To 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Concrete poured to complete well + pad.	1340	

REMARKS:

Richard Preimesberger
8/19/87

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)

4-A.1794

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L. Cordova	150 #	29E-34-S		
Date: 6-29-87		Depth: 4' To 19'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'6"	4	H	W	Medium Sized Gravel	8:25 AM	Set Pipe in Hole for Drilling
	17	H	W	" " "	5:50	Shut down

REMARKS:

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

A 6000-021 (5-85)

4-A.1795

DRILL LOG	By L. Gordon	Rig D 150	Well Number 399 E - 34 - S	Computer Number	Project or Work Order No.
	Date 6-30-87		Depth 17' To 33'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
~~36'6"~~ 40'6½	17	H	W		7:10	Added 10' 4½" CASING
					7:15	W/C LD 16"
					TO 8:50	CASING
					8:50	START HARD
						TOOL DRILLING
	20	H	W	Medium Gravel	10:30	Sample
	25	H	W	" "	12:40	Sample
	28	H	W	" "	3:00	WELD CASING 16"

REMARKS:

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

A 6000 021 (5-85)

4-A.1796

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
L. Gordon	150 C	299-E-34-5		
Date: July 1-87		Depth: 33' To 51		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
~~4'~~					07[35]	START
60'	51'	H	W	LARGE GRAVEL & SAND	09[00]	Add 20 GAL Water
					12[15]	WELD 10'
						16" CASING
					2[00]	Add 20 GAL Water
					4[00]	WELD 10'
						16" CASING
					4[20]	Add 20 GAL Water
					5[45]	STOP For
						DAY

REMARKS:

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

A-6000-021 (5-85)

4-A-1797

217 6/1-5/4

DRILL LOG	By: M. Gordon	Rig: 150 ET	Well Number: 299-E-34-5	Computer Number	Project or Work Order No.
	Date: 7-2-87		Depth: 50 To 60		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
60'7"	60'	H	W	12" Casing + 12" drilling To 60'	700	START
7~~49~~ 59	60'	H	W	10" Casing Shut down	400	

REMARKS:

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

A 6000-021 (5-85)

4-A.1798

DRILL LOG	By Cordon	Rig	Well Number 299-E 34-5	Computer Number	Project or Work Order No.
	Date 7-6-83		Depth 60 To 80		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
11493/8	60	H	W	Medium Gravel	5.00	Start
	65	H	W	" "	7:55	SAMPLE
9-113/8	70	H	W	" "	10:30	"
84-91/8	75	"	"	" "		
10-24	80	"	"	" "	5:00	Shut down
94-113/8						

REMARKS:

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

A-6000-021 (5-85)

4-A-1799

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Cordon	150	E34-5		
Date: 7-7-87		Depth: 80 To 108		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
94-13/8					5:00AM	START
+ 10-3				5:00AM	6:00AM	WELDING
= 105-13/8	85	H	W	MEDIUM GRAVEL	7:30	SAMPLE
	90	H	W	" " + SAND	9:15	"
	92'			" " " 9:50	11:00	WELDING
	95'	H	W	SMALL " + "	11:30	SAMPLE
+ 10-10¼	100	H	W	" " "	12:50	SAMPLE
# 116'-5"	102	H		" " " 1:30	2:15	WELDING
	108	H		MEDIUM "	4:52	SHUT DOWN

REMARKS:

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

A 6000 021 (5 85)

4-A.1800

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Cordon	150	E34-5		
Date: 7/8/87		Depth: 108 To 140'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
116'3"	108				5:08	START RIG
	110	H	W	MEDIUM GRAVEL + SAND	5:35	SAMPLE
+ 10'6"						
= 126'9"	114	H		" " + SAND 6:45	8:00	WELDING CASING
- 1"	115	H	W	" "	8:15	sample
= 126'8"	120	H	W	" "	9:40	Sample
+ 10 1/4	124	H		——— 10:45	11:30	WELDING
= 136'6"	125	H	W	MEDIUM GRAVEL + SILT	12:10	Sample
+ 10'6	130	H		SMALL TO MEDIUM GRAVEL SILT & SALT	1:30	Sample
147'0"	135	H	W	" " " " "	3:17	SAMPLE
	140	H	W	" " " " "	4:35	SAMPLE
					5:00	Shutdown

REMARKS:

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

A-6000-021 (5-85)

4-A-1801

151

DRILL LOG	By Wa/Kies-Cordon	Rig	Well Number E34-5	Computer Number	Project or Work Order No.
	Date 7/30/87	150	Depth 140 To 157 3/4'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
147-7"	140			INSTALL CASING 8"	9.00	2:30	WELDING
					2:30	4:30	STRING TOOLS & WELD
	145	H	W				
8"							
157-3¾"	150	H	W	Gravel & Sand		6:30	SAMPLE
	155	H	W	Sand & pea Gravel		8:15	"
						9:20	SHUT DOWN

REMARKS:

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

A-6000-021 (5-85)

4-A.1802

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
WATKINS	150 ~~FT~~	E34-5		
Date 7/10/87		Depth 155 To 175		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
157-3¾	155	H		Sand & pea Gravel	5.00	START
+ 10-4	160	H	W	Sand & pea gravel	700	sample
= 167-7¾	165	H	W	Sand & pea gravel	800	sample
+ 10-6	170	H	W	Sand & pea gravel	10:00	sample
= 178-1¾	175	H	W	Sand & pea gravel	11:30	sample
+ 10-5½						
= 188-7¼						

REMARKS.

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

A-6

4-A.1803

2 ND

DRILL LOG	By Gordon	Rig	Well Number E34-5	Computer Number	Project or Work Order No.
	Date 7/10/87	150	Depth 175 To 192'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
188-13½	175	H		Sand & pea Gravel	1:30	Start
10-6	180	H	W	" " "	1:55	Sample
199-13½	185	H	W	medium to large Gravel	3:45	Sampl
				345	4:35	welding
	190	H	W	Sand & Gravel medium	6:10	Sample
	192	H		" " "		
	192	H		ROCK BASALT	6:45	
				DRILLED ON ROCK 6:45 TO 8:30	8:45	Shutdown

REMARKS:

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

A 6000-021 (5-85)

4-A.1804

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
J. Butler	#	299 E-34-5		
Date 7-11-87	19-150	Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
199'	1 3/4"					
				Pipe Straightness Test SD		
				Set Screen 8" SD 7/11/87		
				Pull 8" Casing Back 10' Ft Per Geologist SD		

REMARKS:

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

A-6000-021 (5-85)

4-A.1805

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
CORDON	150	E34-5		
Date: 7-11-87		Depth: To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	192				1:pm	pulling CASING
					1:30	FINISHED pulling
						CUTOFF 8" GETTING
						READY TO PUMP
					2:30	BAILING HOLE
					3:30	Tear down Rig
					4:45	Broke Hoist Cable
						unspooled Cable
					6:00	Helping 2 days

REMARKS:

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

A-6000-021 (5-85)

4-A.1806

DRILL LOG	By	Rig	Well Number	Computer Number	Project or Work Order No.
	Al Thomas	153	299-E 34-5		
	Date 6/11/87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
12	192	cable			3:00	Set 12" Surface Casing
						Set 4" Sch 40 Screen
						PVC

REMARKS:

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

A 6000 021 (5-85)

4-A.1807

DRILL LOG	By Mel T	Rig 153	Well Number 299E 34-5	Computer Number	Project or Work Order No.
	Date 8/14/87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Grouted 260 gal ±		
				pulled & bumped from 28' to 31'		
				pulled on dead pull from 31' to 23'	(no casing hammer)	
				had to weld on 16" casing hammer at	(pulling real tight)	
				ground level after	easier pulling after 3'	
				have to rig off well without	feet of bumping	
				before pulling any more 16" casing		

REMARKS:

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

A-6000 021 (5 85)

4-A.1808

FIGURE 3.
DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
O. Amos		299-E34-5		
Date 1-5-98		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Develope well # 299-E34-5		water was
				Start Bailing	10:30	rusty Looking
				Done Bailing	11:35	cleaned up to
				Bailed approx. 150 gals.		where it was
				Set up time	15 mins	clear (no Sand or silt)

REMARKS:

D - Dove Bucket H - Hand Auger R - Reverse M - Mud Rotary A - Auger V - Vacuum Extraction C - Cuttings T - Tube O - Other Remarks/Water

4-A.1809

WELL 299-E34-6

Battelle
Pacific Northwest Laboratories

Well Completion Report/Title III Inspection List

Project 200 Area RCRA Monitoring Wells
Location 200 East
Driller J.L. Gordon / Murphy / Robinson
Drilling Co. Kaiser Eng.
Geologist R.A. Hagen / R.L. Piemzis E. Jensen K. Oster M. Chamness S. Teel T. Crimmins

Well Number 299-E34-5
Temporary Well Number N/A
Coordinates N46,724 W50,609
Casing Elevation 597.33'
Ground Elevation 594.56'

DRILLING METHOD

Rotary Air N/A Mud N/A
Cable Tool D N/A H ✓
Drilling Fluid Water from 200E
Other TOOL LUBRICANT IS CRISCO OIL.

COMPLETION DATA

Drilled Depth 195' below ground
Completion Depth 194.85' below surface
Date Started 6/25/87 Completed 7/2/87
Static Water Level/Date 190.81' below surface 7/14/87

CASING DATA

Type	Size			
16" DIAM. CARBON STEEL	16"	0 + 1'3½"	to	59'1½"
12" DIAM. CARBON STEEL	12"	0 + 1'5"	to	145'4⅛"
8" DIAM. CARBON STEEL Stainless Steel	8"	0 + 2'9"	to	194'8" 195'
	4"	0+ 1.27		

Approved By NAC Date 11/24/87

PERFORMATIONS

Type
Depth - Schedule
N/A
App. By NAC Date 12/10/87

SCREEN

Type 4" st. steel
Length 4" - 20'3¾"
Slot Size .20
Depths 4" 175' - 195'
App. By NAC Date 11/24/87

ANNULAR SEAL

Type	Interval	Volume
10/20 sand	195 - 150	[illegible]
20/30 sand	150 - 143	[illegible]
Bentonite Pellets	143 - 137	3#5gal buckets
Bentonite Crumbles Volclay Grout	137 - 145' 195' - 5'	10#50lb sacks

App. By NAC Date 11/24/87
Cement 5' - 0' unknown

GEOPHYSICAL LOGGING

Sondes	Interval	Date
Natural gamma	0 - 195'	7/13/87
Neutron	0 - 195'	7/13/87
gamma-gamma	0 - 195'	7/13/87

Approved By NAC Date 7/13/87

AQUIFER TESTING

Type of Test
Length of Test N/A
Volume Pumped
Drawdown
insufficient water for aquifer tests
Approved By NAC Date 11/24/87

OTHER APPLICABLE ITEMS

- ✓ Steam Cleaning
- ✓ Storage of Const. Material
- ✓ Tool Lubricants
- NAC Concrete Pad
- NAC Protective Steel Posts
- NAC Safety Paint
- RAH Straightness Test 7/11/87
- N/A Well Development
- ✓ Downhole TV Inspection
- N/A Well Abandonment
- ✓ Complete As-Built Diagram, Driller's and Geologist's Logs

Approved By M.A. Chamness Date 12/7/87

Reviewed By [signature] Date 12-28-87

A-1800-187 (3/87)

PREFACE

This Inspection Plan identifies the inspections required and the responsible people to perform the inspections of the monitoring wells to be constructed under Project B-678.

The inspection of well construction activities is intended to provide assurance that the work performed by construction forces is in accordance with the approved contract documents. The degree of inspection is commensurate with the significance of the monitoring wells with regard to function and safety.

Inspectors

Listed below are the names of the individuals whose initials appear within this inspection plan.

Name	Initial	Organization	Job Title
John F. Keller	JFK	Kaiser Engineering Hanford	Superintendent
Michele A. Chamness	MAC	Pacific Northwest Laboratory	Scientist

The PNL project manager has reviewed the completed inspection plan and is satisfied that all the applicable inspections of the work were made during the construction of the wells.

G. V. Last — 1-13-88

PNL Project Manager — Date

CONSTRUCTION INSPECTION SERVICES

Described herein are the inspection services to be provided and documented by PNL.

Pre-Award Submittal Review

	Item	Contract Reference	Initial	Date
1.	Verify contractor and drillers are licensed for well drilling in the State of Washington.	01100-1.2 01300-1.2.1A	JZK	1-12-88
2.	Verify cable tool drilling experience is five years or more with drive barrel and hard tool.	01100-1.2	JZK	1-12-88
3.	Verify documentation of ground-water monitoring wells drilled by contractor.	01100-1.2	JZK	1-12-88
4.	Verify contractor submitted description of drilling method and equipment.	01300-1.2.1B	JZK	1-12-88
5.	Verify contractor submitted resumes of personnel.	01300-1.2.1C	JZK	1-12-88

Procurements

Verify materials to be furnished to the contractor are as described in the construction specification.

	Item	Contract Reference	Initial	Date
1.	Stainless steel screen (8 inch telescope size).	01100-1.5A	JZK	1-12-87
2.	Stainless steel screen (4 inch).	01100-1.5B	JZK	1-12-87
3.	Centralizers.	01100-1.5C	JZK	1-12-87
4.	Stainless steel casing (4 inch).	01100-1.5D	JZK	1-12-87

	Item		Contract Reference	Initial	Date
5.	Artificial sand packs.		01100-1.5E	JTK	1-12-88
6.	Bentonite pellets.		01100-1.5F	JTK	1-12-88
7.	Bentonite grout.		01100-1.5G	JTK	1-12-88
8.	Granular bentonite.		01100-1.5H	JTK	1-12-88
9.	Sack crete.		01100-1.5I	JTK	1-12-88
10.	Portland cement.		01100-1.5J	JTK	1-12-88
11.	Well cap.		01100-1.5K	JTK	1-12-88
12.	Brass survey marker.		01100-1.5L	JTK	1-12-88
13.	Sample jars.		01100-1.5M	JTK	1-12-88
14.	Hydrologic sampling equipment.		01100-1.5N	JTK	1-12-88
15.	Drive shoes.		01100-1.5O	JTK	1-12-88
16.	Carbon steel casing.	a. 16 inch	01100-1.5P	JTK	1-12-88
		b. 12 inch	01100-1.5P	JTK	1-12-88
		c. 10 inch	01100-1.5P	JTK	1-12-88
		d. 8 inch	01100-1.5P	JTK	1-12-88
17.	Guard posts.		01100-1.5Q	JTK	1-12-88
18.	Paint: primer		01100-1.5R	JTK	1-12-88
	finish enamel		02011-3.5I	JTK	1-12-88

Performance Submittals

	Item	Contract Reference	Initial	Date
1.	Verify submission and approval of construction schedule.	01300-1.2.2A	JTK	1-12-88
2.	Verify drilling logs are submitted daily.	01300-1.2.2B	JTK	1-12-88
3.	~~Verify submission and acceptability of flow meter certification.~~ DFC NO. 200-1	01300-1.2.2C		

2

ATTACHMENT 1

DESIGN/FIELD CHANGE		DFC No. 200-1
Task No. N/A	Project Title 200 Area Burial Ground Detection Monitoring	Final Approval Date 11/25/87

Documents Affected

1. Construction Specifications KEY-1914 (B-677) and (B-678)
2. Inspection Plan Construction Project KEH-1914 (B-677)

Description of Change

Line out and disregard any statements concerning flow meter certification. Specifically paragraph 1, 2.2C under performance submittals in the referenced construction specs. and item 3 under the performance submittals section of the referenced inspection plan.

Justification

See attached letter

Distribution

PNL
SP Airhart
MA Chamness
CS Cline
DR Dahl
TJ Gilmore
RM Smith
JS Wilbur

WHC
RE Clayton
C Hodge
RB Kasper
DM Tulberg

Remarks

None

Initiator/Author	Phone	Organization(s)	Date
G. V. Last G.V. Last	376-1054	Geosciences/PNL	11/25/87

Approvals

D.R. Raymond 11/25/87

Project Manager	QA
G.V. Last 11/25/87	D.R. Dahl 11/20/87

Well Number 299-E34-6

The remaining sections of this inspection plan shall be completed for each well.

Well Drilling Activities

	Item	Contract Reference	Initial	Date
1.	Verify wells are constructed in continuous operation.	01100-1.3		
2.	Verify contractor uses approved water source.	01600-2.0	MAC	1/8/88
3.	Verify beveled edge is cut on temporary casing by contractor.	01600-2.1A	MAC	1/8/88
4.	Verify suitability of split spoon sampling equipment.	01600-2.2	N/A	
5.	Steam cleaning equipment.	01600-2.3	MAC	1/8/88
6.	Aquifer testing equipment.	01600-2.4	MAC	1/8/88
7.	Verify contractor has copy of WAC Chapter 173-160 "Minimum Standards for Construction and Maintenance of Water Wells" and the construction specification at the jobsite.	02011-1.2	MAC	1/8/88
8.	Verify contractor has a copy of all addendums and change orders at the jobsite.	02011-1.2	MAC	1/8/88

Monitoring Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify proper technique of cable tool drilling.	02011-3.1.1	MAC	1/8/88
2.	Verify steam cleaning is being done properly.	02011-3.1.2	MAC	1/8/88

Well Number 299-E34-6

Item	Contract Reference	Initial	Date
3. Verify contractor is handling and storing construction materials properly.	02011-3.1.3	MAC	1/8/88
4. Verify bevel on casing and welding is done as specified.	02011-3.1.4	MAC	1/8/86
5. Verify the contractor uses proper tool lubricants.	02011-3.1.5	MAC	1/8/86
6. Verify only approved drilling additives are used.	02011-3.1.6	MAC	1/8/86
7. Verify the proper disposal of drill cuttings and water.	02011-3.1.7	MAC	1/8/86

Well Testing

Item	Contract Reference	Initial	Date
1. Verify water-level measurements are taken. Note in log.	02011-3.2.1	MAC	1/8/88
2. Verify the bottom of temporary casing is free of plugging material at end of each day. Note in log.	02011-3.2.1	MAC	1/8/88
3. Verify ground-water samples are taken when needed.	02011-3.2.2	MAC	1/8/88
4. Verify aquifer testing is done at each well.	02011-3.2.3	N/A	
5. Verify formation samples are taken as required.	02011-3.3	MHC	1/8/88

Well Number 299-E34-6

Borehole Construction

	Item	Contract Reference	Initial	Date
1.	Verify temporary casing is telescoped at no more than 100 feet intevals.	02011-3.4A	MAC	1/8/98
2.	Verify depth of well.	02011-3.4B	MAC	1/8/98
3.	Verify proper action is taken if overdrilling occurs.	02011-3.4C	MAC	1/8/98
4.	Verify acceptable passing of alignment test.	02011-3.4D	MAC	1/8/98
5.	Verify all temporary casing is removed from the well.	02011-3.4E	MAC	1/8/98

Well Construction

	Item	Contract Reference	Initial	Date
1.	Verify position of 8 inch screen and pullback of casing to expose screen.	02011-3.5A	N/A	
2.	Verify adequate well development.	02011-3.5B	MAC	1/8/98
3.	Witness aquifer test.	02011-3.5B	N/A	
4.	Verify proper setting of 4 inch screen, casing, and centralizer.	02011-3.5C	MAC	1/8/98
5.	Verify proper placement of sand pack.	02011-3.5D	MAC	1/8/98
6.	Verify proper location and thickness of bentonite pellet seal.	02011-3.5E	MAC	1/8/98
7.	Verify proper mixing, placement, and location of Volclay bentonite-based grout.	02011-3.5F	MAC	1/8/98

	Item	Contract Reference	Initial	Date
8.	Verify proper concrete seal at top of well.	02011-3.5G	MAC	1/8/88
9.	Verify proper construction of concrete pad and placement of brass survey marker.	02011-3.5H	MAC	1/8/88
10.	Verify proper placement, construction, and painting of guard posts.	02011-3.5I	MAC	1/8/88
11.	Verify contractor cleans up site and properly stores excess materials.	02011-3.5J	MAC	1/8/88
12.	If abandonment of well occurs, verify proper abandonment.	02011-3.6	N/A	
13.	Verify contractor maintains the drill log daily.	02011-3.7		
14.	Prepare punchlist at construction completion for exceptions.		N/A	

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E34-6 Geologist R. A. HAGEN Page 1 of 2

K. Oster R. Prematic, E. J. Jensen, S. Teel, T. Gilmore
M Shannon

Reviewed by J. E. McLean Date 12-30-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		drill rate (ft/hr.)
Description	Diagram		Diagram Litho.	Lithologic Description	
cement 0'-5'	2.5' of stickup	5		gravelly silty sand	N/A
		10		SILTY SANDY GRAVEL	1.7
		15		" " "	2.2
		20		gravelly silty sand	2.5
		25		" " "	3.3
		30		silty sand	4.2
		35		slightly silty gravelly sand	3.1
		40		" " " "	10
		45		" " " "	42
		50		silty sandy gravel	2.5
		55		" " "	1.1
16" carbon steel casing		60		" " "	2.6
		65		" " "	2.5
12" diam. temporary carbon steel casing		70		" " "	1.9
		75		Gravel	2.0
		80		"	1.1
carbon steel casing		85		"	2.5
		90		gravelly sand	2.5
		95		" "	1.5
		100		silty sandy gravel	1.7
		105		" " "	1.3
		110		sandy gravel	1.6
4" stainless steel casing		115		silty sandy gravel	1.5
		120		" " "	2.9
		125		" " "	2.5
		130		" " "	1.5

A-1800-188 (3/87)

Battelle
Pacific Northwest Laboratories

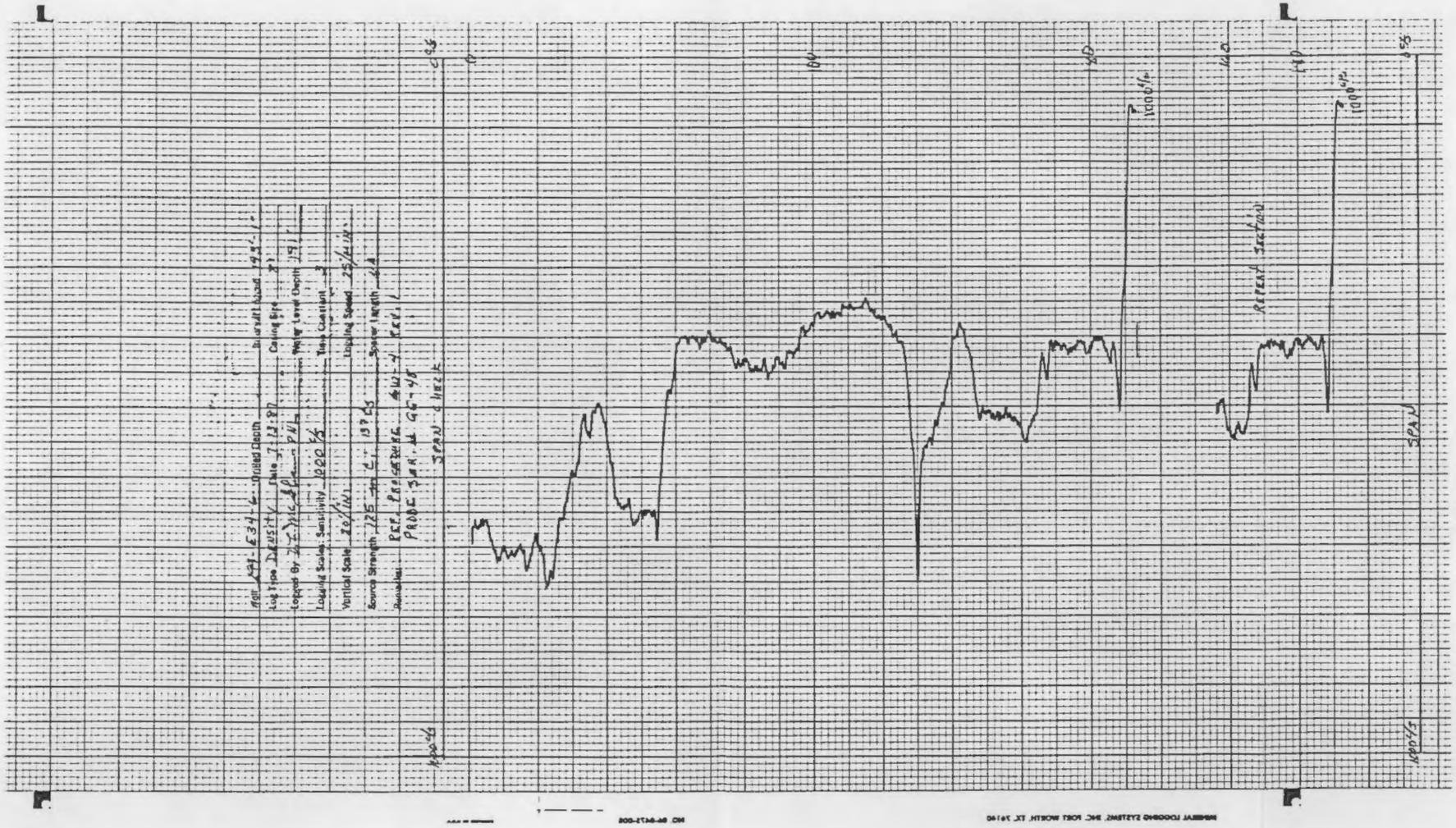
AS-BUILT DIAGRAM

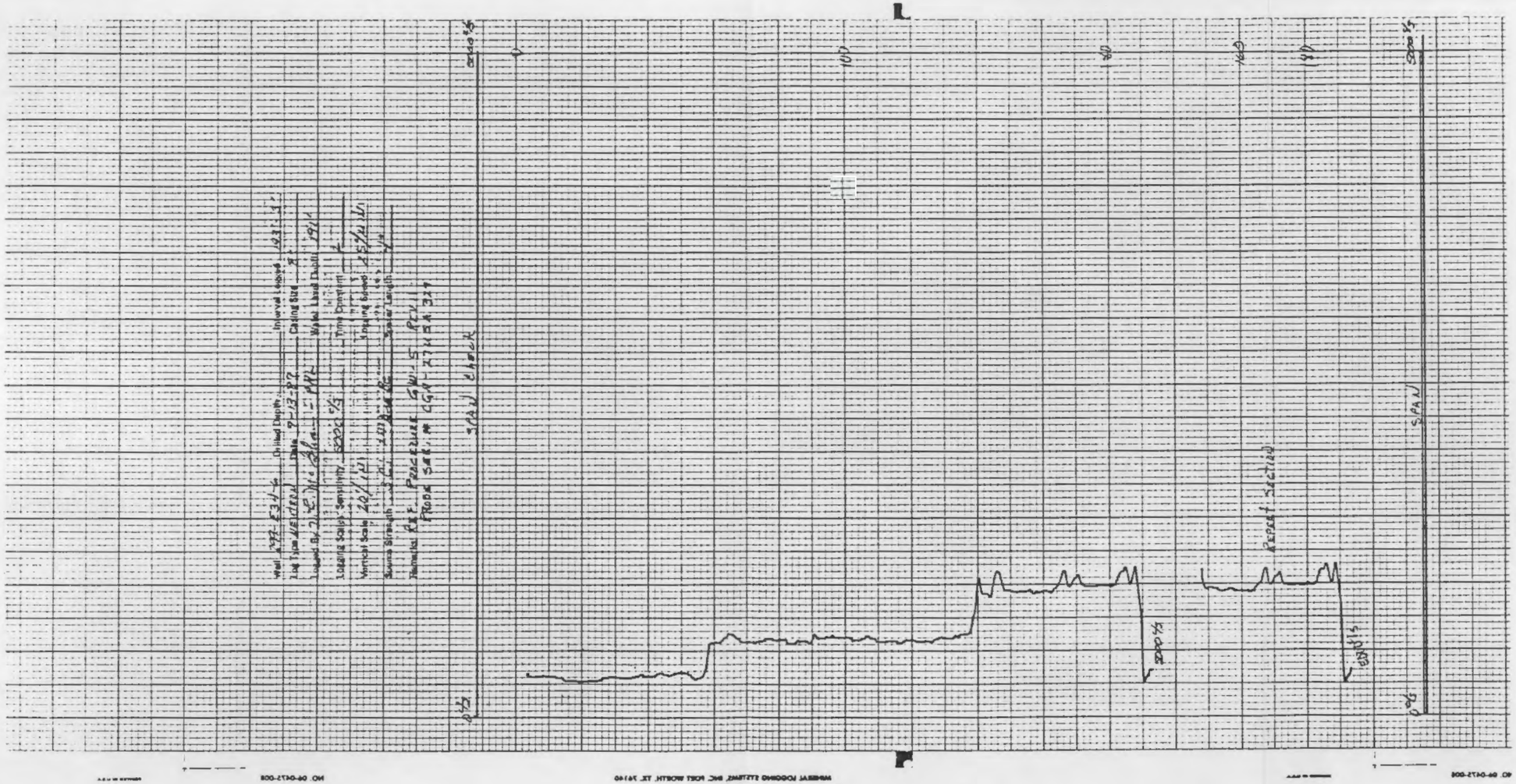
Well Number 299-E34-6 Geologist R.A. Hagen R. Primzic, Page 2 of 2
K. Oster, M. Chamness, E.J. Jensen, C. Teal, T. Grimore

Reviewed by W.E. McGhan Date 12-28-87

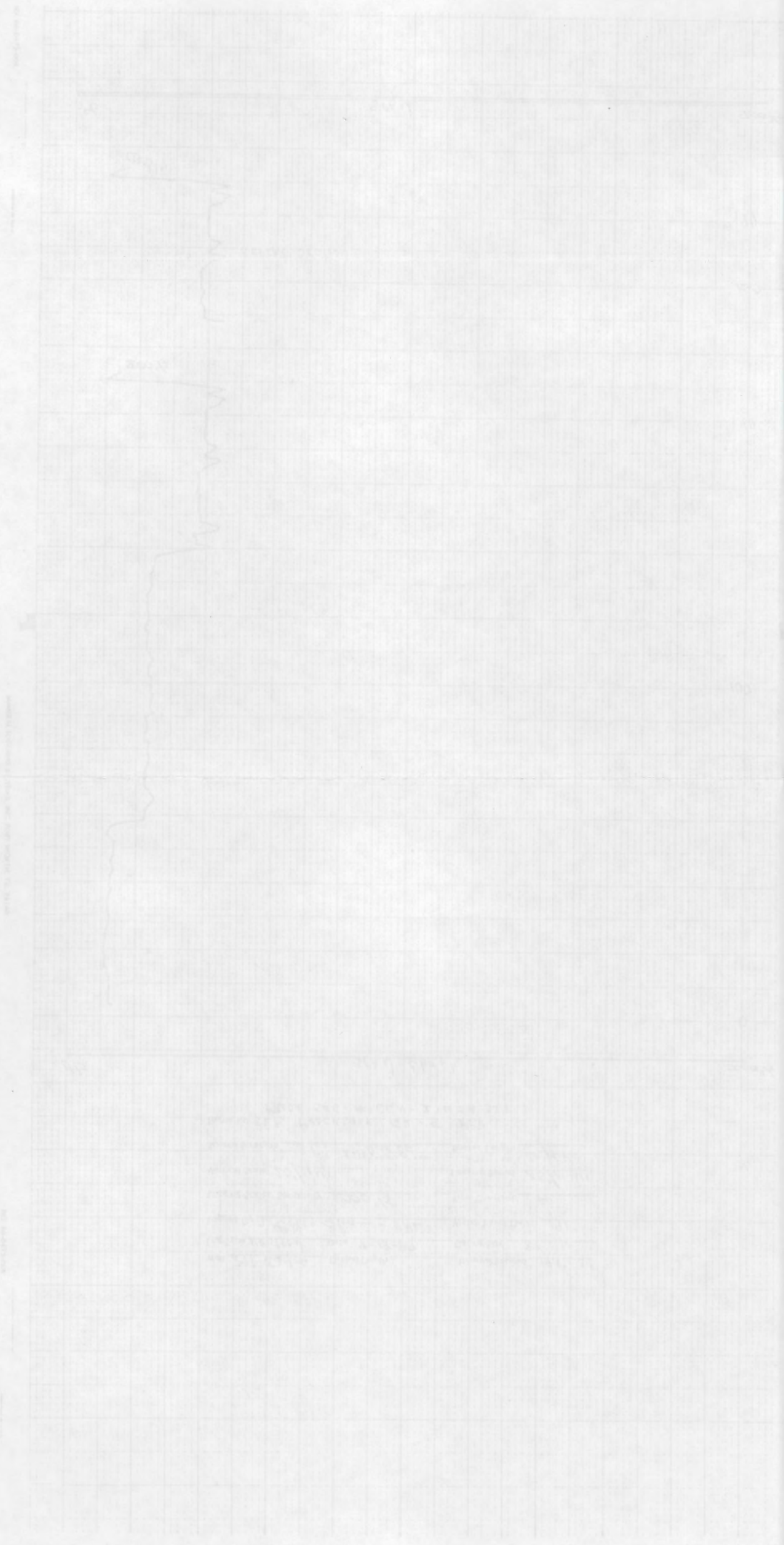
Construction Data		Depth in Feet	Geologic/Hydrologic Data		drill rate ft/hr
Description	Diagram		Diagram Litho.	Lithologic Description	
12" carbon steel		135		silty sandy gravel	2.5
Reverse circulated from 162' to 137'		140			2.0
8" temporary carbon steel casing		145		gravelly sand	2.0
centralizer		150		slightly silty gravelly sand	5.5
Voidage circulated from 162 to 137'		155		slightly gravelly slightly silty sand	4.0
20/30 Silica Sand, 180'-163'		160		slightly silty gravelly sand	4.2
4" 20 slot st steel screen		165		slightly silty gravelly	4.3
8" st steel 20 slot telescoping screen		170			7.5
10-20 sand placed from 195' to 180'		175		SAND	5.4
WT. at 190.81' 7/14/82	T.D. = 195'	180			10.0
		185		slightly silty sand	10.0
		190		silty sandy gravel	2.3
		195			3.3
				Basalt at ~194	

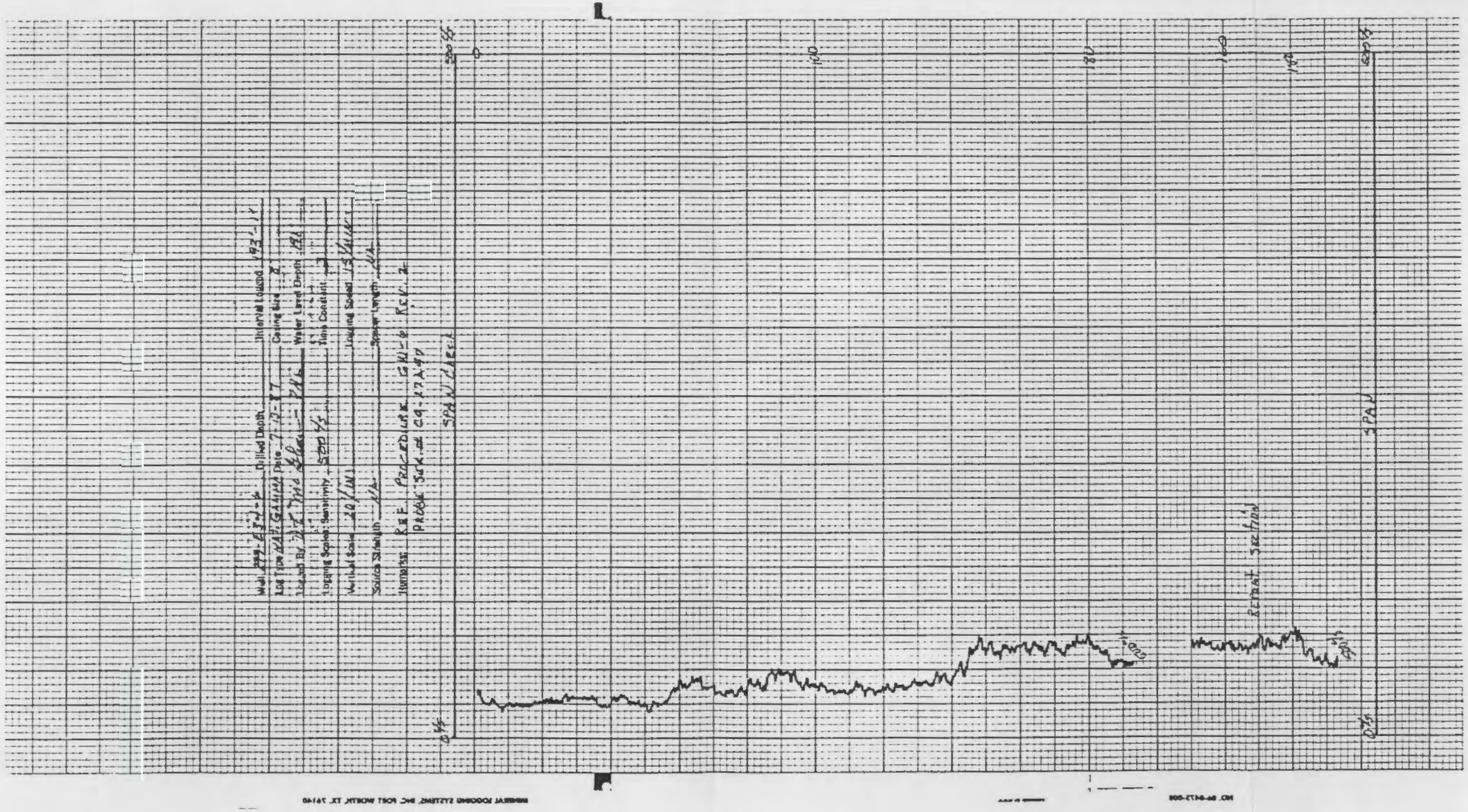
A-1800-188 (3/87)


Well KM-E34-C
Logged By
Vertical Scale
Source Strength
Remarks
PROBE SAM. at 46-48
SPAN
REFERENCE SECTION
SPAN



4-A.1825




Well 29-27-6
Location 660' FSL & 660' FEL
Depth Ref. 10' K.B. Type Log Gamma
Logging Speed: Sensitivity 5" 20 (API)
Vertical Scale 20'/in.
Source Strength n/a
Remarks Run E. Recorded w/ GR-E
Probe 15/16" dia. 9-27A-99
SPRUCE
Drilled Depth 193'-12"
Ground Elev. 2787'
Water Level Depth dry
Hole Condition good
Casing Size 4"
Type Log Gamma
Date 7-12-77
Logging Speed 5"/min
Density: n/a
Sonde Type & Model
Sonde Serial No. 15/16"
Sonde Length n/a
GR-E Recorded
9-27A-99
SPRUCE
500 GR
0
100
200
300
400
SPRUCE
Detail Section
1100
1000
900
800
700
600
500
400
300
200
100
0
GR
MOUNTAIN LOGGING SYSTEMS, INC. FORT WORTH, TX. 76140
NO. 84-8412-008

4-A.1827

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
EJ Jensen	cable tool #1	299-E34-6	NA	KEH-1915-1
Date: 6-24-87		Depth: 0' To 0'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calichie, Etc.	Time	Drilling Comments
				Steam cleaned rig and wire.	0800	
				Set up rig, poured wire rope socket and attached tool string.	1400	

REMARKS:

6/24/87

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)

4-A.1829

DRILL LOG

By PA HAGEN / EJ Jensen | Rig Cable tool #1 | Date 6-25-87 | Well Number 299-E34-6 | Depth 0' To 5' | Computer Number NA | Project or Work Order No KEH-915-1 | Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	4-5'	Backhoe	moist	SILTY GRAVEL, 10% cobbles, 10% pebbles, 5% vcs, 5% cs, 5% ms, 10% fs, 25% vfs, 30% silt, cobbles and pebbles are mostly sub-rounded to well-rounded Basalt, most of the cobbles and large pebbles have caliche rinds on them, material is unconsolidated, dry color is light Brownish gray 10YR (6/2), moisture sample taken. Weak HCl rxn. (Note: from description this is GRAVELLY SILTY SAND - RAH 6/26/87)	1000	DRILLER IS LEJ CORDON
20' 6"	of 16" casing			welded Drive shoe on 16' casing Total casing with drive shoe is 20' 6"	1200	Shoe not milled down.
						20 gals H_2O added
				R.A. Hagen arrives on site to replace Jensen.	1345	
					1353	Resumed drilling
					1410/1446	Stopped / resumed drilling
					1426	Added 20gal water
					1453/1501	Stopped / resumed drilling

REMARKS: (Added 20gal water)

Eric Jensen 6-25-87

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)

4-A.1830

DRILL LOG

By: R A Hagel | Rig: Cable Tool #1 Bucyrus 22W | Date: 6/25/87 | Well Number: 299-E34-6 | Depth: 5' To 9' | Computer Number: N/A | Project or Work Order No.: KEH-1915.1 | Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'6"	at 16'	casing			1533	added 20 gal H2O
					1559/1603	Stopped/resumed drilling
					1609/1717	Stopped/resumed drilling
					1740	End of day's drilling
						Drilled to 9'.
				R & A. H 6/25/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1831

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Cable Tool #1 (68k-19151) Len Corken	299-E34-6	N/A	KEH-1915-1
Date: 6/26/87	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
20'6" at 16" casing					0845	Added 25 gal H2O
					0849	Began drilling
					0857	Stopped drilling
	9-10'	H	W	SILTY SANDY GRAVEL - 70% gravel, 25% sand, 5% silt. Sample is 5% VCP, 7% CP, 25% MP, 20% FP, 13% VFP, 3% VCS, 5% CS, 12% MS, 5% FS. Sample is poorly sorted. Gravel is composed of 65% basalt, 25% metamorphics, 10% granite. Sand is composed of 65% basalt, 35% qtz. Grain clasts are rounded to subrounded. Sand grains are angular to subrounded. Wet color is 5Y 4/2 (olive gray). Dry color is 5Y 7/1 (light gray). Moderate HCl rxn. Material was unconsolidated in place. Much coarser (more gravel) than previous sample	1005	No open hole, but drilling about 6" of casing.
						Added ~2 gal H2O
					1008	Resumed drilling
					1105/1112	Stopped/resumed drilling
					1144/1245	Stopped/resumed drilling
					1317	Added 10 gal water

REMARKS:

M.A. Chamness 7/9/07

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

A-6000-021 (5-85)

4-A.1832

DRILL LOG

By: P. A. HAGEN | Rig: Cable Tool #1 (68K-19151) | Date: 6/26/87 | Well Number: 299-E34-6 | Depth: 10' To 15' | Computer Number: N/A | Project or Work Order No.: KEH-1915-1 | Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
20'6"	of 16"	casing				
	14-15'	H	W	SILTY SANDY GRAVEL. 45% gravel, 45% sand, 10% silt. Sample is 3% VCP, 12% CP, 10% MP, 7% FP, 13% VFP, 10% CS, 20% MS, 10% FS, 5% VFS. Sample is poorly sorted. Gravel is composed of 65% basalt, 15% qtz-rich metamorphics, 20% granitics. Sand is composed of 35% qtz, 60% basalt, 5% rock frags. Gravel clasts are rounded to subangular; sand grains are rounded to angular (qtz and basalt, respectively). Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/1 (light gray). Strong HCl rxn on dried sample. Unconsolidated. Very similar to previous sample - somewhat finer grained gravel & more silt.	1327	
					1416	Added ~10 gal H_2O
					1500	Added 10 gal H_2O
					1905	Stopped drilling
30'4"	of 16"	casing		Note: 16" casing (3 lengths, ~20' long each) was steam-cleaned on-site @ ~1030 this AM. Removed sooty coating on outside. Inside was previously sand-blasted and looks very clean.	1530	Added 9'10" of 16" casing

REMARKS:

M.A. Chamness 7/9/87

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)

4-A.1833

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A Hagen	Cable Tool #1 Bucyrus 22-D (68k-19151)	299-E34-6	NA	KEH-1915-1
Date: 6/26/87		Depth: 15' To 20'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30'4"	of 16" casing			Note: weld @ 20'6" was not gapped - both ends were beveled, but no gap between.		
					1720	Resumed drilling
						Note: driller is marking cable w/paint - the 5' intervals are measured by eye
					1740	End of drilling for the day @ 20'.
				R A Hagen 6/26/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1834

DRILL LOG

By: R A HAGEN | Rig: Calle Tool #1 (68K-19151) | Well Number: 299-E34-6 | Computer Number: N/A | Project or Work Order No.: KEH-1915-1

Date: 6/27/87 | 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
30'4"	± 16"	casing		Geol. arrives on site.	0602	
				Driller is F S Murphy - new driller.	0640	Added ~15 gal water.
	19-20'	H	W	GRAVELLY SILTY SAND. 20% gravel,	0704	Sample taken today,
				60% sand, 20% silt. Sample is 1% VCP,		but drilled to depth
				2% CP, 5% MP, 12% FP, 5% CS, 18% MS,		yesterday.
				30% FS, 7% VFS. Sample is moderately sorted.		
				Gravel is composed of 80% basalt, 15% granites,		
				5% metamorphics. Sand is composed of 30% qtz,		
				65% basalt, 5% rock frags. Grovels are rounded		
				to subangular; sand is rounded to subangular.		
				Wet color is 5Y 4/2 (olive gray); dry color		
				is 5Y 6/2 (light olive gray). Moderate rxn to 10% HCl on	dried sample.	
				Sample is slightly consolidated. Much finer grained		
				than 14-15' sample - much more sand.		
					0712	Began drilling
					0735/0945	Stopped/resumed drilling
					0845/1055	Stopped/resumed drilling
					1057	Added ~10gal H_2O

REMARKS:

M.A. Chamness
7/9/87

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)

4-A.1835

DRILL LOG	By RA HALEY	Rig Cable Tool #1 (68K-19151)	Well Number 299-E34-6	Computer Number N/A	Project or Work Order No. KEH-1915-1
	Date 6/27/87		Depth 20' To 25'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30'4"	at 16"	casing				
	24-25'	H	W	GRAVELLY SILTY SAND. 10% gravel,	1102	No ppt. hole when
				70% sand, 20% silt. Sample is 1% CP,		sampled, but drilling
				3% MP, 5% FP, 1% VFP, 5% DS, 35% FS,		ahead of casing
				30% VFS. Sample is moderately sorted. Gravel		
				is composed of 70% basalt, 20% metamorphics,		
				10% granitics. Sand is composed of 30% qtz,		
				65% basalt, 5% rock frags. Gravel clasts are		
				subrounded to subangular. Sand grains are subrounded		
				to subangular. Wet color is 5Y 3/2 (dark olive		
				gray); dry color is 5Y 6/2 (light olive gray).		
				Moderate HCl rxn on dried sand. No consolidation.		
				Similar to previous sample, but less gravel.		
				Gravel may be carried down from above - same		
				for the 19-20' sample.		
					1110	Shut down for lunch
					1212	Resumed drilling
					1214	Added 10 gal water

REMARKS

N.A. Chapman
7/7/87

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 85)

4-A.1836

DRILL LOG

By: R A Hagen | Rig: Cable Tool #1 (68k-19151) | Well Number: 299-E34-6 | Computer Number: N/A | Project or Work Order No.: RFI-1915-1

Date: 6/27/87 | 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
30'4" of 16" casing					1310	stopped drilling
	29-30	H	W	SILTY SAND. 2% gravel, 78% sand, 20% silt.	1310	~3' of open hole when sampled
				Sample is 1% MP, 1% FP, 35% CS, 20% MS, 18% FS, 5% UFS. Sample is moderately sorted. Gravel is composed of 70% basalt, 20% rhyolite, 10% granitics. Sand is composed of 60% qtz, 30% basalt, 10% R.F. Gravel clasts are angular (broken); sand grains are angular to subrounded - mostly subangular. Wet color is 5Y 4/2 (dark olive gray). Dry color is 5Y 6/2 (light olive gray). Strong HCl rxn on dried sand. No consolidation. Sand is much coarser than previous sample - less gravel too. What gravel is present may be cave-down.		
40'4" of 16" casing					1315	Added 10' 0" of 16" casing. Note: cut edges were beveled by hand + then ground smooth w/grinder.

REMARKS:

M.A. Chrisman 7/9/87

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)

4-A-1837

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HALEY	Cable Tool #1 (68-19151)	299-E 34-6	N/A	HEH-1715-1
Date 6/27/87		Depth 30' To 33'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40'4"	of 16"	casing			1532	Resumed drilling.
					1535	Added ~15 gal water.
					1552	Added ~10 gal water.
					1608	Added 10 gal water.
					1617	End of day's drilling @ 33'.
				R A H 6/27/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1838

DRILL LOG

By: R A HAGEN | Rig: Cable Tool #1 (68k-19151) | Date: 6/29/87 | Well Number: 299-E 34-6 | Depth: 33' To 40' | Computer Number: N/A | Project or Work Order No.: KEH-1915-1 | Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40'4" of 16" casing						Driller is Murphy
					0805	Began drilling
					0812	Added ~20 gal H_2O
					0830/0921	Stopped/resumed drilling
	34-35'	H	W	SLIGHTLY SILTY GRAVELLY SAND. 20% gravel, 70% sand, 10% silt. Sample is 1% CP, 4% MP, 5% FP, 10% VFP, 5% VCS, 40% CS, 15% MS, 5% FS, 5% VFS. Sample is poorly sorted. Gravels are composed of 65% basalt, 25% meta-sediments, 10% granitics. Sand is 20% basalt, 10% RF, 70% qtz. Gravel clasts are rounded to subangular; sand grains are angular to subrounded (qtz is subrounded, basalt is more angular). (Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/2 (light gray). Strong HCl rxn on dried sand. Sample is unconsolidated. Sample has more gravel than previous sample. Very similar sand fraction; less silt.	0933	No open hole when sampled, but drilling ahead of casing.
	39-40'	H	W	SLIGHTLY SILTY GRAVELLY SAND. 20% gravel, 70% sand, 10% silt. Sample is 1% CP, 2% MP, 7%	1005	~2' of open hole when sampled.

REMARKS:

R A Hagen
7/7/87

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 (5-85)

4-A-1839

DRILL LOG

By: R.A HAGEN | Rig: Cable Tool #1 (68K-19151) | Date: 6/29/81 | Well Number: 299-E34-6 | Depth: 40' to 40' | Computer Number: N/A | Project or Work Order No: REH-1915-1 | Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40'4"	of 16"			FP, 10% UFP, 10% VCS, 35% CS, 10% MS, 15% FS. Sample is moderately to poorly sorted. Gravel is composed of 70% basalt, 15% granitics, 15% metamorphics; sand is 20% basalt, 65% qtz, 15% R.F. Gravel clasts are rounded to subangular; sand is angular (basalt rests) to subrounded (rests qtz). Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/2 (light gray). Strong HCl rxn on dried sand. Sample is not consolidated. Similar to previous sample, but coarser sand fraction.		
					1018/1034	Stopped/started drilling
50'4"	of 16" casing				1045	stopped drilling added 10' 0" of 16" casing. (note cut edge of casing beveled by hand w/hacksaw blade).
					1200/1240	Lunch break
					1425	Resumed drilling.
					1440	Added ~20 gal H_2O
					1458	Added ~10 gal H_2O

REMARKS:

R.A Clayton 7/7/81

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

A 6000 021 (5 85)

4-A.1840

DRILL LOG

By: R A Hagen | Rig: Cable Tool #1 (68k-19151) | Well Number: 299-E34-6 | Computer Number: NA | Project or Work Order No.: HEH-1915-1

Date: 6/29/87 | Depth: 40' To 45' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
50'4"	of 16"	casing			1505/1512	Stopped/resumed drilling
					1514	Added ~10 gal H_2O
					1518	Stopped drilling - repairing
						hitting clutch - it's slipping
	41-45'	H	W	SLIGHTLY SILTY GRAVELLY SAND. 20% gravel, 65%	1604	Sample waiting in hole
				Sand, 15% silt. Sample is 1% CP, 4% NP,		before clutch went out.
				8% FP, 12% VFP, 5% VCS, 45% CS, 5% MS, 10%		~2' of open hole when
				FS. Sample is poorly sorted. Gravels are composed		sampled.
				of 75% basalt, 10% granitics, 15% metamorphics.		
				Sands are 15% basalt, 70% quartz, 15% rock		
				frags. Gravel clasts are rounded to subangular; sand		
				grains are subrounded (qtz) to subangular (rock		
				frags + basalt). Wet color is 5Y 4/2 (olive		
				gray); dry color is 5Y 7/2 (light gray). Strong		
				HCl rxn on dried sand. Material is unconsolidated.		
				Little change from previous sample.		
					1613	Resumed drilling
					1623	Added 10 gal H_2O

REMARKS:

H.A. Hagen
7/9/87

4-A.1841

D - Drive Barrel H - 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	Rig	Well Number	Computer Number	Project or Work Order No.
R A. Hagen	Cable Tool #1	299-E34-6	NA	HEH-1915-1
Date: 6/29/87	6BK-19151	Depth: 45' To 49'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
50'4"	of 16"				1710	Added 20gal 111.20
					1750	Ended drilling for
						the day @ 49'
				R&A.16 6/29/87		

REMARKS:

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

A 6000 021 (5 85)

4-A.1842

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HINES	Cable Tool #1 (68K-19151)	299-E34-6	NA	KEH-1715-1
Date: 6/30/87		Depth: 49' To 50'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
50'4"	of 16" casing			Driller is Murphy	0745	Began drilling
	49-50'	H	W	SILTY SANDY GRAVEL. 60% gravel, 30% sand, 10% silt. Sample is 1% UCP, 9% CP, 20% MP, 20% FP, 10% VFP, 5% UCS, 10% CS, 10% MS 5% FS. Sample is poorly to very poorly sorted. Gravels are composed of 70% basalt, 20% metamorphics, 10% granitics. Sand grains are 30% basalt, 60% qtz, 10% R.F. Gravel clasts are rounded to subangular; sand grains are angular to subrounded. Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/2 (light gray). Moderate HCl rxn on dried sand & silt. Sample is unconsolidated. Sharp increase in gravel content compared to previous sample.	0810	~3' of open hole when sampled. Driller noted the gravel began @ approx 48'.
60'4"	of 16" casing				0815	Added 10'0" of 16" casing - note: cut edges beveled by hand
					1012	Resumed drilling

REMARKS:

M.A. Chamness
7/9/87

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)

4-A-1843

DRILL LOG	By R A Hall	Rig Cable Tool #1	Well Number 299-E34-6	Computer Number	Project or Work Order No. RFH-1115-1
	Date 6/30/87	(6BK-11151)	Depth 50' To 55'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
60'4"					1058	Added ~20 gal H_2O
					1105	Added ~15 gal H_2O
					1115	Bailed material contains
						.5% VCP @ ~51'.
				Color change first noted @ ~51' - still drilling	1231	Cannot drill for about
				VCP w/ some small cobble. Color change is from		of casing (<1').
				5Y 4/2 (olive gray) to 5Y 4/1 (dark gray). Very distinct	1232	Added ~10 gal H_2O
				Very slow drilling because of coarse materials. The		Drilled thru lunch-
				interval from ~50'-~52' was very slow drilling,		no lunch break taken.
				the rate increased somewhat from 52'-55'.	1309	Added ~5 gal H_2O
					1326	Added ~5 gal H_2O
					1354	Added ~5 gal H_2O
					1409	Added ~5 gal H_2O
					1434	Added ~5 gal H_2O
	54-55'	H	W	SILTY SANDY GRAVEL. 40% gravel, 45% sand,	1447	~6" of open hole
				15% silt. Sample is 1% small cobble, 3% VCP,		when sampled
				3% CP, 10% MP, 15% FP, 8% VFP, 3% VCS,		Stopped drilling after
				5% CS, 17% MS, 15% FS, 5% VFS. Sample is very		sample taken.

REMARKS:

M A. Chamness
7/9/87

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)

4-A.1844

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. A. HAGEN	Cable Tool #1	299-634-6	N/A	KEH-1915-1
Date: 6/30/87	(68k-19151)	Depth: 55' To 59'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
60'4"				poorly sorted. Gravel composed of 70% basalt, 20% metamorphics, 10% granitics. Sand is composed of 35% basalt, 60% qtz, 5% rock frags. Gravel clasts are rounded to subangular; sand grains are angular to subrounded. Wet color is 5Y, between 4/1 and 4/2 (dark grey to olive grey). Dry color is 5Y 6/1 (light to dark grey). Moderate HCl rxn as dried sand/silt. Material shows no consolidation. Siltyer than 50' sample; less gravel, & + gravel is slightly coarser.		
					1505	Resumed drilling
					1528	stopped drilling-welding
						ears onto top of 16" casing.
					1606	Resumed drilling
					1722	Stopped drilling
				R. A. Hagen 6/30/87	1730	stopped drilling for
						the day @ 59'

REMARKS:

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

A 6000-021 (5-85)

4-A-1845

DRILL LOG	By R A HAVEN	Rig Calle Tool #1 (68k-19151)	Well Number 299-E34-6	Computer Number NA	Project or Work Order No. HEH-1915-1
	Date 7/1/87		Depth 59' To 59'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
60'4"	of 16"	casing		Driller is Murphy	0740	Switching hard tools
				Note: drive shoe on 12" casing not		to a smaller diameter
				milled down on outside. Weld on outside		bit to 12" casing.
				was made to taper the join between the	0800	Repairing rope socket
				shoe & casing. All 12" casing has been		prior to switching tools
				steam cleaned prior to its arrival on site.	0910	Hard tool installed is
				Shoe welded on in laydown yard.		11" diam. under-reamer
21'1½"	of 12"	casing			1025	Installed 21'1½" of
						12" casing w/drive
						shoe
41'11½"	of 12"	casing			1057	Added 20'11" of
						12" casing.
62'11½"	of 12"	casing			1235	Added 21'0" of 12"
						casing.
					1408	Began drilling
					1409	Added 5 gal H_2O
					1411	Added 5 gal H_2O

REMARKS:

M.A. Chambers
7/9/87

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)

4-A.1846

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Cable Tool #1 (68K-19151)	299-E34-6	N/A	KEH-1915-1
Date 7/1/87	**Depth** 59' To 62'			**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
62' 11½" of 12" diam			Casing		1420	Stopped drilling
	57-60'	H	W	SILTY SANDY GRAVEL. Sample is 60% gravel,	1422	~6" of spoil'd
				30% sand, 10% silt. Sample is 1% VCP,		
				5% CP, 19% MP, 25% FP, 10% VFP, 5% VCS,		
				10% CS, 10% MS, 5% FS. Sample is poorly to		
				very poorly sorted. Gravel is composed of 65%		
				basalt, 25% metamorphics, 10% granitics. Sand is		
				composed of 60% basalt, 30% qtz, 10% R.F.		
				Gravel clasts are rounded to subangular; sand grains are		
				angular to subrounded. Wet color is 5Y, between		
				4/1 and 4/2 (dark to olive gray). Dry color is		
				5Y 7/1 (light gray). Slight HCl rxn on dried sand/silt.		
				No consolidation. Similar to previous sample; more gravel.		
			Slight	Oil-like film noted on water in sample bucket - no smell.	1440	Resumed drilling
73' 5" of 12"		casing		Greenish-yellow coloration where HCl applied to dry fines.	1455	Stopped drilling - added
				This has been seen on samples since the past ~30',		10' 5½" of 12" casing.
				but not noted until now.		(factory bevels on casing ends)
					1716	Resumed drilling
					1739	stopped drilling for the day @ 62'.

REMARKS:

R A Hagen 7/1/87

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)

4-A-1847

DRILL LOG

By: R A Hagen | Rig: Cable Tool #1 | Well Number: 299-E34-6 | Computer Number: N/A | Project or Work Order No.: KEH-1915-1

Date: 7/2/87 | Depth: 62' 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
73'5" of 12"					0726	Began drilling
					0730	Added ~10gal water
					0756	Stopped drilling
					0815	Resumed drilling
					0835/0851	Stopped/resumed drilling
						Added 10 gal water
	64-65'	H	W	SILTY SANDY GRAVEL. 50% gravel, 40% sand, 10% silt. Sample is 1% small cobble, 1% VCP, 1% CP, 15% MP, 20% FP, 12% VFP, 5% VCS, 15% CS, 15% MS, 5% FS. Sample is very poorly sorted. Gravel is composed of 65% basalt, 30% metamorphics, 5% granitics. Sand is 50% basalt 35% qtz, 15% rock frags. Gravel is rounded to subangular; sand is subrounded to angular. Wet color is 5Y 4/1 (dark gray); dry color is indeterminable because of wet conditions (sample wont dry). Cant get HCl rxn on dried sample = no dried sample. Sample = very slight rxn on wet sample. Using similar to previous sample.	0921	No open hole calc. Sampler - casing is settling into hole as drilling proceeds - no need to drive casing. Also using some water to pull casing down by attaching it to 16"x12 inch crossover.

REMARKS:

R A Chamberlain
7/1/87

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)

4-A.1848

DRILL LOG

By: R A. HAGEL | Rig: Cable Tool Rig (68k-1915) | Date: 7/2/87

Well Number: 299-E34-6 | Depth: 65' To 70'

Computer Number: n/a

Project or Work Order No.: AEH-1915-1

Subcontract No.: n/a

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
73'5"	of 12" casing				1042	Added 10 gal H2O
	69 70	H	W	SILTY SANDY GRAVEL. SW to Gravelly, 40% sand, 40% silt. Gravels are 10% GR, 30% mR, 10% VF. Sands are 15% vc, 15% c, 10% m, 5% f, 5% vf. Sample is medium very packed. Gravel composition is 70% basalt, 25% mafic plutonic, 5% quartzite. Sand composition is 45% basalt, 45% qtz, 10% other. Gravels are R-SA, Sands are R-SA. Wet color is 5Y4/2 (olive gray). Unable to obtain dr. color due to wet (rain) weather. rxn with HCl. No carbonates. Very similar to previous sample.	1220	Sample taken from bailer
83'10 3/4" of 12" casing					1220	Drillers stopped drilling and 10'5 3/4" of 12" casing welded to the top of the previous 73'5" of 12" casing. The top of the 73'5" 12" casing was not beveled.
					1447	Drilling resumed.
					1505	5 gallons H2O added.
					1525	5 gallons H2O added.
					1530	Some destruction underway. Driller says water is lost between drill bit & casing.

REMARKS:

Richard Brengman

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

A-6000-021 (5-85)

4-A-1849

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. Prentiss	Eagle Tool #1	[illegible] 6	N/A	[illegible]
Date		Depth		Subcontract No.
7/2/87	6.5 - 7.5	70' To 70'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
5 1/2" to 7' of 12" casing	7'					
					1555	[illegible]

REMARKS:

Richard Prentiss 7/2/87

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)

4-A.1850

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. Teel	CME 750 #1	299-E34-6	N/A	
Date: 7-6-87	631-1851	Depth: 70' To 75'		Subcontract No.: N.A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
83'10" of 12" casing				Driller is Murphy	0530	Began drilling
					0605	Bailer bringing up sandy gravel w/ fist sized cobbles @ 73'
					0620	Stopped drilling - pounding down casing
					0635	Started drilling
	74-75'	H	Wet	GRAVEL Trace sm. cobble, Trace VCP, Trace CP, 15% MP 40% FP, 30% UFP, 1% VCS, 5% CS, 3% MS, 1% FS 5% UFS, silt, and clay. Very poorly sorted. (Gravels) - 85% basalt, 10% qtz, 5% met. and other. (sands) - 55% basalt, 35% qtz, 5% metamorphic minerals. Gravels seem to be rounded; sands are angular to rounded Wet color: 5Y 4/1.5 (dark gray to olive gray). Dry color: 5Y 7/1 (light gray) Unconsolidated. Sample is fairly representative. Largest clast size appears to be between small and large cobbles. Much more gravel / less sand than previous sample. Slight reaction to 10% HCL.	0855	

REMARKS:

Steve Teel
7-6-87

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)

4-A.1851

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
S. Teel	Cable Tool #1	299-E34-6	NA	KEH-1715-1
Date: 7-6-87	68K-19151	Depth: 75 To 80		Subcontract No: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0850	Total water added
						today so far ≈ 50 gal
						Drilling rate ≈ 1.5 Ft/hr
						Have been having
						problems with bit jamming
						up inside the casing all
						morning.
					0930	Bit stuck in hole
					1000	Bit still stuck -
						rigging up heater-bar
					1040	Bit is free
						- building-up bit
					1055	Began drilling
94'	4 3/4"	of 12" casing			1300	Welding 10 6⅝" of 12"
						casing added

REMARKS:

Steve Teel
7-6-87

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)

4-A.1852

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
T Gilmore	Cable tool #1	299 E34-6	NA	KJK-1915-1
Date 7/6/87	68K-1915-1	Depth 80 To 87'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	80'	H	Wet	GRAVEL: 80% Gravel, 20% Sand, Tr Silt;	1400	
				Tr VC pebbles, 10% C pebbles, 20% M pebbles, 30% F pebbles, 20% VF pebbles;		
				5% VC Sand, 10% CS, 5% MS, Tr F-VF Sand, Tr Silt;		
				Moderately sorted; Gravels contain 85% Basalt, 15% siliceous		
				Sands contain 85% Basalts, 15% Silica rich grains; Subangular		
				to angular; Most [illegible]; Wet color 2.5Y 4/2		
				(dk gybrn) Dry color 2.5Y 5/2 (lt brngy); Slight to nonreaction		
				in HCl. Poor consolidation		
					1555	~10 gal H2O added
	85'	H	Wet	GRAVEL: 80% Gravel, 20% Sand, Tr silt, 5% Cp,	1600	
				10% Mp, 35% Fp, 30% VFp, 5% VCS, 5% CS, Tr MS,		
				5% FS, 5% VFS, Tr Silt; Moderate Sorting; Gravels		
				contain 50% Basalt, 50% Silica-rich grains, Sands contain		
				75% Basalt, 25% Silica-rich grains; Subround-Subangular		
				Wet color 2.5Y 5/2 (dk gybrn) Dry color 2.5Y 5/2		
				(lt brngy) No reaction in HCl, Slight consolidation; Sample		
				Very similar to previous		
					1700	Shut down

REMARKS: 7/6/87 TD 87' Footage 17' 7in I casing set 4' 3¼" at 0" [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)

4-A.1853

DRILL LOG	By R A HAGEN	Rig Cable Tool (#1 68K-19151)	Well Number 299-E34-6	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 7/7/87		Depth 87' To 95'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
94'4 3/4" of 12"				Driller is Marsh	0525	Began drilling
	89-90'	H	W	GRAVELLY SAND. 27% gravel, 65% sand, 8% silt. Sample is 1%VCP, 10% MP, 10% FP, 6% VFP, 15% VCS, 35% CS, 10% MS, 5% FS. Sample is very poorly sorted. Gravel is composed of 65% basalt, 25% qtzite + meta., 10% granitic to plut. Sand is 20% basalt, 60% qtz, 20% rock frags. Gravel clasts are rounded to subangular. Sand grains are rounded to subangular. Wet color is 5Y 4/2 (olive brown); dry color is 5Y 7/2 (light gray). Moderate HCl rxn on dried fines. Sample is unconsolidated. Much less gravel than previous sample.	0615	
104'1 5/8" of 12"					0700	Added 10'6 7/8" of 12" casing. Beveled edges.
					0811	Resumed drilling
	94-95'	H	W	GRAVELLY SAND. 25% gravel, 70% sand, 5% silt. Sample is 1% CP, 4% MP, 15% FP, 5% VFP, 15% VCS, 40% CS, 10% MS, 5% FS. Sample is poorly	0930	Sample taken with dart bailer - all previous samples taken w/sand pump + poured in top end.

REMARKS:

M.A. Chamness 7/9/87

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-6000-021 (5-85)

4-A.1854

DRILL LOG

By: R.A. HAGEN | Rig: Cable Tools #1 (68K-11151) | Date: 7/7/87 | Well Number: 299-E34-6 | Depth: 95' To 100' | Computer Number: NA | Project or Work Order No.: KEH-1915-1 | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104' 11 5/8" of	12"			Sorted. Gravels are composed of 60% basalt, 25% metamorphics, 15% granitic clasts. Sand is composed of 25% basalt, 65% qtz, 10% rock frags. Gravel clasts are rounded to subangular; sand grains are subrounded to subangular - some are rounded. Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/2 (light gray). Moderate HCl reaction of fines. Sample material is unconsolidated. Sample is very similar to previous sample @ 90'.		
	99-100'	H	W	SILTY SANDY GRAVEL. 50% gravel, 40% sand, 10% silt. Sample is 1% VCP, 3% CP, 26% MP, 15% FP, 5% VFP, 5% VCS, 20% CS, 5% MS, 10% FS. Sample is poorly sorted. Gravel is composed of 55% basalt, 30% qtzite & metamorphics, 15% granites and other rock frags. Sand is 55% basalt, 30% qtz, 15% rock frags. Gravel clasts are rounded to subrounded; sand grains are angular to subrounded. Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/2 (light gray). Slight	1226	Sample taken w/ dart bailer

REMARKS:

R.A. Hagen
7/7/87

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 (5-85)

4-A.1855

DRILL LOG	By R A HAGEN	Rig Cable Tool #1 (68k-19151)	Well Number 299-E34-6	Computer Number NA	Project or Work Order No. HEH-1915-1
	Date 7/7/87		Depth 100' To 106'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
104'11 5/8" of		12"		RXN to 10% HCl on dried fines. Sampled material is		
				unconsolidated. Sharp increase in gravels, and an		
				increase in FS in sand fraction.		
					1355	Stopped drilling -
						bailed top end of
						casing string (by hand,
						overnight buckets are on site!)
115' 4 5/8" of 12"		casing			1415	Added 10'5" of 12"
						casing
					1524	Resumed drilling
	104-105'	H	C1	SILTY SANDY GRAVEL. 60% gravel, 30%	1611	Sampled w/dart bailer
				sand, 10% silt. Sample is 5% CP, 35% MP, 15%		
				FP, 5% VFP, 5% VCS, 10% CS, 10% MS, 5% FS.		
				Sample is poorly sorted. Gravel composed of 60% basalt,		
				25% metamorphics, 15% granitics. Sand is 50% basalt, 40%		
				qtz, 10% R.F. Gravel clasts are rounded to subangular; sand		
				grains are subrounded to angular. Wet color is 5Y 7/1 (olive		
				gray); dry color is 5Y 7/1 (light gray). Slight HCl rxn on dried fines.		

REMARKS: Unconsolidated. Very similar to 100' sample - little change. 1647 Shut down for the day. @ 106'

7/8/87

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)

4-1.1856

DRILL LOG

By: R A Hagen | Rig: Cable Tool #1 (68k-19151) | Well Number: 299-E34-6 | Computer Number: NA | Project or Work Order No.: KFH-1915-1

Date: 7/8/81 | Depth: 106' To 110' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
115'4 5/8" of 12" Casing				Driller is Murphy	0510	Began drilling
	109-110'	H	W	SAND & GRAVEL. 55% gravel, 40% sand, 5% silt. Sample is 1% CP, 25% MP, 29% FP, 5% VFP, 5% VCS, 20% CS, 10% MS, 5% FS. Sample is poorly sorted. Gravel is composed of 70% basalt, 25% metamorphics, 5% granitics; sand is 50% basalt, 40% qtz, 10% rock fragments. Gravel clasts are rounded to subangular; sand grains are mostly angular to subangular. Wet color is 5Y 3/2 (dark olive gray); dry color is 5Y 7/1 (light gray). Slight HCl rxn on dried fines. Sample is unconsolidated. Very similar to previous sample.	0745	Sampled w/dart bailer
					0905	Stopped drilling - changing to a different hard tool.
					1015	Resumed drillings
125'10 7/8" of 12"					1035	Stopped drillings - added 10'6 1/4" of 12" casing

REMARKS:

R.A. Chamberlain
7/13/81

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

A 6000-021 (5-85)

4-A-1857

DRILL LOG

By: R A HAGEN | Rig: Cable Tool #1 (68K-19151) | Well Number: 299-E34-6 | Computer Number: NA | Project or Work Order No.: KEH-1915-1

Date: 7/8/87 | Depth: 110' To 120' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125' 10 7/8" of		12"			1149	Resumed drilling
					1236	Add'l ~20 gal H_2O since 1149
	114-115'	H	W	SILTY SANDY GRAVEL. 45% gravel, 45% sand, 10% silt. Sample is 3% CP, 20% MP, 17% FP, 5% VFP, 5% VCS, 10% CS, 15% MS, 15% FS. Sample is very poorly sorted. Gravel clasts are composed of 65% basalt, 25% metamorphics, 10% granitics. Sand is composed of 65% basalt, 25% qtz, 10% rock frags. Gravel clasts are rounded to subangular. Sand grains are subangular to angular. Wet color is 5Y 3/2 (dark olive gray); dry color is 5Y 7/1 (light gray). Slight HCl rxn on dried fines. Material shows no consolidation. Very much like previous sample - but with an increase in FS.	1252	Sampled w/dent bailer. Added ~10 gal water
	119-120'	H	W	SILTY SANDY GRAVEL. 50% gravel, 40% sand, 10% silt. Sample is 3% CP, 25% MP, 15% FP, 7% VFP, 5% VCS, 10% CS, 20% MS, 5% FS. Sample is very	1441	Sampled w/dent bailer

REMARKS:

M.A. Chrisman
7/9/87

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)

4-A.1858

ORILL LOG	By R A Hagen	Rig Cable Tool #1 (68k-19151)	Well Number 299-E34-6	Computer Number NA	Project or Work Order No. KEH-1915-1
	Date 7/8/87		Depth 120' To 123'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125' 10 7/8" of 12" casing				poorly sorted. Gravel clasts are composed of 70% basalt, 25% metamorphics, 5% granitics. Sand is composed of 25% qtz, 65% basalt, 10% rock frags. Gravel clasts are rounded to subangular; sand grains are angular to subrounded. Wet color is 5Y 3/2 (dark olive gray); dry color is 5Y 7/1 (light gray). Moderate HCl rxn on dried fines. Material shows no consolidation. Very much like previous sample.		
					1608	Stopped drilling - getting ready to add casing - casing not added today
					1645	Shut down for the day.
				R & A. K 7/8/87		

REMARKS:

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

A-6000-021 (5 86)

4-A.1859

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIK	CABLE TOOL #1	299-834-6	N/A	KEH 1915-1
Date: 7/9/87	68K-1915	Depth: 123' To 130'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
125'10 3/8" of 12" casing						Previous Borehole.
124'4 7/8" of 12" casing					0500	10'6" of 12" casing welded to el. previous 125'10 3/8". Total 12" casing = 136'4 3/8".
					0715	Drilling started
	124-125'	H	W	SILTY SANDY GRAVEL, 70% gravel, 25% sand, 5% silt. Gravels are 10% CP, 25% MP, 25% FP, 10% VFP. Sands are 5% VCS, 8% CS, 7% MS, 5% FS. Sample is poorly sorted. Gravel composition is 70% basalt, 25% qtz-rich metamorphics, 5% granitics. Sand composition is 65% basalt, 35% qtz. Gravel is generally SR. Sand is SA-A. Wet color is 5Y 4/2 (olive gray). Dry color is 5Y 7/1 (light gray). Very slight rxn to 10% HCl. No consolidations above gravel than previous sample	0745	sample from bailer.
					1035	5 gallons H_2O added.
	129-130'	H	W	SILTY SANDY GRAVEL. 52% gravel, 40% sand, 8% silt. Gravels are 5% CP, 20% MP, 20% FP, 7% VFP, 10% VCS, 20% CS, 5% MS, 5% FS. Sample is moderately-poorly sorted. Gravel composition is 75% basalt, 20% qtz-rich metamorphics, 5% granitics. Sand composition	1105	

REMARKS:

Richard Premzik

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

A-6000 021 (5 85)

4-A.1860

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	CABLE TOOL #1	219 E 24 6	N/A	KEH-1915-1
Date: 7.9.87	6XK-10131	Depth: 130' To 135'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
136'4⅞" of 12" casing.						
				is 70% basalt, 30% qtz. Gravels are SR-SA. Sands are generally SA. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/1 (lt. gray). Slight-moderate rxn. to 10% HCl. No consolidation. More sand. Smaller gravels than previous sample.		
					1137	5 gallons H_2O added.
146'9⅛" of 12" casing.					1230	Drilling stopped. 10'4⅛" 12" casing welded on the top of the previous 136'4⅞" 12" casing. Top of the 136'4⅞" 12" casing was hand-beveled. Total 12" casing is 146'9⅛".
				Swing shift driller is Robinson	1417	resumed drilling
	134-135'	H	W	SILTY SANDY GRAVEL. 35% gravel, 55% sand, 10% silt. Sample is 5% mF, 20% F, 10% VF, 10% VCS, 25% CS, 10% MS, 10% FS. Sample is poorly sorted. Gravels are 70% basalt, 25% metamorphics, 5% granitics. Sand is 50% basalt, 40% qtz, 10% other. Gravel clasts are rounded to subangular. Sand grains are angular to subrounded.	1453	Sampled w/dart bailer

REMARKS:

Richard Premzic

D - Drive Barrel 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)

4-A.1861

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.A. Hage	Calk Tool #1 (68H-19151)	299-E31-6	NA	KFH-1915-1
Date: 7/9/87		Depth: 135' To 145'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146' 9 1/8" of 12" casing				Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/1 (light gray). Slight HCl rxn on dried fines. Material shows no consolidation. Decrease in percentage and grain size of gravel clasts compared to previous sample.		
	139-140'	H	W	SILTY SANDY GRAVEL. 30% gravel, 60% sand, 10% silt. Sample is 5% MP, 25% FP, 5% UFP, 10% UCS, 30% CS, 10% MS, 10% F+UFS. Sample is poorly sorted. Gravel is composed of 75% basalt, 20% qtz-rich metamorphics, 5% other. Sand is 45% basalt, 45% qtz, 10% rock frags. Gravel clasts are rounded to subangular; sand is angular to subrounded. Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/1 (light gray). Slight HCl rxn on dried fines. Unconsolidated. Little change from previous sample.	1731	Sampled w/ dart bailer.
					1910	Stopped drilling
					1955	Resumed drilling
	144-145'	H	W	GRAVELLY SAND. 25% gravel, 70% sand, 5%	2043	

REMARKS:

M.A. Chamness
7/9/87

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)

4-A.1862

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Cable Tool #1	299-E 34-6	NA	KEH-175-1
Date: 7/9/87	68K-M151	Depth: 145' To 147'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
116'9"	8" of	12" casing		Silt. Sample is 15% FP, 10% UFP, 15% VCS, 40% CS, 10% MS, 5% FS. Sample is moderately Sorted. Gravel is composed of 70% basalt, 20% metamorphics, 10% granitics + other. Sand is 40% basalt, 50% qtz, 10% R.F. Gravel clasts are subrounded to subangular - Sand grains are subangular to subrounded. Wet color is 5Y 4/2 (olive gray). No dry color determined because of rainy weather. No HCl rxn determined because of rain. No consolidation. Much more sand than previous sample.		
					2100	Shut down for the day @ 147'. Will install 8" casing tomorrow morn.
				R C A 16 7/9/87		

REMARKS:

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

A-6000-021 (5 85)

4-A.1863

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
[illegible]	CABLE TOOL #1	[illegible]	N/A	[illegible]
Date: 7/[illegible]	68[illegible]	Depth: 147' To 150'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146' 9½"	of 12" casing					Drilling [illegible]
					0600	Switching from 12" casing to 8".
21' 2½"	of 8" casing				0710	21'2½" of 8" added
41' 11"	of 8" casing				0745	20'8½" of 8" added
62' 11"	of 8" casing				0810	21' 2" of 8" added
83' 8½"	of 8" casing				0845	20'9½" of 8" added
104' 7½"	of 8" casing				0915	20'11" of 8" added
124' 11½"	of 8" casing				1000	20' 4" of 8" added
145' 8½"	of 8" casing				1045	20' 8½" of 8" added
156' 1¾"	of 8" casing				1130	10' 5½" of 8" added
					1210	Drilling started
	149-150'	H	W	SLIGHTLY SILTY GRAVELLY SAND. 25% gravel, 67% sand, 8% silt. Gravels are 3% MF, 15 FP, 7% VFP. Sands are 25% VCS, 20% CS, 15% MS, 7% FS. Sample is moderately - poorly sorted. Gravel composition is 25% basalt, 20% altered metamorphics, 5% granitics. Sand composition is 50% basalt,	1245	Sample from dust bailer

REMARKS:

Richard Prenzin

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

A-6000-021 (5-85)

4-A.1864

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. Tremble	CABLE TOOL #1	299-E34-6	N/A	KEH-1915-1
Date: 7/10/87	68K-19151	Depth: 150' To 158'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
156'1 3/4" of 8" casing.						
				45% qtz, 5% other. Gravels are generally SR-SH. Sands are SR-SA. Wet color is 5Y4/2 (olive gray). Dry color is 5Y7/2 (lt. gray). Slight-moderate rxn to 10% HCl. No consolidation. Very similar to previous sample.		
166'2" of 8" casing.					1300	Stopped drilling. 10'1/4" of 8" casing added to the top of previous 156'1 3/4" of 8" casing. Top of 156'1 3/4" casing was hand beveled. Total 8" casing is 166'2".

Richard Tremble 7/10/87

REMARKS:

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

A 6000-021 (5-85)

4-A.1865

DRILL LOG	By HAGEN	Rig Calle Tool #1 (68K-11151)	Well Number 299-E34-6	Computer Number NA	Project or Work Order No. HEII-1715-1
	Date 7/10/87		Depth 150' To 161'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
166'2"	of 8"			Driller is Robinson	1435	resumed drilling
					1445/1450	stopped/resumed drilling
	154-155'	H	W	SLIGHTLY GRAVELLY SLIGHTLY SILTY SAND Sample is	1539	Sampled w/dart bailer
				5% gravel 85% sand, 10% silt. Sample is 5%		
				UFP, 15% VCS, 55% CS, 10% MS, 5% FS. Sample		
				is moderately sorted. Gravel is composed of 75%		
				basalt, 20% meta., 5% other; sand is 35% basalt,		
				55% qtz, 10% RF. Gravel clasts are A-R;		
				Sand grains are A-SR. Wet color is 5Y 7/1		
				(olive gray); dry color is 5Y 7/1 (light gray).		
				Moderate HCl rxn on dried sand. No consolidation.		
				More sand than previous sample, but similar.		
	160-161'	H	W	SLIGHTLY SILTY GRAVELLY SAND 15% gravel,	1619	Sampled w/dart bailer
				75% sand, 10% silt. Sample is 5% FP, 10% VFP,		
				15% VCS, 45% CS, 10% MS, 5% FS. Sample is		
				MS-PS. Gravel is 70% basalt, 20% metamorphics, 10%		
				granitics. Sand is 40% basalt, 50% qtz, 10% other. Gravel		
				clasts are SR-SA, sand is A-SR. Wet color is		

REMARKS:

M.A. Chamness
7/10/87

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)

4-A.1866

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
HAGEN	Cable Tool #1	299-E34-6	NA	KEH-1915-1
Date 7/10/87	(68k-19151)	Depth 161' To 165		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
166'2" of 8"				5Y 4/2 (olive gray); dry color is 5Y 7/1 (light gray).		
				Moderate HCl rxn on dried fines. No consolidation.		
				Very similar to previous sample, w/a little more gravel.		
					1711	Stopped drilling
176'7 1/4" of 8" casing						Added 10'5 1/4" of
						8" casing
					1903	Resumed drilling
	161-165'	H	W	SLIGHTLY SILTY GRAVELLY SAND. 25% gravel,	1950	Sampled w/ dart bailer
				65% sand, 10% silt. Sample is 1% CP, 4% MP,		
				15% FP, 5% UFP, 10% VCS, 40% CS, 10% MS, 5% FS.		
				Sample is poorly sorted. Gravel is 75% basalt, 15%		
				meta., 10% granitics. Sand is 40% basalt, 30%		
				qtz, 10% other. Gravel is SR-SA; sand is R-SA.		
				Wet color is 5Y 4/2 (olive gray); dry color is		
				5Y 7/1 (light gray). Moderate HCl rxn. No		
				consolidation. Little change from previous sample		

REMARKS:

M.A. Chamness
7/10/87

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)

4-A.1867

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M A Chambless	Cole Tool #1 (DFK 1951)	299-E34-6	N/A	KEH-1115-1
Date: 7/10/87		Depth: 165' To 171'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176' 7¼"	169'-170'	H	wet	SLIGHTLY SILTY GRAVELLY SAND: 20% gravel, 65% sand, 15% silt. 5% fg, 15% vfg, 10% vc, 25% cs, 15% m, 10% f, 5% vfs, 15% silt. VFS. Gravel 65% basalt, 25% qtz, 10% other. Sand 40% basalt, 10% qtz, 20% other. Gravel SA-A. Sand SA-R. Wet color 5Y 4/2 (olive gray) dry ~5Y 7/2 (light gray). Slight rxn. to HCl. Unconsolidated? Same very similar to sample above.	2030	Driller quit at 2045
				RJAH 7/10/87		

REMARKS:

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

A-6000-021 (5 85)

4-A.1868

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Breniz ic	CABLE TOOL #1	299-E34-6	N/A	REM-1915-1
Date: 7/1/87	65K-1915	Depth: 171' To 180'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176'7¼" of 8" casing.						Driller is Murphye.
					0530	Drilling started.
187'1" of 8" casing.					0600	Drilling stopped. 10'5¾" of 8" casing welded to the top of the previous 176'7¼" of 8" casing. Total 8" casing is 187'1"
					0640	Drilling resumed
	175'	H	W	SAND. 1% gravel, 75% sand, 40% s.t. Gravels are 1% FP, trace VFP. Sands are 10% VCS, 30% CS, 45% MS, 15% FS. Sample is well-moderately sorted. Grave composition is 55% basalt, 40% qtz-rich metamorphics, 5% granitics. Sand composition is 30% basalt, 20% qtz. Gravels are H-SH. Sands are generally SR. Wet color is 5Y4/3 (olive). Dry color is 5Y7/2 (lt gray). Good rxn to 10% HCl. No consolidation. Sample has much more sand than previous sample.	0650	Sample from dust bailer.
	180'	H	W	SH/VD. <1% gravel, 95% sand, 5% silt. Sands are 5% VCS, 40% CS, 40% MS, 15% FS. Sample is well-moderately sorted. Sand composition is 20% basalt,	0720	Sample from dust bailer.

REMARKS:

Richard Breniz

D - Drive Barrel 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)

4-A.1869

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMZIC	CABLE TOOL #1	299-534-6	N/A	EE11-1715-1
Date: 7/11/87	68K-1915-1	Depth: 120' To 185'		Subcontract No.: N.A.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
187'1" of 8" casing.				75 % qtz, 5 % other. Sands are SR-SA. Wet color is 5Y4/3 (olive). Dry color is 5Y7/2 (lt. gray). Good rxn to 10% HCl. No consolidation. Similar to previous sample but less gravel.		
	184-185'	H	W	SLIGHTLY SILTY SAND. 2% gravel, 88 % sand, 10 % silt. Gravel is 1% FP, 1% VFP. Sand is 10% VCS, 20% CS, 30 % MS, 40 % FS. Sample is moderately sorted. Gravel composition is 75 % basalt, 20 % qtz-rich metamorphics, 5 % granitics. Sand composition is 25 % basalt, 70 % qtz, 5 % other. Gravels are A, Sands are SR-SA. Wet color is 5Y5/3 (olive). Dry color is 5Y7/2 (lt. gray). Good rxn to 10 % HCl. No consolidation. Sample is very similar to previous sample.	0750	Sample from dart bailer.
197'5" of 8" casing.					0800	Stopped drilling. 10'4" of 8" casing added to the previous 187'1" of 8" casing. Top of 187'1" of 8" casing was hard banded. Total 8" casing is 197'5".
					0900	Resumed Drilling. Driller says drilling rate is slowing due to larger rocks.

REMARKS:

Richard Premzic

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

A-6000-021 (5 85)

4-A.1870

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMUZIC	CABLE TOOL #1	299-E34-6	N/A	KE11-1915-1
Date 7/11/87	CSK-19151	Depth 185' To 190'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
197'5"	of 8" casing					
	190'	H.	W	SILTY SANDY GRAVEL, 50% gravel, 45% sand, 5% silt. Gravels are 3% CP, 12% AP, 20% FP, 15% VFP. Sands are 20% VCS, 15% CS, 10% MS. Sample is poorly sorted. Gravel composition is 25% basalt, 20% cherts & chalcedonies, 5% granitics. Sand composition is 50% basalt, 45% cryptocrystalline, 5% other. Gravels are SA-A. Sands are SR-SA. Wet color is 5Y4/2, (olive gray). Dry color is 5Y3/1 (olive gray). Moderate reaction to 10% HCl. No consolidation. Sample has much more gravel/less sand with larger grain sizes for gravels and sands than previous sample.	1130	Sample from dark bailer.
207'10"	of 8" casing				1255	Drilling stopped. 10'5" of 8" casing welded to the top of the previous 197'5" 8" casing. Top of 197'5" 8" casing cut and beveled. Total 8" casing is 207'10"

REMARKS:

Richard Premuzic 7/11/87

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)

4-A.1871

DRILL LOG

By: RA HACER | Rig: Cable Tool #1 (68K-19151) | Date: 7/11/87 | Well Number: 299-E34-6 | Depth: 190' To 195' | Computer Number: NA | Project or Work Order No.: HEH-1915-1 | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
207'10" of 8" casing						Driller is Robinson
	194-195' H		W	SILTY SANDY GRAVEL. 60% gravel, 35% sand, 5% silt. Sample is 1% CP, 10% MP, 35% FP, 14% VFP, 10% VCS, 20% CS, 5% MS, TRACE of FS. Sample is moderate - poorly sorted. Gravel is composed of 60% basalt, 30% rhyolite, 10% granites. Sand is 40% basalt, 45% qtz, 15% R.F. Gravel clasts are R-SA; sand grains are SA-SR. Wet color is 5Y 4/2 (olive gray); dry color is 5Y 7/1 (light gray). Moderate HCl rxn on dried fines. No consolidation. Very similar to previous sample.	1300?	Sample taken before I arrived on site
					1516	Stopped drilling - casing will not advance when trying to drive, and drill rate is very slow. We think are at top of basalt.
				Meas. w/ S-TAPE w/ SPLICE		
197'5" of 8" casing				D/B = 197'8" - 2'9" (stick up) - 3' (splice) + 2'3 1/4" = 194'2 1/4" (end extra) from surface.		Removed 10'5" of 8" casing - the same piece added previously.

REMARKS:

RJ A. H 7/11/87

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)

4-A.1872

DRILL LOG

By: R A. HACED | Rig: Cable Tool #1 (68k-17151) | Well Number: 299-E34-6 | Computer Number: NA | Project or Work Order No.: AFII-1715-1

Date: 7/11/87 | Depth: 195' To 195' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'5"	of 8"		8'	Screen (telescoping) to be installed is 10' 3" long x 7 1/2" in diameter.		
				D/W = 196'4 3/4" - 2'9" = 193' 7 3/4" below surface	1558	
1				... only about 7" of water in well - water could be sealed off when driving casing into basalt - will check again later.		
				Straightness test performed successfully - used a dart bailer 5 1/2" in diameter with rebar welded around its perimeter in 3 places along its length in effect making it 6" in diameter. Length of tester is ~20 1/2'.	1625	
				Will not set screen today - will bring in a crane to set screen + pull back casing on Monday. Breaking apart tools + rig to move off pad.	1655	
				D/B = 197'7 3/4" - 2'9" - 3' + 2'3 3/4" = 194'2 1/2" (below sur.	1905	
				D/W = 195'2 1/2" - 2'9" = 192'5 1/2" (below surface)	1908	

REMARKS:

(E-TAPE # 110444) 191'11 3/4" @ 2102 hrs
D/W = 191'9" - 2'9 1/4" =
(E-TAPE # 110444)

R A. H 7/11/87

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)

4-A.1873

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No
R.L. PREMO16	CABLE TOOL #1	299-F54-6	N/A	REH-1915-1
Date: 7/13/87	68K-1915	Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'5" of 8" casing						
				D/B using steel tape is: Tape reading 197'7" Minus Tape Splice -3' Extra Tape on tape +2'3¾" Casing stickup -2'9" 194'1¾" from ground surface	0555	
				D/W using E-tape; E-tape reading 193'10½" [model#51453 Serial#11044] Casing stickup -2'9" 191'1½" From ground surface.		
				194'1¾" D/B -191'1½" D/W 3'1¼" of water in well.		
				Decision made to bail well dry and check on recovery. Bailing at this time. Bailer is not holding water. ~¼ gallon recovered after three tries.	0655	started bailing
				New direction from George Last. Told to stop bailing until he arrives and a water sample can be taken.	0705	stopped bailing.
				Vern Meglan on site to geophysically log well.	0825	
				Vern Meglan completes geophysical logging.	1030	

REMARKS:

Richard Premo

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

A-6000-021 (5 85)

4-A.1874

DRILL LOG	By R.L. PREMMIC	Rig CABLE TOOL #1	Well Number 299-E34-6	Computer Number N/A	Project or Work Order No. KRIT-1915-1
	Date 7/13/87	68K-1915-1	Depth 195' To 195'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'5" of 8" casing.						
				Well bailed dry. E tape reads: 196' 11½"	1145	Bailed well.
				~7½ gallons bailed. [model #51453 serial # 11044] - 2'9" casing stickup		
				194' 2½" D/W from ground surface		
				New D/B using steel tape after bailing: 198' 4¾" eye reading	1220	
				-3' tape splice		
				-2'9" casing stickup		
				+2'3¾"		
				194' 11½" D/B from ground surface.		
				E-tape reading: 196' 1"	1250	
				- 2'9" casing stickup		
				193' 4" D/W from ground surface.		
				Directed by Scott Wilbur to collect what water is available from the well by 1400 hours (for preliminary analysis), when completion of the well shall begin. Well completion will exclude the use of the 8" diameter telescoping screen, and use only the 4" diameter screen.		

REMARKS:

Richard Premmic

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

A-6000 021 (5-85)

4-A.1875

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMICE	CABLE TOOL #1	299-E34-6	N/A	KEH-1915-1
Date: 7/13/87	68K-1915	Depth: 195 To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'5" of 8" casing						
				E-tape reading: 195'6"	1325	
				-2'9" casing stickup		
				192'9" D/W from ground surface		
				E-tape reading: 195'3½"	1339	
				-2'9" casing stickup		
				192'6½ D/W from ground surface		
				Took water samples using driller bailer	1345	
				(no teflon bailer was available;		
				broken from use at well #3)		
				Samples taken were as follows: (2) 4oml, #731, Bottle GCS. Gas.		
				(2) 1l, #C70, Bottle PMC. Cyanide		
				(2) 1l, #111,212,946,998,123, Bottle PBC, Radioactive		
				(1) 1l, # 108, Bottle PBC		
				* (1) 2l, #733, Bottle GA.		

REMARKS:

* Bottle was filled only halfway.

Richard Premice

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

A-6000-021 (5 85)

4-A.1876

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMICE	CABLE TOOL #1	EQ1 E34-6	N/A	KE - 915-1
Date: 7/14/87	611C-1915	Depth: 195 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
197'5" of 8"		casing				
				D/B w/steel tape: 195.95' (steel tape #1)	0735	
				.65' length of weights		
				1.00 excess tape		
				197.60		
				-2.75 casing stickup		
				194.85 D/B from ground surface		
				D/W w/steel tape: 193.00' (mold) (steel tape #1)	0745	
				.60 (cut)		
				193.60		
				-2'.75 casing stickup		
				190.85 D/W from ground surface		
				D/W w/E-Tape: 193.75' tape reading	0755	
				[model # 51453 serial # 11044] 2.75 casing stickup		
				191.00 D/W from ground surface.		

REMARKS:

Richard Premice 7/14/87

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)

4-A-1877

DRILL LOG

By: R A HAGEN | Rig: None | Well Number: 299-E34-6 | Computer Number: NA | Project or Work Order No.: HFH-1915-1

Date: 7/14/87 | Depth: 195' to 195' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
SAME				D/W meas. w/ E-TAPE (#1014) @ 193.64 - 2.73' (stick up) = 190.91' below surface @ 1925 hrs.		
				D/W meas. w/ S-TAPE (#1) @ 194 - 0.46 (cut) - 2.73'		
				(stick-up) = 190.81 below surface - meas @ 1931 hrs		
				D/B meas. @ 195.97' - 2.73 (stick up) + 1.63' (excess + wts) = 194.87' below surface		
				(meas w/ S-TAPE #1) meas @ 1938 hrs.		
				∴ 4.07' of water in well		
				RJ AK 7/14/87		

REMARKS:

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

A-6000-021 (5-86)

4-A.1878

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PRENZIC	NONE	299-E34-6	N/A	KEH-1915-1
Date: 7/15/87		Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197.5' of 8" casing.						
				D/W E-Tape reading - 193.75'	0735	
				[P11044] -2.75' casing stickup		
				191.00' D/W from ground surface.		
				D/B steel tape - 195.98'	0740	
				[steel tape #1] 1.65' excess tape tie weights		
				197.63		
				-2.75 casing stickup		
				194.88 D/B from ground surface		
				D/W steel tape - 193.00 hold	0745	
				(steel tape #1) .60 cut		
				193.60		
				-2.75		
				190.85 D/W from ground surface		

REMARKS:

Richard Prenzic 7/15/87

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)

4-A.1879

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	NONE	299-E34-6	N. A	KEH-1915-1
Date: 7/16/87		Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197.5' of 8" casing						
				D/B — (Steel Tape #1) 195.97'	0642	
				+ 1.65' excess tape + weights		
				197.62'		
				− 2.75' casing stickup		
				194.87' D/B from ground surface		
				D/W — (E-tape Serial #11044) 193.79'	0650	
				− 2.75		
				191.04' D/W from ground surface		

REMARKS:

Richard Premzic 7/16/87

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)

4-A.1880

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R Oster	N/A	299-E34-6	N/A	KEH-1915-1
Date: 7/17/87		Depth: 195' to 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'5" of 8" casing				D/W = 190.95' below ground surface (PNL 300'E - TAPE # 11044)	0650	
				D/B = 193.21' + 1.63' = 194.84' below ground surface (PNL 200'	0655	
				STEEL TAPE #1)		

REMARKS:

Karen P. Oster
7/17/87

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)

4-A.1881

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R Oster	N/A	299-E34-6	N/A	KEH-1915-1
Date: 7/18/87		Depth: 195' To 195'		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 = 191.00' below land surface (PNL 300' F TAPE # 11044)	1105	
				D/B = 193.32' + 1.63' = 194.95' below land surface (PNL 200' STEEL TAPE #1)	1110	

REMARKS:

Karen P. Oster
7/18/87

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)

4-A.1882

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMZIC	NONE	Z99-E34-6	N/A	KEH-1915-1
Date: 7/20/87		Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
147's of 8" casing.				D/W = 197.75' (E-tape Ser. No. 11044) −2.75' casing stick-up = 191.00' D/W from ground surface.	0810	
				D/B = 195.94' (Steel tape #1) + 1.63 exists tape at weights = 197.57' −2.75 casing stick-up = 194.82 D/B from ground surface.	0815	

Richard Premzic 7/20/87

REMARKS:

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

A 6000-021 (5 85)

4-A.1883

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R. Oster	N/A	299-E34-6	N/A	KEH-1915-1
Date 7/21/87		Depth 195' To 195'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
				P/W = 190.98' below land surface (PNL 300'E-TAPE # 11044)	0905	
				P/B = 193.15' + 1.63' = 194.78 below land surface (PNL 200' STEEL	0915	
				TAPE #1)		

REMARKS:

Karen R Oster
7/21/87

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)

4-A-1884

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREBILIC	NONE	299-E34-6	N/A	RE11-1915-1
Date: 7/22/87		Depth: 195' To 195'		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 = 193.69'	0720	
				-2.75' casing stickup		
				190.94' D/W from ground surface.		
				D/B = 195.95'	0725	
				+1.63' excess tape & weights		
				197.58'		
				-2.75' casing stickup		
				194.83' D/B from ground surface.		

REMARKS:

Richard Prebilic 7/22/87

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 (5 85)

4-A-1885

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	PtH UTILITY CRANE	299-E34-6	NA	KEH-1915-1
Date 7/23/87		Depth 195' To 195'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'5"	of 8"	casing		Set 1 20' length of 4" 20-slot SS screen	1310	20' casing measured w/Engr. TAPE to be exactly 20 feet long.
				Set 1 20' length of 4" SS. casing	1335	
				Set 1 20' " " " " w/centralizer	1400	centralizer located
				Set 1 20' length of SS. Casing (4")	1416	20' above top of screen
				Set 1 20' " " " " "	1425	Note: operators using
				Set 1 20' " " " " "	1432	new cotton gloves when
				Set 1 20' " " " " "	1438	handling SS. casing.
				Set 1 20' " " " " "	1443	No lubricants used
				Set 1 20' " " " " "	1451	on casing/screen joints.
				Set 1 10' " " " " "	1458	Casing was sealed in
				FASTENED 1 5' PIECE AND 1 2' PIECE OF SS CASING	1505	factory packaging prior
				SET 1 7' PIECE (5+2' PIECES ATTACHED)	1510	to installation.
				OF 4" SS CASING (TOTAL CASING+SCREEN		
				IN WELL IS 197').		
				Set a 5' S.S. CAP ON TOP OF CASING.		
				S.S. CASING STICK-UP IS 2 1/2' above		
				surface		
				Moved off this well and set up crane	1520	

REMARKS: on well 299-E34-5 to set screen + casing.

R A H 7/23/87

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)

4-A-1886

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R Oster	N/A	299-E34-6	N/A	KEH-1915-1
Date: 7/23/87		Depth: 195' To 195'		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 = 191.00' below land surface (PNL 300' E - TAPE # 11014)	0804	
				D/B = 193.28' + 1.63' = 194.91' below land surface (PNL 200' STEEL TAPE #1)	0810	

REMARKS:

K.R. Oster
7/23/87

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)

4-A.1887

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAKEN	NONE	299-E34-6	NA	KEH-1915-1
Date 7/24/87		Depth 195 To 195'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/B meas. @ 195.95' + 1.63' = 197.58' (top of 8")	1620	Used s-tape #1
				Added 1 bag of 10-20 sand.	1625	2.75' of 8" casing
				D/B = 191.55 + 1.63' = 193.18' (top of 8")	1627	sticking up above
				∴ 4.4' of sand gained per bag in annulus		ground.
				between 8" + 4" casings. No casing pulled.		Measurements made
						to top of 8".
				Note: Spliced end of S-TAPE came		Sand added W/o
				off and fell into annulus. Lost were		use of tremie pipe
				two stainless steel weights and ~1' of		
				steel tape. Weights + tape lost prior to		
				putting in sand, so they are at bottom of hole.		
				End of work on this well - won't to add sand		
				to well 34-5.		
				R J A. K 7/24/87		

REMARKS:

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

A-6000 021 (5 85)

4-A.1888

DRILL LOG	By RA HAVEN	Rig Manitowoc Crane (17-10671)	Well Number 299-E34-6	Computer Number NA	Project or Work Order No. HEH-1715-1
	Date 7/25/87		Depth 195' To 195'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'5"	of 8"				0700	Began work @ site.
					0757	Began backpulling 8" casing
				D/B = 196'7" - 3' (splice) - 4'3" (stick up) + 2 3/4" (1/2 of tape) = 191'6 1/2"		Pulled back ~20'.
				to ground surface. Bottom of casing @ 193'.		
				Added 2 bags of 10-20 sand	0809	
				D/B = 187'4" (S-TAPE)		
				Added 1 Bag of 10-20 sand	0814	
				D/B = 183'2"		
					0817	Pulled casing back
				D/B = 188' - 7' stick-up = 181' - Casing bottom @ 190 1/2'		
				D/B = 189'8" - 8'3" = 181'5		
				D/B = 194'5" - 11'3" = 183'2" Bottom of casing @ 186'2"		
				Added 1 Bag of 10-20 sand + 3 bags	0840	
				of 20-30 sand, in Hisorder. All 10-20 sand (5 bags) has been added.		10-20 sand (5 bags) placed at bottom of hole.

REMARKS:

M.A. Chambers
7/25/87

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-6600-021 (5-85)

4-A.1889

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R A HAGEN	Manitowoc (Crane 17-1067)	299-E34-6	NA	KEH-1915 I
Date: 7/25/87	Depth: 195' To 195			Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
196'				D/B = 176'8" - 11'3" = 165'5" (top of sand)		Sling broke after
				D/B = 178'7" - 12' = 166'7" (top of sand)	0850	pulling back 9".
				(TOTAL OF 8 BAGS OF SAND ADDED SO FAR).		
				Pulled back to expose 16 187'1" joint.		
				Bottom of casing @ ~185'.		
				Pulled casing back so that bottom of		
				casing is @ 184'10" below surface.		
				Welded on ears and cut off a 10'4"	0939	
				section.		
				Pulled back casing about 9", then 8" casing	1030	Casing failed at edge
				failed (collapsed inward where the 2 slings		where ear was welded
				were attached). Boom on crane swung back		on - weld was good -
				breaking off hydraulic attachments. Crane now damaged;		steel ripped apart.
				at least one week's overhaul of repairs needs to		Arms that control the
				be done before it can be used. Hydraulic oil		in fore movement of
				leaked out of one fitting; some leaked between		the boom broke off
				the 8 & 12 and 12 & 16" casings at surface.		and the oil leaked
				About 1-2 pints spilled altogether - most on soil		out here.

REMARKS:

M.A Chamness 7/25/87

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)

4-A.1890

DRILL LOG

By: L A HACKEL | Rig: MANITOWAC CRANE (17-10671) | Well Number: 299-E34-6 | Computer Number: NA | Project or Work Order No.: KFH-1915-1

Date: 7/25/87 | Depth: 195' To 195' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
~184'				(oil that fell onto soil around well was removed by scooping up the soil + moving it away from well.) I estimate that about 3-5 tablespoons full of oil fell between 8-12 + 12-16" casings - think this probably all landed on the casing walls. Oil leak controlled on 5-5 so no more reaches the soil around well. Crane cannot be moved because boom is jammed-up against crane mechanism. Will try extractor next.	Several drops of oil leaked onto top of 4" casing - cap was then removed	drops of oil onto top of 4" casing - cap was then removed from casings at this time - no oil leaked inside the 4" casing, a little is on outside - will clean.
				Cutoff damaged casing (11" of 8" off the top) - total casing in hole ~186'.		
				DTB = 167 1/2'		
				Bottom of casing @ 184'.		
				Extractor mounted on casing and ready to try. Extractor is driven by compressed air and is used with a crane - extractor is more of a vibrator, vibrating casing while the crane pulls it. Extractor attached to casing via a 2' extension welded onto top of 8" casing and held up by a crane.	1458	Using a rubber tire mounted crane now.

REMARKS:

M.A. Chamness
7/25/87

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)

4-A.1891

DRILL LOG

By: R A WAGNER | Rig: Gardner Denver Crane | Well Number: 299-E34-6 | Computer Number: NA | Project or Work Order No.: KH-1715-1

Date: 7/25/87 | Depth: 195' To 195' | Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
~184'				(Note: casing began pulling back hard at the gravel/sand contact at 185' - could be sand that is hitching on shoe casing light casing. Casing came back easy thru 16 first 10' of gravel.)		
				Extractor engaged for ~15 minutes - pulled 19" of casing - casing is very tight.	1526	
				Ran it again for 7½ min. & pulled 9" more.	1550	
				Several (1 large) cracks noticed in extractor braces (one brace on each side). Took down off casing to inspect those cracks. Will have to do repair work on extractor.		
				D/B = 171' (top of sand)	1601	
				bottom of casing is @ 182'		
				Pulled back 2' 3½" using extractor, and sand level dropped about 3½'.		
				Extractor brace (shank) is 3" plate steel. workers are looking for material to replace it.		
				Brace is 3" thick x 6½' long x ~20" across.		
				End of workday - need to fix brace.	1630	

REMARKS:

cf A Wagner 7/25/87

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 6010 021 (5 85)

4-A.1892

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. Premzic	Atlas Pioneer + Warner Swasey	EG-E 34-6	N/A	KE--1915-1
Date: 7/31/87		Depth: 195' To 195'		Subcontract No.: Nil

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				American crane is lifting extractor, Warner Swasey crane is lifting & dropping drilling jars. The extractor is operated for a short time followed by the drilling jars. The combination is used in an attempt to jar loose the stuck 8" casing.	1145	
				Casing dropped 1-2". Does not seem to be moving much	1155	Stopped work. Lunch break.
				Resumed jar dropping with Warner-Swasey crane.	1240	
				Casing has dropped a total of 3" or to the well.		
				Preparing to use extractor hung from American crane.	1250	
				Drill back ~7' of casing.	1305	Pulling extractor.
					1315	Stopped extractor.

REMARKS:

Leland Premzic
7/31/87

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)

4-A.1893

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chaumes	American Crane 171-1957	171-6216	1 VA	KEH-1915-1
Date: 7/31/87		Depth: 195' To 195'		Subcontract No.: 1014

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
182'6"				179' 1½"	1430	apparently have fallen
- 1'6"				+ 2' 3½" pipe		back at total of 1'6"
180'6"				181' 5"		of 8" casing today using
				- 8' 3" stickup		extractor Are replacing
				173' 2" DF sand		block.
					1500	started using extractor
						again
180'4"				Can't measure depth to sand outside liner, casing is too high.	1520	shutting down for the day
- 1'7"				with nothing to stand on.		pulled back 1'7"
178'11"	of 8"					+ 1'6"
	casing in hole					3'1" total for day
				M.A. Chaumes 7/31/87		

REMARKS:

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

A-6000-021 (5-86)

4-A.1894

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.R Oster	American Crane	299-E34-6	N/A	KEH-1915-1
Date: 8/1/87	17T-19959	Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
178'11"	1 of 8" casing	in hole			0830	started using extractor hung from crane
178'11" - 1'4.5" = 177'6.5"				Pulled 8" casing back 1'4½". D/B of 8" = 177'6.5"	0930	
				Added 3 sacks (100lbs ea) 20-30 U.S. Sieve Size Colorado Silica Sand. Measured top top of sand pack @ 173'9" - 9'3½" (stick-up) = 164'5½" below land surface (PNL 300' STEEL TAPE)		
				Discovered crack in puller top so will cut off casing and weld on new plate and cut holes to create new puller top at top of casing & then rig up extractor again.	0955	
					1345	Started using extractor to pull casing again.

REMARKS:

Karen R Oster
8/1/87

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)

4-A.1895

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chavarria	American Cable, TFT-1859	29-1-27-6	N/A	KEII 1915-1
Date: 8/1/87	Depth: 195' To 175'			Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
177'6½"					1505	elevated w/ extractor again pulled back 7½"
7½" 177'9"						
				1'4½" + 9½" = 2'2" total 8" casing pulled back today	1520	Chief, decided the extractor is not going to work, so they will make a drill rig on to try to pull casing. Right now the casing is really stuck.
				M.A. Chavarria 8/1/87		

REMARKS:

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

A 6000-021 (5 85)

4-A.1896

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C. L. PRENTICE	VONE	299-E34-6	N/A	KEH-1915-1
Date: 8/3/87		Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
156'9" of 8"	casing			D/O = 161.2' + 2.3' = 163.5'	0845	
below	ground	surface		(Steel Type)		

REMARKS:

Robert Prentice
8/3/87

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)

4-A.1897

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M. A. Chamness	CE 220	219-E24-6		VEH-915-1
Date		**Depth**		**Subcontract No.**
8/2/87	68K1113?	115' To 115'	N/A	N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176'9" at 8" in hole.				165'8"	1730	set up, getting tools ready, cut off pulling head being used before
				- 4' 7½" stick up		
				161' 4½"		
				12' 3½" pipe (steel tape no #)		
				163' 4"		
					1900/1950	lunch break
					2010	started pounding casing
				176' 7¼" weld — A weld was required after pulling (making the weld at an approx. 12'-6"		back down, got it unstuck
				- 8'1" to ground surface — 13" this does not match with having	2045	started pulling casing.
168'6½" of 8" in hole				168' 6¼" of 8" in hole — had 176'9" in the hole, which would have		Are using pulling jaws.
				left only 1¾" before reaching the weld. am therefore starting the		
				measurement of 8" in the hole from		Using Crisco as tool
				this point the discrepancy probably		lubricant
				occured because of one of the pounding		
				and pulling on the casing that week.		
						Pulled 8'1" altogether,
				176' 7¼		
				3'1		are cutting off 5' of 8"
				168' 6¼" — 168' 6¼" casing in hole (from		from 176' 7¼" weld.
				- 3'1		
				165' 6½ — ground surface		
				7' 3½ — There is now 3'1" of 8"	stick up	

REMARKS:

167'10" DL sound

M. A. Chamness

D - Drive Barrel 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)

4-A.1898

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
J. L. IRELAND	D.E. 22W	99-J4-6	N/A	[illegible]
Date		Depth		Subcontract No.
8/4/87	68K-1015	195' To 195'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/B = 165.5 + 2.3 = 167.8'	0730	
				D/B = 161 + 2.3 = 163.3'	0740	1 bag sand added
				Casing bottom is ~168' in depth.		
				A lot of excess grease was found on the casing	0745	
				block and outside of the drilling jars and globs were		
				found on the ground outside the 16" casing. Did not grease		
				fall down inside the annular space. All grease was		
				wiped off before pullback began.		
					0815	Started pullback using
						drilling jars.
				Markings on outside of 8" casing indicate weld is at	0835	Pulled 5' of casing to
				165'2" vs 166'2" as shown in logs. Will use the 166'2" measurement		expose the 2" weld.
				from the logs.	0845	Cutting off drilling jars
						attached to casing stickup.
				D/B = 160.7' + 2.3' = 163'	0915	
				D/B = 158.0' + 2.3' = 160.3'	0920	2-5 gall. buckets of
						bentonite pellets added.
				D/B = 153.6' + 2.3' = 155.9'	0925	1-5 gall. bucket of bentonite
						pellets added

REMARKS:

Richard Brem

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

A-6000-021 (5-85)

4-A.1899

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
C.L. Prentice	R.E. 720	299 634 0	V.H	[illegible]
Date 8/4/87	68K-1715.3	Depth 145 To 145		Subcontract No. V.H

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				TH D/C - 155.9' and bottom of 8 casing is at 163.5'		
				then top of 7" slotted pipe is in well.		
					0930	We had to go for another
						20' casing.
					0940	Pulled back on casing 5'
				D/B = 155 + 2.3 = 157.3'	0950	
				D/B = 152 + 2.3 = 154.3'	1000	1 bag crumbles added
				D/B = 149.4 + 2.3 = 151.7'	1005	1 bag crumbles added
					1005	Pulled back - 5'
				D/B = 154.8 + 2.3 = 157.1'	1010	
				D/B = 145.5 + 2.3 = 147.8'	1010	4 bags crumbles added.
				D/B = 140.0 + 2.3 = 142.3'	1015	2 bags crumbles added.
				D/B = 144.2 + 2.3 = 146.5'	1020	After 5' pullback
				D/B = 138.7' + 2.3 = 141.0'	1025	2 bags crumbles added
					1030	4' pullback. Casing is
						holding a bit. Will cut casing off at this point and
						filling pits.

REMARKS:

Richard S Prentice

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

A 6000-021 (5-85)

4-A.1900

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. PREHAL C	B.E. 22W	200 E 34 6		KE-[illegible]
Date 8/4/87	680-19,55	Depth 145' To 195'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				-	1040	6' 5 inch of 8 inch cutoff from 156'7" w/ t. 149.10' 8" et & casing in hole with a 2'9" stickup.
				D/B = 141.3' 2.3 = 143.6'	1045	
					1050	Driller jar assembly welded to casing.
				8" casing is now free inside the 12" casing. We will now remove the 8" casing from the well	1100	Pulling back on casing. Pulled back ~4'.
				D/B = 142.7+2.3' = 145.00'	1110	Removing 8" casing.
					1215	Completed removal of 8" casing. Awaiting grouting equipment Tomorrow?
				Afternoon shift: set tremie pipe in preparation for grouting tomorrow. P. White 8/4/87		
				Richard Brannon 8/4/87		

REMARKS:

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

A-6000-021 (5-85)

4-A.1901

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P. L. PREMZIC	RC 22W	299 E34-6	N/A	
Date: 8/5/87	691-1913	Depth: 195' To 195'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146'9"	8" of 12" casing			Begin mixing of grout.		7 bags of Volclay grout mixed to 150 gallons total. O.
-1'5"	of stickup					
115'4 1/8"	4" of 12" casing			Mud balance reads 7.4 lbs/gal.	0955	1/4 bag of volclay added.
	below ground			Mixing of mud is in a cow tub from where it is pumped via tremie pipe down the well.		Sample of cuttings collected.
					1000	Pumping grout down well.
				D/B = 121 - 2.3 = 120.7 - 2.03 = 120.67'	1040	
				Pulled tremie pipe out and are now backpulling.	1115	Pulled tremie pipe out
				Backpulling is going slow.		
115'4 1/8"				Keep on slipping out of sliding joint assembly. Will	1200	Stopped backpulling. Started at 3'.
-2'3"				have to rewield new insert to another piece of casing.		welding.
113'1 1/8"	of 12" casing below ground			D/B = 119.8' + 2.3' = 122.1'	1225	13 1/2" of casing cutoff. Total 12" casing in well is now 115' 5 3/8".
				Richard Poeppe 8/5/87		

REMARKS:

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

A-6000 021 (6-85)

4-A.1902

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	BE 2203	299-E34-6	N/A	ISEH-1915-1
Date: 8/5/87	68K0153	Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
141' 7 1/8"						welded ears back on
- 2 1/2"				pulled back 2 1/2"	1600	started pulling back
138' 4 5/8"					1610	casing, top of pulling
						assembly broke off.
						will need to weld it
						back together.
					1915	Lunch break
					1945	Are reinforcing pulling
						head & making a guide
						to attach to the mast
						to keep tools from hitting
						it.
					2315	quit for day

REMARKS:

M.A. Chamness 8/5/87

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 (5-85)

4-A.1903

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chawners	B-61 22W	299 E 34 6		
Date: 8/6/97	68A-1915?	Depth: [illegible] To 65	[illegible] 29	Subcontract No. [illegible]

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
141'4 5/8"	at 12" casing			Changed the design of the pulling head for the 10",		time casing down core
	below	ground		spent the day shift cutting & welding it.		to pull tools together
					1740	started pulling casing
- 8'3/8"					1810	pulled back 8 3/8",
133'1/2"	at 12"	casing				exposed 4 welds
	below	ground		127'9"		
				+ 2'3 1/2" tape		
				130'1/2"		
				- 3'1" stickup		
				126'11 1/2" TB top of grout	1920	lunch break
					1950	finish welding head
						back on
				129'3"	2025	started pulling,
133'1/2"				+ 2'3 1/2" tape	2045	pulled 5'4"
- 5'4"				131'6 1/2"		
127'9"				- 2'9 1/2" stickup		
				129'9" DB top of grout		
				There is now a two foot gap between bottom of		
				casing and top of grout:		
						Re setting 101' of
						tremie pipe in hole.
					2115	finished on this hole
				M.A. Chawners 8/6/97		for today

REMARKS:

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

A-6000-021 (5-85)

4-A.1904

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
[illegible]	B.F. [illegible]	299 134 1.		
Date		Depth To		Subcontract No.
[illegible]	[illegible]			

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
127' 8" of 12" [illegible] below ground surface.				D/B = [illegible] 81 = 2.5 = 129.19	0800	
				3 bags volclay grout + 4 bags catalyst added.	0800	[illegible] content of H2O with grout from stock began entering.
				Mud balance is 9.25 lbs/gal.		
				½ bag grout added, 1 bag catalyst.	0805	
				Mud balance is 9.45 lbs/gal.	0812	
				Began pumping grout via tremie pipe down well.	0814	
				Stopped pumping grout	0825	
				D/B = 102.7' + 2.3' = 105.00	0827	
					1000	started pulling casing.
				125' 0 7/8" weld is 3's above ground surface.	1100	stopped pulling. Pulled 5'.
						Cut grease + rewelding pulling head.
				D/B = 211 + 2.3' = 113.3'	1330	Pulled from 1200 - 1315.
				115' 4 5/8" weld is 2 6" above ground surface.		
				6 bags volclay grout + 5½ bags of catalyst added.	1400	
				Co. - 12 gallons of H2O. Mud balance is 9.45 lb/gal.		
				Began pumping grout via tremie pipe down well.	1402	
				Stopped pumping grout.	1410	

REMARKS:

Richard Bremner

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

A-6000-021 (5-85)

4-A.1905

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PRENTICE	B.I. JOL	E-99-E34-6	N/A	KEH-1915-1
Date 8-7-87	68K 91--	Depth 195' To 195'		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/S = 79+2.3 = 81.5	1415	
					1500	Pulled ~4'.
					1530	pulled ~5'.
				Next weld should be 104' 11 5/8".		

REMARKS:

Richard Prentice 8/7/87

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 (5-85)

4-A.1906

DRILL LOG	By K.R. Oster	Rig B.E. 22W	Well Number 299-E34-6	Computer Number	Project or Work Order No. KEH-1915-1
	Date 8/7/87	68K-19153	Depth 195' To 195'	N/A	Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled casing back to 104'6", Measured D/B of top	1555	
				of Volclay grout at 82'6".		
				Welding puller top back on after cutting casing	1605	

REMARKS:

Karen R. Oster
8/7/87

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 (5-85)

4-A-1907

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chamness	EC 2210	299 E 24 6	N/A	LF11 1915-1
Date 8/7/87	6PK 7153	**Depth** 19' To 105'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				88'1" weld is now 4'6" above ground surface	1720	pulling casing,
100' 11-5/8"				-4' 100' 11 5/8" still below ground		stopped to fix rig,
-2' 8½" 98' 3⅛"					1735	started again
						pulled 2'8½"
				89' 5½"		
				+2' 3½" tape		
				91' 9"		
				- 2' 8"		
				89' 1" top of grout LB		40' of 1" pipe
					1900/1920	lunch break
				Used 8 bags volclay grout + catalyst for ~200 gal H2O	55' +2'3½" tape 57' 3½" - 2' 8" check up 54' 7½" 11' 10" void top dropped into grout 42' 7½" LB grout	
				Ran water through 1" pipe to wash it out, have 9'4" of water on top of grout		
- 8'9"						Pulled 8'7" of 12"
86' to 1½"				Tried to measure to top of grout, which is very difficult with the water on top of it. Top of water was ~37' below surface, had been ~33'5", so it is assumed that grout is ~5½' deeper than when we started, therefore at ~ 119'		casing

REMARKS:

M.A. Chamness
8/7/87

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 (5-85)

4-A.1908

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
M.A. Chambers	RC 720	299-E33-6		KEH-1915-1
Date: 8/7/87	68K1153	Depth: 172' To 195'	D/A	Subcontract No.: D/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
96' 6 3/8"				69' 4"	2250	Pulled 8' 1 7/8" of 12"
9' 1 7/8"				12' 2 1/2" Tpc 66' 7 1/2" 122' to top of 16"		csg.
77' 8 5/8" to top of 16" casing				DEI grout from top of 16" 65' 1/2"		
9' 6 3/8"					2310	Pulled 1' 6 3/4"
68' 2"					2320	quit for day
				M.A. Chambers 8/7/87		

REMARKS:

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

A 6000-021 (5-85)

4-A.1909

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
P. L. Peterson	[illegible]	299 F 571-6	N/A	[illegible]
Date: 8/8/87	[illegible]	Depth: 17' To 95'		Subcontract No. 2.11

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
67' 2 1/2" of 12" below ground surface.					0745	
				D/B = 68.8 + 2.3 = 71.1' (Steel tape)	0750	
				4' of open hole.		
					0755	Cutting tremie pipe [illegible]
				D/W = 59.6' 67.2 - 59.6 = 7.6' of water over grout. (E-Type Ser. # 10798)	0800	
					0805	Mixing mud, grout + catalyst.
				Mud balance reads 9.4 lbs/gal. Pumping grout via tremie pipe down well.	0810	9 1/2 sacks of grout & 9 bags catalyst mixed with 180 gallons of H_2O.
				D/B = 35.5 + 2.3 = 37.8' (Steel tape)	0910	
					1130	Pulled 12" casing from well.
				D/B = 48 + 2.3 = 50.3' (Steel tape)	1300	Mixing up 16" pulling tool
50' 4" ground	weld is 1.7" above surface.				1400	Pulled 10' of 16" casing.
				Two batches of grout, 200 gallons + 150 gallons added to well. Mud balance on each was 9.4 lbs/gal + 9.45 lbs/gal respectively.	1500	

REMARKS:

Richard Brewer

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

A 6000-021 (5-85)

4-A.1910

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. FREDRIC	B.E. 75 W	79-134-6	N/A	KE-79-5
Date 8/8/87	**Date** 6-4-79	**Depth** 145' To 145'		**Subcontract No.** N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/B = 15.3'	1600	
				(steel tape)		
				Grout mixed, 150 gallons.	1605	
				Mud balance is 9.45. Only ~125 gallons brought		
				the top of grout to ground surface.		

REMARKS:

Richard Brennan
8/8/87

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)

4-A.1911

DRILL LOG	By: M. A. Chalmers	Rig: CE 22 b	Well Number: MW-E24-6	Computer Number	Project or Work Order No: KEH-1915-1
	Date: 8/8/87	68K 1915 3	Depth: 115' To 125'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				120'4" weld at ground surface, casing is straight & is not cutting off grout & bad weld on one casing due to grout out casing.		
						rilled 15'5" (to ground surface)
				116'1" weld 2'5" above ground 26'9" in hole	9'8" + 2'3½" tape 11'11½" - 3'5" stickup 8'6½"	1750
				20'6" weld is 1'11" above ground 1'11" 18'7" below ground surface		1830
				Mixed more grout, ~150 gal., filled annulus to near top of 116" casing		1930/hrs Lunch break
				20'10" weld ~ 12'8" above ground. 3'5" 2' 3½" tape 5'8½" 2'10" stickup 2'10½" be grout from ground surface		2100 Lenny Gordon quit for day, Lin Gordon taking over
				3'6½" to top of grout with rest of 16" casing pulled out of ground		
REMARKS:				M.A. Chalmers 8/8/87	2230	done for day

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

A-6000-021 (5-85)

4-A.1912

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R. L. PREMRIC	B.E. 22 W	299-E34-6	N/A	KE14-1915-1
Date: 8/10/87	68K-19153	Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Tearing down r.g. & moving to 299-E34-5	0900	
				Grout is 5' below ground surface. Waiting for		
				cement.		

REMARKS:

Richard Premric 8/10/87

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)

4-A.1913

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
R.L. PREMEAU	NONE	299-E34-6	N/A	KEH-1915-1
Date: 8/19/87		Depth: 195' To 195'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Concrete [illegible] well pad.	13:00	

REMARKS:

Richard Premeau
8/19/87

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)

4-A.1914

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Cordon	# 151	399E-34-6	N/A	
Date: 6-25-87		Depth: 5' To 9'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30'6"	9'	CABLE TOOL			1500 PM	START 16" CASING
						IN HOLE
					1533	ADD 20 GAL
						WATER
					1740	STOPPED FOR
						THE DAY

REMARKS:

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

A-8000-021 (5-85)

4-A-1915

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Cordon	#151	24E-34-6		
Date: 6-26-87		Depth: 0' To 9'10"		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Coliche, Etc.	Time	Drilling Comments
20.5'		H	W	MEdium sized GRAVEL	7:45	START
9'10"						
					5:45 PM	STOP

REMARKS:

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

A-6000-021 (5 85)

4-A.1916

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
F. Murphy	151	299E-34-6		
Date: 6/27/87		Depth: 20'5" To 33'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
1' 4" 403	33'	HARD Tool	Wet		6 00 AM	START
					9 00	Add CASING
					3 00	START DRILLING
					4 30	STOP.

REMARKS:

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

A-6000-021 (5-85)

4-A.1917

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
F. Murphy	4151	299E-34-6		
Date: 6/29/87		Depth: 33' To 49'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
50'3"	49'	Hard Tool	Wet	Sand & gravel	8:30 to 9:30 10:17 to 11:00 11:00 to 2:00 5:50	Chain gound For 11 Safety Welding STOPPED For Day

REMARKS:

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

A-1000 021 (5-85)

4-A.1918

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
F. Murphy	151	E34-6		
Date 6/30/87		Depth 49' To 59'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
6.04"	59'	Hard Tool	Wet	Sand & gravel	8:30 to 9:30	Welding pipe
					5:45	STOP FOR DAY

REMARKS:

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

A 6000-021 (5-85)

4-A.1919

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
F. Murphy	#	E34-61		
Date: July 1, 87	151	Depth: 59 to 62		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
21'5" B					7:00	Switched bits
20'11					4:30	Run 12'
21'						Set platform
10'5" B						
7'5"	62'	Hard Tool	Wet			

REMARKS:

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

A-6000 021 (5-85)

4-A.1920

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Murphy	#151	E34-6		
Date: July 2-87		Depth: 62' To 72'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'5"		Hard tool	Wet		1:45 to	

REMARKS:

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

A 6000 021 (5-86)

4-A.1921

DRILL LOG

By: E Murphy
Date: 7-6-87
Rig: B/151
Well Number: 29-E-34-6
Depth: 72 To 88
Computer Number:
Project or Work Order No.:
Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
106 3/8		Hard tool	Wet	Sand & gravel	1800 to 2100	Welding Casing

REMARKS:

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

A-6000-021 (5-85)

4-A.1922

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
F. Murphy	#151	299E-34-6		
Date: 7-7-87		Depth: 88' To 106'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'6⅝"		Hard Tool	Wet	Sand & gravel - Coarse	6:50 to 7:50	weld casing
10'5¼"						
115'5"						

REMARKS:

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

A-6000 021 (5-85)

4-A.1923

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
F Murphy	151	299E-34-6		
Date: 7-8-87		Depth: 106 To 124'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
106'		Hard		SAND & GRAVEL COARSE	9:10 to 10:10	change bit
					11:30 12:30	stand casing

REMARKS:

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

A-6000-021 (5-85)

4-A.1924

DRILL LOG	By F Murphy	Rig #161	Well Number 29E-34-6	Computer Number	Project or Work Order No.
	Date 7-9-87		Depth 124 To 134'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'6"				Sand & Gravel C	5:30 To 7:00 1:00	stand casing
146'9"					to 7:15	weld casing
146'9"						

REMARKS:

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

A-6000 021 (5-85)

4-A.1925

DRILL LOG

By	Rig	Well Number	Company	Project or Work Order No.
R. Robinson	# 151	299E-34-6	2ND SHIFT	
Date 7-9-87		Depth 134' To 145'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
146'9"		H	W	SAND & GRAVEL Coarse	1:30	
146'9"		H	W	Sand & gravel	9:00	Drove pipe to present depth & quit needs to be cleaned before ran pipe

REMARKS:

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

A-6000-021 (5-85)

4-A.1926

12"

DRILL LOG	By Murphy	Rig #151	Well Number 299E-34-6	Computer Number	Project or Work Order No.
	Date 7-10-87		Depth 145' To 154'		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
145'				Sand & Gravel	0500	Change To
21'2½"					12:30	8" Casing
20'8½"						
20'11½						
20'10'						
20' 11						
20'4⅜						
20'8⅝						
20'5¾	10'5½" 10' ½"					
166'2"						

REMARKS:

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

A-6000 021 (5 85)

4-A.1927

2 NW

DRILL LOG	By Robinson	Rig #151	Well Number 299 E 34-6	Computer Number	Project or Work Order No.
	Date 7/10/87		Depth 154' To 172		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10" 166' 2"			W		1:	weld casing
10" 105' 4"					5:	weld casing
176' 7/4"			W	Sand & gravel	9:00	
						60 gal water

REMARKS:

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

A-6000-021 (5-85)

4-A.1928

DRILL LOG

By: Murphy
Date: 7/1/87
Rig: 151
Well Number: 299-E-34-6
Depth: 172' To 195
~~Computer Number~~ Shift #1
Project or Work Order No.:
Subcontract No.:

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
176 7"	7/4	H	W	Sand & GRAVEL	5:45	
10'5"					6:50	Stand casing
10'4"					8:00	
197'7"					to 8:50	stand casing

REMARKS:

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

A-6000-021 (5-85)

4-A.1929

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Robinson	# 151	299-E-34-6	Shift # 2	
Date 7/4/87		Depth 195 To 196		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
197'7"		H	W			
10'5"		H	W		1:30-2:15	Weld Casing
					2:15-3:00	drove casing to basalt, cleaned out & confirmed it was basalt
					3:00-4:30	rig sand pump and spindle test - OS A.H.
				Drove To BASALT Cleaned up And Confirmed. 196'	4:30-9:00	took tools apart welded etc

REMARKS

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

A-6000-021 (5-85)

4-A.1930

DRILL LOG	By F Murphy	Rig #151	Well Number 299-E-34-6	~~Computer Number~~ #1	Project or Work Order No.
	Date 7-17-87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Continue SETTING up Rig		

REMARKS:

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

A-6000 021 (5 85)

4-A.1931

DRILL LOG

By: Robinson
Date: 7/13/87

Rig: #151

Well Number: 299-E-34-6
Depth: To

Computer Number: shift #2

Project or Work Order No:
Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
						Pulled old 5/8 line off & spooled on 625 ft 3/4 made rope socket pulled sand line off & re spooled it, folded up rig, cleaned up etc.

REMARKS:

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

A-6000-021 (5 85)

4-A.1932

DRILL LOG	By Mac Cooper	Rig	Well Number 247 534 C	Computer Number	Project or Work Order No.
	Date 8-3-87	157	Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Moved Rig + Set up	3:00	
				Rigged up & pulling casing		
				Lenny		
				You have 1' of sand in	5"	Rig'd
				need to put in 1 sack of Sand		to
				measure to sand		
				Tag'd sand @ 167-16"		
				Total Casing 170' 7½" to Top)		
					11:00	Shut down

REMARKS:

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

A-6000-021 (5-85)

4-A.1933

ORILL LOG	By Weston Watkins	Rig D/W #153	Well Number 299 @ 34-6	Computer Number	Project or Work Order No.
	Date 8-4-87		Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				170-7½ of 8" casing		

REMARKS:

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

A 6000 021 (5-85)

- 4-A.1934 -

DRILL LOG	By: Gardner + Ames	Rig	Well Number: 299 E 34-6	Computer Number	Project or Work Order No.
	Date: 8-15-87		Depth: To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					3:00	start
				Started pulling Casing - puller let apart		
				went to pipe yard + got back to		build
				tool Guide and rebuild casing puller		
				& made tool Guide + put on		Rig
				Cut piece of 5" Casing + started		
				to weld on puller		
				Need to weld bottom plate on		
				puller then put in top plate		
				Bottom plate needs to be welded top		
				+ Bottom, Then can weld top two		
				Rings in + weld 8" to 8" in hole		
				Should use diamonds on 8",		
				use Tool Guide when pulling Casing		
				Check Bolts on tool Guide may have		

REMARKS: to weld the nuts on. Have fun — 11:15, Shut down

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

A-6000 021 (5-85)

4-A.1935

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
Hales Riordan		299E-34-6		
Date: 5/6/52	158	Depth: To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Welding on puller. 5:00	5:30	
				pulled 13 3/8" x 12" Casing 2:30	7:30	
				welding on Puller 7:45	8:30	
				Pulled 7" x 12" Casing 9:30	9:45	
				Set 105' x 1½" pro Trench pipe 9:30	9:52	
				Went to 66 L		
				This well ready for Grout		

REMARKS.

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

A-6000-021 (5-85)

4-A.1936

DRILL LOG	By HMCS-Kreider	Rig	Well Number 299E-34-6	Computer Number	Project or Work Order No.
	Date 8/7/87	153	Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled (45') 7" x 12" Casing	3:00	
				Grouted Hole on Yard		
				Hole ready for next Grout - 3" 12" pipe should be down to 69'9" from mark to cut.	11:30	
				Not sure on Grout need to check after you cut off 12" Casing		
				Be sure to weld on leg as 12" is coming easy		

REMARKS:

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

A 6000-021 (5-85)

4-A.1937

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
K.L. Gordon		299E 34-#6		
Date 8/8/89	153	Depth To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled last 16' of 16" Conn ?	3:30 pm	
				Ready for Cement		
					4:00	Loaded
						4 yd to 22'
						1/4 sack —

REMARKS:

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

A-6000-021 (5-85)

4-A.1938

FIGURE 3.
DRILL LOG

By O. Amos | Rig | Well Number 299-E34-6 | Computer Number | Project or Work Order No.
Date 1-5-88 | Depth To | Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Calcite, Etc.	Time	Drilling Comments
				Develope well #299-E34-6		couldn't get
				Start Bailing	9:45	much water out
				Stop Bailing	10:15	of hole it acts
				Bailed Approx. 50 gals		like it only has
				Set up & Tear down time	20min	1-2' of water
						(clean)

REMARKS:

D - Drive Barrel H - Hand Dug C - Large M - Medium S - Small VF - Very Fine F - Fine VF - Very Fine Bounding Water Perched Water

4-A.1939

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