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WHC-MR-0206

# Borehole Completion Data Package for the 216-S-10 Ditch and Pond

S. P. Airhart  
Pacific Northwest Laboratory

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October 1990

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Office of Environmental Restoration  
and Waste Management



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Hanford Company**

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9443223-0780  
BORERHOLE COMPLETION DATA PACKAGE  
FOR THE 216-S-10 DITCH AND POND

S. P. Airhart  
A. W. Pearson  
J. V. Borghese

June 1990

Prepared for  
Westinghouse Hanford Company  
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## 1.0 INTRODUCTION

This data package summarizes the drilling, well completion and development, aquifer testing, and pump installation activities at the 216-S-10 Ditch and Pond (S-10 facility) for FY 1990. Drilling and well completion activities took place from March 1990 through June 1990. Three wells were drilled: wells 299-W26-8, 299-W26-9, and 299-W26-11.

The S-10 facility is located south of the 200-West Area on the Hanford Site (Figure 1.1). A detailed description of the facility and its operational history can be found in Interim-Status Ground-Water Monitoring Plan for the 216-S-10 Pond and Ditch (Airhart et al. 1990).

The purpose of the S-10 facility ground-water monitoring program is to determine the impact of waste disposal on water quality in the uppermost aquifer underlying the facility. Figure 1.2 depicts the location of the S-10 facility and wells as planned in the ground-water monitoring plan. All three wells were drilled according to locations specified in the ground-water monitoring plan (Airhart et al. 1990). A perched water table was encountered during the drilling of well 299-W26-11. Pacific Northwest Laboratory (PNL) and Westinghouse Hanford Company (WHC) decided to complete the well to monitor this perched water table. The completion depth of well 299-W26-11 is not consistent with the ground-water monitoring plan; therefore, an Engineering Change Notice (ECN) to the ground-water monitoring plan was prepared by WHC to add an additional well in FY 91. This will allow for a cluster of three wells in this location to monitor the localized perched water table, the top of the unconfined aquifer, and the bottom of the unconfined aquifer.

Wells 299-W26-8, 299-W26-9, and 299-W26-11 were installed according to specifications outlined in the ground-water monitoring plan (Airhart et al. 1990) and in Generic Specifications - Groundwater Monitoring Wells (Hodge 1990). Drilling, sampling, and documentation of the wells were performed according to procedures presented in Procedures for Ground-Water Investigations (PNL 1989) and Last and Liikala (1987). Specifically, the collection and documentation of borehole samples and the construction of wells followed Procedure DO-1, Rev. 0 (PNL 1989), and special chemical samples were collected

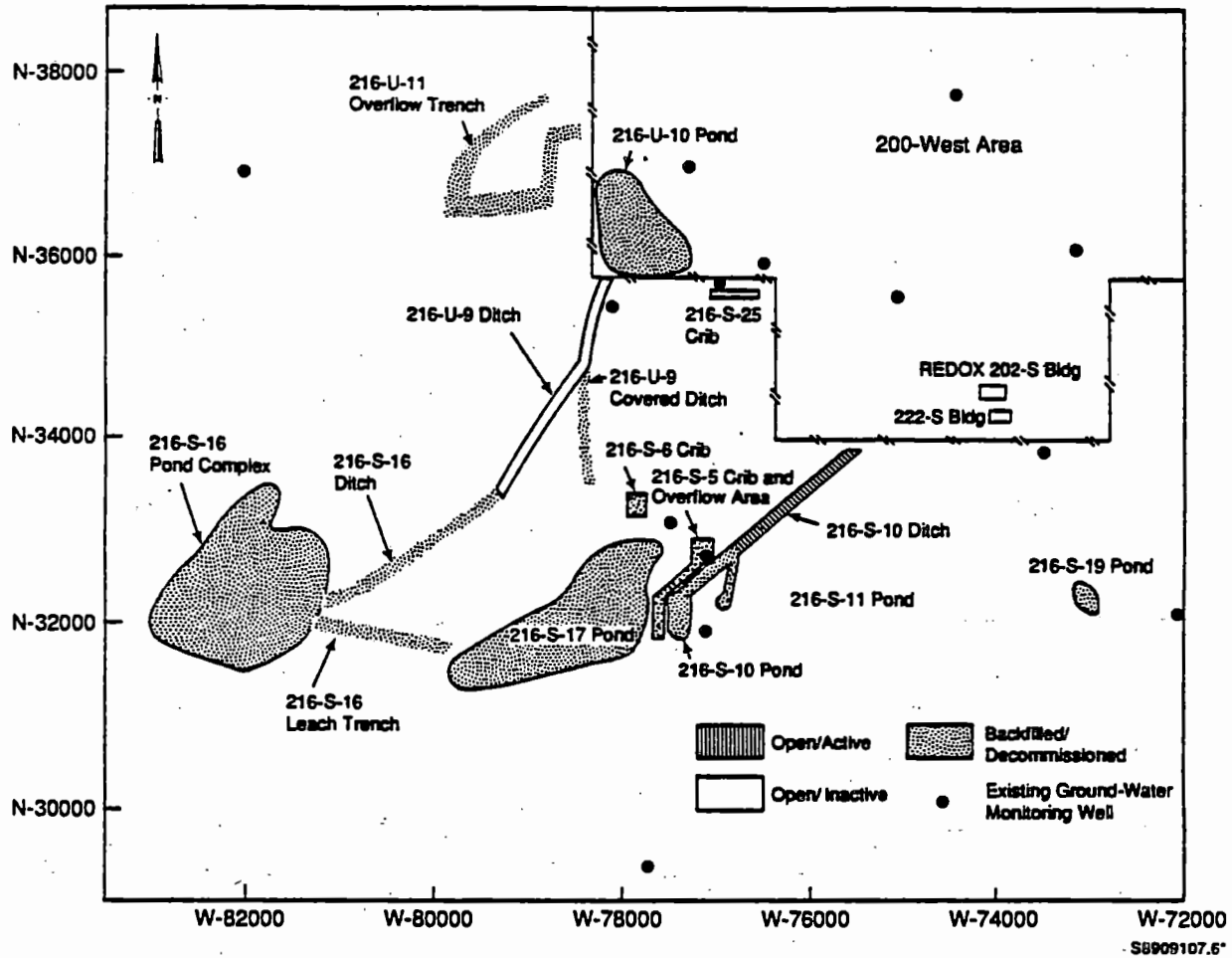


FIGURE 1.1. S-10 Facility Site Map

according to DO-4, Rev.0 (PNL 1989). Note that the forms used for documentation of drilling and well completion activities are those contained in Procedure DO-1, Rev. 1, which was not signed-off by PNL and WHC until the end of the project. It was the decision of the PNL S-10 site manager, and approved verbally through the WHC S-10 cognizant engineer, to use the improved and updated documentation forms. Geophysical logging activities were performed in accordance with Procedure GL-7A, Rev. 0 (PNL 1989). Health and safety considerations associated with the installation of ground-water monitoring wells were specified in Kaiser Engineers Hanford (1990). PNL-generated nonconformance reports are included in Appendix C. No deficiency reports, surveillance reports, or design field changes were generated.





**FIGURE 1.2.** Existing and Planned Ground-water Monitoring Wells Near the S-10 Facility as Shown in the Ground-water Monitoring Plan

Below is a list of the appendixes to this report and what each includes. Appendix A contains as-built diagrams, well completion/inspection reports, and geophysical logs. Appendix B lists sediment sample moisture contents, sieve analyses, sediment chemical analysis results, and chain-of-custody forms. Appendix C contains nonconformance/surveillance reports and deficiency reports. Appendix D contains the well development logs, ground-water sample chemistry analyses, and pump installation reports. Appendix E presents aquifer-test results and interpretation of water-level data, a summary of the water added and removed from the boreholes, and raw data. Appendix F contains the geologic logs.

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## 2.0 DRILLING AND SEDIMENT SAMPLING

All three of the S-10 facility wells were drilled using cable tool drilling methods. Where possible, the sampled materials were recovered from the borehole using a drive barrel sampler; otherwise, wells were drilled with a hard-tool bit and samples collected with a bailer. At well 299-W26-11, a split-spoon sampler was used to recover sediments from low-permeability zones. Wells were drilled to approximately 150 ft below ground surface with 10-in.-diameter temporary carbon steel casing and a drive shoe, and to the final depth using 8-in.-diameter temporary carbon steel casing and a drive shoe.

The boreholes were logged using a natural-gamma probe prior to installation of the 8-in.-diameter carbon steel casing and after reaching final depth; copies of the geophysical logs are included in Appendix A. In addition to the routine logging, Westinghouse Hanford Company logged a portion of the 10-in.-diameter borehole at well 299-W26-11 using a spectral gamma probe.

Sediments samples were collected in two 1-pint jars approximately every 5 ft during the drilling operation. After completion of the well, they were transferred to the Hanford Geotechnical Sample Library located in the 2101-M Building. An additional sample was collected for moisture content analysis from intervals that were drilled with a drive barrel; data from moisture samples are contained in Appendix B. Samples for chemical and radiologic analyses were taken every 20 ft until approximately 40 ft above the water table where sample intervals were increased to every 10 ft. Additional chemical samples were taken from zones of high moisture content or at major lithologic changes. Selected sediment samples collected for chemical analysis were analyzed for volatile organics, anions, total organic carbon, gross alpha, and gross beta. Chemical sample data and chain-of-custody forms are included in Appendix B.

The following paragraphs contain brief descriptions of drilling activities at individual wells.

WELL 299-W26-8

Drilling began March 12, 1990, and continued until April 4, 1990, when a final depth of 216.3 ft was reached. A total of 137.2 ft of 10-in.-diameter and 216.3 ft of 8-in.-diameter temporary carbon steel casing was used to reach the final drilled depth. The sediments encountered during drilling of the borehole are graphically represented in the as-built diagram in Appendix A. The well was logged with the natural-gamma geophysical probe during the drilling operation on April 5, 1990, and after the final well completion on May 29, 1990. Because of mechanical problems with the logging truck, the 10-in.-diameter borehole was not logged. The static water level measured on April 2, 1990, was 200.3 ft below land surface (bls). During drilling, approximately 515 gal of drill supply water were added to the borehole, 255 gal of which were added below the water table.

WELL 299-W26-9

Drilling began March 21, 1990, and continued until April 11, 1990, when a final depth of 206.25 ft was reached. A total of 143.7 ft of 10-in.-diameter and 206.5 ft of 8-in.-diameter temporary carbon steel casing was used to reach the final drilled depth. The sediments encountered during drilling of the borehole are graphically represented in the as-built diagram in Appendix A. The well was logged with the natural-gamma geophysical probe during the drilling operation on April 2 and April 12, 1990, and after the final well completion on May 29, 1990. The static water level measured on April 11, 1990, was 190.1 ft bls. During drilling, approximately 110 gal of drill supply water were added to the borehole, 105 gal of which were added below the water table.

WELL 299-W26-11

Drilling began March 19, 1990, and continued until April 13, 1990, when a final depth of 169.01 ft was reached. Perched water conditions were encountered during the drilling operation at a depth of approximately 125 ft. Drilling continued and the 10-in.-diameter casing was advanced to 145.3 ft at which point a 3- to 4-ft unit of sandy mud was encountered. Five feet of



bentonite slurry were placed in the borehole, and the 8-in.-diameter carbon steel casing was installed. Drilling continued to a depth of 169.01 ft at which point the moisture content in the sediments dramatically decreased. A total of 145.3 ft of 10-in.-diameter and 164.9 ft of 8-in.-diameter temporary carbon steel casing was used to reach the final drilled depth. The sediments encountered during drilling of the borehole are graphically represented in the as-built diagram in Appendix A. The well was logged with the gross-gamma geophysical probe during the drilling operation on April 5 and April 13, 1990, and after the final well completion on May 29, 1990. Westinghouse Hanford Company performed a spectral gamma survey of the borehole on April 4, 1990. The static water level measured on May 17, 1990, was 124.77 ft bls. During drilling, approximately 7 gal of drill supply water were added to the borehole, all of which were added below the perched water table.

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### 3.0 WELL COMPLETION

After the total depth was reached, the wells were bailed to remove excess drill cuttings from the borehole. A straightness test was then performed by passing a 7-in. nominal diameter, 21-ft-long section of stainless steel casing to the bottom of the borehole. A straightness test was not performed at well 299-W26-11. Because this is in violation of the specification document (Hodge 1990) a nonconformance report was issued (Appendix C). Wells 299-W26-8 and 299-W26-9 passed the straightness test. Once the straightness test was performed, the borehole was logged with a natural-gamma probe.

Prior to installation, all completion materials were inspected by the onsite PNL geologist. This inspection included verification that annular seal materials (sand, bentonite, cement) were properly bagged and that the stainless steel materials (casing, screen, end caps) were properly tagged by Kaiser Engineering. All materials were delivered to the site in the original packaging or covered by a plastic tarp. Rejected materials were replaced with new materials or were brought to acceptance by steam-cleaning.

The completion activities (installation of the permanent screen and casing, backpulling the carbon steel casing) were performed using a hydraulic crane and 300-ton-capacity hydraulic jacks. When jarring was required to free the carbon steel casing during backpulling, a cable-tool drilling rig was used.

The wells were constructed using 4-in.-nominal-diameter, Johnson<sup>(a)</sup> type 304, schedule 5 stainless steel casing and Johnson type 304 continuous, wire-wrap screens with bottom caps. Screen selection was made by PNL based on sieve analysis (see Appendix B) of sediments in the screened interval. The slot sizes of the screens used at each well are described in the discussions below. Generally, the annular fill and seal materials used during construction consisted of silica sand filter pack, 3/8- to 1/2-in. bentonite pellets, 8-20 mesh dry granular bentonite, and cement grout-containing aluminum powder. The surface completion consists of a concrete pad, 6-in.-nominal-diameter

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(a) Johnson Filtration Systems, Inc., Saint Paul, Minnesota.

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surface protective casing, four yellow guard posts, and a brass marker set into the concrete pad and stamped with the applicable well number.

The completed well was logged using a gross-gamma probe and camera surveyed prior to well development and sample-pump installation. Specifics of aquifer testing and well development are described in a later section. A well is considered complete when the HydroStar<sup>(a)</sup> pump is installed and tested. Pumps were installed and tested in wells 299-W26-8 and 299-W26-9. Well 299-W26-11 has not been developed, and a pump has not been installed.

The following paragraphs describe the completion activities at individual wells; the datum for the measurements listed is below land surface (bls). As-built diagrams in Appendix A graphically illustrate the placement of the permanent materials.

#### WELL 299-W26-8

Completion activities began at well 299-W26-8 on May 7, 1990. Complications with pulling back the carbon steel casing occurred during the initial completion activities. The stainless steel was removed, and the borehole was partially redrilled to "free up" the carbon steel casing. On May 15, 1990, the stainless steel casing and screen were reinstalled. A total of 224.97 ft of stainless steel casing and 20.35 ft of 10-slot, stainless steel channel pack screen was installed. The screen was placed from 215.7 to 195.4 ft bls, and the casing was placed from 195.4 ft bls to 1.0 ft above land surface. The filter pack, consisting of 20-40 mesh Colorado silica sand, was emplaced from 214.8 to 192.0 ft bls. The filter pack was settled by bailing and surging with a dart bailer inside the screen; approximately 150 gal of water were removed and contained at the well site in 55-gal drums. Bentonite pellets (3/8-in.) were placed from 192.0 to 188.4 ft bls, followed by 8-20 mesh bentonite crumbles from 188.4 ft to 19.9 ft bls. Cement grout containing aluminum powder was emplaced from 19.9 to 2.4 ft bls. Surface completion

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(a) HydroStar is a registered trademark of Instrumentation Northwest, Redmond, Washington.



activities (installing concrete pad, surface protective casing, guard posts, and brass markers) were completed on May 22, 1990.

#### WELL 299-W26-9

The stainless steel casing and screen were set on May 5, 1990. A total of 184.20 ft of casing and 20.34 ft of 10-slot, channel-pack screen was installed. The screen was placed from 204.9 to 184.6 ft bls, and the casing was placed from 184.6 ft bls to 0.4 ft above land surface. The filter pack, consisting of 20-40 mesh Colorado silica sand, was emplaced from 204.2 to 181.8 ft bls. The filter pack was settled by bailing and surging using a dart bailer inside the screen; approximately 135 gal of water were removed and contained at the well site in 55-gal drums. The 3/8-in. and 1/2-in. bentonite pellets were placed from 181.8 to 178.4 ft bls, followed by 8-20 mesh dry bentonite crumbles from 178.4 ft to 18.5 ft bls. A cement grout containing aluminum powder was poured from 18.5 to 2.0 ft bls. Surface completion activities (installing concrete pad, surface protective casing, guard posts, and brass markers) were completed on May 22, 1990.

#### WELL 299-W26-11

Completion activities began on April 23, 1990. The borehole depth terminated at 169.01 ft; however, it was decided by PNL and WHC to complete the well in the upper 15 ft of the perched water table. The lower portion of the borehole (167.3 to 137.4 ft bls) was abandoned by backfilling using Volclay Pure Gold® mixed to a minimum mud weight of 10.2 lb/gal. Before placing the permanent casing and screen, 3 ft of 40-100 Colorado silica sand were placed on top of the grout slurry. After placement of this sand layer, the stainless steel casing and screen were set. A total of 114.0 ft of stainless steel casing and 20.34 ft of 10-slot, stainless steel channel pack screen was installed. The screen was placed from 135.3 to 115.0 ft bls, and the casing was placed from 115.0 ft bls to 1.0 ft above land surface. The

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® Volclay Pure Gold is a registered trademark of American Colloid Company, Arlington Heights, Illinois.

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filter pack, consisting of 20-40 mesh Colorado silica sand, was emplaced from 133.3 to 109.5 ft bls. An attempt was made to settle the filter pack by bailing and surging; however, because of a lack of water in the borehole, caused by slow recharge rates, it was ineffective (only 4 gal were removed). Seven gal of deionized water were later added to allow more water volume for surging; 9 gal were removed. All of the bailed water was contained at the well site in 55-gal drums. Bentonite pellets (1/2-in.) were placed from 109.5 to 105.8 ft bls, followed by 8-20 mesh bentonite crumbles from 105.8 to 21.4 ft bls. A cement grout mixed with aluminum powder seal was poured from 21.4 to 2.0 ft bls. Surface completion activities (installing concrete pad, surface protective casing, guard posts, and brass markers) were completed on May 22, 1990.

#### 4.0 WELL DEVELOPMENT

S-10 facility wells 299-W26-8 and 299-W26-9 were developed following procedure GC-7, Rev. 0, contained in PNL (1989). Submersible 1/2 horse power pumps were used for the development. Both wells were developed until the turbidity of the discharge water was below 5 Nephelometric Turbidity Units (NTUs) and volume discharged exceeded three times the volume of water added below the water table during drilling. Well 299-W26-9 was developed at a rate of approximately 10 gal per minute (gpm), and well 299-W26-8 was developed at a maximum sustainable discharge rate of approximately 1 gpm. A summary table of well development activities, total volumes purged, and final turbidity values is contained in Appendix D. HydroStar pumps were installed in wells 299-W26-8 and 299-W26-9 on June 11, 1990 and June 12, 1990, respectively. Pump-installation logs are included in Appendix D; documentation of the HydroStar® placement was performed in accordance with procedure DO-3, Rev. 0, PNL (1989). Both installed Hydrostar pumps were tested successfully on June 19, 1990.

Well 299-W26-11 could not be developed according to procedure GC-7, Rev. 0, PNL (1989) due to the low hydraulic conductivity of the sediments in the completion interval. An alternative method of developing this well has been proposed and will begin shortly after the submittal of this data package.

Table 4.1 summarizes the drilling, completion and development activities for the individual wells.

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**TABLE 4.1.** Summary Table for 216-S-10 Facility Wells  
(depths are measured from ground surface  
unless otherwise indicated)

ACTIVITY	Well 299-W26-8	Well 299-W26-9	Well 299-W26-11
<b>Drilling</b>			
Start Date	03/12/90	03/23/90	03/19/90
Finish Date	04/03/90	04/11/90	04/13/90
Total Depth	216.29 ft	206.25 ft	169.01 ft
Water Depth(Date)	200.3 ft (4/2/90)	190.1 ft (4/11/90)	124.8 ft (5/17/90)
Casing Used	10 in. = 137.2 ft 8 in. = 216.3 ft	10 in. = 143.7 ft 8 in. = 206.5 ft	10 in. = 145.3 ft 8 in. = 164.9 ft
<b>Completion</b>			
Start Date	05/07/90	05/01/90	04/23/90
Finish Date	05/18/90	05/04/90	04/30/90
Water Depth(Date) <sup>(a)</sup>	202.97 ft (5/31/90)	192.30 ft (5/31/90)	125.57 ft (5/31/90)
Bottom of Screen	215.7 ft	204.9 ft	135.3 ft
<b>Development Activities</b>			
Camera Run	05/29/90	05/29/90	05/29/90
Slug Tested	05/31/90	05/31/90	05/31-06/01/90
Developed	06/08/90	06/06/90	NC <sup>(b)</sup>
Pump Placed	06/11/90	06/12/90	NC
Pump Tested	06/17/90	06/17/90	NC
Pump Depth <sup>(c)</sup>	210.94 ft	200.14 ft	NC
Purge Volume	692 gal	1240 gal	NC

(a) Measurements recorded prior to slug testing from below top of 6-in. surface casing.

(b) NC = work was not completed at the time of this report.

(c) Pump depths are recorded from top of 6-in. surface casing.



5.0 REFERENCES

Airhart, S. P., J. V. Borghese, and S. Dudziak. 1990. Interim-Status Ground-Water Monitoring Plan for the 216-S-10 Pond and Ditch. WHC-SD-EN-AP-018, Rev. 0., prepared by Pacific Northwest Laboratory for Westinghouse Hanford Company, Richland, Washington.

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Last, G. V., and T. L. Liikala. 1987. A Field Guide for Well Site Geologists: Cable Tool Drilling. PNL-6392, Pacific Northwest Laboratory, Richland, Washington.

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APPENDIX A

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

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## AS-BUILT DIAGRAM

Well Number 299-W26-9Geologist C.D. CONNIT (SAE), K. BARTON Page 1 of 2  
A.W. PEARSON (PAUL), LA DORRISReviewed by S. M. PaulDate 6/12/90

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
CEMENT GROUT (2.4'-19.9')		2'		Muddy SANDY GRAVEL
137.13 FT. OF 10" TEMPORARY		10'		SAND
CARBON STEEL CASING		12'		"
Concrete Pad (+C.5'-2.4')		30'		"
216.29 FT. OF 8" TEMPORARY		32'		"
CARBON STEEL CASING		20'		"
		35'		"
8-20 MESH DRY BENTONITE		40'		"
(19.9'-188.4')		45'		"
		50'		"
TYPE 304 SCH. 5, 4" DIA.		55'		"
STAINLESS STEEL		60'		"
CASING		65'		"
		70'		"
		75'		TRACE OF COARSE PEBBLE AT 71' - 72'
		80'		"
		85'		"
		90'		"
		95'		"
		100'		"
		105'		"
		110'		SLIGHTLY MUDDY SAND
CENTRALIZERS		115'		SAND
		120'		"
		125'		SLIGHTLY MUDDY SAND
		130'		" " "



## AS-BUILT DIAGRAM

Well Number 209-W26-8Geologist C.D. CONNIT (GAS), AW Pearson, Page 2 of 2  
L.A. DOREMUS, K.R.O. BARTONReviewed by A. M. SmithDate 6/12/90

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
10" TEMPORARY CARBON STEEL CASING (0'-137.18')		135'		SLIGHTLY MUDDY SAND
		140'		SWITCHED TO HARD TOOL AT 138.2 FT. MUDDY SAND
		145'		" "
8" TEMPORARY CARBON STEEL CASING 216.29' Total		150'		" "
		155'		" "
		160'		" "
		165'		ENCOUNTERED AT 162 FT. MUDDY SANDY GRAVEL
8-20 MESH DRY BEAUFORTITE (19.9'-188.4')		170'		" " "
		175'		" " "
		180'		" " "
		185'		" " "
3/8" VERTICAL TUBES (188.4'-192.0')		190'		" " "
20-40 MESH SILICA SAND (192.0'-215.4')		195'		" " "
		200'		" " "
		205'		" " "
		210'		" " "
		215'		" " "
TYPE 304, 4" DIA. STAINLESS STEEL 10 SLOT CHANNEL PACK SCREEN (195.35'-215.7') w/ BOTTOM CAP				

## WELL COMPLETION/INSPECTION REPORT

Certification No. WHC-5-014 Rev No. 4  
 Project WC17 ECN's: 146189, 146199, 124393  
 Location 216-S-10 124394, 124427  
 Drilling Company KEH  
 Driller CRAIG WAMSLEY  
 Other (Companies) NGNE  
 Geologist(s) C.D. CONDIT (GAI), A.W. Pearson,  
L.A. DOMINUS, R.R.O. BOUTON  
 Technical Procedure No. DO-1 Rev No. 0

Well No. 299-W26-8 Temp. Well No. N/A  
 Coordinates \_\_\_\_\_  
 Casing Elev. \_\_\_\_\_ Ground Elev. \_\_\_\_\_  
 Drilling Method  
 Rotary Air N/A Mud N/A  
 Cable Tool 0 0' - 136.2' H 136.2' - 216.29'  
 Drilling Fluid 200E H2O STAND APT  
 Other NONE

Geophysical Logging  
 Sondes Interval Date  
NATURAL GAMMA 2' - 214.9' 4/5/90  
" " 2.1' - 216' 5/29/90  
" " " " " "  
" " " " " "  
" " " " " "

Completion Data  
 Drilled Depth 216.29'  
 Completed Depth 215.7'  
 Date Started 3/6/90  
 Date Completed 5/22/90  
 Static Water Level/Date 200.3' / 4-2-90

Aquifer Testing  
 Type SLUG WITHDRAWAL  
 Length of Test 1.5 hrs.  
 Volume Pumped N/A  
 Drawdown N/A  
 Date of Test 5/31/90

## Inspection Results

Cleaning  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 7.6 4.2.2  
 Accept Reject Date  
 Drilling Tools/Rig CDC N/A 3/6/90  
 Temporary Materials CDC N/A 3/30/90  
 Permanent Materials AWP N/A 5/8/90

Material Storage/Packing  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 4.2.2 7.3 ECN 124427 146189  
 Accept Reject Date  
 Mtl. Handling/Storage LAD N/A 5-17-90  
 Material Packing LAD N/A 5-17-90

Screen  
 Type Length Slot Size  
Stainless Steel Channel Pack 10.33' 10  
" " 10.02' 10  
 Depth(s) 195.35' - 215.7'

Lubricants/Additives  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 7.2  
 Identify Accept Reject Date  
 Additives N/A N/A N/A  
 Lubricants FOOD GRADE VEG. OIL CDC N/A 3/17/90

Inspection Method VISUAL  
 Acceptance Criteria SECTION 4.2.3  
 Accept AWP Reject N/A Date 5/8/90

Straightness Test  
 Inspection Method RUN PIPE TO BOTTOM  
 Acceptance Criteria SECTION 8.2  
 Accept AWP Reject N/A Date 4/3/90

Casing (permanent)  
 Type Size Placement  
Johnson Division Type 304 4" (200.0') - 7.0' - 195.35'  
Stainless Steel  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 4.2.4  
 Accept AWP Reject N/A Date 5/8/90

Well Protection  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 4.2.10  
 Accept Reject Date  
 Well Pad and Protective Posts KROB (see NCR FNL-90-035) 5/22/90  
 Locks KROB N/A 5/22/90  
 Well Number \_\_\_\_\_

Annular Seal  
 Inspection Method Steel Tape # L300-17  
 Type Interval AWP Volume #3 Accept Reject Date  
CSST 20-40 mesh Silica Sand 214.8' - 215.4' 12.0 23.44 FT LAD N/A 5-16-90  
3/4" Vitrified Tiles 192.0 - 195.4 1.96 FT LAD N/A 5-16-90  
B-20 mesh Bentonite Crumbles 195.4 - 19.9 93.32 FT LAD N/A 5-17-90  
Cement Grout 19.9 - 2.4 13.2 FT LAD N/A 5-17-90

Other (initial if performed)  
 Well Abandonment AWP Downhole TV Inspection SOA Complete As-Built Diagram, Driller's/Geologist's Logs  
 Well Development AWP

For all blanks mark N/A if not applicable.

A-1800-002 (10/89)

ECN's 2-393, 146189, 124427, 146189, 124394
 REVIEWED BY S. M. GORDON 6/12/90  
D. M. Ford

# WESTINGHOUSE

## HANFORD COMPANY

WELL NUMBER 299-W126-X AREA South of 200-West  
 DATE 4-5-90  
 LOG RUN #1 LOG TYPE GAMMA RAY  
 SURVEY COORDINATES \_\_\_\_\_ N \_\_\_\_\_ E  
 ELEVATION DATUM \_\_\_\_\_ ELEVATION \_\_\_\_\_  
 LOG MEASURED FROM GROUND SURFACE  
 LOCATION DESCRIPTION NORTH OF 216-S-E L.R.P.  
 GROUND SURFACE ELEVATION \_\_\_\_\_  
 SURFACE TEMPERATURE 18.5°C WEATHER SUNNY-WARM

### BOREHOLE INFORMATION

DRILLER \_\_\_\_\_  
 DRILL RIG TYPE CABLE TOOL BIT TYPE/DIAMETER 9" REGULAR  
 BOREHOLE DIAMETER(S)/DEPTH 10" - 8"  
 DEPTH DRILLER 11A DEPTH LOGGER 214.8"  
 LIQUID LEVEL 214.7" 199.64CS LIQUID APPEARANCE CLEAR  
 TEMPERATURE 16.3°C

### CASING RECORD

TYPE <u>10" CASEPI STEEL</u>	INTERVAL <u>1'1" STEEL</u>
TYPE <u>8" CASEPI STEEL</u>	INTERVAL <u>2'9" STEEL</u>
TYPE _____	INTERVAL _____
TYPE _____	INTERVAL _____

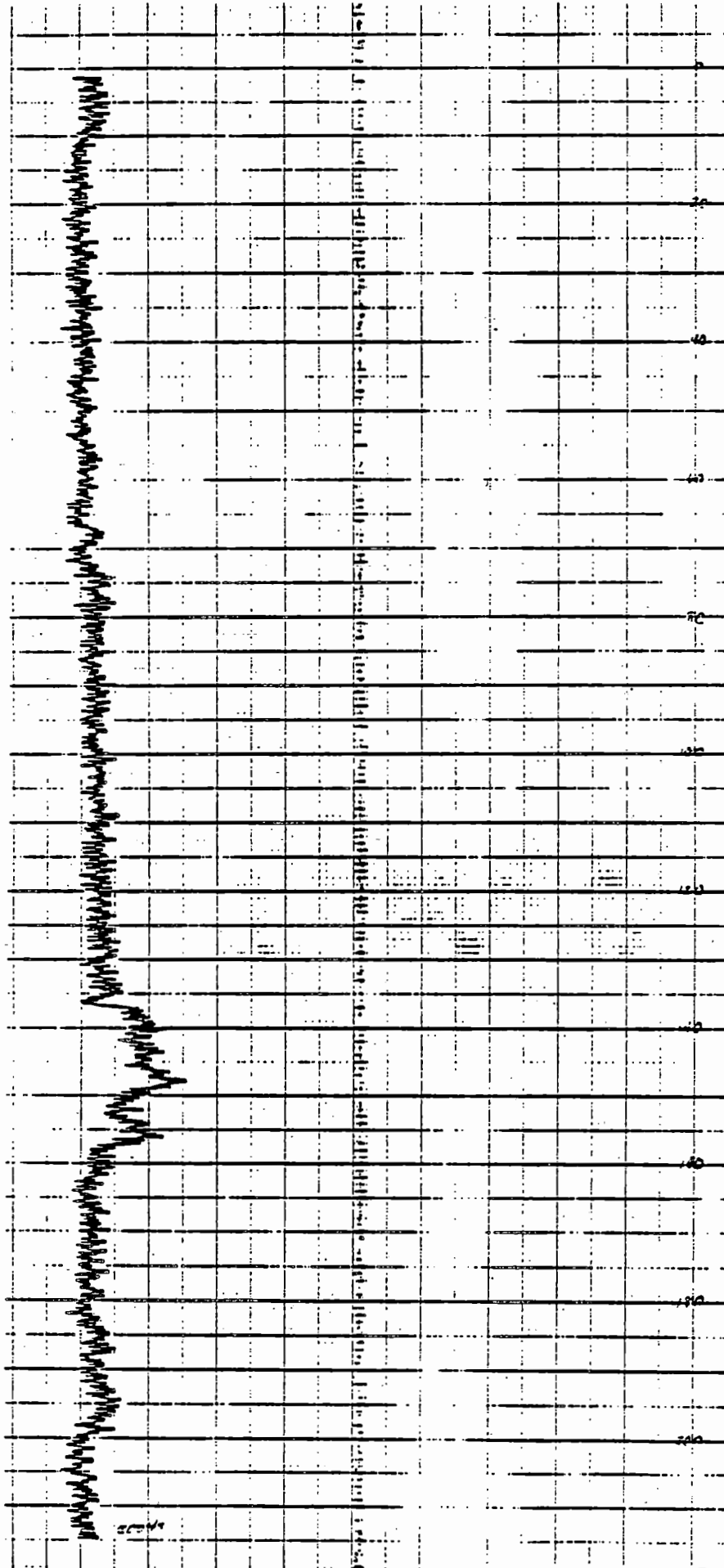
WELL SCREEN INTERVAL:

COMMENTS: NOT CALIBRATED  
RETURN FUEL 1" HIGH

1081-5726-116



9443223.0802





## AS-BUILT DIAGRAM

P.S. INNIS, A.W. PEARSON

Well Number 299-W26-9Geologist S.P. AICHEART, L.A. DOREMUSPage 1 of 2Reviewed by A.M. GouldDate 6/10/90

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		5		SLIGHTLY MUDDY SAND
CEMENT SURFACE SEAL		10		SAND
(30' - 18.5')		15		SAND
		20		SAND
10" CARBON STEEL CASING		25		SAND
(0' - 143.7') - REMOVED		30		SLIGHTLY MUDDY SAND
		35		SLIGHTLY MUDDY GRAVELLY SAND
8" CARBON STEEL CASING		40		MUDDY SANDY GRAVEL
(0' - 206.5') - REMOVED		45		SAND (AT 44')
		50		SAND
8-20 MESH DRY BENTONITE		55		SLIGHTLY MUDDY SAND
(185' - 178.4')		60		SAND
		65		SAND
TYPE 304 SCH. 5, 8" DIA.		70		SAND
STAINLESS STEEL CASING		75		SAND
		80		SLIGHTLY MUDDY SAND
		85		SAND
		90		SAND
		95		SAND
		100		SAND
CENTRALIZERS		105		SAND
		110		SLIGHTLY MUDDY SAND
		115		SAND 114-115 SANDY MUD 113-114, 115-116.5
		120		SLIGHTLY MUDDY SAND
		125		SLIGHTLY MUDDY SAND
		130		SANDY MUD (AT 125')

A-1800-186 (3/87)

Well Number 299-WZ16-9 Geologist P.S. INNIS, A.W. PEARSON Page 2 of 2  
S.P. ARNHEIM, L.A. DOREMUS  
Reviewed by A. H. Paul Date 6/10/90

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
10" CARBON STEEL CASING (0'-143.7') - REMOVED CENTRALIZERS 8" CARBON STEEL CASING (0'-206.5')		135		SLIGHTLY MUDDY GRAVELLY SAND <del>SL. M. SAND</del> (133')
		140		MUDDY SANDY GRAVEL (139)
		145		GRAVELLY SAND (143')
		150		MUDDY SANDY GRAVEL
		155		" " "
		160		SLIGHTLY MUDDY GRAVELLY SAND
		165		MUDDY SANDY GRAVEL
8-20 MESH DRY BENTONITE (18.5'-178.4')		170		" " "
		175		" " "
		180		" " "
CLAY TABLETS (178.4'-181.8')		185		" " "
		190		" " "
DN = 190.1' (411190)		195		" " "
20-40 MESH COLORADO SILICA SAND. (181.8'-204.2')		200		SL. GRAVELLY SL. MUDDY SAND
		205		MUDDY SANDY GRAVEL
TYPE 304, 4" DIA. STAINLESS STEEL 10-SLOT CHANNEL PORE SCREEN (184.9'-204.9')				
W/ BOTTOM CAP				

SL - SLIGHTLY

9

## WELL COMPLETION/INSPECTION REPORT

Specification No. WHC-S-014 Rev No. 4\*  
 Project W-017  
 Location 216-S-10  
 Drilling Company KAISER ENGINEERING HANFORD  
 Driller LOUIS WATKINS  
 Other (Companies) N/A  
 Geologist(s) P.S. INNIS (G.A.I.), A.W. PEARSON  
L.A. DOREMUS, S.P. AIRHART  
 Technical Procedure No. D.O. 1 Rev No. 0

Well No. 299-W216-9 Temp. Well No. N/A  
 Coordinates \_\_\_\_\_  
 Casing Elev. \_\_\_\_\_ Ground Elev. \_\_\_\_\_  
 Drilling Method  
 Rotary Air N/A Mud N/A  
 Cable Tool D 0-176.5' H 176.5'-206.25'  
 Drilling Fluid WATER - 200F STAND PIPE  
 Other NONE

Geophysical Logging  
 Sondes Interval Date  
NATURAL GAMMA 0 - 145' 4/2/90  
" " 104' - 204' 4/12/90  
" " 21' - 204.7' 5/29/90

Completion Data  
 Drilled Depth 206.25'  
 Completed Depth 204.88'  
 Date Started 3/21/90  
 Date Completed 5/4/90  
 Static Water Level/Date 190.1' / 4/11/90

Aquifer Testing  
 Type SLUG WITH DRAWDOWN  
 Length of Test 1.3 hrs.  
 Volume Pumped N/A  
 Drawdown N/A  
 Date of Test 5/31/90

## Inspection Results

Cleaning  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 7.6  

	Accept	Reject	Date
Drilling Tools/Rig	<u>PSI</u>	<u>N/A</u>	<u>4/10/90</u>
Temporary Materials	<u>PSI</u>	<u>N/A</u>	<u>4/10/90</u>
Permanent Materials	<u>LAD</u>	<u>N/A</u>	<u>5-2-90</u>

Material Storage/Packing  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 4.2.2, 7.3, ECN 124427 146189  

	Accept	Reject	Date
Mtl. Handling/Storage	<u>SPA</u>	<u>N/A</u>	<u>5/4/90</u>
Material Packing	<u>SPA</u>	<u>N/A</u>	<u>5/4/90</u>

Screen  

Type	Length	Slot Size
<u>Johnson Type 304 Stainless Steel</u>	<u>20.34'</u>	<u>10 channel pack</u>
Depth(s)	<u>184.6' - 204.3'</u>	<u>204.9'</u>

Lubricants/Additives  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 7.2  

	Accept	Reject	Date
Additives	<u>N/A</u>	<u>P22</u>	<u>3/23/90</u>
Lubricants	<u>PCO GRADE VEG OIL</u>	<u>P22</u>	<u>3/23/90</u>

Inspection Method VISUAL  
 Acceptance Criteria SECTION 4.2.3  
 Accept LAD Reject N/A Date 5-2-90

Straightness Test  
 Inspection Method VISUAL PIPE TO BOTTOM  
 Acceptance Criteria SECTION 8.2  
 Accept P22 Reject N/A Date 4/11/90

Casing (permanent)  

Type	Size	Placement
<u>Johnson Type 304 Stainless</u>	<u>4" dia, 184.99'</u>	<u>10.4' - 184.6'</u>

  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 4.2.4  
 Accept LAD Reject N/A Date 5-2-90

Well Protection  
 Inspection Method VISUAL  
 Acceptance Criteria SECTION 4.2.10  

	Accept	Reject	Date
Well Pad and Protective Posts	<u>KROB (see NCR PNL-90-035)</u>	<u>5/22/90</u>	
Locks	<u>KROB</u>	<u>N/A</u>	<u>5/22/90</u>
Well Number			

Annular Seal  
 Inspection Method VISUAL, STEEL TAPE  

Type	Interval	Volume	Accept	Reject	Date
<u>20-40 Mesh Silica Sand</u>	<u>181.8' - 204.7'</u>	<u>16.0 ft<sup>3</sup></u>	<u>LAD</u>	<u>N/A</u>	<u>5-3-90</u>
<u>3/8", 1/2" Volclay Tablets</u>	<u>178.4' - 181.8'</u>	<u>1.9 ft<sup>3</sup></u>	<u>LAD</u>	<u>N/A</u>	<u>5-3-90</u>
<u>B-20 Mesh Dry Bentonite</u>	<u>18.5' - 178.4'</u>	<u>91.6 ft<sup>3</sup></u>	<u>SPA</u>	<u>N/A</u>	<u>5/4/90</u>
<u>Cement Surface Seal</u>	<u>2' - 18.5'</u>	<u>6.9 ft<sup>3</sup></u>	<u>SPA</u>	<u>N/A</u>	<u>5/4/90</u>

Other (initial if performed)  
N/A Well Abandonment AWP Downhole TV Inspection SPA Complete As-Built Diagram, Driller's/Geologist's Logs  
SPB Well Development  
 Reviewed By S. Goodwin 12/10/90

For all blanks mark N/A if not applicable.

A-1800-002 (10/89)

\* ECN #'s 146189, 146186, 124393, 124427, 124394

# WESTINGHOUSE

## HANFORD COMPANY

WELL NUMBER 299-1126-9 AREA 200-11WEST  
 DATE 4-2-90  
 LOG RUN #1 LOG TYPE GAMMA RAY  
 SURVEY COORDINATES \_\_\_\_\_ N \_\_\_\_\_ E  
 ELEVATION DATUM Top of 10" CASING ELEVATION \_\_\_\_\_  
 LOG MEASURED FROM GROUND SURFACE  
 LOCATION DESCRIPTION SE OF OLD S-11 POND  
 GROUND SURFACE ELEVATION \_\_\_\_\_  
 SURFACE TEMPERATURE NA WEATHER SUNNY-WARM

### BOREHOLE INFORMATION

DRILLER LOUIS WATKINS KEH  
 DRILL RIG TYPE CABLE TOOL BIT TYPE/DIAMETER 7" DRIVE BBL  
 BOREHOLE DIAMETER(S)/DEPTH 10" to 145'  
 DEPTH DRILLER 145' DEPTH LOGGER 144.8  
 LIQUID LEVEL DRY LIQUID APPEARANCE NA  
 TEMPERATURE NA

### CASING RECORD

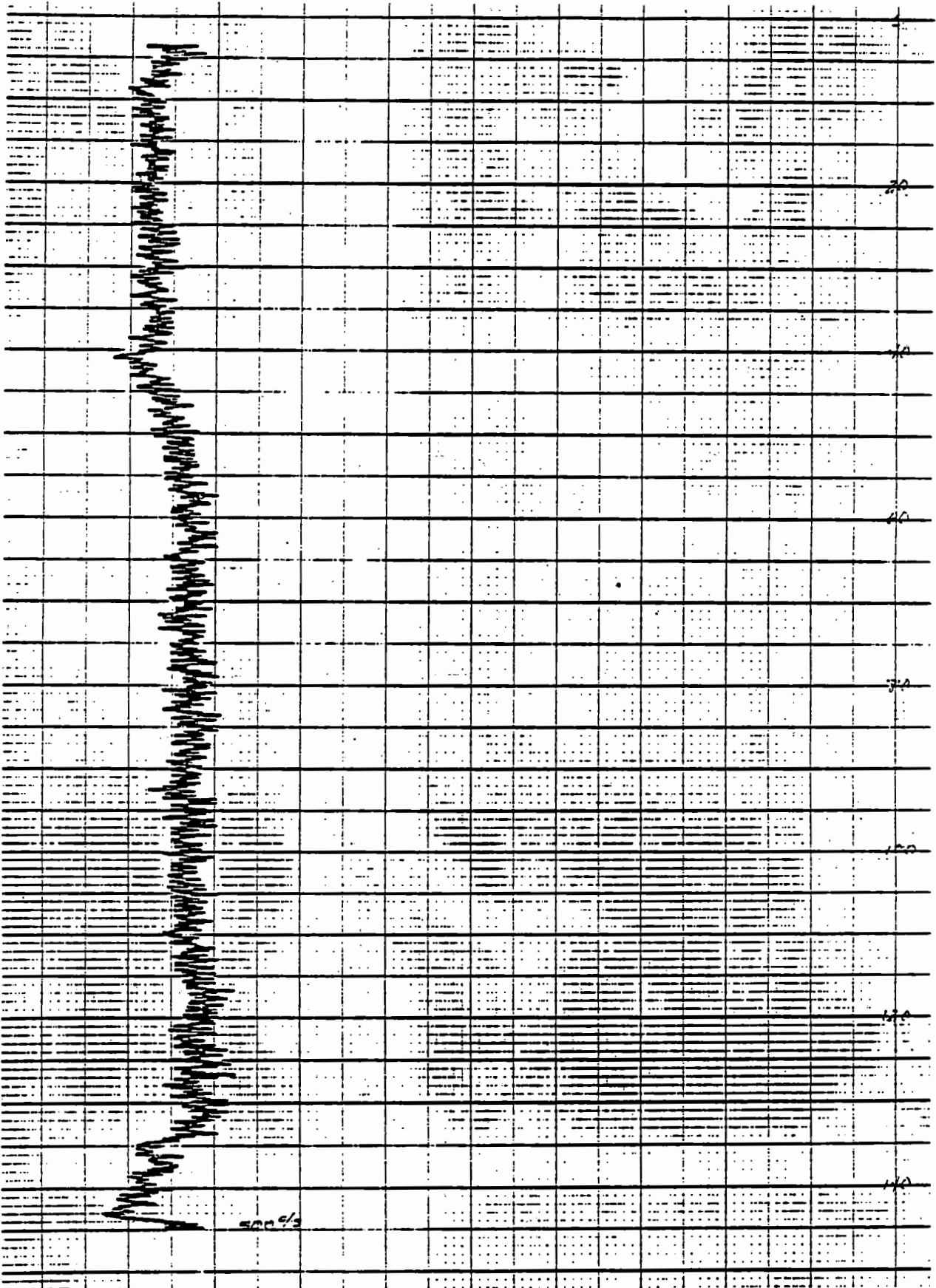
TYPE <u>10" CARBON STEEL</u>	INTERVAL <u>143.3'-SURFACE 1.7 stickup</u>
TYPE	INTERVAL
TYPE	INTERVAL
TYPE	INTERVAL

WELL SCREEN INTERVAL: NA

COMMENTS: NOT CALIBRATED

9143223.0806

9143223.0807



# WESTINGHOUSE

## HANFORD COMPANY

WELL NUMBER 299-1126-9 AREA S-10 Pond  
 DATE 4-12-90  
 LOG RUN #2 LOG TYPE GAMMA Ray  
 SURVEY COORDINATES \_\_\_\_\_ N \_\_\_\_\_ E  
 ELEVATION DATUM \_\_\_\_\_ ELEVATION \_\_\_\_\_  
 LOG MEASURED FROM GROUND SURFACE  
 LOCATION DESCRIPTION S.W. CORNER 200-WEST AREA OUTSIDE  
 GROUND SURFACE ELEVATION \_\_\_\_\_  
 SURFACE TEMPERATURE 23.2°C WEATHER SUNNY-WARM

### BOREHOLE INFORMATION

DRILLER LOUIS WATKINS KEH  
 DRILL RIG TYPE CABLE TOOL BIT TYPE/DIAMETER 8" REGULAR 4 DRIVE BBL  
 BOREHOLE DIAMETER(S)/DEPTH 10"- 8"  
 DEPTH DRILLER \_\_\_\_\_ DEPTH LOGGER 204'  
 LIQUID LEVEL 189.70 G.S LIQUID APPEARANCE CLEAR  
 TEMPERATURE 18.2°C

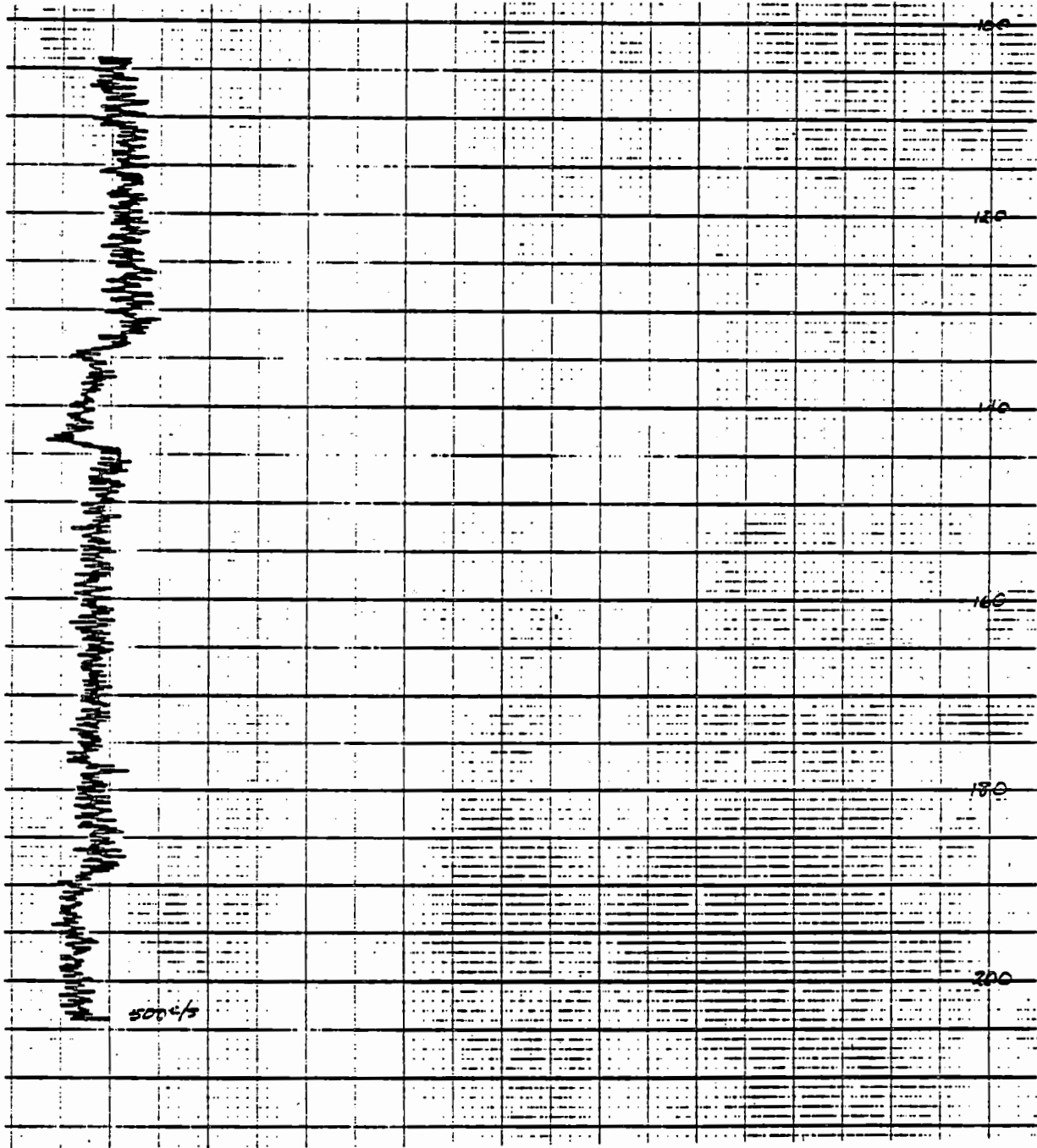
### CASING RECORD

TYPE <u>10" CARBON STEEL</u>	INTERVAL
TYPE <u>8" CARBON STEEL</u>	INTERVAL
TYPE	INTERVAL
TYPE	INTERVAL

WELL SCREEN INTERVAL: NA

COMMENTS: CALIBRATION EXPIRED

6080-223716







Pacific Northwest Laboratories

## AS-BUILT DIAGRAM

Well Number 299-W26-11 Geologist R. Miller (SA), A. W. Carlson Page 1 of 2  
LA DOREMUS, S.P. AIRHART,  
 Reviewed by Shirley Paul S.M. Loomis 6/10/90  
 Date

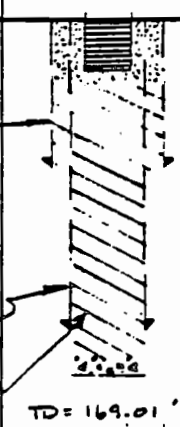
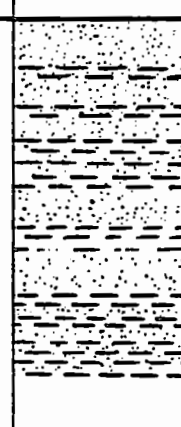
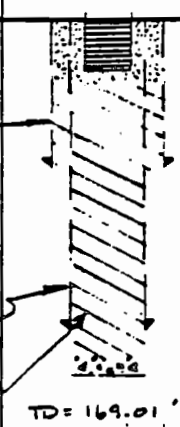
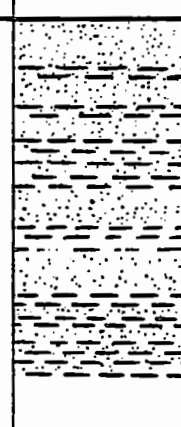
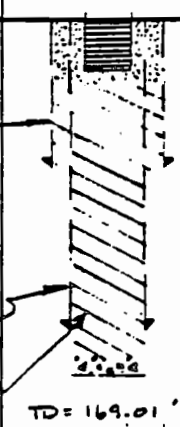
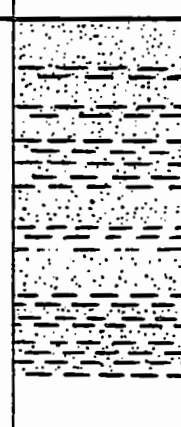
Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
10" temporary carbon steel casing w/drive shoe (0' - 145.3') - removed		5		SAND - trace gravel CB
		10		SAND "
		15		" - c sand "
		20		sl. Gravelly SAND - c sand "
		25		SAND - f sand "
		30		" - c sand "
		35		" - f sand "
		40		" - " "
		45		" - " "
		50		" - " "
		55		" - " - mud lenses "
		60		" - " "
		65		" - m sand - to completion "
		70		" - f sand "
		75		" - " "
		80		SANDY GRAVEL - 76.5 - 78.0 CLAY @ 76.0
		85		SAND - c sand 78.00
		90		SAND "
		95		" "
		100		" "
		105		" "
		110		" "
		115		" "
		120		" - f micaceous "
		125		" - " - wet "
		130		" - " "
20-40 Colorado Silica Sand (109.5' - 133.3')				
40-100 Colorado Silica Sand (133.3' - 137.35')				



AS-BUILT DIAGRAM

Well Number 299-W26-11 Geologist R. Miller (GAI) AW Pearson Page 2 of 2  
LA Doremus

Reviewed by Shirley M. Moul Date 6/10/90

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
10" temporary carbon steel casing w/drill shoe from (0' - 145.3') - removed		135		sl Muddy SAND - at 135.3' - 1 DB
		140		Sandy MUD - 139.5' - 140.5'
		145		SAND & 140.5' - 143.5'
		150		Sandy MUD 143.5' - 147.5'
		155		Muddy SAND 147.2' - 152.0'
8" temporary carbon steel casing w/drill shoe from (0' - 164.9') - removed		155		MUD - some - (sandy) 153' - 155.3'
		160		Muddy SAND 155.5' - 160.0'
		165		MUD 160 - 161.8' & 162.3' - 163.0'
		170		sl Muddy SAND 161.8' - 162.3' & 163.0' - 165.0'
				* BLACK SANDS
Volclay Pure Gold Slurry (137.25' - 167.3')				Muddy SAND to 167.2' T.D.

## WELL COMPLETION/INSPECTION REPORT

Identification No. WHC-S-01A Rev No. 4\*  
 Project W017  
 Location 200W S-10 trench  
 Drilling Company Kaiser Engineers Hanford  
 Driller David Ludtke  
 Other (Companies) NONE  
 Geologist(s) R. Miller (GAI), A. Pearson, S. Aicheart  
L. Doremus, S. Goodwin  
 Technical Procedure No. DO-1 Rev No. 0

Well No. 299-H26-11 Temp. Well No. N/A  
 Coordinates \_\_\_\_\_  
 Casing Elev. \_\_\_\_\_ Ground Elev. \_\_\_\_\_  
 Drilling Method  
 Rotary Air N/A Mud N/A  
 Cable Tool D 2 1/2" 100' H N/A  
 Drilling Fluid 200E Pump Water Supply  
 Other NONE

Geophysical Logging		
Sondes	Interval	Date
<u>neptol gamma</u>	<u>+1.82 - 143.0'</u>	<u>4/4/90</u>
<u>natural gamma</u>	<u>+3.30 - 144.0'</u>	<u>4/5/90</u>
<u>natural gamma</u>	<u>109.0 - 107.0'</u>	<u>4/13/90</u>
<u>natural gamma</u>	<u>122.0 - 135.0'</u>	<u>5/29/90</u>
	<u>SDA UN190</u>	

Completion Data  
 Drilled Depth 1169.01' b/s  
 Completed Depth 1169.01' 125.3'  
 Date Started 3/19/90  
 Date Completed 5/22/90  
 Static Water Level/Date 124.77' 5/17/90

Aquifer Testing  
 Type SLUG WITHDRAWAL  
 Length of Test 19 hrs.  
 Volume Pumped N/A  
 Drawdown N/A  
 Date of Test 5/31 - 6/1/90

## Inspection Results

Cleaning  
 Inspection Method Visual  
 Acceptance Criteria Section 7.6  
 Accept \_\_\_\_\_ Reject \_\_\_\_\_ Date \_\_\_\_\_  
 Drilling Tools/Rig Plan N/A 3/19/90  
 Temporary Materials Plan N/A 3/26/90  
 Permanent Materials SDA N/A 4/25/90

Material Storage/Packing  
 Inspection Method Visual  
 Acceptance Criteria Section 4.2.2, ECN 124427, 146189  
 Accept \_\_\_\_\_ Reject \_\_\_\_\_ Date \_\_\_\_\_  
 Mtl. Handling/Storage SDA N/A 4/25/90  
 Material Packing SDA N/A 4/25/90

Screen  
 Type 304 stainless steel  
 Length 20.24'  
 Slot Size 10-SLOT  
 Depth(s) 115.0' - 135.3'  
AWP W/190 AWP W/190  
 Inspection Method Visual  
 Acceptance Criteria Section 4.2.3  
 Accept Good Reject N/A Date 4/26/90

Lubricants/Additives  
 Inspection Method Visual  
 Acceptance Criteria Section 7.2  
 Identify Accept Reject Date  
 Additives N/A N/A N/A N/A  
 Lubricants regular oil Plan N/A 3/19/90

Straightness Test See NCR & PNL-90-041  
 Inspection Method Run device to bottom  
 Acceptance Criteria Section 8.2  
 Accept N/A Reject N/A Date NOT PERFORMED

Casing (permanent)  
 Type 304 stainless steel  
 Size 4" dia.  
 Placement 115.0' - 145.0'  
AWP W/190  
 Inspection Method Visual  
 Acceptance Criteria Section 4.2.4  
 Accept Good Reject N/A Date 4/26/90

Well Protection  
 Inspection Method Visual  
 Acceptance Criteria Section 4.2.10  
 Accept \_\_\_\_\_ Reject \_\_\_\_\_ Date \_\_\_\_\_  
 Well Pad and Protective Posts KROB (see NCR & PNL-90-035) N/A 5/22/90  
 Locks KROB N/A 5/22/90  
 Well Number N/A

Annular Seal  
 Inspection Method Visual, Steel tape  
 Type Volclay Pure Gild Slurry sm 6115  
 Interval 137.4' - 147.3'  
 Volume 23.1 Ft<sup>3</sup>  
 Accept Good Reject N/A Date 4/26/90  
40-100 Mesh Colorado Silica Sand 133.3' - 137.4' 4.5 Ft<sup>3</sup> SDA N/A 4/27/90  
20-40 Mesh Colorado Silica Sand 109.5' - 133.3' 21.3 Ft<sup>3</sup> SDA N/A 4/27/90  
1" dia Volclay Tablets 105.8' - 109.5' 1.70 Ft<sup>3</sup> LAD N/A 4/30/90

Other (initial if performed)  
 Well Abandonment AWP Downhole TV Inspection SDA Complete As-Built Diagram, Driller's/Geologist's Logs  
 Well Development REVIEWED BY S. M. Goodwin 6/10/90

For all blanks mark N/A if not applicable.

A-1800-002 (10/89)

\* ECN 3, 146189, 146188, 124393, 124427, 124394 17

Well 299-W26-11 continued...

## ANNULAR SEAL

Inspection Method		Acceptance Criteria		Section 4.2.6 to 4.2.9.	
Type	Interval	Volume	Accept	Reject	Date
8-20 MESH DRY BENTONITE	105.8' - 21.4'	52.54 ft <sup>3</sup>	AD	N/A	4/30/00
CEMENT GROUT	21.4' - 2.0'	9.24 ft <sup>3</sup>	AD	N/A	4/30/00
AWP 6/11/00	AWP → 2.0' - 1.5'	1.3 ft <sup>3</sup>	—	—	—
	0.5' - 0.0'	—	—	—	—

REVIEWED BY S.M. GOODWIN Shank-Neil 6/10/99 for all blanks mark N/A if not applicable.

947323.0813

# WESTINGHOUSE

## HANFORD COMPANY

WELL NUMBER 299-W26-11 AREA 200-West  
 DATE 4-5-90  
 LOG RUN #1 LOG TYPE GAMMA RAY  
 SURVEY COORDINATES \_\_\_\_\_ N \_\_\_\_\_ E  
 ELEVATION DATUM \_\_\_\_\_ ELEVATION \_\_\_\_\_  
 LOG MEASURED FROM GROUND SURFACE  
 LOCATION DESCRIPTION NEAR HEAD END OF S-10 Ditch  
 GROUND SURFACE ELEVATION \_\_\_\_\_  
 SURFACE TEMPERATURE 14.8°C WEATHER SUNNY-41°F

### BOREHOLE INFORMATION

DRILLER DARREL LUDTKE KEH  
 DRILL RIG TYPE CABLE TOOL BIT TYPE/DIAMETER 7" DRIVE BBL.  
 BOREHOLE DIAMETER(S)/DEPTH 10" TO 145'  
 DEPTH DRILLER 145' DEPTH LOGGER 144'  
 LIQUID LEVEL 127.60' G.S. LIQUID APPEARANCE CLEAR  
 TEMPERATURE 14.3°C

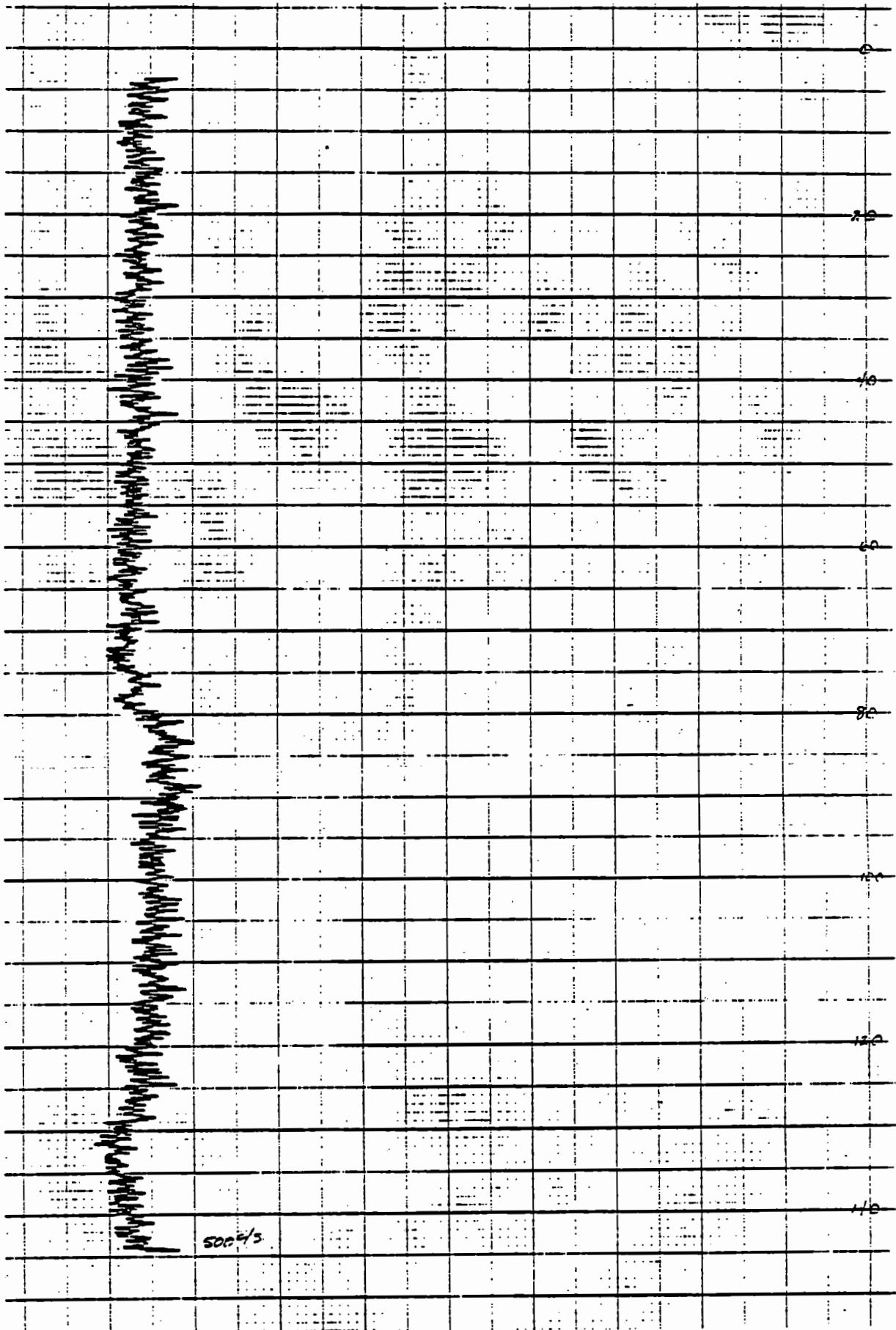
### CASING RECORD

TYPE <u>10" CARBON STEEL</u>	INTERVAL <u>145.2' + 1.8' Stick up</u>
TYPE	INTERVAL
TYPE	INTERVAL
TYPE	INTERVAL

WELL SCREEN INTERVAL:

COMMENTS: FENCED WATER  
NOT CALIBRATED

9443223.0815



WHC-MR-0206

APPENDIX B

MOISTURE CONTENT DATA, SIEVE DATA, CHEMICAL-SAMPLE DATA,  
AND CHAIN-OF-CUSTODY FORMS

9167.223.0816

9443223.0817

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WHC-MR-0206

MOISTURE CONTENT DATA

WELL #	DEPTH ft.	XH2O	WELL #	DEPTH ft.	XH2O	WELL #	DEPTH ft.	XH2O
299-W26-8	5.00	2.49	299-W26-9	5.00	5.74	299-W26-11	5.00	3.64
"	10.00	4.83	"	10.00	3.78	"	10.00	4.11
"	15.00	2.83	"	15.00	4.54	"	15.00	3.88
"	20.00	2.82	"	20.00	2.86	"	20.00	2.40
"	25.00	2.20	"	25.00	5.62	"	25.00	3.38
"	30.00	4.42	"	30.00	18.18	"	30.00	2.38
"	35.00	2.82	"	35.00	3.26	"	35.00	3.93
"	40.00	3.49	"	40.00	8.64	"	40.00	3.58
"	45.00	4.85	"	45.00	2.28	"	45.00	6.52
"	50.00	5.11	"	50.00	3.73	"	50.00	3.27
"	55.00	5.14	"	55.00	7.44	"	55.00	4.38
"	60.00	2.78	"	60.00	4.18	"	60.00	4.25
"	65.00	3.68	"	65.00	2.89	"	65.00	4.12
"	70.00	3.55	"	70.00	2.89	"	70.00	4.55
"	75.00	2.68	"	75.00	2.65	"	75.00	9.42
"	80.00	2.32	"	80.00	8.81	"	78.00	3.73
"	85.00	2.82	"	85.00	4.58	"	80.00	5.75
"	90.00	3.28	"	90.00	6.82	"	85.00	3.63
"	95.00	2.89	"	95.00	4.58	"	90.00	4.55
"	100.00	2.62	"	100.00	4.85	"	95.00	14.51
"	105.00	3.83	"	105.00	4.93	"	100.00	4.93
"	110.00	4.89	"	110.00	18.19	"	105.00	5.84
"	115.00	3.86	"	113.00	27.88	"	110.00	8.34
"	120.00	3.22	"	115.00	25.17	"	115.00	8.41
"	125.00	4.43	"	120.00	8.97	"	120.00	18.78
"	130.00	2.72	"	125.00	15.16	"	125.00	26.54
"	135.00	4.69	"	130.00	23.32	"	130.00	24.98
			"	135.00	11.83	"	140.92	33.18
			"	140.00	9.38	"	140.41	31.37
			"	145.00	4.83	"	155.00	31.87
			"	150.00	8.78	"	180.00	28.28
			"	155.00	12.58	"	182.00	29.58
			"	160.00	18.89	"	187.92	25.82
			"	165.00	15.33			
			"	170.00	19.41			
			"	175.00	11.58			

9413223.0819

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS  
ROCKSAN REPORT

PAGE 1

\*\*\*\* REPORT ON WELL 0299-W26-009 \*\*\*\*

06/25/90

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS		FINE PEB (<= -2)	VFINE PEB (-1)	VERY COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)
200	N/A	H	6.5	82.6	10.9	gs										
SORT-	1.62	MEDIAN-	1.00	MODE-	1.00	MEAN-	0.81	WT	10.8	47.4	109.1	142.0	111.4	53.1	23.8	8.3
SPLIT	WT-	533.8						WT %	2.0	8.9	20.5	26.7	20.9	10.0	4.5	1.6
								CUM WT %	2.0	10.9	31.5	58.1	79.1	89.1	93.5	95.1
205	N/A	H	3.5	45.4	51.1	sg										
SORT-	N/A	MEDIAN-	-1.00	MODE-	-2.00	MEAN-	N/A	WT	216.1	166.7	129.0	86.3	68.7	37.3	18.8	6.4
SPLIT	WT-	750.5						WT %	28.9	22.3	17.2	11.5	9.2	5.0	2.5	0.9
								CUM WT %	28.9	51.1	68.4	79.9	89.0	94.0	96.5	97.4

WHC-MR-0206

2  
7

9443223.0820

WESTINGHOUSE HANFORD OPERATIONS SIEVE ANALYSIS  
ROCKSAN REPORT

PAGE

\*\*\*\* REPORT ON WELL 0299-W26-011 \*\*\*\*

06/25/90

DEPTH	%CAC03	DM	%MUD	%SAND	%GRAVEL	CLASS	FINE PEB (<--2)	VFINE PEB (-1)	VERY COARS (0)	COARS (1)	MED (2)	FINE (3)	VERY FINE (4)	SILT (4.75)	PAN (>4.75)
120	N/A	C	10.2	89.8	0.0	(m)S	WT 0.0	0.2	0.4	5.3	45.3	179.9	133.8	15.9	25.5
SORT-	0.87	MEDIAN-	3.00	MODE-	3.00	MEAN-	WT % 0.0	0.1	0.1	1.3	11.1	44.3	32.9	3.9	6.3
SPLIT	WT-	406.8					CUM WT % 0.0	0.1	0.1	1.5	12.6	56.9	89.8	93.7	100.0

55-

WMC-MR-0206

9443223.0821

WELL NUMBER	DEPTH (ft)	PB-212 (PCI/Q)	SIGMA PB-212 (PCI/Q)	PB-214 (PCI/Q)	SIGMA PB-214 (PCI/Q)	VOA SEDIMENT WT (Q)	VOA CHCl3 (ng/g)	VOA CCl4 (ng/g)	VOA TCE (ng/g)
299-W26-8	120	ND	ND	ND	ND	(b) 1.30	(h) < 32	< 0.4	< 6
299-W26-8	165	ND	ND	ND	ND	(b) 1.71	< 24	< 0.3	< 4
299-W26-8	175	ND	ND	ND	ND	5.08	< 7	< 0.1	< 2
299-W26-8	175	ND	ND	ND	ND	(j)	(j)	(j)	(j)
299-W26-8	190	ND	ND	ND	ND	(c) 5.38	< 6	< 0.1	< 2
299-W26-8	190	(i)	(i)	(i)	(i)	(c,e) 2.00	< 10	2.1	10
299-W26-8	200	ND	ND	ND	ND	(d) 3.94	< 9	< 0.2	< 2
299-W26-8	215	ND	ND	ND	ND	4.05	< 9	< 0.1	< 2
299-W26-9	40	ND	ND	ND	ND	(d) 1.10	< 35	< 0.4	< 6
299-W26-9	130	ND	ND	ND	ND	1.71	< 19	< 0.3	< 4
299-W26-9	170	ND	ND	ND	ND	2.71	< 12	< 0.2	< 3
299-W26-9	190	ND	ND	ND	ND	4.72	< 7	< 0.2	< 2
299-W26-9	200	ND	ND	ND	ND	6.71	< 5	< 0.1	< 1
299-W26-11	70	0.544	0.0810	0.433	0.0904	7.12	< 7	< 0.1	< 1
299-W26-11	100	0.000	0.105	0.529	0.0973	8.30	< 13	< 0.2	< 2
299-W26-11	120	1.03	0.137	0.744	0.133	2.30	< 10	< 0.3	< 3
299-W26-11	130	0.954	0.116	0.610	0.112	9.15	< 5	< 0.1	< 1
299-W26-11	130	(i)	(i)	(i)	(i)	8.55	< 5	< 0.1	< 1
299-W26-11	149.41	0.991	0.128	0.747	0.122	0.01	< 4	< 0.1	< 1
299-W26-11	167.92	1.61	0.204	1.12	0.180	7.73	< 5	< 0.1	< 1
299-W26-11	drill water					(a)			

WELL NUMBER	DEPTH (ft)	VOA PCE (ng/g)	VOA 1,1,1-TCA (ng/g)	VOA TOLUENE (ng/g)	VOA o- and p- XYLENE (ng/g)	VOA o-XYLENE (ng/g)	VOA ETHYL BENZENE (ng/g)	VOA METHYL ISOBUTYL KETONE (ng/g)
299-W26-8	120	< 3.1	< 6	< 37	< DET	< DET	< DET	< DET
299-W26-8	165	< 2.4	< 0	< 109	< DET	< DET	< DET	< DET
299-W26-8	175	< 0.5	< 2	< 0	< DET	< DET	< DET	< DET
299-W26-8	175	(j)	(j)	(j)	(j)	(j)	(j)	(j)
299-W26-8	190	< 0.5	1.7	35	< DET	< DET	< DET	< DET
299-W26-8	190	10	99	1640	32	20	0	APPROX. 190
299-W26-8	200	< 0.0	< 2	< 7	< DET	< DET	< DET	< DET
299-W26-8	215	< 0.9	< 1	< 11	< DET	< DET	< DET	< DET
299-W26-9	40	< 3.4	4	94	< DET	< DET	< DET	< DET
299-W26-9	130	< 1.3	< 4	< 16	< DET	< DET	< DET	< DET
299-W26-9	170	< 0.9	< 3	< 10	< DET	< DET	< DET	< DET
299-W26-9	190	< 0.5	< 2	< 0	< DET	< DET	< DET	< DET
299-W26-9	200	< 0.4	< 1	< 5	< DET	< DET	< DET	< DET
299-W26-11	70	< 0.0	< 1	< 16	< DET	< DET	< DET	< DET
299-W26-11	100	< 1.2	4	24	< DET	< DET	< DET	< DET
299-W26-11	120	< 1.7	< 3	< 21	< DET	< DET	< DET	< DET
299-W26-11	130	< 0.5	2	13	< DET	< DET	< DET	< DET
299-W26-11	130	< 0.5	< 1	< 0	< DET	< DET	< DET	< DET
299-W26-11	149.41	< 0.3	< 1	< 4	< DET	< DET	< DET	< DET
299-W26-11	167.92	< 0.3	< 1	< 4	< DET	< DET	< DET	< DET
299-W26-11	drill water	0.00	0.36					

WHC-MR-0206

9443223.0822

WELL NUMBER	DEPTH (ft)	UST Number	IC NITRATE (micrograms/g)	IC SULFATE (micrograms/g)	IC FLUORIDE (micrograms/g)	IC CHLORIDE (micrograms/g)	IC PHOSPHATE (micrograms/g)	IC BROMIDE (micrograms/g)	IC NITRITE (micrograms/g)	TOC (micrograms/g)
299-W26-8	129	19322	7.6	3.1	< 1.0	1.2	< 2.0	< 1.0	< 1.0	< 10
299-W26-8	165	19329	< 1.0	49.7	1.3	4.9	< 2.0	< 1.0	< 1.0	22
299-W26-8	175	19324	< 1.0	19.3	< 1.0	1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-8	175	19324-dup	< 1.0	18.8	< 1.0	1.7	< 2.0	< 1.0	< 1.0	(j)
299-W26-8	190	19325	< 1.0	15.6	1.4	2.8	< 2.0	< 1.0	< 1.0	< 10
299-W26-8	190	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)
299-W26-8	200	(f) 19328	< 2.0	16.3	< 2.0	3.6	< 4.0	< 2.0	< 2.0	< 10
299-W26-8	215	19327	< 1.0	27.1	< 1.0	5.7	< 2.0	< 1.0	< 1.0	< 10
299-W26-9	40	19328	8.1	4.8	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-9	130	19329	19.0	3.9	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-9	170	19330	11.2	2.9	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-9	190	19331	< 1.0	(g) 34.4	1.7	3.8	< 2.0	< 1.0	< 1.0	< 10
299-W26-9	200	19332	< 1.0	(g) 32.1	1.4	5.3	< 2.0	< 1.0	< 1.0	< 10
299-W26-11	78	19333	1.1	2.6	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-11	100	19334	< 1.0	2.4	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-11	120	19335	< 1.0	4.1	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-11	130	19336	< 1.0	3.8	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-11	130	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)
299-W26-11	149.41	19337	< 1.0	3.5	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-11	187.92	19338	< 1.0	3.2	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 10
299-W26-11	drill water									

WELL NUMBER	DEPTH (ft)	BETA (PCI/Q)	SIGMA BETA (PCI/Q)	LO-ALPHA (PCI/Q)	SIGMA LO-ALPHA (PCI/Q)	K-40 (PCI/Q)	SIGMA K-40 (PCI/Q)	CS-137DA (PCI/Q)	SIGMA CS-137DA (PCI/Q)
299-W26-8	129	28.8	4.81	3.39	2.19	ND	ND	ND	ND
299-W26-8	165	12.1	2.81	3.66	2.19	ND	ND	ND	ND
299-W26-8	175	17.9	3.53	* 1.59	1.84	ND	ND	ND	ND
299-W26-8	175	(j)	(j)	(j)	(j)	ND	ND	ND	ND
299-W26-8	190	16.0	3.20	2.51	2.16	ND	ND	ND	ND
299-W26-8	190	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)
299-W26-8	200	21.7	3.99	* 1.84	1.88	ND	ND	ND	ND
299-W26-8	215	16.8	3.48	3.38	2.85	ND	ND	ND	ND
299-W26-9	40	18.7	3.38	6.22	2.75	ND	ND	ND	ND
299-W26-9	130	30.3	4.92	7.12	2.94	ND	ND	ND	ND
299-W26-9	170	9.54	2.45	2.94	2.84	ND	ND	ND	ND
299-W26-9	190	13.7	2.99	1.94	1.75	ND	ND	ND	ND
299-W26-9	200	13.6	2.92	2.48	1.95	ND	ND	ND	ND
299-W26-11	78	23.2	4.84	3.19	2.19	15.7	2.84	* -0.0184	0.0919
299-W26-11	100	28.2	4.43	4.87	2.38	18.5	2.28	* -0.0134	0.0277
299-W26-11	120	24.5	4.19	3.31	2.85	20.3	2.55	* -0.0250	0.0398
299-W26-11	130	24.6	4.22	10.50	3.43	14.9	1.89	* 0.00674	0.0299
299-W26-11	130	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)
299-W26-11	149.41	29.9	4.78	4.97	2.53	17.6	2.19	* -0.0133	0.0336
299-W26-11	187.92	22.2	3.89	4.57	2.22	15.8	2.23	* -0.00379	0.0478
299-W26-11	drill water								

WHC-MR-0206

## CHEMICAL SAMPLE DATA FOOTNOTES

- (a) Analyst's note: There could be trace amounts of 1,2-Dichloropropene and 1,1,2,2-tetrachloroethane (< 0.5 ppb) in this sample. An unknown purgeable aromatic was observed on the FID at approximately 3 to 5 ppb if comparable with other components in that region.
- (b) Analyst's note: "<" values for organics are high because batch number for purge and trap grade methanol is unknown and sediment weights are low.
- (c) Analyst's note: Sample analysis repeated on these samples, confirming initial results and variability between samples. Purge and trap grade methanol came from the same container (batch number), so contaminants from methanol should not be an issue.
- (d) Analyst's note: Ran duplicate sample and confirmed initial results.
- (e) Analyst's note: Higher molecular weight volatiles were observed after xylenes.
- (f) Analyst's note: extra water was added to get sufficient sample volume for anion's analysis, therefore changing the detection limits.
- (g) Analyst's note: Analysis date different.
- (h) "<" symbol for voc analyses by PNL indicate that a peak for this constituent was not observed in the analysis. The reported "<" values indicate the detection limit for the constituent in the particular sediment analysis.
- (i) UST number not assigned to this sample- duplicate volatile organics analysis carried out at PNL.
- (j) Duplicate IC sample analysis carried out by UST.
- ND Data not available from UST.
- <DET Below detectable limit.

**Battelle**Pacific Northwest Laboratories  
Richland, Washington

## CHAIN OF CUSTODY

W26-8 SIO UOA

Company Contact: Janet A. Schramke Telephone: 376-2136  
 Samples Collected by: A.W. Pearson Date: 4/11/90 Time: 0930  
 Sample Location: 299-W26-8  
 Ice Chest No.: PNL Field Logbook Page No.: \_\_\_\_\_  
 Remarks: Change to M46721

Method of Shipment: Govt. Vehicle

## Sample Identification

(2) 40 ml amber Depth = 120'  
 (2) 40 ml amber " = 165'  
 (2) 40 ml amber " = 175'  
 (2) 40 ml amber " = 190'  
 (2) 40 ml amber " = 200'  
 (2) 40 ml amber " = 215'

## Chain of Possession

Relinquished by:

Alan Pearson

Received by:

C. Vanden

Date/Time:

4/12/90 0915

Relinquished by:

Received by:

Date/Time:

Relinquished by:

Received by:

Date/Time:

Relinquished by:

Received by:

Date/Time:

480 3223 0824

**Battelle**Pacific Northwest Laboratories  
Richland, Washington**CHAIN OF CUSTODY**

WZ6-9 SIO UOA

Company Contact: Janet A. Schramke Telephone: 376-2136  
 Samples Collected by: A.W. Pearson Date: 4/11/90 Time: 1345  
 Sample Location: 299-WZ6-9  
 Ice Chest No.: PNL Field Logbook Page No.: \_\_\_\_\_  
 Remarks: Charge to M46721

Method of Shipment: Govt. Vehicle

**Sample Identification**

(2) 40 ml amber Depth = 40'  
 (2) 40 ml amber " = 130'  
 (2) 40 ml amber " = 170'  
 (2) 40 ml amber " = 190'  
 (2) 40 ml amber " = 200'

**Chain of Possession**

Relinquished by:

Alan Pearson

Received by:

C. Valleron

Date/Time:

4/12/90 0915

Relinquished by:

\_\_\_\_\_  
Relinquished by:

Received by:

\_\_\_\_\_  
Received by:

Date/Time:

\_\_\_\_\_  
Date/Time:

Relinquished by:

\_\_\_\_\_  
Relinquished by:

Received by:

\_\_\_\_\_  
Received by:

Date/Time:

\_\_\_\_\_  
Date/Time:



**Battelle**Pacific Northwest Laboratories  
Richland, Washington

## CHAIN OF CUSTODY

W26-11 S10 U04

Company Contact: Janet A. Schramke Telephone: 376-2136  
 Samples Collected by: A.W. Pearson Date: 4/16/90 Time: 1330  
 Sample Location: 299-W26-11  
 Ice Chest No.: PNL Field Logbook Page No.: \_\_\_\_\_  
 Remarks: Charge to M46721

Method of Shipment: Govt. Vehicle

## Sample Identification

(2) 40 ml amber Depth = 78.0'  
 (2) 40 ml amber " = 100.0'  
 (2) 40 ml amber " = 120.0'  
 (2) 40 ml amber " = 130.0'  
 (2) 40 ml amber " = 149.41'  
 (2) 40 ml amber " = 167.92'

## Chain of Possession

Relinquished by:

Alan Pearson

Received by:

C. V. ...

Date/Time:

4/16/901415

Relinquished by:

Received by:

Date/Time:

Relinquished by:

Received by:

Date/Time:

Relinquished by:

Received by:

Date/Time:

**Pacific Northwest Laboratories**  
Richland, Washington

W26-8 SID CHEM.

Method of Shipment: Govt. Vehicle

(2) 250 mh clear Depth = 120'

(2) 250 mh clear " = 165'

(2) 250 mh clear " = 175'

(2) 250 mh clear " = 190'

(2) 250 mh clear " = 200'

(2) 250 mh clear " = 215'

111, 112, 742, 667, 998

111, 112, 742, 669, 998

111, 112, 742, 069, 998

111, 112, 742, C69, 998

111, 112, 742, 069, 998

111, 112, 742, 069, 998

Alan Pearson

Janet A. Schramke

Relinquished by:

Janet A. Schenke

Wt. By K. Takahashi

Received by:

4/12/90 9:40 am

4-12-90 10:15am

Date/Time:



**Battelle**  
Pacific Northwest Laboratories  
Richland, Washington

## CHAIN OF CUSTODY

W26-9 SIO CHEM

Company Contact: Janet A. Schramke Telephone: 376-2136Samples Collected by: A.W. Pearson Date: 4/11/90 Time: 1345Sample Location: 299-W26-9Ice Chest No.: PNL Field Logbook Page No.: \_\_\_\_\_Remarks: Charge to MH6721, SUBMIT REPORT TO J. A. SCHRAMKE, KG-81, PNL.Do NOT ENTER ON MAGNETIC TAPE. CALL J. A. SCHRAMKE TO COLLECT SAMPLE RESIDUALMethod of Shipment: Govt. Vehicle

## Sample Identification

(2) 250 mL clear	Depth = 40'	111, 112, 742, C69, 998
(2) 250 mL clear	" = 130'	111, 112, 742, C69, 998
(2) 250 mL clear	" = 170'	111, 112, 742, C69, 998
(2) 250 mL clear	" = 190'	111, 112, 742, C69, 998
(2) 250 mL clear	" = 200'	111, 112, 742, C69, 998

## Chain of Possession

Relinquished by: Alan PearsonReceived by: Janet A. SchramkeDate/Time: 4/12/90 9:40 amRelinquished by: Janet A. SchramkeReceived by: Steve G. C. [Signature]Date/Time: 4-12-90 10:15 am

Relinquished by: \_\_\_\_\_

Received by: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Received by: \_\_\_\_\_

Date/Time: \_\_\_\_\_

**Battelle**Pacific Northwest Laboratories  
Richland, Washington

## CHAIN OF CUSTODY

WZ6-11 SIO CHEM

Company Contact: Janet A Schramke Telephone: 376-2136Samples Collected by: A.W. Pearson Date: 4/16/90 Time: 1330Sample Location: 299-WZ6-11Ice Chest No.: PNL Field Logbook Page No.: \_\_\_\_\_Remarks: Charge to MH6721, DO NOT ENTER RESULTS ON MAGNETIC TAPE.

SEND COPY OF RESULTS TO J.A. SCHRAMKE, K6-81, CALL J.A. SCHRAMKE TO PICK UP  
SAMPLE RESIDUALS, REQUIRE MINIMUM OF 5 GRAMS.  
 Method of Shipment: Govt. Vehicle

299-WZ6-11

## Sample Identification

(2) 250 ml clear	Depth = 78.0'	111, 112, 998, C69, 742
(2) 250 ml clear	" = 100.0'	111, 112, 998, C69, 742
(2) 250 ml clear	" = 120.0'	111, 112, 998, C69, 742
(2) 250 ml clear	" = 130.0'	111, 112, 998, C69, 742
(2) 250 ml clear	" = 149.41'	111, 112, 998, C69, 742
(2) 250 ml clear	" = 167.92	111, 112, 998, C69, 742

## Chain of Possession

Relinquished by: Alan PearsonReceived by: Janet A SchramkeDate/Time: 4/16/90 2:35pmRelinquished by: Janet A. SchramkeReceived by: WST. Rpt. ControllingDate/Time: 4-17-90 1:00

Relinquished by: \_\_\_\_\_

Received by: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Relinquished by: \_\_\_\_\_

Received by: \_\_\_\_\_

Date/Time: \_\_\_\_\_

0680 2726 816  
9113223 0830



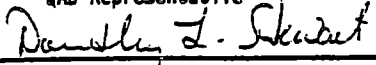
APPENDIX C

NONCONFORMANCE/SURVEILLANCE REPORTS,  
DEFICIENCY REPORTS, AND DESIGN FIELD CHANGES

180-522676  
947323-083

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NONCONFORMANCE REPORT				Page 1 of	No. PNL-98-035
1. PO, WO, or Authorization N/A		2. Nomenclature RCRA Ground Water Monitoring Wells		3. Dwg./Spec./Other WHC-S-014 S-11250	
Program, Project, or Other W-017, S-18 Ditch PNL-WA-78		5. Hold Location Wells 298-W28-8, W28-9, W28-11		6. Hold Tag No. N/A	
7. Supplier Name Address Drilling Performed/Contracted by KEH					
8. Code: Lot/Heat/Serial Wells 298-W28-8,9,11		9. Lot Size 3		10. Sample 3	
11. Qty. Acc. 3		12. Inspection Criteria <input type="checkbox"/> Dwg. <input checked="" type="checkbox"/> Spec. <input type="checkbox"/> Insp. Plan <input type="checkbox"/> Other			
13. Item		14. Description of Nonconformance (List serial number where applicable.)		17. Disposition, Justification, & Instructions	
1.		<p>Reference: WHC-S014, Rev. 4, Section(s) 4.2.18 First Bullet "A 4' x 4' x 8" concrete pad will be installed around the well. The concrete placed in the pad shall extend no more than 3.5' nor less than 2.5' down the borehole to the top of the annular seal." 5.3.1 I. "Install non-shrink Portland Cement Grout from the top of the annular seal to 3' below ground surface while back pulling the starter casing out of the ground."</p> <p>The depth to the top of the annular seals were 28", 24", and 28" respectively. The concrete pads also extend to these depths respectively.</p>		<p>1. Accept As Is:</p> <p>It would compromise the integrity of the well to attempt to break-up, dig out and remove the annular cement grout seal down to 3'. It does not compromise the integrity of the well to leave the top of the annular cement grout seal and the bottom of the cement pad as they are currently.</p>	
2.		<p>4.2.18 Fourth Bullet "A brass survey marker and well identification shall be installed in the surface pad flush with the top of the pad, one foot from the well."</p> <p>Brass caps from all wells are 8 to 18" from the well.</p> <p>Cause Code: P      Significance: IV Deficiency Code: J2      level</p>		<p>2. Accept As Is:</p> <p>The brass caps are approximately 2 to 4" closer to the well head but this should not affect the integrity of the well or the function of the concrete pad and brass marker.</p>	
15. Originator's Signature <i>Alan Pearson</i>		Date 6/7/90		18. Supervisor's/Manager's Signature <i>A.V. [Signature]</i>	
Date 6-7-90					
18. Design Document Change Required? <input type="checkbox"/> Yes, Document No. <input checked="" type="checkbox"/> No		19. Corrective Action Required? <input type="checkbox"/> Yes, CAR No. <input checked="" type="checkbox"/> No			
20. Approvals - Technical Rep Date		21. Signature Date		Signature Date	
QAD Representative <i>Dorothy J. Stewart</i> 6/13/90		Signature Date		Signature Date	
22. Close Out <input type="checkbox"/> Disposition Effected as Directed <input type="checkbox"/> Other (Specify)					
Originator or Representative      Date					
23. Distribution Action:					
Information: QAD QC Manager					

NONCONFORMANCE REPORT						Page <u>1</u> of <u>1</u>	No. PNL-90-041
1. PD, WD, or Authorization N/A		2. Nomenclature RCRA Ground Water Monitoring Wells			3. Dwg./Spec./Other WHC-S-814		Rev. 4
4. Program, Project, or Other W-817, S-18 Ditch PNL-MA-78			5. Hold Location Well 299-W26-11		Impact Level II	6. Hold Tag No. N/A	
7. Supplier Name Address Drilling performed/Contracted by KEH							
8. Code: Lot/Heat/Serial Well 299-W26-11		9. Lot Size 1	10. Sample 1	11. Qty. Acc. 1	12. Inspection Criteria <input type="checkbox"/> Dwg. <input checked="" type="checkbox"/> Spec. <input type="checkbox"/> Insp. Plan <input type="checkbox"/> Other		
13. Item	14. Description of Nonconformance (List serial number where applicable.)			17. Disposition, Justification, & Instructions			
1.	<p>Reference WHC-S-814, Rev. 4, Section 8.2 "to be acceptable under this specification the well must meet the following test for straightness. The well shall be tested for straightness and smoothness..."</p> <p>A straightness test was not performed prior to installing the permanent stainless steel casing and screen.</p> <p>Significance: <u>IV</u> Cause Code: <u>P</u> Deficiency Code: <u>J2</u></p>			<p>1. Accept As Is:</p> <p>Although the section of casing normally used for straightness testing was not passed down the borehole prior to completion there is sufficient evidence that the borehole was straight:</p> <p>1: No problems were encountered during the placement of 145 ft of 8-in. diameter casing inside the 18-in. diameter casing during the telescoping process. Since the 8-inch casing was only advanced to 185 ft (20 ft beyond end of 18-in. casing) it is highly unlikely that the lower portion of the borehole is crooked.</p> <p>2: If the borehole was abnormally crooked it would be evident during the completion process as the stainless steel casing/screen are inserted and as the hole is tagged. Nothing abnormal was evident to the well-site geologist.</p> <p>UOR Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>			
15. Originator's Signature 				16. Supervisor's/Manager's Signature 			
Date 6/13/90				Date 6-13-90			
18. Design Document Change Required? <input type="checkbox"/> Yes, Document No. <input checked="" type="checkbox"/> No				19. Corrective Action Required? <input type="checkbox"/> Yes, CAR No. <input checked="" type="checkbox"/> No			
20. Approvals - Technical Rep		Date		21. Signature		Date	
QAD Representative 		Date 6/13/90		Signature		Date	
22. Close Out <input type="checkbox"/> Disposition Effected as Directed <input type="checkbox"/> Other (Specify)				Originator or Representative Date			
23. Distribution Action:				Information:  QAD QC Manager			



APPENDIX D

WELL-DEVELOPMENT LOGS, PUMP-INSTALLATION LOGS,  
AND SUMMARY OF WATER ADDED AND REMOVED FROM BOREHOLES

RECEIVED  
JAN 11 1961

443223-0834

9443223-0835

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## WELL DEVELOPMENT LOG

DAY 1  
 Well Number 299-W26-8  
 Location S-10  
 Procedure PNL-MA-567, GC-7, Rev. 0

Start Date/Time 6/7 *see drill log*  
 End Date/Time 6/7 *from for time*  
 Page 1 of 1

Well Depth 219.55' Pump Depth (Intake) 217.7 Initial Water Level 203.16

*depths from top of 6"*

Date	Time	Flow Rate	Turbidity	Person Meas.	Rec.	Comments
6/7				JOB	JOB	standardized notes 0-96 NTU
	1055	1.1	7.96			
	1118		61			
	1018 JOB					standardized 0-9 NTU
	1145		2.8			
	1242		2.2			
	1247					Increased flow rate see drill log
	1313	1.33	7.0			
	1331		1.9			
	1436		.9			
	1445					pump off 310 gal
						pumped today need to pump
						a total of 645 gal

Note: Unless otherwise noted,  
 the following units are assumed:

Flow rate - gpm  
 Turbidity - NTU  
 Water Level - ft

Jane V. Borge  
 6/7/90

Equipment:

Make: HACH

Model: 16800

Serial #: 880703336

calibrated 5-1-90

9443223.0837

p1 of 2

DRILL LOG				By <i>Borghese</i>	Rig <i>Pump</i>	Well Number <i>299-W26-8</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>W-017</i>
				Date <i>6/7/90</i>	Rig <i>Rig</i>	Depth <i>N/A</i> To	<i>N/A</i>	Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time	Drilling Comments
				Arrived on site - pump rig + drillers present			0755	
				D/W 202 + 116' = 203.16			0757	Lutkin Steel tape 1300-22
				D/B 216.9 + 2.65 = 219.55			0808	
				pump and pump wire				
				S/N K89-13-0620 stem cleaning				
				witnessed by L. Doremus				
				1.3' Inlet from bottom of pump				
				5.2' length of pump				
				Began installing pump + riser pipe			0820	
				drillers wore clean cotton gloves				
				pump wire attached to pump column with tylon ties				
				pump in place - bottom .57' from bottom			0907	
				left site to use bathroom			915-940	
				started generator - ran out of gas			949	
				waiting for fuel truck				
REMARKS:								

PNL-MA 567 6C-7 Rev 0.

Sara V. Borghese 6/7/90

9443223.0838

# 2 of 2

DRILL LOG			By <i>Borghese</i>	Rig <i>Pump</i>	Well Number <i>299-W26-8</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>W-017</i>
			Date <i>6/7/90</i>	<i>Rig</i>	Depth <i>N/A</i> To		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				<i>KEY drillin brought five gal of fuel</i>		<i>1015</i>	
				<i>pump on</i>		<i>1017</i>	
				<i>pump off</i>		<i>1019</i>	
				<i>pump on</i>		<i>1020</i>	
				<i>3 gpm</i>		<i>1022</i>	<i>1 gal / 20 sec</i>
				<i>adjusted rate to 0.8</i>		<i>1025</i>	<i>1 gal / 1 min 16 sec</i>
				<i>pump off to fill with gas</i>		<i>1027</i>	
				<i>pump on</i>		<i>1048</i>	
				<i>1.07 @ 1.1 gpm</i>		<i>1051</i>	<i>1 gal / 56 sec</i>
				<i>.83 gpm</i>		<i>1245</i>	<i>1 gal / 1 min 12 sec</i>
				<i>adjusted flow rate 2.73 gpm</i>		<i>1247</i>	<i>adj 1 gal / 22 sec</i>
				<i>1250-1300 pressure drop to 50 then rose slowly to 100</i>			
				<i>no adj just movement</i>		<i>1.33 gpm 1408</i>	<i>1 gal / 45 sec</i>
				<i>1.55 gpm</i>		<i>1440</i>	<i>1 gal / 40 sec</i>
				<i>pump off</i>		<i>1445</i>	<i>310 gals pumped today</i>
				<i>placed pump on bottom - locked well</i>		<i>1455</i>	
				<i>Left site</i>		<i>1500</i>	
REMARKS:							
<p style="text-align: right;"><i>pul MA 567 GC-7 RWD</i>  <i>Steve V. Borghese 6/7/90</i></p>							

MHC-MR-0206

## WELL DEVELOPMENT LOG

Well Number 299-W26-8  
 Location S-10  
 Procedure PNL-MA-567, GC-7, Rev. 0

Start Date/Time 6/8/90 0817  
 End Date/Time 6/8/90 1400  
 Page 1 of 1

Well Depth See log from 6/7/90 Pump Depth (Intake) 217.7' Initial Water Level See log from 6/7/90  
depths from top of 6" S.S. Casing

Date	Time	Flow Rate	Turbidity	Person Meas.	Rec.	Comments
6/8	0745			AWP	AWP	Standardized meter 0-9 NTU
	0817	1.11				Pump on
	0821	1.6				
	0840					Standardized meter 0-90 NTU
	0845		12.5			
	0850					Standardized meter 0-9 NTU
	0855		4.1			
	0930		0.9			
	1030	1.28	0.72			Standardized meter 0-0.9 NTU
	1145		0.40			
	1240	1.33	0.36			
	1350	1.30	0.33			
	1400					Pump off
						382 gal. H <sub>2</sub> O pumped Today
						692 gal. H <sub>2</sub> O Total

Note: Unless otherwise noted, the following units are assumed:

Flow rate - gpm  
 Turbidity - NTU  
 Water Level - ft

Equipment:

Make: HACH

Model: 16800

Serial #: 880703336

calibrated 5/1/90

Alan Pearson 6/8/90

9413223.0840

DRILL LOG			By AW Pearson	Rig Pump Rig	Well Number 299-W26-8	Computer Number N/A	Project or Work Order No. W-017
			Date 6/8/90		Depth N/A 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
				Driller is using rubber gloves, face shield &		0740	Geologist & Driller
				rain coat while measuring flow rate			on site
				Set pump intake at 217.7' from yesterday		800	Set pump
				Pump on = 1.11 gpm <sup>adjust</sup> rate ↓		0817	1 gal/54 sec
				Driller noticed white residue on gloves ~1.6 gpm		0821	1 gal/38 sec
				Residue was determined to be talc = 1.28 gpm		1014	1 gal/47 sec
				SSO monitors site PID < Net PH ~ 6.5		1015	
				Check flow rate = 1.33 gpm		1240	1 gal/45 sec
				Check flow rate = 1.30 gpm		1350	1 gal/46 sec
				Pump off		1400	
				Driller begins removing pump & riser pipe.		1405	
				Take $\Delta B$ 216.89' + 2.7' cor. = 219.59' from top of 6" casing		1440	$\Delta B$ = 219.59'
				Take $\Delta W$ 203.0' + 0.06' = 203.06' from top of 6" casing		1450	$\Delta W$ = 203.06'
				$\Delta B$ & $\Delta W$ taken w/ Lufkin Steel Tape # L300-22			
				382 gal. H <sub>2</sub> O pumped today 382 + 310 = 692 gal. Total.			
				Well was locked upon departure.		1500	Leave site
				Driller was Mel Thorenson			
REMARKS:							
PWL-MA 567 GL-7 Rev. Ø Alan Pearson 6/8/90							

MHC-MR-0206

# DAILY BOREHOLE /WELL COMPLETION LOG

Sheet of \_\_\_\_\_

Project 10017-510

**Sign**

Drilling Contractor KEH

### Sign

Date \_\_\_\_\_

Procedure PO 1

Rev No. 1

Measuring Equipment NA

Driller Brett Strode

Rig/Equipment Pump R19[illegible]

WHC-MR-0206



## WELL DEVELOPMENT LOG

Well Number 299 <sup>W26-9 JVB 6/6/90</sup>  
 Location S-10  
 Procedure PNL-MA-567, GC-7, Rev. 0

Start Date/Time 6/6 1144  
 End Date/Time 6/6 1402  
 Page 1 of 1

Well Depth 208.47' Pump Depth (Intake) 207' Initial Water Level 192.2'

*depths from top of 6' casing (and Lufkin steel tape L300-22)*

Date	Time	Flow Rate	Turbidity	Meas.	Person Rec.	Comments
6/6	1145	10.71		JVB	JVB	5 gal/20 sec
	1150		56			standardized notes 0-96 NTU
	1156	6.25				5 gal/40 sec
	1221		10			
	1247		3.6			standardized 0-9 NTU
	1250	15				Increased rate 5 gal/20 sec
	1255		10			standardized 0-96 NTU
	1304		8			" 0-9 NTU
	1313	8.82				dec. flow rate 5 gal/34 sec because running low on water
	1315		5.9			
	1330		5.5			check stand. made 0 w/ blank
	1344		5.1			and 9 with 9 NTU standard
	1350		5.3			

Note: Unless otherwise noted, the following units are assumed:

Flow rate - gpm  
 Turbidity - NTU  
 Water Level - ft

## Equipment:

Make: HACH

Model: 16800

Serial #: 880703336

Calibrated: 5/1/90

*Jane V. Boyhse 6/6/90*

9413223-0843

pg 1 of 2

DRILL LOG			By <i>Borghese</i>	Rig <i>Well</i>	Well Number <i>299- w26 -9</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>W-017</i>
			Date <i>6-6-90</i>	dev.	Depth <i>N/A</i> To	Subcontract No.	
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time
							Drilling Comments
				Arrived on site, pump rig and diller			0730
				not present - waiting for arrival			
				left site to find phone and call KEH			0800
				contacted Olia Amos - pump rig at			0810
				Becker site Olia said it would be			
				at 510 in. in 45 minutes			
				Back on site			0832
				Olia called via radio - pump rig on their way			0920
				D/W $192 + .2 = 192.2$ ' from top of 6"			0922
				D/B $205.82 + 2.65 = 208.47$ "			0925
				pump rig arrived Mel Thoresen + Gene			0955
				Pump. S/N 490 -02-0715 + pump wire			
				steam cleaning witnessed by L. Drennon			
				Inlet 1.38' from pump bottom			
				3.65' pump length			
				dillies wearing clean cotton gloves			
				during installation, tie/ins ties used			
				to attached pump wire to col.			
REMARKS:							
<div style="text-align: right;">           PNL MA 567 GC-7 Rev 0  <i>Jane V. Borghese 6/6/90</i> </div>							

D - Drive Bar

H - Hard Tool

L - Large

M - Medium

S - Small

VC - Very Coarse

C - Coarse

F - Fine

VF - Very Fine

Standing Water

A 0000 031 (5.05)

WHC-MR-0206

[illegible]

7322 0045

[illegible]

WHC-MR-0206

# SAMPLING PUMP INSTALLATION FORM

Project: W-017 S-10 Well Number: 244-W26-8  
 Pump Type: 205 diaphragm piston Pump Model: HS-8001  
 Date Installed: 6-11-90 Installed by: Mal Thoren (REH)  
 Depth-to-Water: 203.18 Depth-to-Bottom: 219.55  
 Reported Depth-to-Bottom: 219.56 Date: May 31, 1990  
 Screened Interval: 519' - 199' Saturated Screened Interval: 219' - 203'

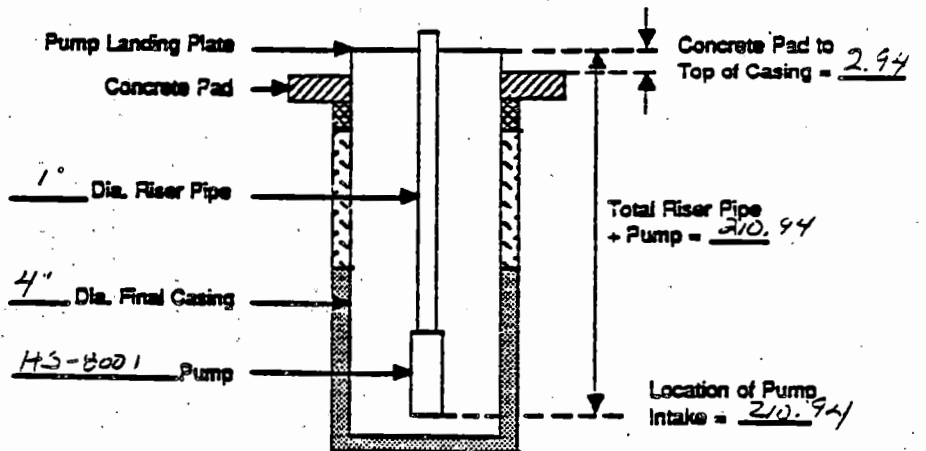
## Pump Riser Pipe Description:

Intake to pump = 12' length of pipe = 12.25  
 19' = 7.993 (ing length) = 189.67  
 1' = 5.01 = 5.01  
 2' = 2.00, 2.01 = 4.01  
210.94

## Additional Comments:

- Depths from top of 6" casing
- riser pipe threads wrapped with teflon tape, insert bottom coupling and last length
- pump pipe came to site in sealed manufacturer's packaging
- driller was clean when given during installation
- pump has been installed

## Sketch of Pump Installation:



Completed By: JV Brykese

Date: 6-11-90

PUL MA 567 DO-3 Rev D

9443223.0847

p1 of 2

DRILL LOG			By Borghese	Rig Pump Rig	Well Number 299-W26-8	Computer Number N/A	Project or Work Order No. W-017
			Date 6-11-90		Depth N/A 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
				Setting Hydrostar			
				Arrived on site, well locked		0830	
				203 + .18 = 203.18 D/W		0840	Lifting Steel tape 4300-22
				216.9 + 2.65 = 219.55 D/B		0840	
				219.55 - 203.18 = 16.37			
				2			
				8.18			
				+ 203.18			
				target pump intake 2 21.36 ~ 21.5			
				20 - 10', 1 - 5', 2 - 2' riser pipe			
				1 amp. + riser pipe came to site in			
				manufacturer's sealed packaging			
				completing riser pipe threads wrapped			
				with teflon tape			
				pump impeller OK, bolts tightened, screen installed		1030	
				Intake to top of pump 2.06'			
REMARKS:							
<p style="text-align: right;">PML MA 567 DO-3 Rev 0            JV Borghese 6/11/90</p>							

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

WHC-MR-0206

9443223.0848

p2 002

DRILL LOG				By <i>Borghese</i>	Rig <i>Pump</i>	Well Number <i>2-14-1026-8</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>W-017</i>
				Date <i>6-11-90</i>	Rig <i>Rig</i>	Depth <i>N/A</i> To		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time	Drilling Comments
				Include to top of coupling on 1 <sup>st</sup> length 12.25'				
				driller Al Thompson wearing clean cotton gloves during installation				
				5' Top of coupling to top of thumle 4.96				
				1.95				
				1.96				
				+ .04				
				5.05				
				9.05				
				Install pump - 19" length, 15, 2-2'				
				and 1 10' length of iron pipe				
				all couplings wrapped w/ teflon except				
				bottom of last length, packing gland, rod cut				
				and thumle well located, left as is			13:00	
REMARKS:								

DPL AM 567 003 RUD

J.V. Borghese 6/11/90

WMC-MR-0206

# SAMPLING PUMP INSTALLATION FORM

Project: W-017, S-10 Well Number: 299-W26-9  
 Pump Type: Positive Displacement Piston Pump Model: HS-8001  
 Date Installed: 6-12-90 Installed by: Mel Thoresen (KEH)  
 Depth-to-Water: 172.55 Depth-to-Bottom: 208.45  
 Reported Depth-to-Bottom: 208.49 Date: 5-31-90  
 Screened Interval: 208 - 198 Saturated Screened Interval: 208 - 192

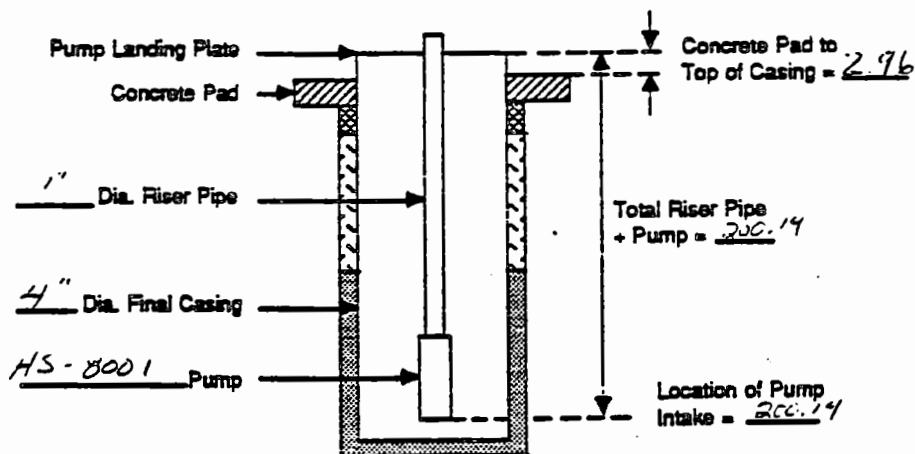
## Pump Riser Pipe Description:

J. like 1' Pump + 1st Length	12.25	
17 lengths 9.703 ft	169.71	
2 3	6	
1 2	2	
1 9.703 + 2 coupling	10.183	Total: 200.14

## Additional Comments:

Depths from top of 6" casing  
 Pump and riser pipe came to site in manufacturer's sealed packaging  
 drill was clean casing gloves during installation  
 station tape on riser pipe towards except on bottom coupling of last length  
 pump has screen installed

## Sketch of Pump Installation:



Completed By: J.V. Bongheer  
 PNL MA 567 DO-3 RUD

Date: 6-12-90



9443223.0850

p. 1 of 1

DRILL LOG			By Sorghese	Rig Pump Rig	Well Number 294-W26-9	Computer Number N/A	Project or Work Order No. W-017
			Date 6/11/90		Depth N/A 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
				Arrived on site, well locked		13:00	
							Linkin drill target L300-22
				2% 192 +.55 = 192.55		13:10	
				D/R 205.78 + 2.65 = 208.43			
				- 192.55			
				15.88			
				= 2			
				Target pump placement 7.94, 192.55 = 200.5			
				pipe lengths:			
				19 - 10' 1 - 2' 2' 1 - 5' 1 - 3' + pump & wires			
				drills were cotton gloves during installation			
				pipe threads wrapped w/ teflon tape			
				5' in to pump connection (note: will not screw in)		14:10	
				for new pump - no pump chisel out OK			
				pump length 2.26'			
				installed 1 length in pump in hole			
				overnight - will measure in morning			
				well locked, left site		15:05	
REMARKS:							

PNL MA 567 D03 Rev 0

S. V. B. on line 6/11/90

9443223.0851

1 of 1

DRILL LOG			By <i>Borghese</i>	Rig <i>Pump</i>	Well Number <i>299-1026-9</i>	Computer Number	Project or Work Order No. <i>W-017</i>
			Date <i>6-12-90</i>	Rig <i>Rig</i>	Depth <i>N/A</i> To	<i>N/A</i>	Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.			Time
				Drilling Comments			
				Arrived on site, 2nd Day			0750
				<i>Pump</i> Intake to top of coupling 12.25'			
				Intake to <i>Dump</i> 1st length 13.25 ft			
				SUB 17 <del>18</del> - 7.983 lengths 169.711			
				1 - 53 2.96 r. 04 - 3.00			
				1 - 53 2.96 r. 04 - 3.00			
				1 - 2 1.96 r. 04 - 3.00 SUB			
				1 - 7.983 r. 02 (coupling) 10.183 9.983 SUB			
				200.14			
				dump and riser pipe installed			0950
				packing blank installed, rod cut and threaded			
				well bled			1001
				left .6			1020

REMARKS:

PUL MA 567 DO 3 R.O.O

J.V. Borghese 6/11

D - Drive Barrel

H - Hard Tool

L - Large

M - Medium

S - Small

VC - Very Coarse

C - Coarse

F - Fine

VF - Very Fine

Standing Water

WHC-MR-0206

## WELL DEVELOPMENT DATA FOR 216-S-18 TRENCH

WELL NUMBER	DRILLED DEPTH (FT)	DEPTH TO WATER (FT)	TOTAL DRILL WATER ADDED (GAL)	WATER ADDED BELOW WATER TABLE (GAL)	END DEVELOPMENT (DATE)	VOLUME BAILED (GAL) (a)	VOLUME PURGED (GAL)	FINAL TURBIDITY (NTU)
299-W28-8	216.29	200.3	515	255	6-28-98	150	692	9.33
299-W28-9	208.25	190.1	110	105	6-28-98	135	1240	4.8
299-W28-11	189.81	124.8	7	7	(b)	13	(b)	(b)

(a) Volume bailed is amount removed to settle the sand pack during completion.

(b) Well # 299-W28-11 was not developed. See well development summary for future plans.

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APPENDIX E

AQUIFER-TEST DATA

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WHC-MR-0206

APPENDIX E

AQUIFER-TEST DATA

Slug withdrawal aquifer tests were performed at all three wells on May 31, 1990, and June 1, 1990. The tests were performed according to procedure AT-6, Rev. 0 (PNL-1989). Aquifer test documentation for each well is found in this appendix.

9580-5726116

page 1 of 1

Pumping Well                     

Observation Wells N/A

Type of Aquifer Test Step withdrawal

How Q Measured  $n/A$

How W.L.'s Measured slut from them

Rad./Dist. of From Pumping Well 2.

Meas. Point for W.L.'s top of 6"

Elevation of Meas. Point \_\_\_\_\_

Depth of Pump/Airpipe \_\_\_\_\_/

Pump On: date                      time 11

Pump Off: date 11/1/81 time 11:15

Duration of Aquifer Test 7/7

standard: 2.96"

[illegible]

62

J. V. Byler 5/31/90



9413223.0858

DRILL LOG			By <i>Borghese</i>	Rig <i>Pump</i>	Well Number <i>244-W26-8</i> <i>244-W26-4</i> <i>Jul 5/12</i>	Computer Number <i>N/A</i>	Project or Work Order No. <i>W-017</i>
			Date <i>5-31-20</i>	Rig <i>Rig</i>	Depth <i>N/A</i> To		Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				<i>slug sticking</i>			
				<i>arrived on site - well locked upon arrival</i>		<i>1008</i>	
				<i>STANDPIPE: 2.96' from top of pad</i>			<i>E-tape 12174</i>
				<i>WL E-tape 203. + .00 = 203' top of 6"</i>			<i>steel tape L300-22</i>
				<i>WL Steel 203 - .03 = 202.97 top of 6"</i>			<i>D Loggs 10701</i>
				<i>D/B 216.91 + 2.65 = 219.56</i>			<i>Trans I-site SA</i>
				<i>selected test 1</i>			<i>PIX 161D</i>
				<i>Setting bottom of slug 8' from well bottom</i>			<i>259198</i>
				<i>trans 21' from bottom</i>			
				<i>run 14.69</i>		<i>1038</i>	
				<i>14.60</i>		<i>1040</i>	
				<i>14.45</i>		<i>1043</i>	
				<i>14.44</i>		<i>1050</i>	
				<i>14.44</i>		<i>1059</i>	
				<i>14.44</i>		<i>1104</i>	
				<i>delay start test 1 @ 1108</i>			
				<i>slug pulled ~ 18' at 1061"</i>			
				<i>Test 1 stopped</i>		<i>1131</i>	
REMARKS: <i>well locked, left site</i>						<i>1139</i>	

WMC-MR-0206

## Equipment Record Form for the Installation and Removal of Data Loggers and Pressure Transducers

Initial Check: <i>J. V. Borghese</i>		
Purpose of Installation: <i>monitor water level changes during slug testing</i>		
Monitored Hydrologic Unit or Water Body: <i>screened interval</i>		
Date/Time of Installation: <i>5/31/90 1035</i>		Procedure Followed: <i>DLL MA 567 W.L. 4 RWD</i>
Data Logger Make/Model: <i>Hi-mat SE1000 B</i>		
Serial No.: <i>143 - 701</i>	Number of Channels Used: <i>1</i>	
Pressure Transducer Make/Model: <i>Inst. Co. PTX-101D</i>	Full Scale Range: <i>10 psi</i>	Well No.: <i>249 W26-8</i>
	Serial No.: <i>259198</i>	Depth: <i>N 318</i>
Pressure Transducer Make/Model:	Full Scale Range:	Well No.:
	Serial No.:	Depth:
Description of Data Logger Installation and Well Head Configuration: <i>st. 10' cable data logger</i>		
Comments: <i>transducer and cable cleaned w/ distilled water prior to use</i>		
Equipment Installed By <i>J. V. Borghese</i>		
Date/Time of Equipment Removal: <i>5/31/90 1132</i>		
Decontamination Procedure (if required): <i>N/A</i>		
Equipment Removed By <i>J. V. Borghese</i>		

*FILED MA 567 AT 6 RWD*

*J. V. Borghese 5/31/90*

## SLUG TEST RECORD FORM

Location S-10 Date of Test May 31, 1990  
 Well Number 299-W26-8 Procedure Number PULMAS67AT-6Rw0  
 Type of Test(s) slug withdrawal  
 Personnel Conducting Test J.V. Borgheese, B. Stodde (KEIL)

## WELL CONFIGURATION

Well Depth 217.56' Borehole Diameter 8"  
 Well Casing Inside Diameter 4" Well Screen Inside Diameter 4"  
 Length of Screened Interval 20' Depth of Screen 214 - 194  
 Comments notes from top of 6" casing

## SLUG INFORMATION

Slug Construction Materials galvanized steel  
 Length of Slug 6' Diameter of Slug 0.19"  
 Comments slug stem cleaned prior to use  
 Volume of Attachments (if applicable) \_\_\_\_\_

## MEASUREMENT EQUIPMENT INFORMATION

	Make	Model	Serial Number
Electric Tape	Slope Indicator		12174
Steel Tape	Lufkin	300'	L300-22
Data logger	Hermit	SE1000B	1KB-701
Transducer	In situ	PTX161D	259198
Other			

(5/18/89, Rev. 0)

## ELECTRONIC DATA CONTROL FORM

DATE AND START TIME OF DATA ACQUISITION May 31, 1990 1108DATE AND END TIME OF DATA ACQUISITION May 31, 1990 1131WELL NUMBER 299 - W26 - BTYPE OF TEST OR DATA slug withdrawal

TYPE AND IDENTIFICATION NUMBER OF DATA LOGGER

Hermit SE1000B 1KB-701TEST NUMBER 1CHANNEL OR INPUT NUMBER 1UNITS OF VALUES RECORDED ft. from referenced levelNUMBER OF PAGES ATTACHED 2

COMMENTS:

DATA VALIDATION STATEMENT:

The attached data represent the data as originally recorded on the data logger.. Any exceptions and reasons for such are indicated in the comments section.

Jane V. Beagles Scientist 6/5/90  
Name, title Date

1980 5273 116

SE1000B  
Environmental Logger  
05/31 11:34

Unit# 00701 Test# 1

INPUT 1: Level (F)

Reference 0.00  
Scale factor 9.99  
Offset - 0.01

Step# 0 05/31 11:08

Elapsed Time	Value
0.0000	- 0.00
0.0033	0.00
0.0066	0.00
0.0099	- 1.44
0.0133	- 5.25
0.0166	1.28
0.0200	0.21
0.0233	- 2.20
0.0266	- 1.48
0.0300	- 2.53
0.0333	- 1.77
0.0500	- 1.90
0.0666	- 1.91
0.0833	- 1.86
0.1000	- 1.82
0.1166	- 1.79
0.1333	- 1.76
0.1500	- 1.73
0.1666	- 1.70
0.1833	- 1.67
0.2000	- 1.64
0.2166	- 1.62
0.2333	- 1.60
0.2500	- 1.58
0.2666	- 1.56
0.2833	- 1.53
0.3000	- 1.51
0.3166	- 1.48
0.3333	- 1.46
0.4167	- 1.37
0.5000	- 1.28
0.5833	- 1.20
0.6667	- 1.12
0.7500	- 1.04

0.8333 - 0.98  
0.9167 - 0.91  
1.0000 - 0.86  
1.0833 - 0.81  
1.1667 - 0.76  
1.2500 - 0.72  
1.3333 - 0.69  
1.4166 - 0.66  
1.5000 - 0.62  
1.5833 - 0.59  
1.6667 - 0.57  
1.7500 - 0.54  
1.8333 - 0.52  
1.9167 - 0.50  
2.0000 - 0.48  
2.5000 - 0.38  
3.0000 - 0.31  
3.5000 - 0.25  
4.0000 - 0.22  
4.5000 - 0.18  
5.0000 - 0.16  
5.5000 - 0.13  
6.0000 - 0.11  
6.5000 - 0.10  
7.0000 - 0.08  
7.5000 - 0.07  
8.0000 - 0.06  
8.5000 - 0.05  
9.0000 - 0.05  
9.5000 - 0.04  
10.0000 - 0.04  
11.0000 - 0.03  
12.0000 - 0.02  
13.0000 - 0.02  
14.0000 - 0.01  
15.0000 - 0.01  
16.0000 - 0.00  
17.0000 - 0.00  
18.0000 - 0.00  
19.0000 - 0.00  
20.0000 - 0.00  
21.0000 - 0.00  
22.0000 - 0.00  
23.0000 - 0.00

END

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DRILL LOG		By <i>Borghese</i>	Rig <i>Steam</i>	Well Number	Computer Number	Project or Work Order No. <i>W-017</i>
		Date <i>5/31/90</i>	<i>cleaning</i>	Depth <i>N/A</i> To	<i>N/A</i>	Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time
Drilling Comments						
				<i>Steam cleaning 3 days</i>		<i>0730</i>
				<i>operator: 8. Strobe</i>		
				<i>Pressure: 1400 psi</i>		
				<i>Temp: 180°F</i>		
				<i>done</i>		<i>0740</i>
				<i>wrapped in plastic</i>		
				<i>Joe V. Borghese</i>		<i>5/31/90</i>
REMARKS:						

D - Drive Barrel

H - Hard Tool

L - Large

M - Medium

S - Small

VC - Very Coarse

C - Coarse

F - Fine

MHC-MR-0206

page 1 of 1  
Data for Well 299-0226-9  
Pumping Well 121A  
Observation Wells 10/19

Location S-10  
Type of Aquifer Test Slug Test  
How Q Measured N/A  
How W.L.'s Measured Equip, Slab + Trans  
Rad./Dist. 5 From Pumping Well 2"  
Meas. Point for W.L.'s top of 6"  
Elevation of Meas. Point 11000

Depth of Pump/Airpipe \_\_\_\_\_  
 Pump On: date \_\_\_\_\_ time 12:15  
 Pump Off: date \_\_\_\_\_ time 1:15  
 Duration of Aquifer Test \_\_\_\_\_

[illegible]

70 J.V. Borge 5/31/90



WHC-MR-0206

Location S-10 Date of Test May 31, 1990  
Well Number 299-W36-9 Procedure Number PUL MA567 AT-6 Rev D  
Type of Test(s) Slug WITHDRAWAL  
Personnel Conducting Test J.V. Berghese, B. Storde (KEN)

WELL CONFIGURATION

Well Depth 208.49' Borehole Diameter 8"  
Well Casing Inside Diameter 4" Well Screen Inside Diameter 4"  
Length of Screened Interval 20' Depth of Screen 208.49 - 188.49  
Comments depth from top of 6" casing

SLUG INFORMATION

Slug Construction Materials galvanized steel  
Length of Slug 3<sup>508</sup> 6' Diameter of Slug .19"  
Comments slug screen cleaned prior to use  
Volume of Attachments (if applicable) \_\_\_\_\_

MEASUREMENT EQUIPMENT INFORMATION

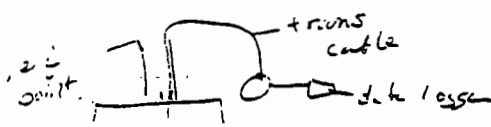
	Make	Model	Serial Number
Electric Tape			
Steel Tape			
Data logger			
Transducer			
Other			

*see gasflow test record form*

PUL MA 567 AT-6 Rev D

Jan V Berghese 5/31/90

## Equipment Record Form for the Installation and Removal of the Instrumentation Northwest Data Loggers and Pressure Transducers

Purpose of Installation: <i>monitor water level changes during slug test</i>		
Monitored Hydrologic Unit or Water Body: <i>screened interval</i>		
Date/Time of Installation: <i>5/31/90 0900</i>	Procedure Followed: <i>DNL M4 567 1.2-4 Rev 0</i>	
Data Logger Make/Model: <i>Horiz. SE1000B</i>		
Serial No.: <i>1KB 701</i>	Number of Channels Used: <i>1</i>	
Pressure Transducer Make/Model: <i>INSITU DTX 161D</i>	Full Scale Range: <i>10 psi</i>	Well No.: <i>244 WAB-9</i>
	Serial No.: <i>359198</i>	Depth: <i>~207</i>
Pressure Transducer Make/Model:	Full Scale Range:	Well No.:
	Serial No.:	Depth:
Description of Data Logger Installation and Well Head Configuration: 		
Comments: <i>Initial check performed in lab trans and cable removed by distilled water prior to use.</i>		
Equipment Installed By <i>J. V. Bagher</i>		
Date/Time of Equipment Removal: <i>5/31/90 0955</i>		
Equipment Removed By <i>J. V. Bagher</i>		

FNL M4 567 AT-6 END

*J. V. Bagher*  
5/31/90

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WHC-MR-0206

**D - Drive Barrel**

**H - Hard Toot**

1 - 1 янв

**AA Mortium**

**c c...d**

uu u u

(5/18/89, Rev. 0)

## ELECTRONIC DATA CONTROL FORM

DATE AND START TIME OF DATA ACQUISITION May 31, 1990 0925DATE AND END TIME OF DATA ACQUISITION May 31, 1990 0951WELL NUMBER 299 - W26 - 9TYPE OF TEST OR DATA slug withdrawal

TYPE AND IDENTIFICATION NUMBER OF DATA LOGGER

Hermite SE 1000B 1KB - 701TEST NUMBER 0CHANNEL OR INPUT NUMBER 1UNITS OF VALUES RECORDED ft. from reference levelNUMBER OF PAGES ATTACHED 2

COMMENTS:

DATA VALIDATION STATEMENT:

The attached data represent the data as originally recorded on the data logger. Any exceptions and reasons for such are indicated in the comments section.

Jane V. Boshu, Scientist 6/5/90  
Name, title Date

SE1000B  
Environmental Logger  
05/31 09:57

Unit# 00701 Test# 0

INPUT 1: Level (F)

Reference 0.00  
Scale factor 9.99  
Offset - 0.01

Step# 0 05/31 09:25

Elapsed Time	Value
0.0000	0.00
0.0033	0.00
0.0066	0.00
0.0099	0.00
0.0133	- 12.63
0.0166	2.01
0.0200	0.25
0.0233	- 1.80
0.0266	- 1.30
0.0300	- 2.20
0.0333	- 1.91
0.0500	- 1.71
0.0666	- 1.58
0.0833	- 1.43
0.1000	- 1.29
0.1166	- 1.18
0.1333	- 1.08
0.1500	- 0.98
0.1666	- 0.89
0.1833	- 0.81
0.2000	- 0.75
0.2166	- 0.68
0.2333	- 0.62
0.2500	- 0.57
0.2666	- 0.52
0.2833	- 0.47
0.3000	- 0.43
0.3166	- 0.40
0.3333	- 0.36
0.4167	- 0.24
0.5000	- 0.17
0.5833	- 0.12
0.6667	- 0.09
0.7500	- 0.07

0.8333 - 0.05  
0.9167 - 0.04  
1.0000 - 0.03  
1.0833 - 0.02  
1.1667 - 0.01  
1.2500 - 0.01  
1.3333 - 0.00  
1.4166 - 0.00  
1.5000 0.00  
1.5833 0.00  
1.6667 0.00  
1.7500 0.00  
1.8333 0.00  
1.9167 0.00  
2.0000 0.01  
2.5000 0.01  
3.0000 0.02  
3.5000 0.02  
4.0000 0.02  
4.5000 0.02  
5.0000 0.02  
5.5000 0.02  
6.0000 0.02  
6.5000 0.02  
7.0000 0.02  
7.5000 0.02  
8.0000 0.02  
8.5000 0.02  
9.0000 0.02  
9.5000 0.02  
10.0000 0.03  
11.0000 0.02  
12.0000 0.02  
13.0000 0.02  
14.0000 0.02  
15.0000 0.03  
16.0000 0.02  
17.0000 0.02  
18.0000 0.02  
19.0000 0.02  
20.0000 0.02  
21.0000 0.02  
22.0000 0.02  
23.0000 0.02  
24.0000 0.02  
25.0000 0.02  
26.0000 0.02

END

7-3223-0072

DRILL LOG			By Borghese	Rig Steam cleaning	Well Number	Computer Number	Project or Work Order No. W-017
			Date 5/31/90		Depth N/A 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
				Steam cleaning 3 slugs			0730
				operator B. Strode			
				Pressure 1400 psi			
				temp 180 °F			
				done			0740
				wrapped in plastic			
				Done V. Borghese			5/31/90

REMARKS:

WHC-MR-0206





page 2 of 2

Data for Well - 99-1575-11

Pumping Well 11/1

Observation Wells 14/A

Location S-10

Type of Aquifer Test slug withdrawal

How Q Measured Q/A

How W.L.'s Measured still E-tape, 16.75

(Rad./Dist. of) From Pumping Well 2 "

Meas. Point for W.L.'s top of 6"

Elevation of Meas. Point 1014

**Depth of Pump/Airpipe** \_\_\_\_\_

Pump On: date                      time h

Pump Off: date 1/1 time 17

Duration of Aquifer Test                     

[illegible]

9443223.0875

DRILL LOG			By <i>Borghese</i>	Rig <i>Pump</i>	Well Number <i>299- W36-11</i>	Computer Number	Project or Work Order No. <i>W-017</i>
			Date <i>5/3/90</i>	<i>Ry</i>	Depth <i>N/A To</i>	<i>N/A</i>	Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				Arrived on site		1146	
				Well was locked upon arrival			
				Inward slug - wt declining			
				slowly recorded portion			
				of decline of data logger			
				Test 2 - 1 minute reading.			
				Because of the long length of recovery			
				time - pulled slug recorded,			
				with data logger on log scale,			
				water level changed overnight.			
				Well was locked with tri-schuck			
				cable in place			
REMARKS:				PNL 114567 AT-6 RND <i>Jane V. Borghese 5/1/90</i>			

D - Drive Ba.

H - Hard Tool

L - Large

M - Medium

S - Small

VC - Very Coarse

C - Coarse

F - Fine

VF - Very Fine

Standing Water

WMC-MR-0206

Location S-10 Date of Test May 31, 1990  
 Well Number 299-W-26-11 Procedure Number PNL-MH 567 AT-6 Rev 0  
 Type of Test(s) Slug WITHDRAWAL  
 Personnel Conducting Test JV Boghis B. Steh (KEH)

## WELL CONFIGURATION

Well Depth 139.02' Borehole Diameter 8"  
 Well Casing Inside Diameter 4" Well Screen Inside Diameter 4"  
 Length of Screened Interval 20' Depth of Screen 139.02 - 119  
 Comments depths from top of 6" casing

## SLUG INFORMATION

Slug Construction Materials galvanized steel  
 Length of Slug 6' Diameter of Slug 0.19"  
 Comments slug stem cleaned prior to use  
 Volume of Attachments (if applicable) \_\_\_\_\_

## MEASUREMENT EQUIPMENT INFORMATION

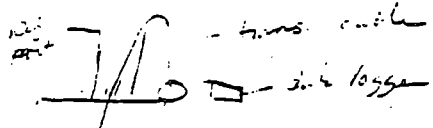
	Make	Model	Serial Number
Electric Tape			
Steel Tape	<u>see</u>	<u>aguter</u>	<u>test data sheet</u>
Data logger			
Transducer			
Other			

PNL-MH-567 AT-6 Rev 0

Jan V Boghis 5/31/90

WHC-MR-0206

Equipment Record Form for the Installation and Removal of the Instrumentation Northwest Data Loggers and Pressure Transducers

Purpose of Installation: <i>Monitor water level changes for slug testing</i>		
Monitored Hydrologic Unit or Water Body: <i>covered interval</i>		
Date/Time of Installation: <i>5/31/90 12 40</i>	Procedure Followed: <i>PNL MA 567 WL-4 Rev 0</i>	
Data Logger Make/Model: <i>Hermit SE1000B</i>		
Serial No.: <i>1KB 701</i>	Number of Channels Used: <i>1</i>	
Pressure Transducer Make/Model: <i>INSITU DTX 161D</i>	Full Scale Range: <i>10 psi</i>	Well No.: <i>299 U226-11</i>
	Serial No.: <i>257212</i>	Depth: <i>N 138'</i>
Pressure Transducer Make/Model:	Full Scale Range:	Well No.:
	Serial No.:	Depth:
Description of Data Logger Installation and Well Head Configuration: 		
Comments: <i>Initial cal. performed in lab. transducer and cable rinsed w/ distilled water prior to use.</i>		
Equipment Installed By <i>J.V. Borghese</i>		
Date/Time of Equipment Removal: <i>6/1/90 0930</i>		
Equipment Removed By <i>J.V. Borghese</i>		

PNL MA 567 AT-6 Rev 0

*Jane V Borghese 6/1/90*

9443223-0877

9443223.0878

DRILL LOG			By <i>Borghese</i>	Rig <i>Steam</i>	Well Number	Computer Number	Project or Work Order No. <i>U-017</i>
			Date <i>5/31/90</i>	<i>cleaning</i>	Depth <i>N/A</i> To	<i>N/A</i>	Subcontract No. <i>N/A</i>
Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.		Time	Drilling Comments
				<i>Steam cleaning 3 slugs</i>		<i>0730</i>	
				<i>operator 2. Strobe</i>			
				<i>Pneumatic 1400 psi</i>			
				<i>temp 189°F</i>			
				<i>done</i>		<i>0740</i>	
				<i>wrapped in plastic</i>			
				<i>Joe V. Borghese</i>		<i>5/31/90</i>	
REMARKS:							

(5/18/89, Rev. 0)

## ELECTRONIC DATA CONTROL FORM

DATE AND START TIME OF DATA ACQUISITION May 31, 1990 1322DATE AND END TIME OF DATA ACQUISITION May 31, 1990 1420WELL NUMBER 299-W26-11TYPE OF TEST OR DATA Slug Test

TYPE AND IDENTIFICATION NUMBER OF DATA LOGGER

HERMIT SC1000B 1KB - 701TEST NUMBER 2CHANNEL OR INPUT NUMBER 1UNITS OF VALUES RECORDED Ft. from referenced levelNUMBER OF PAGES ATTACHED 2

## COMMENTS:

6' slug immersed at 1320 - because  
of slow return to static recorded water  
level changed from 1321 to 1419

## DATA VALIDATION STATEMENT:

The attached data represent the data as originally recorded on the data logger. Any exceptions and reasons for such are indicated in the comments section.

Jane V. Borcher Scientist  
Name, title6/5/90  
Date

SE1000B  
Environmental Logger  
06/01 11:04

Unit# 00701 Test# 2

INPUT 1: Level (F)

Reference 0.00  
Scale factor 9.98  
Offset 0.00

Step# 0 05/31 13:21

Elapsed Time	Value
0.0000	- 0.00
1.0000	- 0.00
2.0000	- 0.00
3.0000	- 0.01
4.0000	- 0.01
5.0000	- 0.01
6.0000	- 0.01
7.0000	- 0.02
8.0000	- 0.02
9.0000	- 0.02
10.0000	- 0.02
11.0000	- 0.02
12.0000	- 0.03
13.0000	- 0.03
14.0000	- 0.03
15.0000	- 0.03
16.0000	- 0.03
17.0000	- 0.04
18.0000	- 0.04
19.0000	- 0.04
20.0000	- 0.04
21.0000	- 0.05
22.0000	- 0.05
23.0000	- 0.05
24.0000	- 0.05
25.0000	- 0.05
26.0000	- 0.05
27.0000	- 0.05
28.0000	- 0.05
29.0000	- 0.06
30.0000	- 0.06
31.0000	- 0.06
32.0000	- 0.06
33.0000	- 0.07

Well 299-W26-11 page 1 of 2  
Slug Withdrawal Test #2, water-level after slugging rod immersion

9443223.081

34.0000	-	0.07
35.0000	-	0.07
36.0000	-	0.07
37.0000	-	0.07
38.0000	-	0.07
39.0000	-	0.07
40.0000	-	0.08
41.0000	-	0.08
42.0000	-	0.08
43.0000	-	0.08
44.0000	-	0.08
45.0000	-	0.08
46.0000	-	0.09
47.0000	-	0.09
48.0000	-	0.09
49.0000	-	0.09
50.0000	-	0.09
51.0000	-	0.09
52.0000	-	0.10
53.0000	-	0.09
54.0000	-	0.10
55.0000	-	0.10
56.0000	-	0.10
57.0000	-	0.10
58.0000	-	0.10

END



(5/18/89, Rev. 0)

## ELECTRONIC DATA CONTROL FORM

DATE AND START TIME OF DATA ACQUISITION May 31 1425DATE AND END TIME OF DATA ACQUISITION June 1 0922WELL NUMBER 299-W26-11TYPE OF TEST OR DATA Slug WITHDRAWAL

TYPE AND IDENTIFICATION NUMBER OF DATA LOGGER

Hermit SE1000B 1KB-701TEST NUMBER 3CHANNEL OR INPUT NUMBER 1UNITS OF VALUES RECORDED ft from referenced levelNUMBER OF PAGES ATTACHED 24

## COMMENTS:

WL was not at static when  
slugging rod was pulled.

## DATA VALIDATION STATEMENT:

The attached data represent the data as originally recorded on the data logger. Any exceptions and reasons for such are indicated in the comments section.

J.V. Borglase Scientist 6/5/90  
Name, title Date

SE1000B  
Environmental Logger  
06/01 11:06

Unit# 00701 Test# 3

INPUT 1: Level (F)

Reference 0.00  
Scale factor 9.98  
Offset 0.00

Step# 0 05/31 14:25

Elapsed Time	Value
0.0000	0.00
0.0033	- 0.00
0.0066	- 0.00
0.0099	- 0.03
0.0133	3.33
0.0166	0.06
0.0200	- 4.07
0.0233	0.13
0.0266	- 1.67
0.0300	- 1.59
0.0333	- 2.45
0.0500	- 2.15
0.0666	- 2.15
0.0833	- 2.14
0.1000	- 2.13
0.1166	- 2.13
0.1333	- 2.13
0.1500	- 2.12
0.1666	- 2.12
0.1833	- 2.12
0.2000	- 2.12
0.2166	- 2.11
0.2333	- 2.12
0.2500	- 2.11
0.2666	- 2.11
0.2833	- 2.11
0.3000	- 2.11
0.3166	- 2.11
0.3333	- 2.11
0.4167	- 2.10
0.5000	- 2.10
0.5833	- 2.08
0.6667	- 2.09
0.7500	- 2.09

9/13/23 08:33

0.8333 - 2.08  
0.9167 - 2.08  
1.0000 - 2.08  
1.0833 - 2.08  
1.1667 - 2.07  
1.2500 - 2.07  
1.3333 - 2.07  
1.4166 - 2.07  
1.5000 - 2.07  
1.5833 - 2.07  
1.6667 - 2.07  
1.7500 - 2.06  
1.8333 - 2.06  
1.9167 - 2.06  
2.0000 - 2.06  
2.5000 - 2.06  
3.0000 - 2.05  
3.5000 - 2.06  
4.0000 - 2.05  
4.5000 - 2.04  
5.0000 - 2.05  
5.5000 - 2.05  
6.0000 - 2.05  
6.5000 - 2.04  
7.0000 - 2.04  
7.5000 - 2.04  
8.0000 - 2.04  
8.5000 - 2.04  
9.0000 - 2.04  
9.5000 - 2.03  
10.0000 - 2.04  
11.0000 - 2.03  
12.0000 - 2.02  
13.0000 - 2.02  
14.0000 - 2.02  
15.0000 - 2.02  
16.0000 - 2.01  
17.0000 - 2.01  
18.0000 - 2.01  
19.0000 - 2.00  
20.0000 - 2.00  
21.0000 - 2.00  
22.0000 - 2.00  
23.0000 - 2.00  
24.0000 - 1.99  
25.0000 - 1.99  
26.0000 - 1.99  
27.0000 - 1.99  
28.0000 - 1.99  
29.0000 - 1.99  
30.0000 - 1.99

WHC-MR-0206

31.0000 - 1.99  
32.0000 - 1.99  
33.0000 - 1.98  
34.0000 - 1.98  
35.0000 - 1.98  
36.0000 - 1.98  
37.0000 - 1.98  
38.0000 - 1.98  
39.0000 - 1.98  
40.0000 - 1.98  
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42.0000 - 1.98  
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75.0000 - 1.96  
76.0000 - 1.96  
77.0000 - 1.96  
78.0000 - 1.96  
79.0000 - 1.96  
80.0000 - 1.96  
81.0000 - 1.96

Well 299-W26-11 page 3 of 24  
Slug Withdrawal Test #3

5880 5225446  
9473223 0885

91323.086

82.0000	-	1.96
83.0000	-	1.95
84.0000	-	1.96
85.0000	-	1.95
86.0000	-	1.95
87.0000	-	1.95
88.0000	-	1.95
89.0000	-	1.95
90.0000	-	1.95
91.0000	-	1.95
92.0000	-	1.95
93.0000	-	1.95
94.0000	-	1.95
95.0000	-	1.95
96.0000	-	1.95
97.0000	-	1.95
98.0000	-	1.95
99.0000	-	1.95
100.000	-	1.95
101.000	-	1.95
102.000	-	1.95
103.000	-	1.95
104.000	-	1.95
105.000	-	1.95
106.000	-	1.95
107.000	-	1.95
108.000	-	1.95
109.000	-	1.95
110.000	-	1.95
111.000	-	1.95
112.000	-	1.95
113.000	-	1.95
114.000	-	1.95
115.000	-	1.95
116.000	-	1.95
117.000	-	1.95
118.000	-	1.95
119.000	-	1.95
120.000	-	1.95
121.000	-	1.95
122.000	-	1.95
123.000	-	1.95
124.000	-	1.95
125.000	-	1.95
126.000	-	1.95
127.000	-	1.95
128.000	-	1.95
129.000	-	1.95
130.000	-	1.95
131.000	-	1.95
132.000	-	1.95

133.000 - 1.95  
134.000 - 1.95  
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175.000 - 1.94  
176.000 - 1.94  
177.000 - 1.94  
178.000 - 1.94  
179.000 - 1.94  
180.000 - 1.94  
181.000 - 1.94  
182.000 - 1.94  
183.000 - 1.94

Well 299-W26-11 page 5 of 24  
Slug Withdrawal Test #3

184.000	-	1.94
185.000	-	1.94
186.000	-	1.94
187.000	-	1.94
188.000	-	1.94
189.000	-	1.94
190.000	-	1.94
191.000	-	1.94
192.000	-	1.94
193.000	-	1.94
194.000	-	1.94
195.000	-	1.94
196.000	-	1.94
197.000	-	1.94
198.000	-	1.94
199.000	-	1.94
200.000	-	1.94
201.000	-	1.94
202.000	-	1.94
203.000	-	1.93
204.000	-	1.93
205.000	-	1.94
206.000	-	1.94
207.000	-	1.93
208.000	-	1.93
209.000	-	1.93
210.000	-	1.93
211.000	-	1.93
212.000	-	1.93
213.000	-	1.93
214.000	-	1.93
215.000	-	1.93
216.000	-	1.93
217.000	-	1.93
218.000	-	1.93
219.000	-	1.94
220.000	-	1.93
221.000	-	1.93
222.000	-	1.93
223.000	-	1.93
224.000	-	1.93
225.000	-	1.93
226.000	-	1.93
227.000	-	1.93
228.000	-	1.93
229.000	-	1.93
230.000	-	1.93
231.000	-	1.93
232.000	-	1.93
233.000	-	1.93
234.000	-	1.93

235.000 - 1.93  
236.000 - 1.93  
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256.000 - 1.93  
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282.000 - 1.93  
283.000 - 1.93  
284.000 - 1.93  
285.000 - 1.93



0680 5226 116  
9443223.0890

286.000	-	1.93
287.000	-	1.93
288.000	-	1.93
289.000	-	1.93
290.000	-	1.93
291.000	-	1.93
292.000	-	1.93
293.000	-	1.93
294.000	-	1.93
295.000	-	1.93
296.000	-	1.93
297.000	-	1.93
298.000	-	1.93
299.000	-	1.93
300.000	-	1.93
301.000	-	1.93
302.000	-	1.93
303.000	-	1.93
304.000	-	1.93
305.000	-	1.93
306.000	-	1.93
307.000	-	1.93
308.000	-	1.93
309.000	-	1.93
310.000	-	1.93
311.000	-	1.93
312.000	-	1.93
313.000	-	1.92
314.000	-	1.92
315.000	-	1.93
316.000	-	1.92
317.000	-	1.93
318.000	-	1.93
319.000	-	1.93
320.000	-	1.92
321.000	-	1.92
322.000	-	1.92
323.000	-	1.92
324.000	-	1.92
325.000	-	1.92
326.000	-	1.92
327.000	-	1.92
328.000	-	1.92
329.000	-	1.92
330.000	-	1.92
331.000	-	1.92
332.000	-	1.92
333.000	-	1.92
334.000	-	1.92
335.000	-	1.92
336.000	-	1.92

9443223.0891

337.000	-	1.92
338.000	-	1.92
339.000	-	1.92
340.000	-	1.92
341.000	-	1.92
342.000	-	1.92
343.000	-	1.92
344.000	-	1.92
345.000	-	1.92
346.000	-	1.92
347.000	-	1.92
348.000	-	1.92
349.000	-	1.92
350.000	-	1.92
351.000	-	1.92
352.000	-	1.92
353.000	-	1.92
354.000	-	1.92
355.000	-	1.92
356.000	-	1.92
357.000	-	1.92
358.000	-	1.92
359.000	-	1.92
360.000	-	1.92
361.000	-	1.92
362.000	-	1.92
363.000	-	1.92
364.000	-	1.92
365.000	-	1.92
366.000	-	1.92
367.000	-	1.92
368.000	-	1.92
369.000	-	1.92
370.000	-	1.92
371.000	-	1.92
372.000	-	1.92
373.000	-	1.92
374.000	-	1.92
375.000	-	1.92
376.000	-	1.92
377.000	-	1.92
378.000	-	1.92
379.000	-	1.92
380.000	-	1.92
381.000	-	1.92
382.000	-	1.91
383.000	-	1.92
384.000	-	1.92
385.000	-	1.91
386.000	-	1.92
387.000	-	1.91

Well 299-W26-11 page 9 of 24  
Slug Withdrawal Test #3

WHC-MR-0206

388.000	-	1.91
389.000	-	1.92
390.000	-	1.92
391.000	-	1.92
392.000	-	1.91
393.000	-	1.92
394.000	-	1.91
395.000	-	1.92
396.000	-	1.91
397.000	-	1.92
398.000	-	1.92
399.000	-	1.91
400.000	-	1.91
401.000	-	1.91
402.000	-	1.91
403.000	-	1.91
404.000	-	1.91
405.000	-	1.91
406.000	-	1.91
407.000	-	1.91
408.000	-	1.91
409.000	-	1.91
410.000	-	1.91
411.000	-	1.91
412.000	-	1.91
413.000	-	1.91
414.000	-	1.91
415.000	-	1.91
416.000	-	1.91
417.000	-	1.91
418.000	-	1.91
419.000	-	1.91
420.000	-	1.91
421.000	-	1.91
422.000	-	1.91
423.000	-	1.91
424.000	-	1.91
425.000	-	1.91
426.000	-	1.91
427.000	-	1.91
428.000	-	1.91
429.000	-	1.91
430.000	-	1.91
431.000	-	1.91
432.000	-	1.91
433.000	-	1.91
434.000	-	1.91
435.000	-	1.91
436.000	-	1.91
437.000	-	1.91
438.000	-	1.91

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542.000 - 1.90  
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544.000 - 1.90  
545.000 - 1.90  
546.000 - 1.90  
547.000 - 1.90  
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551.000 - 1.90  
552.000 - 1.90  
553.000 - 1.90  
554.000 - 1.90  
555.000 - 1.90  
556.000 - 1.90  
557.000 - 1.89  
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Well 299-W26-11 page 13 of 24  
Slug Withdrawal Test #3

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745.000	-	1.87
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Well 299-W26-11 page 17 of 24  
Slug Withdrawal Test #3

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Well 299-W26-11 page 21 of 24  
Slug Withdrawal Test #3

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1000.00	-	1.86
1001.00	-	1.86
1002.00	-	1.86
1003.00	-	1.86
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1006.00	-	1.86
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1008.00	-	1.86
1009.00	-	1.86
1010.00	-	1.86
1011.00	-	1.86
1012.00	-	1.86
1013.00	-	1.86
1014.00	-	1.86
1015.00	-	1.86
1016.00	-	1.86
1017.00	-	1.86
1018.00	-	1.86
1019.00	-	1.86
1020.00	-	1.85
1021.00	-	1.85
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1073.00	-	1.86
1074.00	-	1.87
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1080.00	-	1.86
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1097.00	-	1.86
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1099.00	-	1.86
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1102.00 - 1.87  
1103.00 - 1.85  
1104.00 - 1.86  
1105.00 - 1.86  
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APPENDIX F  
GEOLOGIC LOGS

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DAILY BOREHOLE LOG				Boring or Well Number <u>299-426-8</u>		Date <u>3/5/90</u>		Sheet No. <u>1</u> of <u>65</u>	
				Location <u>E-10</u>		Project <u>W017-610</u>			
Logged by <u>C.D. CONNIT (CAT)</u>				Date <u>3/5/90</u>		Drilling Contractor <u>KEH</u>			
Reviewed by <u>A. de M...</u>				Date <u>6/12/90</u>		Driller <u>CRAG WAMSLEY</u>			
Lith. Class. Scheme <u>FALK</u>				Procedure <u>W-1 (REV. 4)</u>		Rig/Method <u>DE GUL / CARIE TOOL</u>			
Depth	Contam- ination Inst/Rea	Mois- ture	Samples Type/No	Graph Log	Class	Lithologic Description Particle size dist., Sorting, Mineralogy, Roundness, Color, Reaction to HCl, etc.	Pene. Rate/ Blows	Time	Drilling Comments Bit, Casing, Water level, fluid added
						VISUALLY WITNESSED STEAM CLEANING OF DRILL RIG		1000	DRILLER AT 200 EAST LAY
						AND VISUALLY INSPECTED RIG UPON COMPLETION.			DOWN YARD. BEGINNING
						ACCEPTED. REFERENCE WMC-5-014 SECTION 7.6.			TO STEAM CLEAN RIG.
								1100	CLEANING OF RIG COMPLETION.
								1200	DRILLER BREAKS FOR LUNCH
								1315	ARRIVED AT WELL SITE.
									RPT ON SITE TO CHECK
									DRILL AREA. AREA NEEDS
									TO BE CLEARED OF VEGETA-
									TION.
								1345	GEOTECHNIST OFF SITE
						VISUALLY WITNESSED STEAM CLEANING OF DRILL RIG		1415	DRILLER AT 200 EAST LAY
						AND VISUALLY INSPECTED TOOLS UPON COM-			DOWN YARD. BEGINNING
						PLETION. ACCEPTED. REFERENCE WMC-5-014 SECT. 7.6.			TO STEAM CLEAN RIG TOOLS
								1510	CLEANING OF TOOLS COM-
									PLETED.
								1515	DRILLER SHUTTING DOWN
									FOR THE DAY
								1520	GEOTECHNIST OFF SITE

WMC-MR-0206

10/10/90

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DAILY BOREHOLE LOG				Boring or Well Number <u>299-W26-8</u>		Date <u>3/6/90</u>		Sheet No. <u>2</u> of <u>65</u>		
				Location <u>S-10 OUTSIDE ZOO W AREA</u>		Project <u>W017-S10</u>				
Logged by <u>C.D. CONNIT (GAE)</u>				Date <u>3/6/90</u>		Drilling Contractor <u>KEH</u>				
Reviewed by <u>A. M. P. M.</u>				Date <u>6/12/90</u>		Driller <u>CRANK WARMLEY</u>				
Lith. Class. Scheme <u>FOLK</u>				Procedure <u>DO-1 / REV 0</u>		Rig/Method <u>PE 60L / CABLE TOOL</u>				
Depth	Contam- ination Inst	Rea	Mois- ture	Samples Type No	Graph Log	Class	Lithologic Description Particle size dist., Sorting, Mineralogy, Roundness, Color, Reaction to HCl, etc.	Pene. Rate/ Blows	Time	Drilling Comments Bit, Casing, Water level, fluid added
									10100	GEOLOGIST AND DRILLER
										AT ZOOE LAY DOWN YARD.
										LOADING 10" C.S. CASING
										ONTO TRAILER.
									10515	DRILLER BEGINNING TO
										STEAM CLEAN 10" C.S.
										CASING AND GENERATOR.
							VISUALLY WITNESSED AND VISUALLY INSPECTED		10930	STEAM CLEANING OF 10"
							STEAM CLEANED 10" C.S. CASING AND EQUIPMENT			C.S. CASING AND EQUIP-
							ACCEPTED. REFERENCE WMC-6-C14 SECTION 7.6.			MENT COMPLETED
									11030	GEOLOGIST AT WELL SITE.
										DRILLER BEGINNING TO
										SET UP RIG
									11200	BREAK FOR LUNCH
									11230	DRILLER CONTINUING TO
										SET UP RIG
									11515	DRILLER SHUTTING DOWN
										FOR DAY
									11520	GEOLOGIST AND DRILLER
										AT SITE

WMC-MR-0206

116

9413223-0912

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 3 of 65Location 216-5-10Project W017-S-10Logged by C.D. CONDIT (GEL)  
Print

Sign

Date 3/7/90Drilling Contractor KEHChecked by S. Goodwin  
Print

Sign

Date 6/12/90Driller CRAIG WAMELELithologic Classification Scheme FOLKProcedure DD-1Rev No. 0Rig/Method BE 60L / CABLE TOOL 1122-14100Measuring Equipment TAPE #L300-19 AND #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			GEOLOGIST AND DRILLER ON SITE
											DRILLER CONTINUES TO SET UP
											DRILL SITE
								0740			DRILLER BEGINNING TO WELD SECTIONS
											OF PIPE ONTO 10" CORE BARREL
								0920			DRILLER COMPLETES WELDING OF
											10" CORE BARREL. CONTINUING TO
											PREPARE DRILL SITE FOR CALIBRATION
								1200			DRILLER BREAKS FOR LUNCH
								1230			ATTENDED DRILLER / GEOLOGIST /
											MEETING CONCERNING PROBLEMS
											FOR 216-5-10 PROJECT
								1330			GEOLOGIST AND DRILLER BACK ON
											SITE, BEGINNING TO CONNECT TAPS
											AND 10" CORE BARREL. NOTES: LUBRI-
											CANT USED, W/RE REFLECTED OIL
								1430			REFLECTED SECTION OF 10" C.S.
											AGING WITH SILE DUE TO CEMENT
											ENCRUSTED ON INSIDE OF PIPE
								1445			DRILLER PERFORMING RIG MAINTENANCE
								1610			DRILLER AND GEOLOGIST OFF SITE

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WHC-MR-0206

WHC-MR-0206



WHC-MR-0206

WHC-MR-0206

9443223.0916

## DAILY BOREHOLE LOG

Boring or Well Number 299-V125-8Sheet 7 of 65Location 216-5-10Project WYAT-5-10Logged by C.D. CONNIT (GAT)  
PrintDate 3/12/90Drilling Contractor KEHChecked by S. GOODWIN  
Print

Sign

Date 6/12/90Driller CRAIG WAMELEYLithologic Classification Scheme FolkProcedure DO-1Rev No. φRig/Method BE GUL/CAUSE TOOL #22-14100Measuring Equipment #1300-19 #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCl, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							NOTED THAT DRIVE SHOE HAD BEEN SAND BLASTED	0900			OUTSIDE DIAMETER OF 10" CASING
							AND VISUALLY APPEARED CLEAN. REFERENCE WMC-				DRIVE SHOE = $11\frac{3}{4}" = 0.98'$
							S-014 REV. 4 SECTION 7.6.	1000			WELDING OF DRIVE SHOE TO 10"
											C.B. CASING STOPS. DRILLER NO-
											TICKED CRACK IN SHOE ALL THE
											WAY AROUND. DRILLING FOREMAN
											WAS NOTIFIED, AND DRIVE SHOE
											WAS CUT OFF
								1045	5		DRILLER BEGINNING TO WELD NEW
											DRIVE SHOE TO 10" C.B. CASING.
											O.D. = $11\frac{3}{4}" = 0.98'$ . NOTED THAT
											DRIVE SHOE HAD BEEN SAND BLASTED
											AND VISUALLY APPEARED CLEAN
											REF. WMC-S-014 REV. 4 (SEC. 7.6
								1200			DRILLER BREAKING FOR LUNCH
								1230			DRILLER RESUMING THE WELDING
											OF DRIVE SHOE TO 10" C.B. CASING.
								1200			WELDING OF DRIVE SHOE STOPS.
											DRILLER HAS NOTICED THAT THIS
											SHOE IS ALSO CRACKING. DRILLING
											FOREMAN HAS BEEN NOTIFIED

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WMC-MR-0206

WHC-MR-0206

9413223.0918

## DAILY BOREHOLE LOG

Boring or Well Number 241-W26-8Sheet 9 of 65Location 216-8-10Project W017-S-10Logged by C.D. CONDIT (CAT)

Print

Date 3/13/90Drilling Contractor KEHChecked by S. GORDON

Print

S. Gordon

Sign

Date 6/12/90Driller CRAIG WAMELEYLithologic Classification Scheme FDLKProcedure D-1Rev No. 6Rig/Method BE 60L / CABLE TOOL #22-14100Measuring Equipment #1300-19 #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			GEOLOGIST AND DRILLER ON SITE
								0705			DEPTH TO BOTTOM = 3.2' TAFE
											#1300-19
3.2'			51P1000 PID	1 DET				0710			END MON. BOREHOLE
								0715		9.6'	10" C.S. CASING ADDED
								0720			DRILLING WITH CORE BARREL BEGINS
								0735			DRILLING STOPS. PREPARING TO ADD 10" C.S. CASING
								0800		10.1'	10" C.S. CASING ADDED
										10.7'	
								0905			DRILLING RESUMES.
			51P1000 PID	1 DET				0930			END MON. DRILL SITE
10'	LITH	2			D		SAND (95% SAND, 5% MUD) 1% CE, 15% IOD.	0935			SAMPLE - C.B.
	MOIST	1					60% FO, 19% UCS, 5% MUD, WELL SORTED.				
							SAND; 40% BASALTIC/MAFIC, 50% QUARTZ, 10% FELD.	0940			DRILLING RESUMES
							FELD. 50-50. COLOR: 2.5Y4/2 DARK GRAY				
14'			51P1000 PID	1 DET			BELOW: SLIGHT KEN TO 10% ICL. UNCONSOLIDATED.	0950			END MON. BOREHOLE
							CHANGES NOTED: ABSENCE OF GRAVEL AS COMBINED				
							10.5 FT. SAMPLE				
15'	LITH	2			D		SAND (1% GRAVEL, 95% SAND, 4% MUD), 4% IOD.	1005			SAMPLE - C.B.
	MOIST	1					MP. 0.5% FP, 15% UCS, 60% SCL, 19% PM, 5% FS	1010			DRILLING RESUMES

W = wet, M = moist, D = dry

A-1800-003 (01/90)

MHC-MR-0206

123

9443223.0919

## DAILY BOREHOLE LOG

Boring or Well Number 299. W26-8Sheet 10 of 65Location 216-5-10Project W017-5-10Logged by C.D. CONDIT (GAT)  
PrintDate 3/13/90Checked by S. GORDON  
Print

Sign

Date 6/12/90Lithologic Classification Scheme FolkProcedure DO-1Rev No. 0Drilling Contractor KEHDriller CRAIG WAMSLEYRig/Method CE 60L / CABLE TOOL #22-14100Measuring Equipment #1300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
15'							(15 FT. SAMPLE DECK CONT.) 40% MUD, WELL SORTED, GRAVEL: 70% BASALTIC / MAFIC, 20% QUARTZITE, SA-SR, SAND: 50% BASALTIC / MAFIC, 30% QUARTZ, 17% FELIC, 30% RED SANDSTONE GA-SR, COLOR: 5Y4/2 OLIVE GRAY, SLIGHT RN TO 10% ICL, UNCONSOLIDATED. CHANGE NOTED: INCREASE IN BASALTIC / MAFIC CONTENT, INCREASE IN COARSE SAND FRACTION. DRILLER COMMENTED THAT SAND BECAME COARSER AT 11 FT.	1015			DRILLING STOPS, PREPARING TO ADD 10" C.D. CASING
								1125			
								1130			
20'	LITH	2			D		SAND (2% GRAVEL, 90% SAND, 8% MUD)	1145		10" C.D. CASING ADDED	
	CHEM	2					.5% MP, 1% FP, .5% UFP, 8% UCS, 40% CCS, 30%	1150	5	10" C.D. CASING ADDED	
	UOA	2					MO, 10% FS, 2% VS, 9% MUD, WELL SORTED.			10" C.D. CASING ADDED	
	MOIST	1					GRAVEL: 90% BASALTIC / MAFIC, 20% FELIC, SA-SR			10" C.D. CASING ADDED	
							SAND: 40% BASALTIC / MAFIC, 40% QUARTZ, 19%	1200		10" C.D. CASING ADDED	
							FELIC, 1% FELIC SULFIDES, SA-SR, COLOR:			10" C.D. CASING ADDED	
							5Y3/2 DARK OLIVE GRAY, SLIGHT RN TO 10%			10" C.D. CASING ADDED	
							ICL, UNCONSOLIDATED. CHAIN OF CUSTODY			10" C.D. CASING ADDED	
							#1300-19 - W26-8			10" C.D. CASING ADDED	
								1220			DRILLING RESUMES

W = wet, M = r

dry

A. .03 (01/90)

WHC-MR-0206

9443223.0920

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 11 of 65Location 216-S-10Project W017-S-10Logged by C.D. CONDIT (GAT)

Print

Date 3/12/90Drilling Contractor KEHChecked by S. Gropman

Print

Date 6/12/40Driller CRAY WAMLEYLithologic Classification Scheme FolkProcedure NO-1Rev No. 0Rig/Method BE 60L / CABLE TOOL #22-14100Measuring Equipment #1300-19 #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
21'			SIPI000 PID	4 DET				1240			650 MON. DRILL SITE
25'	LTH	2			D		SAND (3% GRAVEL, 90% SAND, 7% MUD)	1300	5		SAMPLE - C.B.
	MOIST	1					Tr. CP, 1% MP, 1% FP, 1% VFP, 8% VES, 40%	1305			DRILLING RESUMES
							CS, 30% MS, 10% FE, 2% VFS, 7% MUD	1310			RPT ON SITE TO CHECK SAMPLES
							MODERATE TO WELL SORTED, GRAVEL; 70% BAAL-	1320			DRILLING STOPS. PREPARING TO
							IC/MAFIC, 25% QUARTZITE, 5% FELSK, SA-R,				ADD 10" C.S. CASING
							SAND; 40% BASALTIC/MAFIC, 40% QUARTZ,	1445		10.3'	10" C.S. CASING ADDED
							20% FELSK, SA-SR, COLOR: 5Y3/2 DARK			TOT = 40.1'	
							OLIVE GRAY, SLIGHT RSN 10% KIL. UNCOMMON.	1450			DRILLING RESUMES
								1510			DRILLING STOPS. BEGINNING TO
											CLEAN UP DRILL SITE
							TOTAL FT. DRILLED FOR DAY: 5' TO 25' = 20 FT.	1520			GEOLOGIST AND DRILLER OFF SITE
							10" CASING ADDED TODAY: 40.1' TOT = 40.1'				
							H <sub>2</sub> O ADDED DOWNHOLE: 10				

W = wet, M = moist, D = dry

A. 1800 003 (01/00)

WHC-MR-0206

9443223.0921

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 12 of 65Location 216-S-10Project W017-S-10Logged by C.D. CONDIT (GAT)  
PrintDate 3/14/90Drilling Contractor KEHChecked by S. GOSLOW  
Print

Sign

Date 6/12/90Driller CRANG WAMBLEYLithologic Classification Scheme FOLKProcedure DZ-1Rev No. 0Rig/Method BE 60L/CABLE TOOL #22-14100Measuring Equipment #1300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOIS- TURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			GEOWEST AND DRILLER ON SITE.
											SSD ON SITE. RIG IS WARMING
											UP. RIG MAINTENANCE
								0730			DRILLING WITH CORE BARREL BEGINS
30'	LITH	2	6101000 PID	L DET	D		SAND (92% SAND, 8% MUD) 5% MS, 40% FS.	0740			SAMPLE - C.B.
	MOIST	1					27% VFE, 9% MUD. WELL TO VERY WELL				
							SORTED. SAND; 25% BASALTIC/MAFIC, 55% QUARTZ	0745			DRILLING RESUMES
							15% FELIC, 4% MICA, 1% FEKV SULFIDE. SA-				
							SR. COLOR: 5Y4/3 OLIVE. SLIGHT RAN TO 10%	0755			
							HCL NOTED SLIGHT CONSOLIDATION OF SAND THAT				
							HAD PROBABLY RUN TO 10% HCL. DRILLING CON-				
							STINUED. SAND BECAME FINER THAN 25 FT SAM-				
							PLE AT 28'.				
35'	LITH	2	6101000 PID	L DET	D		SAND (92% SAND, 8% MUD) 5% VFE, 5% MS.	0800			SAMPLE - C.B.
	MOIST	1					30% VFE, 40% FS, 12% VFE, 1% MUD. WELL SORTED	0815			DRILLING RESUMES
							SAND; 35% BASALTIC/MAFIC, 45% QUARTZ, 15%	0805			RPT CAN ENTER TO CHECK SAMPLER
							FELIC, 1% FEKV SULFIDE, 1% HCL. SAND, MAFIC.	0825			DRILLING STOPS. PROBABLY 10'
							SA-SR. COLOR: 5Y4/3 OLIVE. SLIGHT RAN TO				FEED 10" C.S. CHUCK.
37'			6101000 PID	L DET			10% HCL UNRECOGNIZED	0830			650 MON BOREHOLE
								0830			DEPTH TO BOTTOM = 37.0'

W = wet, M = r D = dry

A J03 (01/90)

WHC-MR-0206



9/13223-0922

## DAILY BOREHOLE LOG

Boring or Well Number 2991-W26-8Sheet 13 of 65Location 216-S-10Project W017-E-DLogged by C.D. CONDIT (GAI)  
PrintDate 3/14/90Drilling Contractor KEHChecked by S. GOODWIN  
Print

Sign

Date 6/12/90Driller CRAIG WAMBLEYLithologic Classification Scheme FOLKProcedure DO-1Rev No. 0Rig/Method BE 60 L / CABLE TOOL H 22-14100Measuring Equipment #1300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOIS- TURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0955		10-19'	10" C.S. CASING ADDED
										LOT = 5029	
								1000			DRILLING RESUMES
40'	LITH	2			D		SAND (92% SAND, 8% MUD) 1% CO, 10% MS.	1025			SAMPLE - C.B.
	CHEM	2					10% FO, 16% VFB, 9% MUD, WELL SORTED.	1030			DRILLING RESUMES
	NDA	2					SAND; 20% BA-ALITE/MAFIC, 55% QUARTZ, 20% FELSIC, 4% MIC, 1% FELIC SULFIDES, SA-SR				
	(MOIST)	1					COLOR: 5Y4/3 OLIVE, SLIGHT RIN TO 10% HCL.				
							NOTED PRESENCE OF MODERATELY CONSOLIDATED SAND				
							RETAINED ON SEIVE, STRONG RXN TO 10% HCL				
							CHAIN OF CUSTODY # 0314E10-W26-8				
45'	LITH	2			D		SAND (92% SAND, 8% MUD) 9% VES, 5% CO, 30%	1050			SAMPLE - C.B.
	MOIST	1					MS, 10% FO, 12% VFB, 8% MUD, WELL SORTED, SAND;	1055			DRILLING RESUMES
							30% BA-ALITE/MAFIC, 45% QUARTZ, 23% FELSIC,	1105			DRILLING STOPPED, PREPARING TO
							1% FELIC SULFIDES, 1% RED SANDSTONE, SA-SR,				ADD 10" C.G. CASING.
							COLOR: 5Y4/3 OLIVE, SLIGHT RIN 10% HCL	1200			DRILLER BREAKS FOR LUNCH
							WYON: OLIVINE.	1230			DRILLED, CONTINUING TO WEND
										10" C.G. CASING	
								1320		8-77'	10" C.S. CASING ADD
										LOT = 59126	
								1325			DRILLING RESUMES

W = wet, M = moist, D = dry

A 1800 003 (01/00)

WHC-MR-0206

WHL-MK-0206

94/3223-0924

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 15 of 65Location 215-S-10Project W017-S-10Logged by C.D. CONdit (GAT)

Print

Date 3/15/90Drilling Contractor KEHChecked by S. GOODWIN

Print

Date 6/12/90Driller CRAIG WAMBLEYLithologic Classification Scheme FOLKProcedure DO-1Rev No. 4Rig/Method BELO L/CABLE TOOL #122-14100Measuring Equipment #L300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCl, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0655			GEOLOGIST AND DRILLED ON SITE
											RIG IS WARMING UP
55'			SIP1000 PID	DET				0700			650 MON. BOREHOLE
							DEPTH TO BOTTOM = 56.3' - 3.8' + 2.5' = 55.0'	0705			DEPTH TO BOTTOM = 55.0'
								0715			DRILLER PERFORMING TO PLAN
											10" C.D. CASING
								0720		10.50'	10" C.D. CASING ADDED
										10' = 19.5'	
								0730			DRILLING WITH CORE BARREL
											DEBITS
								0735	5		DRILLER ADDING H <sub>2</sub> O TO AID IN
											MATERIAL REMOVAL
60'	LITH	2			D	55'	SAND (92% SAND, 8% MUD) 10% MC, 60% FS.	0745			SAMPLE - C.B.
	CHEM	2				60'	22% FS, 9% MUD, WELL TO VERY WELL SORTED.	0750			DRILLING RESUMES
	NOA	2					SAND; 15% PEGMATITE/MARK, 65% QUARTZ, 15% FINE				
	MOIST	1					GRIT, 4% MICA, 1% FELT, UNFELT, SA-SR				
							OVER, 544/3 OLIVE, SLIGHT PRT TO 11% VL				
							UNCONFORMED, C. OF C. #031590-W26-8				
62'			SIP1000 PID	DET		60'		1005			650 MON. BOREHOLE
65'	LITH	2	SIP1000 PID	DET	D		SAND (92% SAND, 8% MUD) SAMPLE DESCRIP-	1105			SAMPLE - C.B.
	MOIST	1					1107) SIMILAR TO 60 FT. SAMPLE				
						65'		1110			DRILLING RESUMES

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WHC-MR-0206

91-3223-0925

## DAILY BOREHOLE LOG

Boring or Well Number 2991-W26-8

Sheet 16 of 65

Location 216-E-10

Project NO17-S-10

Logged by C.D. CONNIT (LAI)  
Print

Date 3/15/10

Drilling Contractor KEH

Checked by S. Goodwin  
Print

Date 6/12/90

Driller CRAIG W. MCLELLANLithologic Classification Scheme Folk

Procedure DO-1

Rev No. 5

Rig/Method BE 60 L / CABLE TOOL # 22 - 14100

Measuring Equipment # L300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED.	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1125			Drilling stops. Preparing to add 10" C.S. casing
								1200			Driller BREAKING FOR LUNCH
								1230			Driller CONTINUING TO WELD 10" C.S. CASING.
								1310		10.38'	10" C.S. CASING ADDED
								1315		TOT = 79.94'	Drilling RESUMES
70'	LITH	2			D	[Pattern]	SAND (92% SAND, 8% MUD) SAMPLE DESCRIP-	1335			SAMPLE - C.B.
	MAGN	1	GIP 1000 PIS	'DET		[Pattern]	-TION SIMILAR TO 60 FT. SAMPLE	1340			Drilling RESUMES
72'								1355			SSO MON. BOREHOLE
								1400	3		Driller ADDING H <sub>2</sub> O TO "BOREHOLE"
								1405	H		H <sub>2</sub> O ADDED DOWNHOLE
75'	LITH	2			D	[Pattern]	SAND (C10% SAND, 10% MUD) 10% MS, 60% FC,	1430			SAMPLE - CB
	MAGN	1	GIP 1000 PIS	'DET		[Pattern]	AD% VFS, 10% MUD. WELL TO VERY WELL SORTED	1435			SSO MON. BOREHOLE
							SAND; 80% BASALTIC/MAFIC, 60% QUARTZ, 15%	1440			RPT ON SITE TO CHECK SAMPLES
							FELT, 4% MICR, 1% FELCU-SULPHIDES, SA-GR. COLOR	1500			Drilling STOPS. FIRE WATCH!
							SY413 OLIVE, SLIGHT RAN TO 100% FKL, UNCONCOLI-	1515			GEOLOGIST AND Driller OFF SITE
							DATED. NOTED TRACE OF CP AT T1' TO T3' INTERVAL				
							Total Ft Drilled For Day : 55' to 75' = 20 ft				
							10" C.S. CASING ADDED : 20.88'    π = 79.94'				

W = wet, M = r      D = dry

12 GALLONS H<sub>2</sub>O AIBED DOW.

**A- J03 (01/90)**

**WHC-MR-0206**

9443223-0926

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-SSheet 17 of 65Location 216-S-10Project W017-S-10Logged by C.D. CONNIT (GRT)  
PrintDate 3/16/90Drilling Contractor KEHChecked by S. GOODWIN  
Print

Sign

Date 6/12/90Driller CRAIG WAMLEYLithologic Classification Scheme FolkProcedure DO-1Rev No. ΦRig/Method BE 60L / CABLE TOOL # 22-14100Measuring Equipment # L300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
76.1'			SIP1000 PID	DET				0700			GEOLOGIST AND DRILLER ON SITE
								0715			550 MAN. BOREHOLE
							DATA TO BOTTOM: $77.5' - 3.4' + 2.5' = 76.1'$	0710			DEPTH TO BOTTOM = 76.1'
								0715			DRILLER PREPARING TO ADD 10"
								0845		10.20'	10" C.C. CASING ADDED
										TOT = 90.17'	
								0955			DRILLING WITH CORE BARREL BEGINS
80'	LITH	2	SIP1000 PID	DET	D		SAND (92% SAND, 8% MUD) 1% VCC, 2% CC.	0910			SAMPLE - C.B.
	CHEM	2					10% MS., 60% FC., 19% VFE, 8% MUD, WELL	0915			DRILLING RESUMES
	MOIST	1					SORTED SAND: 20% GRAVEL (1mm-5mm), 6% QUARTZ, 10% FELIC, 5% MICA, CA-SR. COLOR: 5Y4/3 OLIVE, SLIGHT RXN TO 10% HCL, UNCONSOLIDA- TED. CHAIN OF CUSTODY # 031690-W26-S				
85'	LITH	2			D		SAND (92% SAND, 8% MUD) SAMPLE DISCIP.	0951			SAMPLE - C.B.
	MOIST	1					FIN SIMILAR TO 80 FT. SAMPLE.	0955			DRILLING RESUMES
								1005			DRILLING STOPPED PREPARING TO ADD 10" C.C. CASING
								1130		9.24'	10" C.C. CASING ADDED
								1135		TOT 99.51'	DRILLING RESUMES

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WIC-MR-0206

WHC-MR-0206

9443223.0928

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 19 of 65Location 216-S-10Project W017-S-10Logged by C.D. CORRENT (ent)  
PrintDate 8/19/90Drilling Contractor KEHChecked by S. GOODWIN  
PrintDate 6/12/90Driller CRAIG WATKINSLithologic Classification Scheme FOLKProcedure DD-1Rev No. 3Rig/Method PE 60L CABLE TOOL H22-14100Measuring Equipment H1300-19, H1276

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
95.3'			6101000 PID	DET				0700			GEOMIST AND DRILLER ON SITE
								0705			SEE MON. BOREHOLE
							96.2' 12.5' - 3.4' = 95.3'	0710			DEPTH TO FORM = 95.3'
								0715			DRILLER PERFORMING RIG
											MAINTENANCE
								0740			PREPARING TO ADD 10" C.C. CASING
								0905		8.82'	10" C.C. CASING ADDED
										TOT=108.33'	
100'	1mm	2	6101000 PID	DET	D		SAND (42% SAND, 8% MUD) 10% MC. 10% FS.	0910			DRILLING WITH CORE BARREL (FRESH)
	CHG	2					22% VEG. 4% MUD. WELL TO NEARLY WELL SORTED.	0935			SAMPLE - C.B.
	WPA	2					SAND: 70% BASALTIC (MAFIC), 60% QUARTZ, 15% C.	0940			DRILLING RESUMES
	MOIST	1					FEELK, 4% MICA, 1% FELK. SPLITTING. SA-FR.				
							COLOR: S/YH3 OLIVE, OLIVET FINE TO 10% HCL. HIRON.				
103'			6101000 PID	DET			VALIDATED. CHAIN OF CUSTODY H02K10-W26-8.	0955			SEE MON. BOREHOLE
105'	LTH	2			D		SAND (42% SAND, 8% MUD) SAMPLE DE: 114	1010			SAMPLE - C.B.
	MOIST	1					1143 SAMPLE TO 1011 FT. SAMPLE.	1025			DRILLING RESUMES
								1030			DRILLING STOPS. PREPARING TO
											ADD 10" C.C. CASING
								1050			RPT ON SITE TO CHECK SAMPLES
								1140		8.87'	10" C.C. CASING ADDED

W = wet, M = moist, D = dry

TOT=117.20

A-1800-003 (01/90)

WIC-MR-0206

9443223.0929

## DAILY BOREHOLE LOG

Boring or Well Number 412901-1124-2Sheet 20 of 65Location 216-C-10Project W017-0-10Logged by C.D. CONNIT (GAI)  
PrintDate 3/11/90Drilling Contractor KEMChecked by S. GOGOWA  
PrintDate 6/12/90Driller CRAIG WAMBLEYLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method DE GOLF CABLE TOOL 4122-14100Measuring Equipment #1300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1145			DRILLING RESUMES
								1200			DRILLER BREAKS FOR LUNCH
108'			SIP1000 PID	1 DET				1230			END MAIN BOREHOLE
								1235			DRILLING RESUMES.
110'	LITH	2			D		SLIGHTLY MUDY SAND (1% GRAVEL, 87% SAND, 12% MUD)	1245			SAMPLE - C.B.
	MOIST	1					1% FP, 1% VSG, 2% HCS, 10% MS, 50% FS.	1250			DRILLING RESUMES.
							24% VFS, 12% MUD, WELL SORTED, GRAVEL: 100%				
							DIAGENITIC MAFC, SR. SAND: 20% BASALTIC MAFC.				
							10% QUARTZ, 15% FELIC, 11% MKA, 1% FELIC SULF.				
							FIBES. SA-ER, COLOR: 5Y4/3 OLIVE. MODERATE				
							RAN TO 10% HCL. UNCONSOLIDATED.				
115'	LITH	2	SIP1000 PID	1 DET	D		SAND (42% SAND, 5% MUD) 10% MS, 60% FS.	1320			SAMPLE - C.B.
	MOIST	1					17% VFS, 8% MUD, WELL TO VERY WELL SORTED.				DRILLING STOPS. PREPARING TO
							SAND: 20% BASALTIC MAFC, 10% QUARTZ, 15%				ADD 10" C.S. CASING
							FELIC, 4% MKA, 1% FELIC SULFIDES. FA-SD.	1440		8-58'	10" C.S. CASING ADDED
							COLOR: 5Y4/3 OLIVE, SLIGHT RAN TO 10%			11:12.58'	
							HCL. UNCONSOLIDATED.	1445			RPT ON SITE TO CHECK SAMPLES
								1450			DRILLING RESUMES
							TOTAL FT DRILLED FOR DAY = 95' TO 115' = 20 FT	1510			DRILLING STOPS FOR THE DAY
							10" C.S. CASING ADDED = 26.27 FT. TOT = 125.78 FT	1520			DRILLER AND GEOLOGIST OFF SITE
							GALLONS H <sub>2</sub> O ADDED = 0				

W = wet, M = dry

A- 003 (01/90)

WIC-MR-0206



9443223.0930

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 21 of 65Location S-10 TrenchProject W-017-S-10-TrenchLogged by AW Pearson Alan Pearson Date 3/19/90Checked by S. Goodwin A. Hulse Date 6/12/90Lithologic Classification Scheme N/A Procedure D2-1 Rev No. 0Measuring Equipment N/ADrilling Contractor KEHDriller Craig WamsleyRig/Method BE60L / Cable Tool

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1300			Witness steam cleaning of (9) lengths of 8" Carbon Steel Casing @ KEH laydown yard.
								1345			Laborer arrives to start cleaning. Steam cleaning info: Temp. = fluct. 140°-190°F Press. = 1600 PSI
							Also had problems w/ Temperature Burner unit is equipped with a thermostat (turns off ~190°F & on @ ~140°F). Did not start functioning properly until ~1440.				Ref. WHC-S-014 Rev. 4 Section 7.6
								1415			Having problems w/ Press. Call Mechanic to look at it.
								1430			O. Doolle (WHC-QA) watches steam cleaning. No comments.
							Casing will be covered w/ plastic & delivered to well site tomorrow (3/20/90)	1450			Have KEH grind paint off one length of pipe - all appear clean - large rocks in tipper will be removed during unloading at site
							Geologist leaves site	1505			

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WHC-MR-0206

9413223.0931

## DAILY BOREHOLE LOG

Boring or Well Number 29A-W26-8Sheet 22 of 65Location 216-5-10Project W017-5-10Logged by C.D. CONNITT (GNC)  
PrintDate 3/20/90Drilling Contractor KEHChecked by S. GOODWIN  
PrintDate 6/12/90Driller CRAIG WANSLEYLithologic Classification Scheme FOLKProcedure DO-1Rev No. 0Rig/Method BE 60L / CABLE TOOL H 22-14100Measuring Equipment #1300-19 #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0655			GEOLOGIST AND DRILLER ON SITE
											RIG MAINTENANCE
116.8'			GIP1000 PID	1 DET				0705			END MON. BOREHOLE
							122.5' + 2.5' = 8.2' = 116.8' FL. #1300-19	0710			DEPTH TO BOTTOM = 116.8'
								0720			DRILLING BEGINS WITH CORE PAPER
120'	LITH	2			D		SANDS (40% SAND, 10% mud) 10% ms, 55% fs,	0730			SAMPLE - C.B.
	CHEM	2					25% ufs, 10% mud. WELL TO VERY WELL SORTED.	0735			DRILLING RESUMES
	MOA	2				120'	SAND: 15% BASALTIC LAMAR. (10% QUARTZ, 20%	0755			DRILLING STOPS. PREPARING TO
	MOVA	1					FLUID, 4% mud, 1% FELT/CLAY/SHALE. SA-SR.				ADD 10" C.S. CASING
							COLOR: 5-14/3 CLAY. DRILL RAN TO 10' HCL. VIB.				
							RECOMMENDED. C. OF CORDON 110320015-1026-8.				
							CIRCUITS OF 10" FINE 8" C.S. CASING WITH	0805			TRUCK AND CRANE ON SITE TO
							WINDMILL AND DECEASED ON BLINDS BY				UNLOAD 10" + 8" C.S. CASING
							L. DETRIEUX AND A. PIERREAU RESPECTIVELY.				
							REF. WIRE - S. C. 111 REV. 4 SECTION 7.6 SAND	0830			DRILLER CONTINUING TO WELD
							GEOTECH. UNIT 21				10" C.S. CASING
								0840		10.02'	10" C.S. CASING ADDED
										10.135.8'	
								0855			DRILLING RESUMES

W = wet, M = m

D = dry

A

03 (01/90)

WHC-MR-0206

9413223-0932

## DAILY BOREHOLE LOG

Boring or Well Number 2919-1126-SSheet 23 of 65Location 216-3-10Project W017-S-10Logged by C.D. CONDUIT (CAR)  
PrintDate 3/10/90Drilling Contractor KEHChecked by S. GOODWIN  
Print

Sign

Date 6/12/90Driller CRAIG WANKLEYLithologic Classification Scheme FOLKProcedure DO-1Rev No. 0Rig/Method BELOW CABLE TOOL 1122-14100Measuring Equipment #1300-19 #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
125'	LITH	2			D	120'	SUBTLY MUDDY SAND (95% SAND, 15% MUD)	0945			SAMPLE - C.B.
	MOIST	1				126'	10% MS, 40% FE, 35% UFE, 15% MUD. WELL SORTED. SAND: 15% BASALTIC/MAFIC, 10% QUARTZ, 20% FELIC, 4% mica, 1% FELEX SULFIDES. SA-SR. COLOR 2.5Y4/4 OLIVE BROWN. MODERATE RYN TO 10% HCL. UNCONSOLIDATED.	0950			DRILLING RESUMES.
130'	LITH	2			D	127'	SUBTLY MUDDY SAND (95% SAND, 15% MUD)	1015			SAMPLE - C.B.
	MOIST	1				128'	10% MS, 40% FE, 35% UFE, 15% MUD. WELL SORTED. SAND: 15% BASALTIC/MAFIC, 55% QUARTZ, 25% FELIC, 4% mica, 1% FELEX SULFIDES. SA-SR. COLOR 2.5Y4/4 OLIVE BROWN. MODERATE RYN TO 10% HCL. UNCONSOLIDATED.	1020			DRILLING RESUMES.
132'			GIP 1000 P10	1 DET		129'		1030			DRILLING STOPS. PREPARING TO ADD 10" C.B. CASING
						130'		1055			550 MON. BOREHOLE
								1100			RPT ON SITE TO CHECK SAMPLES
								1135			9.84' 10" C.B. CASING ADDED
								1140			TOT: 146.64'
135'	LITH	2			D	130'	SUBTLY MUDDY SAND (95% SAND, 15% MUD) SAMPLE	1155			DRILLING RESUMES
	MOIST	1				135'	DESCRIPTIONS SIMILAR TO 120 FT. SAMPLE	1200			SAMPLE - C.B.
137'			GIP 1000 P10	1 DET				1230			DRILLER BREAKS FOR LUNCH
								1310			DRILLING CONTINUES
											550 MON. BOREHOLE

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WHC-MR-0206

9413223.0933

## DAILY BOREHOLE LOG

Boring or Well Number 29C1-W26-8Sheet 24 of 65Location 216-S-10Project W217-S-10Logged by C.D. CONNIT (GAE)  
PrintDate 3/20/90Drilling Contractor KEHChecked by S. GOODWIN  
PrintDate 6/12/90Driller CRANE WAMBLEYLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method RE BOL / CABLE TOOL H22-14100Measuring Equipment H1300-19, H12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1315			DRILLER COMMENTED THAT MATERIAL IN BOREHOLE IS TOO DIFFICULT TO REMOVE WITH CORE BARREL AND RIG CANNOT ACCOMPLISH THIS. MATERIAL IS SLIGHTLY MUDDY TO MUDDY SAND. DRILLER PLANS TO SWITCH TO HARD TOOL.
								1330		-4.61'	10" C.S. CASING DELETED
										TOT: 140.83'	
							NOTED: LUBRICANT USED WHEN SWITCHING TOOLS WAS FOOD GRAINED VEGETABLE OIL. REFERENCE W217-S-014 (REV. 4) SECTION 7.2	1335			DRILLER BEGINNING TO SWITCH TOOLS
								1425		-2.85'	10" C.S. CASING DELETED
										TOT: 137.98'	10" C.S. CASING IS READY TO BE LOGGED 8" C.S. CASING WILL START TOMORROW.
								1445			RPT ON SITE TO CHECK SAMPLES
								1500			DRILLER SHUTTING DOWN OPERATIONS FOR THE DAY. FIRE WITH GEOLOGIST AND DRILLER OFF SITE.
							TOTAL FT. DRILLED FOR DAY: 115' TO 135' = 20 FT.				
							10" C.S. CASING ADDED = 119.1 - 7.66 = 12.20'	1510			
							TOTAL 10" C.S. CASING = 137.98'				
							CALCULATED H <sub>2</sub> O USED DURING DAY = 0				

W = wet, M = m

) = dry

A.

J3 (01/90)

WMC-MR-0206

9413223-0934

## DAILY BOREHOLE LOG

Boring or Well Number 899-W26-8Sheet 25 of 65Location 216-S-10Project W017-S-10Logged by C.D. CONDIT (R)  
PrintDate 3/21/90Drilling Contractor KEHChecked by S. Goodman  
Print

Sign

Date 6/12/90Driller CRAIG WAMELEYLithologic Classification Scheme FolkProcedure DD-1Rev No. 0Rig/Method BE BDL/CABLE TOOL #22-14100Measuring Equipment #1300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
136.2'			SIP 1000 PID	LOFT				0700			GEOLOGIST AND DRILLING ON SITE. EDD MON. BOREHOLE
								0705			ATTENDED TAILGATE MELTING. BE- TWEEN GEOLOGISTS, DRILLERS, AND EDD.
							DEPTH TO BOTTOM = 134.5' + 2.5' - 0.8' = 136.2'	0725			DEPTH TO BOTTOM = 136.2'
							TAPE #1300-19	0735			DRILLER WEIGHING. ENDS TO 9"
								0830			C.S. CASING.
											NOTED THAT GEOPHYSICAL LOGGING OF 10" C.S. CASING WILL NOT OCCUR DUE TO TRUCK IN FOR MAINTENANCE
								0910			DRILLER BEGINNING TO WELD 8" C.S. CASING. OUTSIDE DIAMETER OF DRIVE SHAFT = 0.82 FT.
								1000		70.12'	8" C.S. CASING ADDED
								1045			RPT ON SITE FOR SURVEY
								1050		20.00'	8" C.S. CASING ADDED
										101 - 40.12'	
								1200			DRILLER BREAKS FOR LUNCH
								1200			CONTINUING TO WELD 8" C.S. CASING

W = wet, M = moist, D = dry

A-1800-003 (01/90)

MHC-MR-0206

WHC-MR-0206

9413223.0936

## DAILY BOREHOLE LOG

Boring or Well Number 299-426-8Sheet 27 of 65Location 216-5-10Project W017-5-10Logged by C.D. CONNIT (GAL)  
Print

Sign

Date 3/22/90Checked by S. Goodwin  
Print

Sign

Date 6/12/90Drilling Contractor KEHDriller CRAIG WAMBLEYLithologic Classification Scheme FolkProcedure DO-1Rev No. 4Rig/Method BE601/CABLE TOOL #22-14100Measuring Equipment H1300-19 H12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			NOTED NO ACTIVITY ON SITE DUE TO DRILLER RESERVING HEALTH PHYSICAL.
								1130			GEOLOGIST AT WELL SITE. DRILLER AND MECHANIC ON SITE REPAIRING WELDER.
								1200			DRILLER BREAKS FOR LUNCH
								1230			DRILLER BEGINNING TO WELD 8" C.S. CASING.
								1340		21.00'	8" C.S. CASING ADDED
										TOT = 94.24'	
								1350			DRILLER BEGINNING TO WELD ON HARD TOOL GO TO BUILD UP BIT.
								1500			DRILLER SHUTTING DOWN WELDING FOR DAY (NOT WATCH)
								1515			GEOLOGIST AND DRILLER OFF SITE
											TOTAL FT DRILLED FOR DAY = 0 FT
											8" C.S. CASING ADDED = 21.00' TOT = 94.24'
											GALLONS H <sub>2</sub> O ADDED TODAY = 0

WMC-MR-0206

W = wet, M = moist, D = dry

A 1000 002 101 000

9403223.0937

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-BSheet 28 of 65Location 216-S-10Project WOIT-5-10Logged by C.D. CONDIT (GAT)  
PrintDate 3/23/90Drilling Contractor KEHChecked by S. GOODWIN  
Print

Sign

S. GoodwinDate 6/12/90

Sign

Driller CRAIG WARMLEYLithologic Classification Scheme FOLKProcedure DO-1Rev No. 41Rig/Method BE 60L/CABLE TOOL #22-14100Measuring Equipment #1300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			GEOREST AND DRILLED ON SITE
											RIG IS WARMING UP.
136'			SIP1000 PID	L DET				0705			SSO MON. BOREHOLE
								0715			DRILLER CONTINUING TO WELD
											8" C.B. CASING
								0800		17.59'	8" C.S. CASING ADDED.
										TOT=111.93'	
								0955		17.64'	8" C.S. CASING ADDED
										WT=129.47'	
136'			SIP1000 PID	L DET				1000			SSO MON. BOREHOLE
								1125		16.69'	8" C.B. CASING ADDED
										TOT=146.16'	
								1140	20		DRILLER ADDING H <sub>2</sub> O TO HOLE
								1145			DRILLING WITH HT AND FLAT BOTTOM
											BAILER BEGINS
140'	LITH	2	SIP1000 PID	L DET	N/A		MUDDY SAND (75% SAND, 25% MUD) 10%	1150			SAMPLE - HT AND F. BAILER
	CHEM	2					MG. 35% FS, 20% VFC, 25% MUD, WELL SORTED				
	VOA	2					SAND: 15% BASALTIC/MAFIC, 70% QUARTZ,	1200			DRILLER BREAKS FOR LUNCH
							15% FELSIC. SA-SR. COLOR: 2.5Y 4/1 OLIVE				
141'			SIP1000 PID	L DET			BROWN. MODERATE RAN TO 10% HCL UNCONS.	1235			SSO MON. BOREHOLE
							CHAIN OF CURRENCY #032390-W26-B	1240			DRILLING RESUMES

W = wet, M = r 7 1/2 dry

A. J03 (01/90)

WHC-MR-0206



WHC-MR-0206

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8

7443223-0939

Sheet 30 of 65Location 216-B-10Project W017-S-10Logged by C.D. CONNIT (GAE)  
PrintDate 3/26/90Drilling Contractor KEHChecked by S. GOODWIN  
PrintDate 6/12/90Driller CRAIG WANSLEYLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method REBOLICABLE TOOL II 22-141100Measuring Equipment #L300-K, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			GEOLOGIST AND DRILLER ON SITE
								0710			RIG IS WARMING UP.
146'			6IP 1000 PID	1 DET				0726	20		500 MON. DRILL SITE
								0735			H <sub>2</sub> O ADDED TO BOREHOLE
											DRILLING WITH HT AND FLAT
											BOTTOM BAILER BEGINS
150'	LITH	2			N/A	145'	MUDDY SAND (75% SAND, 25% MUD) 10% MS.	0750			SAMPLE - HT AND F. BAILER
							30% FS, 35% VES, 25% MUD, WELL SORTED.	0755	5		DRILLING RESUMES
153'			6IP 1000 PID	1 DET		130'	SAND; 15% CRANK/MARL, 50% QUARTZ, 35%	0815	16		500 MON. BOREHOLE
							FELSIC, SA-SZ, COLOR: SY4/3 OLIVE, MODERATE				
							RAN TO 10% HCL, UNCONSOLIDATED.				
155'	LITH	2			N/A	150'	MUDDY SAND (75% SAND, 25% MUD) 10% MS.	0835			SAMPLE - HT AND F. BAILER
							30% FS, 35% VES, 25% MUD, WELL SORTED	0940			DRILLING RESUMES
158'			6IP 1000 PID	1 DET		155'	SAND; 15% CRANK/MARL, 50% QUARTZ, 35%	0900			500 MON. BOREHOLE
							FELSIC, SA-SZ, COLOR: SY4/3 OLIVE, MODERATE				
							RAN TO 10% HCL, UNCONSOLIDATED.				
160'	LITH	2			N/A	155'	MUDDY SAND (75% SAND, 25% MUD) SAMPLE	0910			SAMPLE - HT AND F. BAILER
	SIRM	2				160'	DESCRIPTION SIMILAR TO 155 FT. SAMPLE.	0915			DRILLING STOPS. PREPARING TO
	VM	2					SHOWN OF CUTOFF #032690-W26-8				ADD 8" C.O. CASING

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WHC-MR-0206

9443223.0940

## DAILY COREHOLE LOG

Boring or Well Number 299-W26Sheet 3125Location 216-B-10Project W017-S-10Logged by C.D. CONNIT (EAT)  
PrintDate 3/2/90Drilling Contractor KEHChecked by S. GOODMAN  
Print

Sign

Date 6/12/90Driller CRAIG WAMLEYLithologic Classification Scheme FOLKProcedure DD-1Rev No. 0Rig/Method BE 601/CABLE TOOL # 22-14100Measuring Equipment #1300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCl, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
161'			SIP 1000 PID	L DET				1000			500 MON. BOREHOLE
								1025			RECEIVED WORD FROM E. AIRHART (PH) THAT DRILLER SHOULD ATTEMPT TO SWITCH BACK TO CORE PARREL. DRILLER BEGINNING TO SWITCH TOOLS TRUCK AND STAKE ON SITE TO DELIVER 8" C.S. CASING
							8" C.S. CASING WAS VISUALLY INSPECTED AND INSPECTED FOR CLEANING BY A.W. PEARSON ON THIS DATE. ACCEPTED. REFERENCE WMC-S-014 REV. 4 SECTION 7.2.	1105			RPT ON SITE TO CHECK SAMPLES
161'			SIP 1000 PID	L DET				1130			500 MON. BOREHOLE
							NOTED THAT LUBRICANT USED WHEN SWITCH- ING TOOLS WAS FOOD GRADE VEGETABLE OIL. REF. WMC-S-014 REV. 4 SECTION 7.2.	1200			DRILLER BROKE FOR LUNCH
								1245			DRILLING WITH CORE PARREL BEGINS
161'			SIP 1000 PID	L DET							500 MON. BOREHOLE
								1300			DRILLING STOP. PREPARING TO ADD 8" C.S. CASING.
								1400		8.67'	8" C.S. CASING ADDED
										WT: 1702'	
								1410			DRILLING RESUMES
								1430			NOTED THAT CORE PARREL IS UNABLE TO REMOVE MATERIAL FROM HOLE. MATERIAL IS MUDY SAND. ALSO

WMC-MR-0206

W = wet, M = moist, D = dry

A-1000-003 (01/90)

[illegible]

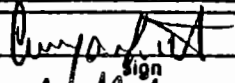
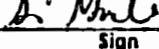
W = wet, M = moist, D = dry

**A-1P07-003 (01/90)**

WHC-MR-0206

9413223.0942

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 33 of 65Location 216-B-10Project WOST-S-10Logged by C.D. CONNOR (GNT)  
Print  
SignDate 3/27/90Drilling Contractor KEHChecked by S. Goodwin  
Print  
SignDate 6/12/90Driller CRAIG WAMELEYLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method BEAD/CABLE TOOL #22-14100Measuring Equipment #L300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
110.2'			SIP 1000 PID	L DET				0655			GEOLOGIST AND DRILLER ON SITE
								0705			600 MON. BOREHOLE
							NOTED THAT WORKERS USED WASH FOR D GRAB VEG.	0720			DRILLER CONTINUING TO SWITCH
							OIL. REF WMC-S-014 REILY SECTION 7-2				TOOL TO H.T. AND FLAT BOTTOM
147							D.B. = 112.2' + 2.5' - 4.7' = 110.0' TAPR #L300-151	0800			BAILER
								0810	18		DEPTH TO BOTTOM = 110.2'
								0815			DRILLING WITH H.T. BEING
											DRILLING STOP. PREPARING TO
											ADD 8" C.B. CASING
162'			SIP 1000 PID	L DET				0845			600 MON. BOREHOLE
								0900			4.53' 8" C.B. CASING ADDED
											TOT = 175.42'
								1030	10		DRILLING RESUMES
								1045			H <sub>2</sub> O ADDED TO BOREHOLE
165'	LITH	2			N/A		MUDDY SANDY GRAVEL (40% GRAVEL, 50% SAND, 10% MUD)	1050			RPT ON SITE TO SURVEY AREA
	CHEM	2					MUD) 5% SP, 10% MC, 10% FP, 15% YFP, 15% UCS,	1055			SAMPLE - HT AND SAND PUMP
	UVA	2					15% CO, 10% MC, 10% FS, 10% MUD, P.C.F. RLY	1130	10		DRILLING RESUMES
							SORTED, GRAVEL: 40% BASALTIC/MAFIC, 10%	1200			H <sub>2</sub> O ADDED TO BOREHOLE
							QUARTZ, 10% FELIC, SA-GR, SAND: 50% BASALTIC/MAFIC				DRILLER BREAKS FOR LUNCH
							40% QUARTZ, 10% FELIC, SA-GR, COLOR SY3/2 DARK				
							OLIVE GRAY, MIN. AND 10% HCL. UNCONSOLIDATED,				
							NOTED: GRAVEL/CORRSE SAND. DRILLER HARD.				
							CLIPS OF CUSTODY #1032-F10-W26-8				

WMC-MR-0206

W = wet, M = moist, D = dry

A 1800 003 1013001

[illegible]

A-1000-003 (01/90)

WHC-MR-0206

9413223-0944

## DAILY BOREHOLE LOG

Boring or Well Number 2951-W26-8Sheet 35 of 65Location 215-2-10Project W017-E-10Logged by C.D. CONNIT (GAL)

Print

Date 3/28/90Drilling Contractor KEHChecked by S. Goodwin

Print

Sign

Date 6/12/90Driller CRAIG WAMELEYLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method RECOL/CABLE TOOL H22-14100Measuring Equipment H1300-19, H12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
141'								0700			GEOLOGIST AND DRILLER ON SITE
											ATTENDED TAILGATE MEETING BE-
											TWEEN GEOLOGIST, DRILLER,
											AND GEO.
							D.B. = 171.9' + 2.5' - 3.1' = 170.8' TAPR H1300-19	0720			DEPTH TO BOTTOM = 170.8'
											DRILLER PERFORMING RIG MAINTENANCE
								0735			PREPARING TO ADD 8" C.B. CASING
								0745		9.77'	8" C.B. CASING ADDED
										101 = 185.25'	
								0805			DRILLING WITH H.T. BEGINS
175'	LITH	2			N/A		MUDDY SANDY GRAVEL (40% GRAVEL, 50% SAND, 10% MUD)	0925			SAMPLE - H.T. AND F. BAILEY
	CHEM	2					15% CL, 10% MP, 10% FP, 15% VFP, 15% VS, 10% MUD	0930	15		DRILLING RESUMES
	NOA	2					GRAVEL: 50% DARK / MAFIC, 10% OLIVINE, 10% FELIC, SP-R, SAND; 40% GRANITE / MAFIC, 40% QUARTZ, 20% FELIC, SP-R, COLOR: 5Y 3/2 - DARK	1000	15		H <sub>2</sub> O ADDED TO BOREHOLE
			SIP1000 PID	DET			DRILLING WITH H.T. BEGINS	1020	10		H <sub>2</sub> O ADDED TO BOREHOLE
179.5'							DRILLING WITH H.T. BEGINS	1025			RPT ON SITE TO CHECK SAMPLES
							DRILLING WITH H.T. BEGINS	1045			END MON. BOREHOLE
							FINISH OF CASING #1032840-W26-8				
180'	LITH	2			N/A		MUDDY SANDY GRAVEL (40% GRAVEL, 50% SAND, 10% MUD)	1055			SAMPLE - H.T. AND F. BAILEY
							10% MUD) SAMPLE DESCRIPTION IS SIMILAR TO	1100			DRILLING RESUMES
							175 FT. SAMPLE.	1105	10		H <sub>2</sub> O ADDED TO BOREHOLE

WHC-MR-0206

W = wet, M = moist, D = dry

A 1000 002 101 001

4

<b>DAILY BOREHOLE LOG</b>		Boring or Well Number <u>299-W26-8</u>	Sheet <u>36</u> of <u>65</u>
Location <u>216-S-10</u>		Project <u>W017-S-10</u>	
Logged by <u>C.D. CONdit (GPE)</u> Print	<u>[Signature]</u> Sign	Date <u>3/28/90</u>	Drilling Contractor <u>KEH</u>
Checked by <u>S. GOODWIN</u> Print	<u>[Signature]</u> Sign	Date <u>6/12/90</u>	Driller <u>CRAIG WAMBLEY</u>
Lithologic Classification Scheme <u>FOLK</u>	Procedure <u>DO-1</u>	Rev No. <u>(b)</u>	Rig/Method <u>BE GUL/CABLE TOOL #22-14100</u>
Measuring Equipment <u>#1300-19, #12576</u>			

**WHC-MR-0206**

**A-1544-003 (01/90)**



9413223.0946

## DAILY BOREHOLE LOG

Boring or Well Number 299-426-8

Sheet 37 of 65

Location 216-S-10

Project W017-S-10

Logged by C.D. CONERT (GAE)

Print

Date 3/29/90

Drilling Contractor KEH

Checked by S. GOODWIN

Print

Sign

Date 6/12/90

Driller CRAIG WAMOLEY

Lithologic Classification Scheme FOLK

Procedure CO-1

Rev No. 4

Rig/Method BEGOL/CABLE TOOL #22-14100

Measuring Equipment #L300-19, #12176

DEPTH	SAMPLES		CONTAMINATION		MOH. TUBS	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			GEOLOGIST AND DRILLED ON SITE.
								0720	10		RIG IS WARMING UP.
								0725			H <sub>2</sub> O ADDED TO POTENTIAL
								0730			DRILLING WITH H.T. BEAMS.
186'			SIP 1000 PID	8.8PPM				0740			SSO MON. DRILL SITE AND CEMENT
											DUE TO DETECTION, BEGINNING TO
151'											BARREL MATERIAL TAKEN FROM HOLE
								0745	15		H <sub>2</sub> O ADDED TO POTENTIAL
								0730	5		H <sub>2</sub> O ADDED TO POTENTIAL
187'			SIP 1000 PID	51.5PPM				0735			SSO MON. BOREHOLE
190'	LITH	2	SIP 1000 PID	2.0PPM	N/A		MURRY SANDY GRAVEL (60% GRAVEL, 40% SAND 10% MUD) 10% SP, 10% MP, 15% FP, 15% VFP,	0910			SAMPLE - H.T. AND F. BAILER
	CHEM	2					10% XS, 20% PC, 5% MC, 5% FE, 10% MUF,	0925	10		H <sub>2</sub> O ADDED TO BOREHOLE
	NON	2					PERLY SORTED, GRAVEL: 70% BASALTIC/MOF,	0930			SSO MON. BOREHOLE
190'			SIP 1000 PID	1.5PPM			20% QUARTZITE, 10% FESE, SA-SR, SAND: 40%	0935			DRILLING RESUMES
							POSSIBLY IMPURE, 10% QUARTZ, 20% FESE, SA-SR	0955			DRILLING STOPS. PREPARING TO
							COLOR: 5Y4/3 OLIVE, NO RAIN TO 14% HCL VITROL				ADD 8" C.S. CASING
							COLLIDATED, C. U.F.C. #G22990-W26-8	1000			RPT ON SITE TO CHECK SAMPLES
191'			SIP 1000 PID	1.0PPM				1025			SSO MON. DRILL SITE
								1125			9.40' 8" C.S. CASING ADDED
										10 = 204.39	
								1130			DRILLING RESUMES

WHC-MR-0206

W = wet, M = moist, D = dry

## DAILY BOREHOLE LOG

Boring or Well Number 299-4126-96

Sheet 38 of 65

Location A. 216-5-10

Project W017-S-10

Logged by C.D. CONDIT (GNI)

**Print**

Date 3/29/90

## Sign

Checked by S. Goepwind

Print

Date 6/12/90

## Sign

Lithologic Classification Scheme Folk

Procedure DD-1

Rev No. 0

Drilling Contractor KEH

Driller CRAIG WAMSLEY

Rig/Method BE 60 L CABLE TOOL #22-14100

**Measuring Equipment** #1300-19, #12176

[illegible]

W = wet, M = moist, D = dry

**.003 (01/90)**

9413223.0948

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 34 of 65Location 216-E-1DProject W017-S-1DLogged by C.D. CONDT (GAS.)

Print

Date 3/30/90Drilling Contractor KEHChecked by S. GOODWIN

Print

Sign

Date 6/12/90Driller CRAIG WANDLEYLithologic Classification Scheme FOLISProcedure DO-1Rev No. (1)Rig/Method BELOW CABLE TOOL H 22-14100Measuring Equipment HL300-19 #12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
153							D.B. = 200.8' - 2.5' - 6.8' = 197.5 TAPE HL300-19	0700			GEOPHYSICIST AND DRILLED ON SITE
							D.W. = 200.9' - 5.8' = 195.1 TAPE #12176	0715			RIG IS WARMING UP.
							MATERIAL AT BOTTOM OF HOLE (SAND & SILT)	0725			DEPTH TO BOTTOM = 197.5
							IS BACKING PASSAGE OF WATER INTO BOREHOLE	0740			DEPTH TO WATER = 195.1
								0750	5		DRILLING WITH H.T. BEGINS
								0830	5		DRILLING STOPS. WELDING ON
								0845			H.T. TO BUILD PIT UP.
								0910			DRILLING RESUMES
200'	LITH	2			N/A		MUDDY SANDY GRAVEL (60% GRAVEL, 35% SAND, 5% MUD)	0945			H2O ADDED TO BOREHOLE
	CLIM	2					10% SP, 15% MP, 20% FP, 15% VFP, 5% VS.	0910			SAMPLE - H.T. AND SAND PUMP
200'	NOR	2	SIP1000 PID	DET			5% SS, 15% MG, 10% FE, 5% MUD. PROBABLY SORTED.	0955			PREPARING TO ADD 8" C.O. CASING
							(GRAVEL: 50% BASALTIC/MAFIC, 25% QUARTZITE, 25% FELSY, SR-WR. SAND, 35% BASALTIC/MAFIC, 45% QUARTZ, 80% FINE, SA-SR, COLOR: 5Y4/3 OLIVE	1025		9.64'	8" C.O. CASING ADDED
							NO PIN TO 10% ILL. UNCONSOLIDATED, CHAIN OF	1030		101=214.03	
204'			SIP1000 PID	DET			CUSTOMER # 033090-W26-9.	1050	20		DRILLING RESUMES
								1055			H2O ADDED TO BOREHOLE
								1115			SSO MON. DRILL SITE
											RPT ON SITE TO CHECK SAMPLES
											WHE ON SITE TO REVIEW OPS
											AND WELL INSPECTION REPORT.
											SWANSON, THURKADEN, AND
											GILKESON.

WHC-MR-0206

A. -003 (01/90)

WHC-MR-0206

9413223.0950

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 41 of 65Location 216-S-10Project W-017-SWLogged by AW PearsonAlan PearsonDate 4/2/90Drilling Contractor KEHChecked by S. GoodwinS. PhilDate 6/12/90Driller Craig WamsleyLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method BE60L / Cable ToolMeasuring Equipment L300-19

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0805			Geologist on site
							Bailed ~ 30 gal. Hole recharged to Static in ~ 1 hr.				Driller took D <sub>W</sub> before bailing hole this AM = 200.3'
							Driller also took 210' sample				Then bailed with dart bailer to clean out hole
							211.2' - 4.0' su. + 2.5' = 209.7'	0815			Take D <sub>W</sub> = 209.7'
							204.3' - 4.0' su. = 200.3'	0820			Take D <sub>W</sub> = 200.3'
210'	Lith	Z	PID	<Det.	N/A	210'	Muddy sandy GRAVEL: 10% Gravel, 35% Sand, 5% Mud	0830			Describe 210' Sample.
156'			GM	<Det.			tr. 1Kp, 10% CP, 15% HA, 20% VFA, 5% VFS, 5% FS, 10% MS				
							10% FS, 5% VFS, 5% Mud: Poorly Sorted				
							Gravel: 40% Basaltic, 10% Qtz, 50% Granitic: SR.				
							Sand: 30% Mafic, 20% Qtz, 50% Felsic: SA:				
							Wet Color olive 5Y4/3: Unconsolidated:				
							No reaction w/ 10% HCL: Similar to 205' sample				
							214.03' + 8.56' = 222.59' Total 8" C.S. Casing	0840		222.59'	Add 8.56' of 8" C.S. Casing
								0845			Welding 8" Casing
								0935			Resume drilling w/H
								1200			Break for lunch
							SSO monitors site	1230			Resume drilling
			PID	<Det							

WHC-MR-0206

9443223.0951

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8Sheet 42 of 65Location 216-S-10Project W-017-S10Logged by AW Pearson Alan Pearson Date 4/2/90Checked by S. Goodwin A. Maw Date 6/12/90Lithologic Classification Scheme Folk Procedure DO-1 Rev No. 0Measuring Equipment L300-19Drilling Contractor KEHDriller Craig WamsleyRig/Method BE60L/Cable Tool

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
215'	Lith	2	PID	<Det	N/A	0.0.0.	MUDDY SANDY GRAVEL: 65% Gravel, 30% Sand, 5% Mud	1345			Take Special Sample w/ Sand Pump
	Chem	2	GM	<Det		0.0.10	10% VCP, 15% CP, 15% MP, 15% FP, 10% VFP, 10% VS, 5% LS, 5% MS, 5% FS, 5% VFS, 5% Mud; Poorly Sorted:				COC# 040290 S10 W26-8
	VDA	2				0.0.0.	Gravel 30% Basaltic, 20% Qtz, 50% Granitic SR				
							Sand 30% Mafic, 25% Qtz, 45% Felsic; SA:				
							Wet Color olive 5Y4/3: No reaction				
							w/10% HCL: Unconsolidated: Very Similar to 210' Sample				
								1355			Resume Drilling w/ HT
								1415			Bailing Well to clean out to depth
154'							207.1' - 6.3' s.u. = 200.8' ∴ has not yet recharge to static after bailing	1430			Take D/w
							219.6' - 6.3' + 2.5' = 215.8' Material has seemed to stop heaving after bailing of hole. Will have to check tomorrow AM.	1440			Take D/B
								1530			Quit for Day
							Footage = 210' - 216.29' = 6.29'				
							8.56' of 8" C.S. Casing added today				
							222.59 = Total 8" C.S. Casing				
							No H <sub>2</sub> O added to borehole today				

W = wet, M = mol. = dry

A-1000-003 (01/90)

WHC-MR-0206

9413223.0952

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-8  
Location 216-S-10Sheet 43 of 65Project W-017-S10

Logged by AW Pearson Alan Pearson Date 4/13/90  
 Checked by S. Goodwin S. M. L. Date 6/12/90  
 Lithologic Classification Scheme Folk Procedure DO-1 Rev No. 0  
 Measuring Equipment L300-11

Drilling Contractor KEH  
 Driller Craig Wamsley  
 Rig/Method BE60L / Cable Tool

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
8.5'								0700			Geologist & Driller on site
								0705			SSO monitors site
			PID	<Det			219.3' - 6.3' su + 2.5' add on = 215.5'	0710			Take $\Delta B = 215.5'$
							206.7' - 6.3' su. = 200.4'	0715			Take $\Delta w = 200.4'$
							222.59' - 3.59' = 219.00' Total C.S. Casing	0730		219.00'	Cut 3.59' of 8" C.S. Casing
							Run 21' long, 0.55" O.D. stringer	0745			Witness Stringer Test
							test down hole. Run to bottom of hole. freely (no hang-ups).				Ref. WMC-S-01: h. 11
											Section 8.2
								0800			Begin breaking down rig
							Bottom of 8" casing @ 219.00' - 2.71' su. = 216.29' = Final Drilled Depth.				
								1230			Clean Litter from site
								1300			Driller works on temporary cap to prevent tampering of borehole
								1310			Driller Departs Site w/ Rig
								1320			Geologist Departs Site

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WMC-MR-0206

9413223.0953

DAILY BOREHOLE / WELL COMPLETION LOG						Boring or Well Number <u>299-W26-8</u>			Sheet <u>44</u> of <u>65</u>	
Location <u>216-S-10</u>						Project <u>W-017-S10</u>				
Logged by <u>A.W. Pearson</u> <span style="float: right;">Date <u>5/7/90</u></span>						Drilling Contractor <u>KEH</u> Driller <u>Gene Thomas, Cole Bettendorf</u> Rig/Equipment <u>Pettibone Crane / Hydraulic Jacks</u>				
Reviewed by <u>S. Goodman</u> <span style="float: right;">Date <u>6/12/90</u></span>										
Lithograph Classification Scheme <u>N/A</u> Procedure <u>DO-1</u> Rev No. <u>0</u>										
Measuring Equipment <u>L300-17</u>										
Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0945										Geologist arrives at site - Driller & Operator unloading materials
0950				2.7'				215.4		Take D/B = 215.6 - 2.7 su. + 2.5 add on
1000										Take D/W = 202.2' - 2.7' = 199.5'
1100	Carbon Steel	8"	222.3'	6.0'	216.3'					Weld on 8" Carbon Steel Casing S.W.
1230										Break for lunch
1300										Setting up Jacks
1310	(2) 10 slot Johnson Division Stainless Steel Channel Pack									Check green tags & seals of all
	(5) 20' long Johnson Division 4" Dia. Stainless Steel Casing w/ Centralizers Type 304 SCH 5 ASME-SA-312 ASTM A-312 929458									Stainless materials.
	Green Tag Info: PCP# CR 9112, WD# 200E, PO# 42493, Item #2									Ref. WHC-S-014 Rev. 4
8/1	(5) 20' long Johnson Division 4" Dia. Stainless Steel Casing w/o Centralizers Type 304 SCH 5 ASME-SA-312 ASTM A-312 929458									Sect. 4.2.2, 12.2.1
	Green Tag Info: PCP# CR 9112, WD# 200E, PO# 42493 Rel. 16 Item #1									4 ECN# 146189, 124427
	(1) Stainless Steel Johnson Division Type 304 Bottom Cap									
	Green Tag Info: Item #27									
1400										Begin setting Stainless Steel Casing
1415	Stainless Steel 10 slot Channel Pack w/ Bottom Cap	4"	10.33'							
1420	" w/o Bottom Cap	4"	10.02'							
	Cap									

WHC-MR-0206



A-1800-004 (10/R9)

9413223.0955

DAILY BOREHOLE / WELL COMPLETION LOG						Boring or Well Number <u>299-W26-8</u>			Sheet <u>46</u> of <u>65</u>			
Location <u>216-S-10</u>						Project <u>W-017-S10</u>						
Logged by <u>A.W. Pearson</u> <span style="float: right;"><u>Alan Pearson</u></span>						Date <u>5/18/90</u>			Drilling Contractor <u>KEH</u> Driller <u>Gene Thomas, Cole Pettendorf</u> Rig/Equipment <u>Pettibone Crane/Hydraulic Jacks</u>			
Reviewed by <u>S. Goodwin</u> <span style="float: right;"><u>S. Goodwin</u></span>						Date <u>6/12/90</u>						
Lithograph Classification Scheme <u>N/A</u>						Procedure <u>DO-1</u>						
Measuring Equipment <u>1300-17</u>						Rev No. <u>0</u>						
Time	Casing/Screen					Annular Fill			Over-lap	Comments		
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth				
0720										Geologist & Drillers on site		
										Begin setting remaining Stainless Steel Casing		
0730	Stainless Steel	4"	19.99'									
	Casing w/Central									All Stainless Steel Casing was sealed		
0740	" w/o Central	4"	20.01'							in 10 mil plastic & appeared clean.		
0755	" w/Central	4"	20.00'									
0805	" w/o Central	4"	19.99'									
						CSSE 20-40 mesh	(1/4) bag			Place sand below channel pack		
0820	Carbon Steel	8"	222.3'	6.0'	216.3'	Silica sand		213.1'		216.6' - 6.0' + 2.5'		
0830	Carbon Steel	8"	222.3'	6.6'	215.7'	"	(1/4) bag	213.3'	2.4'	217.4' - 6.6' + 2.5'		
0900	Stainless Steel	4"	220.37'	5.6'	214.77'					Jacks were sinking => Had to fill ground surface.		
0950										Pipe is extremely tight		
0955										Slip broke		
1030						Suggested to Olin Amos (KEH) that we pull the Stainless Steel Casing & Screen before moving drill rig over. He decided not to, thinking casing should be free in the next couple of feet.				Leave site => to slab yard to watch steam cleaning of rig to be used to free casing		
1400												Begin Steam Cleaning Drill Rig
												Temp. = 180°F
										Press. = 1600 PSI		
1520	Leave	Slab Yard								Ref. WHC-S-014 Rev 4 Ser' 76		

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9443223.0956

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-8Sheet 47 of 65Location 216-S-10Project W-017-S10Logged by A.W. PearsonAlan PearsonDate 5/9/90Drilling Contractor KEHReviewed by S. GoodwinS. GoodwinDate 6/12/90Driller Gene Thomas, Cole BetterdorfLithograph Classification Scheme N/AProcedure DO-1Rev No. 0Rig/Equipment Bettibone Crane / Hydraulic JacksMeasuring Equipment L300-17BE 22W / Cable Tool

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0700										Geologist & Drillers on site
0710										Drillers begin setting up drill rig
0800	Carbon Steel	8"	225.3'							Add 3.05' of 8" C.S. Casing
0820										SSO monitors site PRO = Det.
0830	"	8"	225.3'	10.0'	215.3'			213.8'	2.0'	Drive casing down ~0.5'
0840	"	8"	225.3'	10.4'	214.9'			213.3'	1.6'	Try back pulling with rig
										Gain $\Rightarrow$ Stretch
0900	"	8"	225.3'	9.9'	215.4'			213.3'	2.1'	Drive casing down
0915	"	8"	222.3'	6.9'	215.4'			213.3'	2.1'	Cut 3.0' 8" Casing - Used Slag Catcher
0925	"	8"	219.8'	4.4'	215.4'			213.3'	2.1'	Cut 2.5' 8" Casing
0950	"	8"	222.7'	7.9'	214.8'			213.3'	1.5'	Add 2.9' of 8" Casing
1020	"	8"	222.7'	8.4'	214.3'			213.3'	1.0'	Pull Casing
1025	"	8"	222.7'	7.9'	214.8'			213.3'	1.5'	Drive Casing
1030	"	8"	222.7'	8.5'	214.2'			213.3'	0.9'	Pull Casing
1035	"	8"	222.7'	8.1'	214.6'			213.3'	1.3'	Drive Casing
1037	"	8"	222.7'	8.7'	214.0'			213.3'	0.7'	Pull Casing
1040	"	8"	222.7'	8.3'	214.4'			213.3'	1.1'	Drive Casing
1045	"	8"	222.7'	8.8'	213.9'			214.9'	1.0'	Pull Casing / Tag Bottom = 1.0' Open Hole
1055	"	8"	222.7'	8.8'	213.9'	CSSE 20-40 mesh	(1/2) bag	210.7'	3.2'	217.0' - 8.8' + 2.5'
						Silica Sand				
1110	"	8"	222.7'	8.4'	214.3'			210.7'	3.6'	Drive Casing
1115	"	8"	222.7'	9.0'	213.7'			210.7'	3.0'	Pull Casing

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9413223-0957

DAILY BOREHOLE /WELL  
COMPLETION LOGBoring or Well Number 299-W26-8Sheet 48 of 65Location 216-S-10Project W-017-510Logged by A.W. PearsonAlan PearsonDate 5/9/90Drilling Contractor KEHReviewed by S. GoodwinA. PearsonDate 6/12/90Driller Gene Thomas, Cole BettendorfLithograph Classification Scheme N/AProcedure DO-1Rev No. 0Rig/Equipment Pettibone Crane/Hydraulic JacksMeasuring Equipment L300-17BE22W/Cable Tool

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
1120	Carbon Steel	8"	222.7'	8.6'	214.1'			210.7'	3.4'	Drive Casing
1125	"	8"	222.7'	9.4'	213.3'			210.7'	2.6'	Pull Casing
1127	"	8"	222.7'	8.8'	213.9'			210.7'	3.2'	Drive Casing
1130	"	8"	222.7'	9.6'	213.1'			210.7'	2.4'	Pull Casing
1150	"	8"	218.3'	5.2'	213.1'			210.7'	2.4'	Cut 4.4' 8" Casing
1200										Break for Lunch
1235	"	8"	218.3'	5.2'	213.1'			211.8'	1.3'	214.5' - 5.2' + 2.5'
1300	"	8"	218.3'	5.2'	213.1'	CSSE 20-40 mesh (12 bag)		209.4'	3.7'	212.1' - 5.2' + 2.5'
						Silica Sand				
1320										SSO monitors site PLO < Pet.
1400	"	8"	221.8'	8.7'	213.1'			209.4'	3.7'	Add 3.5' of 8" Casing
1440	"	8"	221.8'	8.5'	213.3'			209.4'	3.9'	Drive Casing
1445	"	8"	221.8'	8.8'	213.0'			209.4'	3.6'	Pull Casing
1450	"	8"	221.8'	8.5'	213.3'			209.4'	3.9'	Drive Casing
1455	"	8"	221.8'	8.8'	213.0'			209.4'	3.6'	Pull Casing
1500										Decide to Pull Stainless Steel
										Casing & Screen & Redrill to original
										Depth. → 0lin Amos
1520										Leave site

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DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 29A-W26-8Sheet 49 of 65Location 216-S-10Project W-017-S10Logged by A.W. PearsonAlan PearsonDate 5/10/90Reviewed by S. GoodwinS. MoulDate 6/12/90Lithograph Classification Scheme N/AProcedure DO-1Rev No. 0Measuring Equipment L300-17Drilling Contractor KEHDriller Gene Thomas, Mel ThorensonRig/Equipment Pittman Crane / Hydraulic JacksBEZZW / Cable Tool

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0240										Geologist at KEH Decon Pad to witness steam cleaning of drill tools
										Driller at well site preparing to pull Stainless Steel Casing & Screen.
0500										Begin steam cleaning drill stem & Hard tool bit.
0640										Steam Cleaning Info:
0643										Temp = 180°F
										Pressure = 1200 PSI
										Steam & bit appear visually clear & were wrapped in plastic prior to being transported to site
										Ref. WMC-5-OH Rev. 4
										Sect. 7.6 & ECN# 124427
1000										Geologist on site - all stainless steel has been removed from borehole & wrapped in plastic.
1010	Carbon Steel	8"	216.4'	3.4'	213.0'					Driller cut off 5.4' of 8" C.S. Casing
1015										Welding ears on C.S. Casing
1110	"	8"	216.4'	3.4'	213.0'			213.1' 10.9'		213.0' - 3.4' + 2.5'

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A-186, 10/89)

9443223-0960

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 294-1128-6Sheet 51 of 65Location S-10 PatchProject 0217-310Logged by Llyn Dorellis  
PrintDate 5-11-90Reviewed by S. G. Dorellis  
Print

Sign

Sign

Date 6/12/90Lithograph Classification Scheme N/AProcedure DOTRev No. 0Measuring Equipment Steel Tape # L500-03Drilling Contractor KEHDriller C. Hensley, G. Thomas, C. Bestford & F.Rig/Equipment Averyus Erie HD-22-5212

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
7:30										Geologist & KEH personnel on site. Drillers prepare to drill cut casing @ 20'-4" weld
7:50	Carbon Steel	8"	204.3							
8:20										Site safety officer monitors fire PID & detectable, no CCl <sub>4</sub> Attach underreamer to drill drilling.
8:55										
9:15										Pipe hanging around, weld cut onto side & drill
9:40										
10:20										making little progress, cannot pull hole w/out adding water waiting for water service on site Add 10 gallons drinking water (from Teamsters)
11:00										pull into barrel numbered # U-2510-90-000 prepare to weld on 8" casing Casing to be used is from previously cut casing, wrapped in plastic and returned on site (5.9')
11:10										
										Water Truck on Site

WHC-MR-0206

**Q-227.096**

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WHC-MR-0206



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DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-1126-BSheet 53 of 65Location S-10 DitchProject W2017-510Logged by Lynn Dorenius

Print

Date 5-14-90Drilling Contractor KEHReviewed by S. Goodwin

Print

Date 6/12/90Driller G. THOMAS, M. ThoresenLithograph Classification Scheme NAProcedure DO 1Rev No. 0Rig/Equipment Bucyrus Erie H022-5212Measuring Equipment Steel Tape #2300-17

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
7:20	Carbon Steel	8"	210.2	2.7	207.5			204.6		Geological & Driller on site
										D/B 204.8 - 2.7 + 2.5
7:40										Drilling
7:50										Bit cutting into barrel number
										V-2510-90-008
7:55										Add 10 gallons H <sub>2</sub> O, Drill
9:00										Prepare to weld on casing (10.7)
9:15	"	8"	220.9	13.4	207.5					Welding
9:35										Drive casing
10:00										Continue Drilling
11:00										Site Safety Officer monitors hole
										finds FIDC det
								208.8		D/B 211.5 - 5.2 + 2.5
12:00										Lunch break
12:35										Resume work, drill into
										Barrel # V-2510-90-009
13:15										Add 20 gallons H <sub>2</sub> O
										Drill
										Drill into Barrel V-2510-90-010
13:45	"	8"	220.9	4.8	214.1			213.5		D/B 217.8 - 4.8 + 2.5
										Add 25 gallons H <sub>2</sub> O
										Drill into same barrel

MHC-MR-0206

# DAILY BOREHOLE /WELL COMPLETION LOG

Sheet 54 of 65

Project 12017-310

Date 5-14-90

Drilling Contractor KEIT

Date 6/12/90

Driller G. Thomas, C. Betendorf

Procedure DO 1

Rev No. 0

Rig/Equipment Bucyrus Erie MO 22-5212

Measuring Equipment Excel Type # L500-03

[illegible]

A-186, . . . (10/89)

WHC-MR-0206

9443223.0964

DAILY BOREHOLE /WELL  
COMPLETION LOGBoring or Well Number 219-1326-BSheet 55 of 65Location 5-10 ditchProject 1017-510Logged by L. Lynn Dorellus  
PrintDate 5-15-90Drilling Contractor KEHReviewed by G. Goodwin  
Print

Sign

Date 6/12/90Driller G. Thomas, E. BerrinLithograph Classification Scheme NAProcedure DOIRev No. 0Rig/Equipment BEYERLE H22 5212Measuring Equipment Steel Tape #LSDD-03

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
7:20		8"	220.9	4.8	216.1					Geologist on site
								214.8	1.3'	D/B 217.4 - 4.8 + 2.2
7:40										change tools on drill rig to
										install stainless steel casing
8:50										Prepare to install stainless that
										was previously inspected and
										installed. Casing was stored
										on site wrapped in plastic, off
										the ground. Inspected for
										cleanliness as installed.
	stainless steel	4"								
	10 slot channel pack									
	screen		20.35'							
	stainless steel									
	w/ screen liner	4"	20.50'							
	stainless steel w/o	4"	19.99'							
9:15	5 steel w/cent.	5"	20.00'							
	stainless steel w/o	4"	20.50'							
9:30	5 steel w/cent.	4"	20.00'							Site safety officers monitor hole
	stainless steel w/o	4"	20.01'							finds PID = 2 ppm in stainless
	5 steel w/cent.	4"	20.00'							pipe, not in breathing zone
10:00	stainless steel w/o	"	20.01'							Tested for CO <sub>2</sub> and Toluene w/ Drueger
	5 steel w/cent.	"	20.01'							tubes, none present. Read PID = 0.5
10:25	stainless steel w/o	"	19.99'							ppm 1/2 hour later.
										Inspected by R. Stevens 3:29:00
	TOTAL		220.36'	Stainless Steel	Schedule 5 Type 304			214.6		Item # 1

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9413223.0965

DAILY BOREHOLE / WELL COMPLETION LOG						Boring or Well Number <u>297-026-8</u>			Sheet <u>56</u> of <u>65</u>	
						Location <u>5-10 N111E</u>			Project <u>W017-310</u>	
Logged by <u>Lynn Downings</u> Print _____ Sign _____						Date <u>5-15-90</u>			Drilling Contractor <u>KEH</u>	
Reviewed by <u>S. Goodwin</u> Print _____ Sign _____						Date <u>6/12/90</u>			Driller <u>L. Timmons, C. Bertram, J. I.</u>	
Lithograph Classification Scheme <u>NA</u>						Procedure <u>Do-1</u>			Rev No. <u>0</u>	
Measuring Equipment <u>Steel Tape &amp; L500-03</u>									Rig/Equipment <u>Bucyrus Erie H022-5212</u>	

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
10:40	Carbon Steel	8"	220.9	4.8	216.1					Pipe to weld on "ears" for pulling pipe w/ drill
	"	"	223.5	7.4	216.1					Welding add 2.6'
	"	"	223.5	8.7	214.8					Pull ~ 1.5'
	"	"	223.5	9.2	214.3			213.8	0.5	D/B 220.3 - 8.7 + 2.2
								214.9	0.6	Pull
						20-40 mesh silica sand	(1/2) 94 lb bag	213.1	1.2	D/B 220.1 - 9.2 + 2.2
						"	(1/2) 94 lb bag	208.9	5.4	D/B 215.9 - 9.2 + 2.2
										Pull
	"	8"	223.5	10.8	212.7			209.4	3.3	D/B 218.0 - 10.8 + 2.2
						"	(1/2) 94 lb bag	199.7	13	D/B 208.3 - 10.8 + 2.2
11:55										Pull, crane won't pull casing
12:35										Lunch break
								207.5	5.2	D/B 216.1 - 10.8 + 2.2
										Pull w/ drill - alternate tapping and pulling
13:20		8"	217.1	6.3	210.8					Cut casing (6.4') shiny exterior used
13:30										Break down drilling rig
										move jacks over hole
								209.7	1.1	D/B 213.8 - 6.3 + 2.2
13:50						"	(1/2) 94 lb bag	207.0	3.8	D/B 211.1 - 6.3 + 2.2

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9443223.0966

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-1026-BSheet 57 of 65Location S-10 DitchProject W017-S10Logged by Llyn Doremus

Print

Date 5-15-90Drilling Contractor KEHReviewed by S. Goodwin

Print

Date 6/12/90Driller G. Thomas, C. BettendorfLithograph Classification Scheme NAProcedure DOTRev No. 0Rig/Equipment Cummins and casing JacksMeasuring Equipment Steel Tape # 6500-03

Time	Casing/Screen				Annular Fill			Over- lap	Comments	
	Type	Diameter	Length	Stickup	Depth	Type	Quantity			Depth
	Carbon Steel	8"	217.1	6.3	210.8	20-40 mesh silica sand	(18) 94 lb bag	204.6	6.2	D/B 208.7 - 6.3 + 2.2
			217.1	7.4	209.7					Pull
								205.8	3.9	D/B 211.0 - 7.4 + 2.2
							(18) 94 lb bag	202.9	6.8	D/B 208.1 - 7.4 + 2.2
			217.1	8.5	208.6					Pull
								204.3	4.3	D/B 210.6 - 8.5 + 2.2
						"	(18) 94 lb bag	201.7	6.9	D/B 208.0 - 8.5 + 2.2
			213.0							Pull, cut 4.1', slug catcher used
			213.0	6.8	206.2			203.4	2.8	D/B 208.0 - 6.8 + 2.2
						"	(18) 94 lb bag	200.5	5.7	D/B 205.1 - 6.8 + 2.2
			213.0	8.0	205.0					Pull
								201.6	3.4	D/B 207.4 - 8.0 + 2.2
						"	(11) 94 lb bag	196.5	8.5	D/B 202.1 - 8.0 + 2.2
										Pull, slug catcher in
										Cut first thing tomorrow
										and measure D/B
1510										Geologist at site
						"	5 bags			Total

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9443223.0967

DAILY BOREHOLE / WELL COMPLETION LOG				Boring or Well Number <u>399-0226-B</u>		Sheet <u>58</u> of <u>65</u>	
				Location <u>S-10 Ditch</u>		Project <u>W017-S10</u>	
Logged by <u>Karen R.O. Barton</u>		<u>Karen R.O. Barton</u>		Date <u>5/16/90</u>		Drilling Contractor <u>K&amp;H</u>	
Reviewed by <u>S. Goodwin</u>		<u>S. Goodwin</u>		Date <u>6/12/90</u>		Driller <u>G. Thomas, C. BeHendorf</u>	
Lithograph Classification Scheme <u>N/A</u>		Procedure <u>DO-1</u>		Rev No. <u>0</u>		Rig/Equipment <u>crane and casing jacks</u>	
Measuring Equipment <u>STEEL TAPE # C500-03</u>							

Time	Casing/Screen				Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity		
0715	Carbon Steel	8"	207.3'	6.75'	202.55'				Cutoff 3.7' slag catcher used
								199.33'	$D/B = 203.82' - 6.75' + 2.26' = 199.33'$
					20-40 mesh silica sand	(1) 94 lb bag	194.76'	7.79'	$D/B = 199.25' - 6.75' + 2.26' = 194.76'$
						(2) 94 lb bag	192.61'	9.94'	$D/B = 197.1' - 6.75' + 2.26' = 192.61'$
			204.25'	6.45'	197.80'				Pull 8" casing slag catcher used
		4"			216.31'				Cut off 5.05' " " "
						(1) 94 lb bag	199.21'	7.41'	$D/B = 203.4' - 6.45' + 2.26' = 199.21'$
							198.81'	7.01'	$D/B = 203' - 6.45' + 2.26' = 198.81'$
						(3) 94 lb bag	197.11'	6.9'	$D/B = 201.3' - 6.45' + 2.26' = 197.11'$
						(1) 94 lb bag	192.76'	5.04'	$D/B = 197.0' - 6.45' + 2.26' = 192.76'$
						(1) 94 lb bag	188.21'	9.59'	$D/B = 192.4' - 6.45' + 2.26' = 188.21'$
				7.7'	196.55'				Pull 8" casing
							192.56'	3.99'	$D/B = 198' - 7.7' + 2.26' = 192.56'$
						(1) 94 lb bag	188.36'	8.19'	$D/B = 193.8' - 7.7' + 2.26' = 188.36'$
			201.45'	6.2'	195.25'				Pull 8" casing cut off 2.8' (slag catcher used)
							195.86'	7.61'	$D/B = 199.8' - 6.2' + 2.26' = 195.86'$
0910									Site safety officers monitors hole
									PID = Oppin
0915									wait for more sand.
0945						(1 1/2) 94 lb bag	191.06'	4.19'	$D/B = 195.0' - 6.2' + 2.26' = 191.06'$
						(1 1/2) 94 lb bag	189.46'	5.79'	$D/B = 193.4' - 6.2' + 2.26' = 189.46'$

WHC-MR-0206

9443223.0968

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 244-W26-BSheet 59 of 65Location S-10 DitchProject W017-S10Logged by Karen R.D. BartonKaren R.D. BartonDate 5/16/90Reviewed by S. Goodwin

Print

Sign

Date 6/12/90Lithograph Classification Scheme N/AProcedure DO-1Rev No. 0Drilling Contractor KENDriller G. Thomas, C. BeHendorfRig/Equipment cane and casing jacksMeasuring Equipment STEEL TAPE #C500-03

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
				6.2'	195.25'					Pull Casing & set down w/same stick-up.
								195.26'	0.01'	D/B = 199.2' - 6.2' + 2.26' = 195.26'
							(2) 94# bags	186.26'	8.99'	D/B = 190.2' - 6.2' + 2.26' = 186.26'
								175.06'	0.19'	Pull Casing & set down w/same stick-up.
								175.06'	0.19'	D/B = 199.0' - 6.2' + 2.26' = 195.06'
							(2) 94# bags	186.16'	11.09'	D/B = 190.1' - 6.2' + 2.26' = 186.16'
										Pull Casing & set down w/same stick-up.
								194.46'	0.79'	D/B = 198.4' - 6.2' + 2.26' = 194.46'
							(2) 94# bags	186.06'	9.19'	D/B = 190.0' - 6.2' + 2.26' = 186.06'
				6.9'	194.55'					Pull Casing
								191.61'	2.94'	D/B = 196.25' - 6.9' + 2.26' = 191.61'
							(1) 94# bags	186.86'	7.69'	D/B = 191.5' - 6.9' + 2.26' = 186.86'
										Pull Casing & set down w/same stick-up.
								193.86'	0.69'	D/B = 198.5' - 6.9' + 2.26' = 193.86'
							(2) 94# bags	184.86'	10.39'	D/B = 189.5' - 6.9' + 2.26' = 184.86'
										Pull Casing
				7.83'	193.62'			188.43'	5.19'	D/B = 194.0' - 7.83' + 2.26' = 188.43'
										Pull Casing
				8.67'	192.78'			190.89'	1.89'	D/B = 197.3' - 8.67' + 2.26' = 190.89'
			190.85'	6.07'	192.78'					Cut off 2.6' of B" casing
1105										Prepare to bail well to settle sandpack
1120										Start bailing well.

WHC-MR-0206

9413223.0969

DAILY BOREHOLE / WELL COMPLETION LOG						Boring or Well Number <u>299-W26-B</u>			Sheet <u>60</u> of <u>65</u>	
						Location <u>S-10 Ditch</u>			Project <u>W017-S10</u>	
Logged by <u>Karen R. J. Barton</u>		<u>Karen R. J. Barton</u>		Date <u>5/16/90</u>		Drilling Contractor <u>KEH</u>				
Reviewed by <u>S. Goodwin</u>		<u>S. Goodwin</u>		Date <u>6/12/90</u>		Driller <u>G. Thomas, C. Behendorf</u>				
Lithograph Classification Scheme <u>N/A</u>		Procedure <u>DO-1</u>		Rev No. <u>0</u>		Rig/Equipment <u>crane &amp; casing jacks</u>				
Measuring Equipment <u>STEEL TAPE # L500-16</u>										

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
1200										Lunch (New Geologist L. Dornier)
1240										Resume Borehole, slow recovery
										Surge
1310										Recovery
1320										Recovery
										Surge
1340										Recovery
1345										Surge
1410			198.9	6.3	192.6			190.8	1.8	D/B 194.5 - 6.3 + 2.6
										Break down drill rig
										Pull
			198.9	6.4	192.5			191.5	1.0	D/B 195.3 - 6.4 + 2.6
										Pull
			198.9	6.8	192.1			192.0	0.1	D/B 196.2 - 6.8 + 2.6 (Top of Sand)
1440						3/8" Volclon 1.6 lbs	2.50	187.1	5.0	D/B 191.3 - 6.8 + 2.6
			198.9	7.9	191.0					Pull
								188.4	2.6	D/B 193.7 - 7.9 + 2.6
						"	1.5 gallon bucket	186.4	4.4	D/B 191.7 - 7.9 + 2.6
			198.9	9.2	189.5					Pull
								187.6	1.9	D/B 194.2 - 9.2 + 2.6
										Pull
			198.9	10.0	188.9			188.4	0.5	D/B 195.8 - 10.0 + 2.6

1515

Geologist off site

A-1800-004 (10/89)

WIC-MR-0206



9413223.0970

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-BSheet 61 of 65Location S-10 DitchProject W017-S10Logged by Karen R.D. BartonKaren R.D. BartonDate 5/17/90Drilling Contractor KEHReviewed by S. GoodwinS. GoodwinDate 6/12/90Driller G. Thomas, C. BettendorfLithograph Classification Scheme N/AProcedure DD-1Rev No. 0Rig/Equipment crazz and casing jacksMeasuring Equipment STEEL TAPE #LS00-03

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0710	Carbon Steel	8"	198.9'	10.15'	188.75'					Leaving Down rig / Cleaning up site
0800										Geologist on site
0845										Site Safety Monitors Hole PID=0 ppm
0850			194.85'	6.1'	188.75'					Cut off 8" Casing (4.05')
					Top of	3/8" Volclay Tablets	—	188.41'	.34'	D/B = 192.25' - 4.1' + 2.26' = 188.41'
						8-20 mesh Crumbles	(4) 50 lb bags	171.36'	17.39'	D/B = 175.2' - 6.1' + 2.26' = 171.36'
0910										Pull 8" Casing
				8.53'	186.32'			174.23'	12.09'	D/B = 180.5' - 8.53' + 2.26' = 174.23'
			192.55'	6.3'	186.25'					Cut off 8" Casing (2.23')
						"	(30) 50 lb bags	88.96'	97.29'	D/B = 93.0' - 6.3' + 2.26' = 88.96'
										Pull 8" Casing
			175.37'	6.45'	168.92'					Cut 17.18' off 8" Casing
								107.61'	61.31'	D/B = 111.8' - 6.45' + 2.26' = 107.61'
										Pull 8" Casing
			161.56'	6.6'	154.96'					Cut 13.81' off 8" Casing
								118.51'	36.45'	D/B = 122.85' - 6.6' + 2.26' = 118.51'
						"	(5) 50 lb bags	104.46'	50.5'	D/B = 108.8' - 6.6' + 2.26' = 104.46'
1100										Pull 8" Casing out of hole Site Safety monitors hole LEL=C, PID=≤0.1 ppm
1135	Carbon Steel	10"	137.98'	0.75'	137.23'			125.01'	12.22'	D/B = 123.5' - 0.75' + 2.26' = 125.01'
1145										Wait for 10" Casing to Add on to pull pipe.
1200										Lunch
1230										Return from Lunch / wait for 10" Casing

WHC-MR-0206

**A-1800-004 (10/89)**

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DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299 1026-9Sheet 63 of 65Location 5-10 TrenchProject W017-S10Logged by LA Dorenius

Print

Date 5-18-90Reviewed by S. Goodwin

Print

Sign

S. GoodwinDate 6/12/90

Sign

Lithograph Classification Scheme NAProcedure DOIRev No. 0Measuring Equipment Steel Tape # 6530-03Drilling Contractor K E HDriller G Thomas, C BollerhoffRig/Equipment Crane and Casing Jacks

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
7:30										Geologist on Site
	Carbon Steel	10"	125.9	6.6	119.3			106.6	12.7	D/B 111.0 - 6.6 + 2.2
						8-20 mesh bentonite (s) salt brine	57.4	61.9		D/B 61.8 - 6.6 + 2.2
	"	10"	108.3	6.9	101.4	crumbles				Pull to 108.3' weld, cut
								65.5	35.9	D/B 70.2 - 6.9 + 2.2
	"	10"	90.2	6.8	83.4					Pull to 90.2' weld, cut
								71.5	11.9	D/B 76.1 - 6.8 + 2.2
3:10						"	(18) salt brine	48.5	24.9	D/B
1:17	"	"	69.6	7.3	62.3					Pull to 69.6' weld, cut
								52.2	10.1	D/B 57.3 - 7.3 + 2.2
						"	(20) salt brine	21.7	41.6	D/B 25.8 - 7.3 + 2.2
	"	"	50.3	6.9	43.4					Pull to 50.3, cut
								28.5	14.9	D/B 33.2 - 6.9 + 2.2
						"	(10) salt brine	12.4	31.0	D/B 17.1 - 6.9 + 2.2
	"	"	29.8	6.7	23.1					Pull to 30.0' weld, cut
								20.7	2.4	D/B 25.2 - 6.7 + 2.2
						"	(1) salt brine	18.7	4.4	D/B 23.2 - 6.7 + 2.2
	"	"	29.8	8.1	21.7			19.5	2.2	D/B 25.4 - 8.1 + 2.2 (Pull)
	"	"	29.8	7.1	20.7			19.9	0.8	Pull D/B 26.8 - 9.1
10:40						Portland Type I-II cement	(1) salt brine			Prepare to mix grout, mix
11:10						cement				Pour Grout
						"	(1) salt brine			Mix Grout

WIC-MR-0206

9413223.0973

DAILY BOREHOLE / WELL COMPLETION LOG						Boring or Well Number <u>297-126-8</u>			Sheet <u>64</u> of <u>65</u>	
Location <u>S-10</u>						Project <u>W017-510</u>				
Logged by <u>LA DORRINS</u> Print						Date <u>5-18-90</u>			Drilling Contractor <u>KEH</u>	
Reviewed by <u>S. GOODWIN</u> Print						Date <u>6/12/90</u>			Driller <u>G. THOMAS, C. BETTERIDGE</u>	
Lithograph Classification Scheme <u>NA</u>						Procedure <u>D01</u>			Rev No. <u>0</u>	
Measuring Equipment <u>Steel Tape # L500-03</u>						Rig/Equipment <u>Coll. well casing, JACKS</u>				

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
11:25										Pump GROUT
11:30	Carbon Steel	10"	19.7	7.2	12.5					Pull to 19.7' weld, cut
								4.8	7.7	D/B 9.8-7.2+2.2
						Portland Type I-II	2) 94 lb bags			Mix GROUT
						Cement				Pour GROUT
11:50	"	10"	9.6							Pull to 9.6' weld, cut
										Pour GROUT
										Pull remaining pipe
								4.8		D/B
178						"	2) 94 lb bags			Mix GROUT
								3.8		Pour GROUT
						"	2) 94 lb bags			Mix GROUT
12:30								2.4		Pour GROUT
										Hook out GROUT Pump
13:00										Lunch break
13:30										Return to site
13:35								215.7		D/B 217.8-4.3+2.2
13:40										GROUT off site

WHC-MR-0206

**A-1800-004 (10/89)**



# CENTRAL PRE-MIX CONCRETE CO.

11919 HARRIS ROAD • PASCO, WA 99301

INSPECTORS COPY

WA REG #223 01-CE-NT-PP-MSTLJL

ID REG #5894-AAA-1-3-3

MT REG #3481A

## UNLOADING

unloading time 7 1/2 minutes per cubic yard  
concrete. Charge thereafter at posted truck  
rates. This concrete designed in accordance  
with specifications indicated below.  
make deliveries inside the curb line at cus-  
tomer's risk only and accept no responsibility  
thereafter for damages resulting from such  
deliveries.

CONCRETE

SAND &amp; GRAVEL

545-8405

CRUSHED ROCK

FILL

CAUTION: May cause eye or skin injury. Contains  
Portland cement. Freshly mixed cement, mortar,  
concrete, or grout may cause skin injury. Avoid con-  
tact with skin where possible, and wash exposed  
skin areas promptly with water. If any cement or  
concrete mixtures get into the eye, rinse immediately  
and repeatedly with water and get prompt medical  
attention. All claims for damages or shortages must  
be made within 24 hours of delivery.

LEAVE PLANT 11:31	ARRIVE JOB SITE 12:18	START DISCHARGE 13:00	FINISH DISCHARGE 14:00	ARRIVE PLANT :	<input type="checkbox"/> TEST CYLINDERS TAKEN ADDITIONAL WATER ADDED TO THIS CON- CRETE WILL REDUCE ITS STRENGTH.  ESTIMATED SLUMP AT UNLOADING <u>4</u> ADDED <u>2</u> GAL. WATER AT CUSTOMER REQUEST.
SIGNATURE <u>X. H. H. 10418-25-22-90</u>					
ORDER NO. 007084	CUSTOMER NO. 406010	CPM PROJECT NO. 601002	CUSTOMER PROJ. NO. B2012/REL#34	TICKET NO. 09757	DRIVER 00009108 MARK H. 1
CUSTOMER KAISER			DELIVERY ADDRESS 200 WEST GATE		DATE 22-May-90
DELIVERY INSTRUCTIONS HANFORD					MAP 12:00 00087
LOAD QTY. 4.00	DELIVERED QTY. 4.00	ORDER QTY. 4.00	PRODUCT CODE 0300H	PRODUCT DESCRIPTION 3000 SSK 3/4 5%	UNIT PRICE AMOUNT WC RATIO ALLOWED <u>1.52</u> TOTAL WATER ALLOWED <u>100.3</u> MOISTURE'S <u>3</u> 170 <u>7480</u> <u>7405</u> <u>75</u> SAND 370 <u>6040</u> <u>5864</u> <u>176</u> SUB TOTAL WATER BATCHED <u>665</u> TOTAL AVAILABLE <u>10 GAL.</u> <u>87</u>
LOAD SIZE 4.00	MIX NO. 0300H	MIX DESCRIPTION 3000 SSK 3/4 5%	SLUMP 4.00	AIR 100	CC 0.00
USE TRUCK	PLANT 1	SUBTOTAL 982	TOTAL DUE		

 Truck no.: 952  
 3000# 5.0SK. 3/4"

 Batch size: 4.00 Yds.  
 Time 11:21:35 AM

 Mix name: 0300H  
 Date 22 May, 1990

3/4 RND	1.0	7535	7480 Lbs C	LAF2-1-2	1880	1930 Lbs D
ASTM. SAN	3.0	13423	13520 Lbs C			
			Zero			Zero
			Zero			Zero
REAR-2	100	28	28 0: 0	WATER 1	674	663 Lbs C
PLAST-3	112	112	112 0: 0			
CALCIUM	0.00	0	0 0: 0			
			Zero			Zero

Water trim: -10.0 / Yd. Time 11:23:38 AM

A-1800-003 (01/90)

9413223.0977

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 2 of 44Location 216-S-10 TRENCHProject W-017Logged by P.S. INNIS (G.A.I.)

Print

Rachel S. Innis

Sign

Date 3/22/90Checked by S. Goodwin

Print

A. Goodwin

Sign

Date 6/10/90Lithologic Classification Scheme FOLKProcedure D.O.IRev No. 0Drilling Contractor KEHDriller LOUIS WATKINSRig/Method CABLE TOOL R.E. #22-14103Measuring Equipment STEEL TAPE 1300-016

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			ARRIVE AT 200 EAST SLAB
											YARD TO OBSERVE STEAM
											CLEANING OF DRILLING TOOLS
							WHC-S-014 REV 4 SECT 7-6	0730			STEAM CLEANING OF TOOLS
											BEING DONE BY MEL.
								0740			STOPPED TO GET CRANE TO MOVE
											TOOLS FOR STEAM CLEANING
								0820			UNLOADING TOOLS FOR CLEANING
							TEMP. 180°F HEAD PRESSURE 1900 <sup>+</sup> PSI	0900			STEAM CLEANING CONTINUED.
							OUTLET PRESSURE 1900 <sup>+</sup> PSI	1000			VISUAL INSPECTION OF TOOLS -
											ALL APPEARED CLEAN. KEH
											WRAPPING TOOLS IN PLASTIC FOR
											TRANSPORT TO WELL SITE
											WATER FROM STEAM CLEANING
											IN BARRELS U-DXW-90-43 TRAIL 47
								1130			ARRIVE AT WELL SITE
								1200 -			LUNCH
								1230			
								1235			DRILLER LEVELING RIG
								1300			DRILLER & GEOLOGIST REVIEWED
											HASP WITH S.S.O
								1315			KEH UNLOADING TOOLS NOTED
											ABOVE. TOOLS ARE - 'ING

W = wet, M = m D = dry

A

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WHC-MR-0206



7-223,0979

# DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9

Sheet 3 of 44

Location 216-S-10 TRENCH

Project W-017

Logged by P.S. INNIS

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**Print**

Pamela S. Jones  
Sign.

Date 3/22/90

Drilling Contractor KEH

Checked by S. GOODWIN

**Print**

Sign

Date 6/1-190

Driller LOUIS WATKINS

Lithologic Classification Scheme FOLK

Procedure D.O.1

Rev No. 0

Rig/Method CABLE TOOL BE #22-14103

### Measuring Equipment

[illegible]

W = wet, M = moist, D = dry

**A-1800-003 (01/90)**

WHC-MR-0206 ,

9443223.0979

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 4 of 44Location 216-S-10 TRENCHProject W-017Logged by P.S. INNIS (G.A.I.)

Print

Camelia S. Innis

Sign

Date 3/23/90Checked by S. Goodwin

Print

S. Goodwin

Sign

Date 6/1/90Lithologic Classification Scheme FOLKProcedure DO-1Rev No. 0Drilling Contractor KEHDriller LOUIS WATKINSRig/Method CABLE TOOL B.E #22-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
0								0700			ARRIVE AT WELL SITE
											DRILLER LEVELING RIG & TOOLING UP
							WHC-S-014 REV. 4 SECT. 7-2				USING FOOD GRADE OIL.
								0815			KEH SETTING UP EXCLUSION ZONE
								0840			DRILLING BEGAN
5	LITH	2	PID	<DET	D		SLIGHTLY MUDDY SAND 3% GRAVEL, 87% SAND,	0915			ROLLED CORE BARREL (C-B) SAMPLE
	MOIST	1	GM	<DET			10% Mud; Tr. MP, 1% FP, 2% VFP, 2% VCS,				
							5% CS, 15% MS, 35% FS, 30% VFS, 10% Mud,				
							WELL TO MOD SORTED; GRAVELS: 40% BASALTIC				
							(MAFIC), 20% QTZ, GRANITIC, 10% DIORITE				
							25% CALICHE, 5% OTHER SR; SAND:				
							60% BASALTIC, 30% QTZ FELSIC, 5% MICA,				
							5% OTHER SR-A; BROWN (10YR 5/3)				
							MOD RXN TO HCL, SLIGHTLY CONSOLIDATED				
								0955		8-67	DRILLER WELDING SHOE ON TO 10"
											CASING. SHOE DIMENSIONS:
											OD = 0.98' L = 0.83
								1115			RPT ON SITE FOR SURVEILLANCE
								1200-			LUNCH
								1230			DRILLER LOWERING CASING
								1232			OVER HOLE.
								1245		10-21	DRILLER WELDING

W = wet, M = r

dry

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WHC-MR-0206

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9443223.0980

## DAILY BOREHOLE LOG

Boring or Well Number 299-V12.16-9Sheet 5 of 44Location 2116-S-10 TRENCHProject W-017Logged by P.S. INNIS

Print

Pamela S. Innis

Sign

Date 3/23/90Checked by S. Goodwin

Print

S. Goodwin

Sign

Date 6/10/90Drilling Contractor KEHDriller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O. 1Rev No. 0Rig/Method CABLE TOOL B.E. #2-14103

Measuring Equipment \_\_\_\_\_

DEPTH	SAMPLES		CONTAMINATION		MOIS- TURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
											STEEL CASING TOTALING 18.92' (18'-10 1/2")
								14:15			DRILLING CONTINUED
10'	LITH	2	GM	LDPT	D		SAND 4% GRAVEL 87% SAND, 9% MUD; TR. MP, 2% FP, 2% VFP, 3% VCS, 39% CS, 20% MS, 15% FS, 10% VFS, 9% MUD; M.S.; GRAVELS: 40% BASALTIC, 20% QTZ, GRANITICS 10% DIORITE, 20% CALICHE (?), 10% OTHER	14:25			PULLED CB SAMPLE
	Moist	1					SR, SAND: 60% BASALTIC 35% QTZ, FELSIC, 5% OTHER SR-A; LT OLIVE BROWN 2.545/4 MOD RN TO HCL, SLIGHTLY CONSOLIDATED, NOTED THIN LAYERS OF FINE APPARENT MATERIAL.	14:50			KEH INSTALLING DEAD-MAN TO ASSIST IN KEEPING CASING IN TOOLING OFF GROUND
15'	LITH	2	GM	LDPT	M		SAND, 1% GRAVEL, 92% SAND, 7% MUD; TR. FP, 1% VFP, TR. VCS, 2% CS, 45% MS 35% FS, 10% VFS, 7% MUD; WELL SORTED; GRAVELS: 20% BASALTIC, 10% QTZ, FELSIC, 10% CALICHE SR; SAND: 30% BASALT, 10% QTZ 30% FELSIC, 25% MICA, 5% OTHER SR-A; LT OLIVE BROWN 2.545/4 SLIGHT RN TO HCL, UNCONSOLIDATED	14:55			PULLED CB SAMPLE RPT ON SITE
	Moist	1						15:30			OFF SITE
											TOTAL FOOTAGE 15' CASING AT 15'

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WMC-MR-0206

9443223.0981

DAILY BOREHOLE LOG						Boring or Well Number <u>299-W26-9</u>		Sheet <u>6</u> of <u>44</u>			
						Location <u>216-S-10 DITCH / POND</u>		Project <u>W-017</u>			
Logged by <u>P.S. INNIS (G.A.I)</u>			<u>Carmela A. Innis</u>			Date <u>3/26/90</u>		Drilling Contractor <u>KEH</u>			
Checked by <u>S. GROWING</u>			<u>A. Paul</u>			Date <u>6/10/90</u>		Driller <u>LOUIS WATKINS</u>			
Lithologic Classification Scheme <u>FOLK</u>			Procedure <u>D.O.I</u>			Rev No. <u>0</u>		Rig/Method <u>CABLE TOOL B.E. #22-14103</u>			
Measuring Equipment <u>STEEL TAPE 1300-06</u>											
DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			DRILLER & GEOLOGIST ON SITE
											DRILLER BACK PULLING CASING TO STRAIGHTEN
18.7							$21.5 + 0.5 - 5.1 = 16.7$	0730			TOOK DJB
								0750			DRILLING BEGAN
20.0	LITH	2	PID	<DET	D		SAND, TR. GRAVEL, 97% SAND 3% MUD	0815			TOOK CB SAMPLE
	MOIST	1	GM	<DET			TR. VEP, TR. VCS, 7% CS, 57% MS 25% FS				CHAIN OF CUSTODY #
	VDA	2					8% YES, 3% MUD; WELL SORTED;				032690S10W26-9
	CHEM	2					GRAVELS: 45% BASALTIC, 15% QZ, GRANITES,				
							35% CALCIC / CARBONATE LINT, 5% OTHER SR,	0840		10.23	DRILLER WELDING 10" CASING
							SAND: 30% BASALT, 40% QZ, 25% FSIS, 5% MICA				TOTALING 29.11' (29'-1 1/4")
							SR-A; PALE YELLOW (2.5Y7/4), NO RAY TO				
							10% HCL, UNCONSIDERABLE	10:25			DRILLER DRIVING CASING
								10:40			KEH UNLOADING 10' CASING
											STEAM CLEANING WITNESSED BY
											A. PEARSON. APPEARS CLEAN
								10:50			DRILLING BEGAN
25	LITH	2	PID	<DET	D		SAND, TR. GRAVEL, 97% SAND, 3% MUD	11:05			PULLED CB SAMPLE
	MOIST	1	GM	<DET			DESCRIPTION SIMILAR TO PREVIOUS SAMPLE	11:10			RPT ON SITE
30	LITH	2		<DET	D		SLIGHTLY MUDDY SAND, 38% SAND, 12% MUD	11:30			PULLED CB SAMPLE
	MOIST	1					TR MS, 33% FS, 55% VES 1/2 MUD; W.S				

W = wet, M = m

= dry

A-1000-003 (01/90)

MHC-MR-0206

9413223-0982

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 7 of 44Location 216-S-10 DITCH / PONDProject W-017Logged by P.S. INNIS

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Camela C. Innis

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Date 3/26/90Checked by S. Goodwin

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S. Goodwin

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Date 6/10/90Drilling Contractor K E HDriller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O.IRev No. 0Rig/Method CABLE TOOL RE #22-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION [PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.]	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS [DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.]	
	TYPE	NO.	INSTRUMENT	READING						CASING	
30'							(CONT) SAND: 15% BASALT, 20% QTZ, 55% FELSIC, 5% MICA, 5% OTILL, SR-A, LT OLIVE BROWN 2.545/4; STRONG RXN TO HCL; SLIGHTLY CONSOLIDATED, CHANGE AT APPROX 2.8'	11:45 1200- 1230 1235 12:25 13:40		9-92	DRILLER WELDING 10" C.S. CASING TOTALING 39.03' (39'-1/4")
35	LITH	2	GM	4DET	D		SLIGHTLY MUDDY GRAVELLY SAND, 20% GRAVEL, 71% SAND, 9% MUD; 3% CP, 7% MP, 5% FP, 5% VFP, 3% VCS, 5% CS, 12% MS, 21% FS, 20% VFS, 9% ILL.; PS. GRAVEL; 75% BASALT, 15% QTZ, GRANITIC, 5% QUARTZITE, 5% OTILL, R-SR; SAND: 20% BASALT, 55% QTZ, 20% FELSIC, 5% MICA, SA; OLIVE BROWN 2.545/4; STRONG RXN TO HCL, SLIGHTLY CONSOLIDATED				LUNCH CONTINUED WELDING DRILLING CONTINUED PULLED CB SAMPLE
40	LITH	2	GM	4DET	D		MUDDY SANDY GRAVEL; 50% GRAVEL, 42% SAND, 8% MUD; 5% CP, 15% MP, 15% FP, 1% VFP, 5% VCS, 7% CS, 10% MS, 12% FS, 8% VFS, 2% MUD; VFP SLIGHTLY SELECTED; GRAVELS: 80% BASALT, 10% QTZ, GRANITIC, 5% DIORITE, 5% CALCINE	1400 1410			PULLED CB SAMPLE CHAIN OF CUSTODY 0326905-10W26-9 10-41 11-5"
											DRILLER WELDING 10" C.S. CASING TOTALING 49.44' (49'-5/4")

W = wet, M = moist, D = dry

A 1800 007 (01/90)

WMC-MR-0206

WHC-MR-02006

9443223.0984

## DAILY BOREHOLE LOG

Boring or Well Number 299-WZ16-9Sheet 9 of 44Location 216-S-10 DITCH / PONDProject W-017Logged by P.S. INNIS (G.A.I.)

Print

*Parola A. Innis*

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Date 3/27/90Checked by S. Goodwood

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*S. Goodwood*

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Date 6/10/90Drilling Contractor KEHDriller LOUIE WATKINSLithologic Classification Scheme FOLKProcedure DD 1Rev No. 0Rig/Method CABLE TOOL BE #22-14103

Measuring Equipment \_\_\_\_\_

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
40'								0700			DRILLER + GEOLOGIST ON SITE
			PID	<DET							SSO TOOK INITIAL CUNTAH READING
								0755			DRILLER FINISHING WELDING
								0805			DRILLER DRIVING CASING
								0900	5		DRILLING BEGAN
											AFTER 3 ATTEMPTS AT RETAINING
											SAMPLE IN BARREL DRILLER ADDED
											5 GAL H <sub>2</sub> O
45'	LITH	2	PID	<DET	D		SAND, TR GRAVEL, 94% SAND, 6% MUD	0915			PULLED CB SAMPLE
	MOIST	1	GM	<DET			TR VFP, TR VCS, 9% CS, 45% MS, 30% FS, 10% VFS, 6% MUD; WS TO MS; GRAVELS: 50% BASALT, 30% QTZ, GRANITE S, 15% CALCITE / CLASTIC; 5% OTHER, SR; SANDS: 20% BASALT, 45% QTZ, 30% FELSIC, 5% OTHER, SA; LT. YELLOWISH BROWN (2.5Y 6/4), MOD. FVN TO HCL, UNCHANGED, CHANGE IN LITH. APPRX. 44'	0940		10-DB	DRILLER WELDING 10" C.S. CASING TOTALING 39.52 (59-6 1/4")
50'	LITH	2	GM	<DET	D		SAND, TR GRAVEL, 95% SAND, 5% MUD	11:00			PULLED CB SAMPLE
	MOIST	1					TR FP, TR VFP, TR VCS, 20% CS, 40% MS, 25% FS, 10% VFS, 5% MUD; WS TO MS; GRAVELS: 40% BASALT, 30% QTZ, GRANITE, 25% CALCITE / CLASTIC; CLASTIC; 5% OTHER, SR; SANDS: 15% BASALT				

WHC-MP-0206

W = wet, M = moist, D = dry

A 1800 007 (01/00)

9443223.0985

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 10 of 44Location 2116-S-10 DITCH / PONDProject W-017Logged by P.S. INNIS

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Camela J. Innis

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Date 3/27/90Checked by S. Goodwin

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S. Goodwin

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Date 6/10/90Lithologic Classification Scheme FOLKProcedure D.O.1Rev No. 4Drilling Contractor KEHDriller LOUIS WATKINSRig/Method CABLE TOOL B.E #22-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
50'							(CONT) 45% QZ, 30% FELSIC, 5% MICA, 5% OTHER SR-A; LT. YELLOWISH BROWN 2.5Y6/4, MOD. RXN TO HCL, UNCONSOLIDATED				
55'	LITH	2	GM	LOET	D		SLIGHTLY MUDDY SAND, 89% SAND, 11% MUD, 20% FS, 69% VFS, 11% MUD; WS; SAND; 15% BASALT, 50% QZ, 30% FELSIC, 5% MICA SR-SA; YELLOWISH BROWN 10YR5/4, STRONG RXN TO HCL, SLIGHTLY CONSOLIDATED	11:20			PULLED CB SAMPLE
	MOIST	1									
60'	LITH	2	GM	LOET	D		SAND, TR. GRAVEL, 91% SAND 9% MUD, TR. VFP, TR. VCS, 4% CS, 30% MS, 46% FS, 11% VFS, 9% MUD; WS TO MS; GRAVELS: 60% BASALT, 15% QT, GRANITICS, 25% CALICHE / CARBONATE CEMENTS SR-SA; SAND; 15% BASALT, 40% QZ, 35% FELSIC, 10% MICA; OTHER SR-A; LT OLIVE BROWN (2.5Y5/4) MOD RXN TO HCL, SLIGHTLY CONSOLIDATED	11:40			PULLED CB SAMPLE CHAIN OF CUSTODY 032790510W26.9
	MOIST	1									
	YDA	2									
	250ml	2									
	CHEM										
								11:45		9.81	DRILLER WELDING 10" CS CASING TOTALING 69.33 (69' - 4")
								12:00 - 12:30			LUNCH
								12:40			DRILLER CONTINUED WELDING
								13:45			DRILLING CONTINUED

W = wet, M = m

= dry

A J03 (01/90)

WIC-MR-0206



9443223.0986

## DAILY BOREHOLE LOG

Boring or Well Number 299-W216-9Sheet 11 of 14Location 216-S-10 DITCH/PONDProject W-017Logged by P.S. INNIS

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Date 3/27/90Drilling Contractor KEHChecked by S. Goodman

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Date 6/10/90Driller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O. 1Rev No. 0Rig/Method CABLE TOOL BE #22-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCl, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
65	LITH	2	GM	4DET	D		SAND, TR. GRAVEL, 91% SAND, 9% MUD TR. FP, TR. VCS, 11% CS, 30% MS, 35% FS 15% VFS, 9% MUD, WS TO MS; GRANITE: 35% BASALT, 15% Qtz GRANITES, 45% CALICHE/ CARBONATE CLASTE, 5% OTHER SR; SAND; 12% BASALT, 30% Qtz, 10% FELSIC, 8% Mica SR-A; YELLOWISH BROWN 10YR5/4; MOD RAN TO HCl, UNCONSOLIDATED	1410			PULLED CB SAMPLE
	MOIST	1									
70	LITH	2	GM	4DET	D		SAND, 93% SAND, 7% MUD; TR. VCS, 8% CS, 35% MS, 40% FS, 10% VFS, 7% MUD WS TO MS; SAND, 15% BASALT, 40% Qtz 35% FELSIC, 10% Mica; OTHER SR-A; YELLOWISH BROWN 10YR5/4; MOD RAN TO HCl, SLIGHTLY CONSOLIDATED	1435 1440 1445			RPT ON SITE PULLED CB SAMPLE
	MOIST	1									
										9-31	DRILLER WELDING 10" C.S. CASING TOTALING 78.64 (78.74')
								1500			RIG SHUT DOWN
							TOTAL FOOTAGE 30	1530			OFF SITE
							CASING AT 67				
							5 GAL WATER ADDED				

W = wet, M = moist, D = dry

MHC-MR-0206

9413223.0987

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 12 of 44Location 216-S-10 DITCH / PONDProject W-017Logged by P.S. INNIS (G.A.1)

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*Paula S. Innis*

Sign

Date 3/28/90Checked by S. Goodwin

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*S. Goodwin*

Sign

Date 6/10/90Lithologic Classification Scheme FOLKProcedure D.D.1Rev No. 0Drilling Contractor KENDriller LOUIS WATKINSRig/Method CABLE TOOL B.E. #22-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			TAILGATE MEETING FOR S-10
											PROJECT DIRECTED BY A PENNSYLV
70'								0715			DRILLER & GEOLOGIST ON SITE
											DRILLER FINISHING WELDING
								0830			DRILLING BEGAN
75'	LITH	2	PIB	<DET	D		SAND, 93% SAND, 7% Mud; 13% CS, 25%	0850			PULLED CB SAMPLE
	MOIST	1	GM	<DET			MS, 40% FS, 15% VFS, 7% Mud; WS to MS;				
							SAND: 20% BASALTIC, 30% QTZ, 40% FELSIK,				
							5% MICA, 5% OTHER, R-A, LT. OLIVE	0900			TOOK DRILL WATER SUPPLY
							BROWN 2.5Y5/4 MOD-STRONG RXN TO				SAMPLE - CHAIN OF CUSTODY
							HCL (UNCONSOLIDATED)				032890S10W26-9
80'	LITH	2	GM	<DET	D		SLIGHTLY MUDDY SAND 97% SAND, 11% Mud	0920			PULLED CB SAMPLE
	MOIST	1					35% FS, 54% VFS, 11% Mud; W.S.; SAND:				CHAIN OF CUSTODY
	YOA	2					15% BASALTIC, 45% QTZ, 35% FELSIK, 5% MICA				032890S10W26-9
	250 ml						SR-A; YELLOWISH BROWN 10YR5/4; MOD-				
	CHEM	2					STRONG RXN TO 10% HCL, SLIGHTLY CONSOLIDATED	0930		8-9B	DRILLER WELDING 10'CS CASING
											TOTALING 87.62' (87-7 1/2")
								1015			RPT ON SITE
								1045			DRILLING BEGAN
85'	LITH	2	GM	<DET	D		SAND 91% SAND, 9% Mud	1105			PULLED CB SAMPLE
	MOIST	1					TR. CS, 44% MS, 35% VFS, 12% VFS, 9% Mud				
							WS TO MS; SAND: 15% FS, 45% QTZ				

W = wet, M = mc

dry

A. 03 (01/90)

MHC-MR-0206

9413223.0988

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 13 of 44Location 216-S-10 DITCH/PONDProject W-017Logged by P.S. INNIS

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Pamela A. Innis

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Date 3/28/90Drilling Contractor KEHChecked by S. Goodwin

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S. Goodwin

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Date 6/10/90Driller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O.IRev No. 0Rig/Method TABLE TOOL BE #23-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
85'							(CONT) 35% FELSIC, 5% MICA; OTHER; SR-A; YELLOWISH BROWN (10YR 5/4); MOD RYN TO HCL, UNCONSOLIDATED				
90'	LITH	2	GM	4 DET	D		SAND, 91% SAND, 9% MUD	11:30			PULLED CB SAMPLE
	Moist	1					TO MS, 41% FS, 50% VFS, 9% MUD; WS				
							SAND, 12% BASALTIC, 48% QZ, 35% FELSIC	11:35		8.75	DRILLER WELDING 10' C.S. CASING
							5% MICA; OTHER; SR-A; YELLOWISH				TOTALING 96.37' (96'-4 1/2")
							BROWN (10YR 5/4 TO 10YR 5/6); STRONG				
							RYN TO HCL, SLIGHTLY CONSOLIDATED;	12:00 - 12:30			LUNCH
							NOTED YELLOWISH BROWN LAMINAR STAINING	12:35			DRILLER CONTINUED WELDING
							WITHIN SANDS	13:40			DRILLING CONTINUED
95'	LITH	2	GM	4 DET	D		SAND, 93% SAND, 7% MUD	14:10			PULLED CB SAMPLE
	Moist	1					20% MS, 50% FS, 23% VFS, 7% MUD; WS TO				
							MS; SAND, 10% BASALTIC, 50% QZ, 35% FELSIC				
							5% MICA; OTHER; SR-A; LT OLIVE BROWN				
							2.5Y 5/4; STRONG RYN TO HCL, SLIGHTLY				
							CONSOLIDATED				
100'	LITH	2	GM	4 DET	D		SAND, 93% SAND, 7% MUD	14:30			PULLED CB SAMPLE
	Moist	1	PID	4 DET			18% MS, 55% FS, 20% VFS, 7% MUD; WS TO				CHAIN OF CUSTODY
	140 ml	2					MS, SAND, 8% BASALTIC, 55% QZ, 30%				03289015-10W26-9
	VDA						FELSIC, 7% MICA; SR-A; LT OLIVE BROWN				
	250 ml	2					2.5Y 5/4, STRONG RYN TO HCL, SLIGHTLY				
	PALE						CONSOLIDATED				

W = wet, M = moist, D = dry

A 1000 003 101 001

WIC-MR-0206

9.

DAILY BOREHOLE LOG	Boring or Well Number <u>299-W26-9</u>	Sheet <u>14</u> of <u>44</u>
	Location <u>211a-S-10 DITCH/POND</u>	Project <u>W-017</u>
Logged by <u>P.S. INNIS</u> Print	<u><i>Pamela S. Innis</i></u> Sign	Date <u>3/28/90</u>
Checked by <u>S. Goodwin</u> Print	<u><i>S. Goodwin</i></u> Sign	Date <u>6/10/90</u>
Lithologic Classification Scheme <u>FOLK</u>	Procedure <u>D.O. 1</u>	Rev No. <u>0</u>
Measuring Equipment _____		
	Drilling Contractor <u>KEH</u>	
	Driller <u>LOUIS WATKINS</u>	
	Rig/Method <u>CABLE TOOL BE #22-14103</u>	

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A- 03 (01/90)

~~WHE~~-MR-0206

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## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 15 of 44Location 216-S-10 DITCH/PONDProject W-017Logged by P.S. INNIS (GAI)

Print

*Print*Date 3/29/90Checked by S. Goodwin

Print

*Print*Date 6/10/90Lithologic Classification Scheme FOLKProcedure D.O. 1Rev No. φDrilling Contractor KEHDriller LOUIS WATKINSRig/Method CABLE TOOL BE 22-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
100'								0700			DRILLER & GEOLOGIST ON SITE
								0840			DRILLER FINISHING WELDING
105	LITH	2	PID	4 DET	D		SAND, 92% SAND, 8% MUD	0910			DRILLER DRIVING CASING - DRILLING BEGAN
	MOIST	1	GM	4 DET			7% MS, 45% FS, 40% VFS, 8% MUD; WS; SAND:				PULLED CB SAMPLE
							12% BASALTIC, 35% QTZ, 45% FELSIC, 8% MICA				DRILLER REPORTS CASING DRIVING
							SR-SA; OLIVE BROWN 2-5Y4/4; MOD. RYN	0925		9.97	DRILLER WELDING 10" C.S. CASING
							TO HCL, SLIGHTLY CONSOLIDATED	0930			TOTALING 116.11 (116-1/2)
								1110			KEH REMOVED SAND PUMP FROM
								1130			DRILL SITE TO COMPLETION SITE
110	LITH	2	GM	4 DET	D		SLIGHTLY MUDDY SAND, 85% SAND, 15% MUD				DRILLER DRIVING CASING - DRILLING CONT.
	MOIST	1					15% FS, 70% VFS, 15% MUD; WS; SAND:				PULLED CB SAMPLE
							20% BASALTIC, 45% QTZ, 30% FELSIC, 5% MICA				
							SR-SA; YELLOWISH BROWN 10YR5/4;				
							STRONG RYN TO HCL, SLIGHTLY CONSOLIDATED; NOTED				
							LAMINAR BEDDING - FINE <1mm				
113	LITH	2	GM	4 DET	D		SANDY MUD; 45% SAND, 55% MUD	1145			PULLED SPECIAL CB SAMPLE
	MOIST	1					45% VFS, 55% MUD; WS; SAND: 10% BASALT				CHAIN OF CUSTODY
	YUA	2					85% QTZ FELSIC, 5% MICA; SR-SA(?); PALE				032990510W26-9
	250 ml						YELLOW (2.5Y7/4) TO LT. YELLOWISH BROWN (2.5Y6/4)				
	CUM	2					STRONG RYN TO HCL; SLIGHTLY CONSOLIDATED				

MHC-MR-0206

W = wet, M = moist, D = dry

A 1000 003 1011001

943223.0991

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 16 of 44Location 216-S-10 DITCH/PONDProject W-017Logged by P.S. INNIS

Print

Camela J. InnisDate 3/29/90Drilling Contractor KEHChecked by S. Goodwin

Print

A. HohlDate 6/10/90Driller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O.IRev No. 0Rig/Method CABLE TOOL BE #122-14103

Measuring Equipment \_\_\_\_\_

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
						115		1200 - 1230			LUNCH
115	LITH	2	GM	<DET	D	115	SANDY MUD; 45% SAND, 55% MUD	1245			PULLED CB SAMPLE
	MOIST	1					DESCRIPTION SIMILAR TO PREVIOUS				
							SAMPLE. THICKNESS APPROX 1.5' SAND	1300		9.71	DRILLER WELDING 10" CASING
							BETWEEN 4 FOLLOWING SAND, MUD LAYERS				TOTALING 125.82 (125-10")
								1400			DRILLING CONTINUED
120	LITH	2	GM	<DET	D		SLIGHTLY MUDDY SAND; 88% SAND 12% MUD	1430			PULLED CB SAMPLE
	MOIST	1					30% FS, 58% VFS, 12% MUD, WS; SAND				RPTS ON SITE
	40ml VOA	2					10% BASALTIC, 50% QZ, 35% FELSIC, 5% MICA				CHAIN OF CUSTODY
	250ml CHEM	2					SR-SA; LT OLIVE BROWN 2.5/4, STRONG				032990510W26-9
							Rxn to HCl, SLIGHTLY CONSOLIDATED, MUD 17'-18'				
125	LITH	2	GM	<DET	D		SLIGHTLY MUDDY SAND; 89% SAND, 11% MUD	1500			PULLED CB SAMPLE
	MOIST	1					10% MS, 40% FS, 39% VFS, 11% MUD, WS -				
							MS; SAND 15% BASALTIC, 60% QZ,				
							20% FELSIC, 5% MICA; SR-A; LT OLIVE	1530			OFF SITE
							BROWN 2.5/4, STRONG Rxn to HCl				
							SLIGHTLY CONSOLIDATED, THIN INNERBEDDED				
							MUDS - THICKNESS < 0.2				
							TOTAL FOOTAGE 25'				
							CASING AT 123'				

W = wet, M = moist, = dry

A-100-003 (01/90)

WHC-MR-0206

7443223.0992

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 17 of 44Location 216-S-10 DITCH / PONDProject W-017Logged by PS INNIS (SAI)

Print

Gamela J. Innis

Sign

Date 3/30/90Drilling Contractor K E HChecked by S. G. G. W. J.

Print

J. G. G. W. J.

Sign

Date 6/10/90Driller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O.IRev No. 0Rig/Method CABLE TOOL DR #22-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MONI- TUBE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
125'			PID	<DET				0700			DRILLER & GEOLOGIST ON SITE
								0715		9.68	S.S.O. ON SITE - DRILLER WELDING
											10" CASING TOTALING 135.50 (135'-0")
								0830			DRILLING BEGAN
130'	LITH	2	PID	9.8ppm	D	128	SANDY MUD, 40% SAND, 60% MUD; TR. FS	0915			PULLED SPECIAL 'CB SAMPLE
	MOIST	1	GM	<DET		130	40% VFS, 60% MUD; WS; SAND: 10% BASALTIC				SSO DETECTED READINGS
	4DMT	2					80% QTZ, FELSIC, 10% Mica, OTHER: SR-SA (?)				OF 9-10 ppm. SAMPLE
	YDA	2					LT. YELLOWISH BROWN (2.5Y6/4); MOD-SLEG				CHAIN OF CUSTODY
	25DMT	2					Rxn TO 10% HCL, SLIGHTLY CONSOLIDATED;				033090SIOW26-9.
197	CHEM						SANDY MUD; INTERVAL 128'-133' CONTAM.				DRILLING MATERIAL BEING
							READING DETECTED APPROX 129'				PLACED IN 55 GAL DRUMS
135'	LITH	2	PID	3-5ppm	D	133	SLIGHTLY MUDDY GRAVELLY SAND (SPA 6/12/90)	10:05			PULLED 'CB SAMPLE
	MOIST	1	GM	<DET		139	GRAVELLY MUDDY SAND; 20% GRAVEL,				MATERIAL PLACED IN BARRELS
							70% SAND, 10% MUD; 4% VCP, 2% CP,				
							3% MP, 6% FP, 5% VFP, 3% VCS, 5% CS,				
							12% MS, 30% FS, 20% VFS, 10% MUD; P.S.;	1045		9.56	DRILLER WELDING, 10" C.S. CASING
							GRAVELS: 5% BASALT, 5% QTZ, 85% CALCHE,				TOTALING 145.06 (145'-3/4")
							CARBONATE CLASTS, 5% QUARTZITE, SANDSTONE				
							& OTHER; SR-SA; SAND: 10% BASALTIC,	1050			SWANSON, THURMANN & GILKENS
							45% QTZ, 35% FELSIC, 10% CALCHE, SR-A;				OF WHC ON SITE - SUPERVISOR
							PALE YELLOW TO YELLOW (2.5Y7/4-2.5Y7/6); STRONG				& REPORT ON CONTAM. READINGS
							Rxn TO 10% HCL, SLIGHT TO MODERATE				

WHE-MR-0206

W = wet, M = moist, D = dry

A. 1000 007 101401



9413223.0993

DAILY BOREHOLE LOG						Boring or Well Number <u>299-W26-9</u>		Sheet <u>18</u> of <u>44</u>			
						Location <u>216-S-10 DITCH / POND</u>		Project <u>W-017</u>			
Logged by <u>P.S. INNIS</u>		Print		Sign <u>Camela J. Innis</u>		Date <u>3/30/90</u>		Drilling Contractor <u>KEH</u>			
Checked by <u>S. Goodwin</u>		Print		Sign <u>A. Hart</u>		Date <u>6/10/90</u>		Driller <u>LOUIS WATKINS</u>			
Lithologic Classification Scheme <u>FOLK</u>						Procedure <u>D.O. I</u>		Rev No. <u>0</u>			
Measuring Equipment _____											
DEPTH	SAMPLES		CONTAMINATION		MOIS- TURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
135							(CONT) CONSOLIDATION; DENDRITICS ON SOME FRESH CALICHE SURFACES, YELLOWISH BROWN STAIN ON CALICHE SURFACES; COARSER GRAVELS AT 139'	12:00- 12:30 12:40 12:50			LUNKII DRILLER CONTINUING WELDING S. TURNER & S. SEMERS ON SITE TO SAMPLE 130' SEDIMENT WITH OVA
140	LITH	2	PID	LDET	M	139 0.00 0.00 0.00 0.00 0.00 143	MUDDY SANDY GRAVEL 45% GRAVEL, 48% SAND, 7% MUD; 2% SC, 3% VCP, 5% CP, 10% MP, 15% FP, 10% VFP, 5% VCS, 10% CS, 17% MS, 9% FS, 7% VFS, 7% MUD VPS; GRAVELS: 65% BASALTIC, 10% QTZ, GRUNITE 15% CALICHE; 10% QUARTZITE/SANDSTONE & OTHER R-SA; SAND 70% BASALTIC, 5% QTZ, 10% FELSIK, 10% CALICHE, 5% OTHER R-A; LT. OLIVE BROWN (2.5Y5/6), STAINING RYN TO HCL, SLIGHT CONSOLIDATION, CORRIES NOT INCLUDED IN LITH. SAMPLE INTERVAL 139-143	13:30		PULLED CB SAMPLE CHAIN OF CUSTODY 033090516W26-9	
145	LITH	2	GM	LDET	M	143 0.00 0.00 0.00 0.00 0.00 145	GRAVELLY SAND 20% GRAVEL, 73% SAND 7% MUD; TR. SC, 2% VCP, 3% CP, 6% MP 5% FP, 4% VFP, 5% VCS, 8% CS, 35% MS 15% FS, 10% VFS, 7% MUD; VPS; GRAVELS 65% BASALTIC, 10% QTZ, GRUNITE, 15% QUARTZITE/LIMESTONE, 5% D. 5% OTHER	14:15		PULLED CB SAMPLE	

W = wet, M = ml

= dry

A-100 J03 (01/90)

MHC-MR-0206



WHC-MR-0206

9443223.0995

DAILY BOREHOLE LOG					Boring or Well Number <u>299-W26-9</u>		Sheet <u>20</u> of <u>44</u>	
					Location <u>216-S-10 DITCH/POND</u>		Project <u>W-017</u>	
Logged by <u>P.S. INNIS (GAI)</u>		<u>Pamel S. Innis</u>		Date <u>4/2/90</u>		Drilling Contractor <u>KEH</u>		
Checked by <u>S. Goodwin</u>		<u>S. Goodwin</u>		Date <u>6/10/90</u>		Driller <u>LOUIS WATKINS</u>		
Lithologic Classification Scheme <u>FOLK</u>		Procedure <u>D.O.I</u>		Rev No. <u>0</u>		Rig/Method <u>CABLE TOOL BE #22-14103</u>		
Measuring Equipment _____								

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			DRILLER ON SITE
								0900			GEOLOGIST ON SITE
								0915			V. McGHAN ON SITE TO RUN GEOPHYSICAL LOG.
								0930			GEOLOGIST OFF SITE
								0945			GEOLOGIST ON SITE AT 200 EAST
											SLAB YARD TO OBSERVE STEAM
											CLEANING OF 8" CASING & TOOLS
											INSPECTED 16 PIECES OF 8" C.S.
											CASING - APPEARED CLEAN -
											WRAPPED IN PLASTIC FOR TRANSPORT
								1015			INSPECTED CLARS - APPEARED CLEAN
											WATER IN BARRELS 11-2DCW -
											90-59 THRU 60
								1130			OBSERVED STEAM CLEANING
											OF STAINLESS STEEL SCREENS (2)
											APPEARED CLEAN - WRAPPED IN PLASTIC
											LUNCH
								1200-1230			KEH DELIVERING CASING TO
								1315			WELL SITE
											OUT IN AFTERNOON.
								1320			OFF SITE

W = wet, M = moist, = dry

A-180U-003 (01/90)

WHC-MR-0206

9443223.0996

# DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9

Sheet 21 of 44

Location 216-S-10 DITCH / POND

Project W-017

Logged by P.S. INNIS (G.A.I.) Camela A. Innis  
Print Sign

Date 4/3/90

Drilling Contractor KEH

Checked by S. Goodwin A. Smith  
Print Sign

Date 6/10/90

Driller LOUIS WATKINS

Lithologic Classification Scheme FOLK

Procedure D.O.I

Rev No. 0

Rig/Method CABLE TOOL BE #22-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
108								0700			GEOLOGIST ON SITE AT 200E SLAB
											YARD TO WITNESS STEAM CLEANING
								0730			GEOLOGIST AT WELL SITE
											DRILLER MAKING SKIRT TO FISH
											GEOPHYSICAL LOGGING PROBE OUT
								0915			PROBE RETRIEVED FROM HOLE
								0950			DRILLER DRIVING 10" CASING TO
											FINAL DEPTH 1 SETTING UP TO
											CHANGE OUT TOOLS & JBS
											FINAL 10" CASING DEPTH - 14.6'
											DRILLER BEGAN WELDING
										W/SIDE 22.08	8" CARBON STEEL CASING
											LUNCH
										17.65	DRILLER CONTINUING WELDING
										18.10	ON 8" C.S. CASING TOTALING
										19.54	77-37' (77-4 1/2')
											RIG SHUT DOWN FOR
											FIRE WATCH
											OFF SITE
								1500			
								1530			

WHC-MR-0206

9413223.0997

## DAILY BOREHOLE LOG

Boring or Well Number 299-W2.6-9Sheet 22 of 44Location 2116-S 10 DITCH / PONDProject W-017Logged by P.S. INNIS (GAI)

Print

Gamela S. Innis

Sign

Date 4/4/90Checked by S. Goodwin

Print

A. Paul

Sign

Date 6/10/90Lithologic Classification Scheme FOLKProcedure D.O.1Rev No. 0Drilling Contractor K.E.HDriller LOUIS WATKINSRig/Method CABLE TOOL BE #2-14103

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			TAILGATE MEETING DIRECTED BY A. PEARSON W/ DRILLERS & SITE GEOLOGISTS
								0715			DRILLER & GEOLOGIST ON SITE
										18.50	DRILLER CONTINUING WELDING OF 8" C.S. CASING
										20.56	
										19.50	
										18.77	TOTALING 154.70 (154-8½)
								1200 - 1230			LUNCH
								1235			CONTINUED WELDING LAST SECTION OF CASING
											DRILLING BEGAN
145'								1345			PULLED CB SAMPLE
150'	LITH	2	GM	<DET	D		MUDDY SANDY GRAVEL; 60% GRAVEL, 33% SAND, 7% MUD; 5% VCP, 10% CP, 17% MP, 15% FP, 13% VFP, 3% VCS, 5% CS, 9% MS, 10% FS, 6% VFS, 7% MUD; VPS; GRAVELS. 70% BASALTIC, 20% QTZ, FELSIC, 10% OTHER SR-SA; SAND; 65% BASALTIC, 20% QTZ, 10% FELSIC, 5% OTHER SR-A; LT OLIVE BROWN 25Y5/4; Mod RXN TO HCL, SLIGHTLY CONGLOMERATE	1415			
	MOIST	1						1450	5		DRILLER ADDED WATER AFTER 4 ATTEMPTS TO RETRIEVE SAMPLE FORMATION TIGHT. DRIVE WHEEL PULLING HARD. DRILLER FELT HE MAY NEED TO SWITCH TO HARD TOOL.

W = wet, M = mois

dry

A-1000-003 (01/90)

MHC-MR-0206

[illegible]

**W = wet, M = moist, D = dry**

9443223.0999

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 24 of 44Location 216-S-10 Ditch/PondProject W-017-S10Logged by AW PearsonAlan PearsonDate 4/5/90Drilling Contractor KEHChecked by S. GoodwinS. GoodwinDate 6/10/90Driller Louis WatkinsLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method RE60L / Cable ToolMeasuring Equipment L300-06

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			Driller & Geologist on site.
							161.0' - 5.0 s.u. - 0.5' = 155.5'	0705			Take P/A = 155.5'
155	Lith	2	PID	<Det	M		MUDDY SANDY GRAVEL: 50% Gravel, 38% Sand, 12% Mud	0710			Describe 155' sample from
	Moist	1	GM	<Det			5% CP, 10% MP, 15% FP, 20% VFA, 8% VS, 10% CS, 10% MS, 5% FS, 5% VFS, 12% Mud: Poorly Sorted:				Yesterday. It does not
						155	Gravel: 70% Basaltic, 10% Qtz, 20% Granitic, SR:				appear that the water
							Sand: 60% Mafic, 10% Qtz, 30% Felsic, SR:				added yesterday has affected
							Wet Color dark yellowish brown 10YR 4/4: Ab				the moisture content of
							reaction w/10% HCL: Moderately Consolidated:				the sample. ∴ Moist sample
							Becoming more consolidated.				was taken
							154.70' + 8.52' = 163.22' Total 8" Casing	0750		163.20'	Webbing 8" C.S. Casing
								0855			Take 40 mL sample of
											Drill H <sub>2</sub> O
											COC# 040590510W269
								0910			Resume Drilling - CB
160	Lith	2	PID	<Det	M		SLIGHTLY MUDDY GRAVELLY SAND: 25% Gravel	1000			Take Special Sample w/CB
	Moist	1	GM	<Det			65% Sand, 10% Mud: tr VCP, 5% CP, 5% MP, 5% FP, 10% VFA,				COC# 040590510W269
	Chem	2				160	10% VS, 10% CS, 15% MS, 15% FS, 15% VFS, 10% Mud:				
	VOA	2					Poorly Sorted: Gravel 80% Basaltic, 20% Granitic, SA:				
							Sand: 60% Mafic, 10% Qtz, 30% Felsic, SA:				
							Wet Color dark yellowish brown 10YR 4/4:				
							No reaction w/10% HCL: Slightly consolidated.				

W = wet, M = m D = dry

A

3 (01/90)



WIC-MR-0206

WHC-MR-0206

9413223.1001

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 26 of 44Location 216-S-10 Trench/ PondProject W-017-S0Logged by AW Pearson  
PrintAlan Pearson  
SignDate 4/5/90Checked by S. Goodwin  
PrintA. Goodwin  
SignDate 6/10/90Lithologic Classification Scheme FolkProcedure DO-1Rev No. 0Drilling Contractor KEHDriller Louis WatkinsRig/Method BE60L / Cable ToolMeasuring Equipment L300-06

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
175'	Lith	2	PID	<Det	M		Muddy SANDY GRAVEL: 70% Gravel, 20% Sand, 10% Mud	1445			Take Sample w/ CB
	Moist	1	GM	<Det			10% SL, 15% K.P., 15% CP, 10% MP, 10% FP, 10% VEP, 8% VCS, 4% CS				
						175'	3% MS, 3% FS, 2% VFS, 10% Mud: Very Poorly Sorted:				
							Gravel: 80% Basalt, 15% Granitic, 5% Gneiss: SP				
							Sand: 50% Mafic, 5% Qtz, 45% Felsic: SA				
							Wet Color dark yellowish Brown 10YR 4/4:				
							No Reaction w/ 10% HCL: Slightly Consolidated				
							% Gravel & Size increased: $\Rightarrow$ may decrease				
							moisture content.				
								1455			Resume Drilling - CB
								1530			Quit for Day
							Footage $\Rightarrow$ 178' - 155.5' = 22.5'				
							8" Casing add = 8.52' + 10.54' = 19.06'				
							No H <sub>2</sub> O added Today.				

W = wet, M = m

= dry

A

03 (01/90)

WMC-MR-0206



7413223.1002

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 27 of 44Location 216-S-10 Ditch/RoadProject W-017-S10Logged by AW PearsonAlan PearsonDate 4/6/90Checked by S. GoodmanS. GoodmanDate 6/10/90Lithologic Classification Scheme FolkProcedure DO-1Rev No. 0Drilling Contractor KEHDriller Louis WatkinsRig/Method BE60L/Cable ToolMeasuring Equipment L300-06

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
307								0700			Geologist & Driller at site
							179.2' - 3.2' sec + 0.5' add on = 176.5'	0715			Take B/R = 176.5'
							The formation is becoming more consolidated & finer grained. Core Barrel & Casing is becoming much more difficult to drive. By switching to Hard Tool Driller will be able to under-ream hole thus freeing the casing.	0720			Driller is switching to Hard Tool
								0800			Driller is building up bit so it will under-ream more effectively.
											C. Swanson, Gilkenson & B. Williams visited site. Looked @ AS-Built & Title III Inspection Forms.
							173.76' + 9.96' = 183.72' Total ?"	1020		18372'	Welding 8" Carbon Steel Casing
								1130	15		Begin Drilling w/ Hard Tool
								1200			Break for Lunch
								1230	21		Resume Drilling w/ HT

W = wet, M = moist, D = dry

A 1000 003 (01/00)

WMC-MR-0206

9413223.1003

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9  
Location Z16-S-10 Ditch/AbndSheet 28 of 44Project W-017-S10Logged by AW Pearson Adam Pearson Date 4/6/90Checked by S. Goodwin S. Goodwin Date 6/10/90Lithologic Classification Scheme Folk Procedure DO-1 Rev No. 0Measuring Equipment L300-06Drilling Contractor KEHDriller Louis WatkinsRig/Method BE60H/Cable Tool

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
180	Lith	2	PID	<Det	N/A		MUNDY SANDY GRAVEL: 65% Gravel, 25% Sand, 10% M.	1325			Take Special Sample
	Chem	2	GM	<Det			5% VCP, 10% CP, 20% MP, 15% FP, 15% VFP, 10% VLS, 5% FS, 5% NS, 3% FS, 2% VFS, 10% Mud: Poorly Sorted				w/ Dart Bailer
	VDA	2					Gravel; 70% Basalt, 10% Qtz., 20% Granitic, SA: Sand; 60% Mafic, 15% Qtz., 25% Felsic, SR: Wet Color light olive brown 2.5/5/4; No reaction w/10% HCL: Moderately Consolidated: Color change is probably due to HT drilling:				LOG# 040690.S10W26-9
							183.72' + 9.96' = 193.68' Total C.S. Casing	1330			193.68' Webbing 8" Carbon Steel Casing
								1435			Resume Drilling w/HT
								1450			Drilling rate has slowed.
							Bailed (3) times w/ Dart Bailer	1515			Driller thinks he may have encountered water
							193.0' - 12.6' + 0.5' = 180.9'	1520			Take P/A = 180.9'
							192.4' - 12.6' = 179.8'	1530			Take D/W = 179.8'
								1535			Bailed (1) w/ Dart Bailer
							193.3' - 12.6' + 0.5' = 181.2'	1620			Take D/B = 181.2'
							192.2' - 12.6' = 180.2'	1630			Take D/P = 180.2'
							Bottom of 8" Casing @ 193.68' - 12.6' = 181.08'	1655			Leave Site
							Footage 181.2' - 176.5' = 4.7'				
							55 gal. H <sub>2</sub> O added, 19.92' of casing Added.				

W = wet, M = m.

dry

A-1 J03 (01/90)

WHC-MR-0206

208

9443223-1004

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 29 of 44Location 216-S-10 DITCH / PONDProject W-017Logged by PS INNIS (G.A.I.)

Print

Pamela D. Janis

Sign

Date 4/9/90Drilling Contractor KEHChecked by S. Goodwin

Print

A. Malt

Sign

Date 6/10/90Driller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O. 1Rev No. 0Rig/Method CABLE TOOL BE #22-14103Measuring Equipment E-TAPE S/N 12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
181.1'							192.82 - 11.7 = 181.1'	0700			GEOLOGIST & DRILLER ON SITE
							DEPTH TO BOTTOM OF CASING 182.9	0715			TOOK D/W. - POSSIBLY ONLY MUDSTONE
								0735	10		DRILLING BEGAN
								0805			RPT ON SITE
185'	LITH	2	GM	LD ET	N/A	0805	MUDDY SANDY GRAVEL, 55% GRAVEL	0825	10		PULLED HT SAMPLE
			MSA	LD ET		0805	35% SAND, 10% MUD; 5% CP, 10% MP, 20% FP				
						0805	20% VFP, 10% VCS, 9% CS, 6% MS, 5% FS				
						0805	5% VFS, 10% MUD; PS TO VPS; GRAVELS	0815			DRILLER BUILDING UP HARD TOOL
						0805	70% BASALTIC, 15% QTZ, 10% GRANITICS,				
						0805	5% OTHER SR-SA; SAND: 75% BASALTIC				
						0805	15% QTZ, 5% FELSIC, 5% OTHER SR-SA;	0925	10		CONTINUED DRILLING
						0805	4 YELLOWISH BROWN 10YR5/4; NO RXN TO				
						0805	10% HCL, SLIGHTLY CONSOLIDATED				
190'	LITH	2	GM	LD ET	N/A	0805	MUDDY SANDY GRAVEL; 55% GRAVEL	0945	10		PULLED HT SAMPLE w PART BAILEY
	10ml					0805	35% SAND, 10% MUD; 3% CP, 12% MP, 20% FP				CHAIN OF CUSTODY
	10A	2				0805	20% VFP, 5% VCS, 5% CS, 10% MS, 8% F				040940 S10 W26-9
	250ml					0805	7% VFS, 10% MUD; PS TO VPS; GRAVELS:				
	CHEM	2				0805	65% BASALTIC, 10% QTZ, 15% GRANITICS, 5%				
						0805	LIMBITE, 5% OTHER SR-SA; SAND: 65%				
						0805	BASALTIC, 15% QTZ, 10% FELSIC, 10% OTHER,				
						0805	SR-SA; 4 YELLOWISH BROWN 10YR5/4;				

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WMC-MR-0206

9443223.1005

DAILY BOREHOLE LOG						Boring or Well Number <u>299-W26-9</u>		Sheet <u>30</u> of <u>44</u>			
						Location <u>216-S-10 DITCH/POND</u>		Project <u>W-017</u>			
Logged by <u>P.S. INNIS</u>		Print		Sign		Date <u>4/9/90</u>		Drilling Contractor <u>KEH</u>			
Checked by <u>S. Goodwin</u>		Print		Sign		Date <u>6/10/90</u>		Driller <u>LOUIS WATKINS</u>			
Lithologic Classification Scheme <u>FOLK</u>				Procedure <u>D.O. 1</u>		Rev No. <u>0</u>		Rig/Method <u>CABLE TOOL BE #22-14103</u>			
Measuring Equipment _____											
DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
190'							(CONT.) No RXN TO 10% HCL, SLIGHTLY CONSOLIDATED; GRAVELS FINER W/ INCREASE IN GRANITICS & DIORITE	10:20		9.01	DRILLER WELDING CASING TOTALING 202.69'
								11:40			WAITING FOR WELDING FUEL
								12:00 - 12:30			WELDING CONTINUED
								12:35			LUNCH
192'								13:15	10		WELDING CONTINUED
											DRILLING BEGAN - RAILING INTO BARRELS - APPROACHING WATER TABLE
195'	LITH	2	GM	4 DET	N/A		MUDDY SANDY GRAVEL, 30% GRAVEL, 60% SAND, 10% MUD, 4% CP, 1% MP, 10% FP, 10% VFP, 12% VCS, 19% CS, 15% MS, 8% FS, 6% VFS, 10% MUD, PS TO VPS; GRAVELS: 60% BASALTIC, 15% QZ, 10% GRANITICS, 5% DIORITE, 5% VOLC. ALTERATIONS, 5% OTHER, R-SA; SAND: 80% BASALTIC, 10% QZ, 10% FELSIC, SR-SA; OLIVE BROWN 2.5Y4/4	14:35			PULLED HT SAMPLE
							No RXN TO HCL, SLIGHTLY CONSOLIDATED				RPT ON SITE
											DRILLER FELT WATER WAS COMING IN. - WILL BAIL HOLE CLEAN & TAKE A D/W IN A.M.
								15:30			OFF SITE
							TOTAL WATER 50 GAL				
							TOTAL FOOTAGE 15.7'				
							CASING AT 196.8'				

W = wet, M = moist, D = dry

A-1800-003 (01/90)

MHC-MR-0206

7443223.1006

## DAILY BOREHOLE LOG

Boring or Well Number 299-WZ6-9Sheet 31 of 44Location 211a-S-10 DITCH / PONDProject W-017Logged by P.S. INNIS (GAI)

Print

Pamela S. Innis

Sign

Date 4/10/90Drilling Contractor KEHChecked by S. Goodwin

Print

A. Paul

Sign

Date 6/10/90Driller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O. 1Rev No. φRig/Method CABLE TOOL BE #22-14103Measuring Equipment E-TAPE S/N 12176

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
196.8'							195.5 - 5.8 = 189.7'	0700			GEOLOGIST & DRILLER ON SITE
								0710			TOOK D/W
								0730			TOOK DRILLING WATER SAMPLE
											CHAIN OF CUSTODY #
											041090S10WZ6-9
											CLEANED UP AROUND SITE
											LABELLED BARRELS OF CUTTING
											FROM 4/9/90 # W-2510-90
											- OIL THRU - O13
								0850			WMC'S SWANSON, WILLIAMS &
											GILKENSAN STOPPED BY SITE
								0855			DRILLING BEGAN
200'	LITH	2	GM	LD ET	N/A		SLIGHTLY GRAVELLY SLIGHTLY MUDDY SAND;	0950			PULLED HT SAMPLE - COTCH
	40 ml	2					8% GRAVEL, 80% SAND, 12% MUD; 1% MP,				041090S10WZ6-9
	YOA						3% FP, 4% VFP, 10% VCS, 20% CCS, 20% MS,				
	250 ml						12% FS, 10% FS, 12% MUD; MS TO PS; GRAVEL				
	CHEM	2					55% BASALTIC, 20% QZ, 10% GRANITICS, 10%	1010		9.00	DRILLER WELDING 8" C.S. CASING
							DIORITE, 5% OTHER SR-SA; SAND: 65%				TOTALING 211.69'
							BASALTIC, 25% QZ, 10% FELSIC R-SA;				
							OLIVE BROWN 2.5Y4/1; NO RXN TO 10%	1030			SAND PUMP BROUGHT ON SITE
							HCL, SLIGHTLY CONSOLIDATED LESS GRAVEL				WRAPPED IN PLASTIC; STEAM CLEANING
							THAN PREVIOUS				WITNESSED BY A. PEARSON

WMC-MR-0206

9443223.1007

DAILY BOREHOLE LOG						Boring or Well Number <u>299-W26-9</u>		Sheet <u>32</u> of <u>44</u>	
						Location <u>216-S-10 DITCH/POND</u>		Project <u>W-017</u>	
Logged by <u>P.S. INNIS</u>		Print		Signature <u>[Signature]</u>		Date <u>4/10/90</u>		Drilling Contractor <u>K.E.H.</u>	
Checked by <u>S. Goodwin</u>		Print		Signature <u>[Signature]</u>		Date <u>6/10/90</u>		Driller <u>LOUIS WATKINS</u>	
Lithologic Classification Scheme <u>FOLK</u>				Procedure <u>D.O.I</u>		Rev No. <u>0</u>		Rig/Method <u>CABLE TOOL BE #22-14103</u>	
Measuring Equipment <u>STEEL TAPE L300-06</u>									

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPE LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								11:40			DRILLING CONTINUED
								1200-1230			LUNCH
201'								1240			DRILLING CONTINUED
											CUTTINGS IN DRUMS #11-2510-90-14 THRU 16
205	LITH	2	GM	LODET	N/A	98.80 6.80 18.00	MUDDY SANDY GRAVEL, 60% GRAVEL, 30% SAND, 10% MUD; TR. SC, 5% VCP, 12% CP, 18% MP, 15% FP, 10% VFP, 6% VCS, 9% CS, 5% MS, 5% FS, 5% VFS, 10% MUD; VPS; GRAVELS: 55% BASALTIC, 15% QIZ, 10% GRANITICS, 10% DIORITE, 5% QUARTZITE, 5% OTHER R-SA; SAND: 65% BASALTIC 15% QIZ, 20% FELSIC SR-A; LT OLIVE BROWN 2.5 YS/4, NO REX TO 10% HCL, UNCONSOLIDATED APPEARANCE OF BROWNISH RED QUARTZITE MATERIAL NO LONGER CONSOLIDATED	14:20 14:30			PAVED HT SAMPLE S.S.O OFF SITE RPT ON SITE DRILLER BAILING WELL TO FINAL DEPTH OF APPRX. 206
211.55							211.55 + 0.5 - 5.15 = 206.90'	15:25			TOOK D/B
							TOTAL FOOTAGE 10				
							CASING AT 206.54	15:35			OFF SITE
							NO WATER ADDED				

9443223.1008

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-9Sheet 33 of 44Location 216-S-10 DITCH / PONDProject W-017Logged by P.S. INNIS (G.A.I.)

Print

Camela A. Innis

Sign

Date 4/11/90Drilling Contractor KEHChecked by S. Goodwin

Print

A. Innis

Sign

Date 4/10/90Driller LOUIS WATKINSLithologic Classification Scheme FOLKProcedure D.O.1Rev No. 0Rig/Method CABLE TOOL BE #22-14103Measuring Equipment E-TAPE S/N # 12176; STEEL TAPE L300-06

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0700			DRILLER & GEOLOGIST ON SITE
											SSO ON SITE
							195-25-5.15 = 190.1'	0720			TOOK D/W W/E TAPE
							210-90 + 0.50 - 5.15 = 206.25'	0725			TOOK D/B W/STEEL TAPE
								0740			RAN STRAIGHTNESS TEST
							WHC-S-014 REV. 4 SECT. B-2				USING A STEEL PIPE WITH
											O.D. = 6.55 AND L = 21.56-0K
								0800		-3.00	DRILLER CUTTING 3.00' OFF LAST
											SECTION OF PIPE LEAVING 6.00'
											TOTALING 208.69' WITH
											2.15' STICK-UP
								0900			DRILLER BREAKING DOWN RIG
								0915			RPT'S ON SITE TO SURVEY OUT
											RIG & TOOLS
								1030			KEH LOADING UP TOOLS
								1045			RPT'S ON SITE
								1050			DRILLER WELDING CAP ON 8" CASING
								1130			GEOLOGIST OFF SITE

WHC-MR-0206-2



9413223-1009

<b>DAILY BOREHOLE / WELL COMPLETION LOG</b>		Boring or Well Number <u>299-WZ6-9</u>		Sheet <u>34</u> of <u>44</u>	
		Location <u>S-10 ditch</u>		Project <u>W017 S10</u>	
Logged by <u>L A Duvvins</u> Print		Date <u>5-1-90</u>		Drilling Contractor <u>KEH</u>	
Reviewed by <u>S. Goodwin</u> Print		Date <u>6/10/90</u>		Driller <u>G Thomas, C Betteendorf</u>	
Lithograph Classification Scheme <u>NA</u>		Procedure <u>DO 1</u>		Rev No. <u>0</u>	
Measuring Equipment <u>Steel Tape = L500-03</u>					

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
1120										Geologist on site, KEH personnel moving equipment on site to prepare for completion
		8"	208.7	2.1	206.6			204.5	2.1	D/B 204.4 - 2.1 + 2.2
1200										Lunch break
1235										return to site, drillers prepared to weld on 8" dia casing nipple
1240										welding
1345	Carbon	8"	212.5	5.9	206.6					complete welding Add 3.83' casing
										install Stainless Steel well
	Stainless Steel	4"	10.01	channel pack screen						Johnson Type 304
	"	"	10.01	channel pack screen						10.01 channel pack screen,
	"	"	.32	cap		Total Screen = 20.34'				non-passivated, inspected by Hoover
	"	" w/cent. size	20.01							Item # 39 and # 40, # 24 224-90
	"	"	19.99							Casing Inspected by R Stevens 3-29-90
	"	" w/cent.	19.99							to # 42493, Release 16, PCP # 9112
1455	"	"	20.02							T-304 Schedule 5, Items # 1 & 2
	"	" w/cent.	20.00							
	"	"	20.00							
	"	" w/cent.	20.00							
	"	"	19.99							
	"	" w/cent.	20.00							20.34' stainless steel well

1525

A-11 (10/89)

MHC-MR-0206



9403223.1010

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 294-1024-9Sheet 35 of 44Location S-16 DuchProject W017 S-16Logged by LA Darrins  
PrintJ. Darrins  
SignDate 5-2-90Drilling Contractor KEHReviewed by S. Goodwin  
PrintA. Goodwin  
SignDate 6/10/90Driller G. Thomas, C. BellendornLithograph Classification Scheme NAProcedure D-1Rev No 0Rig/Equipment Filling and Crane and JacksMeasuring Equipment Steel Tape #LS00-03

Time	Casing/Screen			Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth
730								
								Geologist On Site
								Install remaining stainless steel
	stainless steel	4"	5'					casing
	"	"	5'			construction piece		
								Total 200.34' (installed 5-1-90)
						205.33' = Final		+ 4.99 (installed today)
						210.32' = construction		+ 4.99 (construction piece)
								Installed by R. Stevens, 3-29-90
								ref # 689112, P.O. # 12493 2/1/90
								Item # 3, stainless casing 7' 3" 12 2
								Installed by G. Thomas
								204.3
	stainless steel	4"						D/B 208.3 - 6.2 = 12 2
								186.9
	1.000 steel	8"	212.5	5.9	206.6			D/B 193.1 - 6.2 = 186.9
								204.2 2.4
						20-40 mesh silts		D/B 204.2 - 6.2 = 12.2
						(1/2) 9116		D/B 199.8 - 6.2 = 12 2
								Pull
				7.3	205.2			D/B 202.1 - 7.3 = 12 2
				7.4	205.1			Pull D/B 202.5 - 7.6 = 12.2
						" (1/2) 9116		D/B 200.4 - 7.6 = 12.2
								Pull
			212.5	9.0	203.5			D/B 204.5 - 9.0 = 12.2

WMC-MR-0206

9413223.1011

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299 1026-9Sheet 36 of 44Location S-10Project 12017 SLOLogged by L.A. Doremus  
PrintJ. P. Doremus  
SignDate 5-2-90Reviewed by S. Gouws  
PrintA. M. Gouws  
SignDate 6/1-90Lithograph Classification Scheme NAProcedure DU 1Rev No. 0Drilling Contractor KEHDriller G. Thomas, C. BettendorfRig/Equipment Pettibone Casing and JacksMeasuring Equipment Steel Tape # L500-03

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
	Carbon Steel	8"	210.6	6.9	103.7					Pull, Cut 1.9' (slip cutters used)
10:20								199.9	3.8	(PNL inspection team arrives on site)
										D/B 204.6-6.9 +2.2
						20-40 mesh silica sand	(1/2) 94 lb bag	197.2	6.5	1/8 201.9-6.9 +2.2
				8.2	202.9					Pull
								197.7	4.7	D/B 203.7-8.2 +2.2
						"	(1/2) 94 lb bag	195.7	6.7	D/B 201.7-8.2 +2.2
										(PNL team inspects logs and a copy of procedures. Suggest that barrels be placed all around (leave site))
10:46										Lube Truck arrives & services engine
11:20	"	8"	207.7	6.5	201.2					Pull, Cut 2.9'
								199.7	1.5	D/B 204.0-6.5 +2.2
						"	(1/2) 94 lb bag	197.6	3.6	1/8 201.9-6.5 +2.2
			207.7	7.8	199.9					Pull
								198.2	-1.7	D/B 203.8-7.8 +2.2
						"	(1/2) 94 lb bag			
12:30										Lunch break
12:40										Resume Work
12:45								197.3	2.6	1/8 202.9-7.8 +2.2
								195.1	4.8	1/8 200.7-7.8 +2.2

WHC-MR-0206

9413223-1012

DAIL, BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 241 13223-9  
Location S-10Sheet 37 of 44Project W017-10Logged by LH Darrigous

Print

Date 5-2-90Reviewed by S. Goodwin

Print

Date 6/10/90Lithograph Classification Scheme N/AProcedure Bo1Rev No. 0Measuring Equipment Steel Tape # L500-03Drilling Contractor KEHDriller G. Thomas, C. BessardRig/Equipment Pittman Crane and Jacks

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
	Carbon Steel	8"	204.9	10.5	198.4			198.4	0	Pull, Cut 2.8' slog catcher used
								198.4	0	D/B 202.7 - 6.5 + 2.2
						20-40 mesh silver sand	(1) 9411.1	198.4	5.6	D/B 197.7 - 6.5 + 2.2
										Lift and Drop Screen, attempt to set it in permanent position. Previously it drops with each casing pull, and needs to be lifted to correct position.
										Screen & casing set permanently.
	Stainless Steel	4"								D/B 20
	Carbon Steel	8"	204.9	7.9	197.0			197.0	0	D/B 202.7 - 7.9 + 2.2
1330						"	(1) 9411.1	192.5	4.5	D/B 195.2 - 7.9 + 2.2
										Site Safety Officer: monitored drill hole w/ PID, reads PID set
	Carbon Steel	8"	202.1	6.3	195.8			194.5	1.3	Pull, Cut 2.8' (slog catcher used)
								194.5	1.3	D/B 198.6 - 6.3 + 2.2
						"	(1) 9411.1	190.2	5.6	D/B 194.3 - 6.3 + 2.2
			202.1	7.7	194.4					Pull
								191.4	3.0	D/B 196.9 - 7.7 + 2.2
							(1) 9411.1	189.6	4.8	D/B 195.1 - 7.7 + 2.2
										Pull
			202.1	9.1	193.0			192.6	1.0	D/B 196.9 - 9.1 + 2.2

WHC-MR-0206

# DAILY BOREHOLE /WELL COMPLETION LOG

Boring or Well Number 299 W26-9

9413223-1013

Sheet 38 of 44

Location S-10 Clinton

Project W2617

Logged by L.A. Korman  
Print

Date 5-2-90

Drilling Contractor K.E.H.

Reviewed by S. Goodwin  
Print

Sign  
A. Moul  
Sign

Date 6/10/90

Driller G. Thomas, C. Battendorf

Lithograph Classification Scheme N/A

Procedure DO1

Rev No. 0

Rig/Equipment Fettibone Crane, Caskey Jacks

Measuring Equipment Steel Tape # L500-03

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
	Carbon Steel	8"	199.6'	6.6	193.0					Cut 2.5', slug catcher used
						20-40 mesh silica sand	119411.1	187.4	5.6	D/B 191.8 - 6.6 12.2
	"	8"	199.6	7.9	191.7					Pull
								189.8	1.9	D/B 195.5 - 7.9 12.2
						"	119416.6	185.4	6.3	D/B 191.1 - 7.9 12.2
		8"	199.6	9.2	190.4					Pull
1430								188.0	2.4	D/B 195.1 - 2.2 12.2
			197.2	6.9	190.4					Cut 2.4' slug catcher used
								185.9	4.5	D/B 190.5 - 6.9 12.2
			197.2	8.4	188.6					Pull
								189.0	0.2	D/B 195.2 - 8.4 12.2
						"	119411.1			
1501										9.4.1st 11' side

818

MHC-MR-0206

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EDMC	H4-22

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DAILY BOREHOLE / WELL COMPLETION LOG						Boring or Well Number <u>299-WZ6-9</u>			Sheet <u>40</u> of <u>44</u>		
						Location <u>S-10 Ditch</u>			Project <u>W017</u>		
Logged by <u>L.A. Derwin</u> <small>Print</small>						<u>[Signature]</u> <small>Sign</small>			Date <u>5-3-90</u>		
Reviewed by <u>S. Goodwind</u> <small>Print</small>						<u>A. Moul</u> <small>Sign</small>			Date <u>6/10/90</u>		
Lithograph Classification Scheme <u>N/A</u>						Procedure <u>D01</u>			Rev No. <u>0</u>		
Measuring Equipment <u>Steel Tape &amp; L500-03</u>											
Drilling Contractor <u>KELI</u>											
Driller <u>G Thomas, C Bettendorf</u>											
Rig/Equipment <u>Pellibore Centre, Jacks</u>											

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
	(drill) steel	8"	189.6	6.6	183.0		1/4" drill bit	180.7	2.3	D/B 185.1 - 6.6 + 2.2
8:50										Prepare to Bail
										Pump Truck and Building Tool
										Shovel cleaning witnessed by
										C.D. Walker (WHC) according
										to WHC-S-014 See file
9:05										Surging
9:15										Bail ~ 30 gallons
9:40										Surging ~ 105 gallons
9:45										Bail - thick mud sediment at
										the bottom of the bucket (~ 1/4")
10:30										Finish building, break down
										pump truck. Water leaves
										< 1 tsp sand and small mud
										deposit at bottom of bucket
10:45								182.9	0.1	D/B 187.3 - 6.6 + 2.2
							1/4" drill bit	182.0	1.0	D/B 186.4 - 6.6 + 2.2
							1/4" drill bit			Roll
			189.6	7.3	182.3			181.8	0.5	D/B 186.9 - 7.3 + 2.2 - Top of Sand
						2/3 Volclay Tablets	1/5 gallon			
						2/3 Volclay Tablets	bucket	176.1	5.6	D/B 181.8 - 7.3 + 2.2

WHL-MR-0206

9443223.1016

DAIRY COREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299 WZ6-9Sheet 39 of 44Location 210 PitchesProject W017 S10Logged by L. Lynn Doreman  
PrintL. Lynn Doreman  
SignDate May 3, 1990Drilling Contractor KEHReviewed by S. Goodwin  
PrintS. Goodwin  
SignDate 6/10/90Driller G. Thomas, C. Bennett, J. fLithograph Classification Scheme N/AProcedure DO 1Rev No. 0Rig/Equipment Pettibone Crane, JicksMeasuring Equipment Steel Tape # LS00-123

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
715										Geologist on site
	Carbon Steel	8"	197.2	8.1	189.1			188.3	0.8	P/B 194.2-8.1 + 2.2
							188.9	186.9		P/W 197.0-8.1
	Stainless Steel	4"					204.9	204.9		P/B 210.8-8.1 + 2.2
						20-40 mesh silica	1194 lb bag	183.8	5.3	P/B 189.7-8.1 + 2.2
	Carbon Steel	8"	197.2	9.4	187.8	sand				Pull
800								186.2	1.3	P/B 193.4-9.4 + 2.2
			194.6	6.8	187.8					Cut 2.6', slug catcher used
			194.6	8.1	186.5	"	1194 lb bag	182.9	4.9	P/B 187.5-6.8 + 2.2
										Pull
								184.6	1.9	P/B 190.5-8.1 + 2.2
						"	2194 lb bag	182.2	4.3	P/B 188.1-8.1 + 2.2
						"	1194 lb bag	179.9	6.6	P/B 185.8-8.1 + 2.2
										Pull
			194.6	9.4	185.2			181.9	3.3	P/B 189.1-9.4 + 2.2
			192.2	7.0	185.2					Cut 2.4' slug catcher used
						"	2194 lb bag	179.7	6.0	P/B 184.0-7.0 + 2.2
			192.2	8.4	183.8					Pull
								181.9	1.9	P/B 188.1-8.4 + 2.2
						"	2194 lb bag	180.0	3.8	P/B 186.2-8.4 + 2.2
			192.2	9.2	183.0			182.1	0.9	Pull 189.1-9.2 + 2.2
			181.6	6.6	183.0					Cut 2.6', slug catcher used

9413223.1017

DAILY BOREHOLE / WELL COMPLETION LOG						Boring or Well Number <u>299-W26-9</u>			Sheet <u>42</u> of <u>44</u>		
Location <u>S-10 D.L.L. &amp; Pond</u>						Project <u>W-017 S-10</u>					
Logged by <u>S. P. AIRHART</u> <span style="float: right;">Date <u>5/4/90</u></span> <div style="text-align: center;">Print <u>S.P.A.</u> Sign <u>[Signature]</u></div>						Drilling Contractor <u>LAH</u> Driller <u>BETTENDORF, THOMAS</u> Rig/Equipment <u>CRANE, HYD. JACKS</u>					
Reviewed by <u>S. GOODWIN</u> <span style="float: right;">Date <u>6/10/90</u></span> <div style="text-align: center;">Print <u>S. Goodwin</u> Sign <u>[Signature]</u></div>											
Lithograph Classification Scheme <u>N/A</u> Procedure <u>Do-1</u> Rev No. <u>0</u>											
Measuring Equipment <u>S-TAPE &amp; L300-17</u>											

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0700										on-site
0815										Finished welding 10" casing
0843										Setting jacks over hole
	Carbon Steel	10"	—	—	148.1'	8-20 mesh Bentonite	15 bags	117.9'	25.2'	122' ± 2.5' - 6.6'
							10 bags	102.2'	40.9'	106.3' ± 2.5' - 6.6'
0940	"	10"	135.5'	7.5'	128'		—	111.4'	16.6'	116.4' ± 2.5' - 7.5'
1005					128'		25 bags	72.5'	55.5'	77.5' ± 2.5' - 7.5'
1010	"	"	116.1'	7.0'	109.1'		—	84.8'	24.3'	89.3' ± 2.5' - 7.0'
1025	"	"			109.1'		25 bags	44.2'	64.7'	48.7' ± 2.5' - 7.0'
1040			96.4'	7.0'	89.4'		—	52.7'	36.7'	57.2' ± 2.5' - 7.0'
1045					89.4'		—	35.5'	53.9'	40' ± 2.5' - 7.0'
1050			78.7'	7.0'	71.7'		12 bags	24.6'	47.2'	29' ± 2.5' - 7.0'
1110			59.5'	6.9'	52.6'			33.4'	19.2'	37.8' ± 2.5' - 6.9'
1125					52.6'		12 bags	14.3'	38.3'	18.7' ± 2.5' - 6.9'
1135			39.0'	7.0'	32.0'			22.4'	9.6'	26.9' ± 2.5' - 7.0'
1142					32.0'		6 bags	12.9'	19.1'	17.4' ± 2.5' - 7.0'
1255			29.1'	8.8'	20.3'			17.5'	2.8'	22' ± 2.5' - 7.0'
1310					18.9'			18.5'		24.3' ± 2.5' - 8.3'
										Top of Dry BENTONITE @ 18.5'
										129 bags used

WIC-MR-0206



943223.1018

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-4Sheet 41 of 44Location 210 ditch & PondProject W017 210Logged by E.A. Koverman  
PrintDate 5-3-90Drilling Contractor KEHReviewed by S. Goodman  
Print

Sign

Date 6/10/90Driller G. Thomas, C. PettiboneLithograph Classification Scheme N/AProcedure DO-1Rev No. 0Rig/Equipment Pettibone Crown Drill JacksMeasuring Equipment Steel Tape # L500-03

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
1120	Carbon Steel	8"	189.6	8.3	181.3					Pull
								178.9	2.4	D/B 185.0 - 8.3 + 2.2
						3/8" Volclay Tablets	1) Squid	176.4	4.9	D/B 182.5 - 8.3 + 2.2
			189.6	9.4	180.2	bucket				Pull
								177.9	2.3	D/B 185.1 - 9.4 + 2.2
			186.8	6.6	180.2					Cut 2.8'
			186.8	7.1	179.7					Pull
								178.4	1.3	P/B 183.3 - 7.1 + 2.2
						0.20 mesh Bentonite (10) 50 lb bags		178.6	31.1	D/B 153.5 - 7.1 + 2.2
1155						crumbles				Lunch break
1249										S.P. Air-Loc takes over well logging using S-tape # L500-17
1258			173.8'	6.7'	167.1'			160.7'	6.4'	D/B 164.9' - 6.7' + 2.5' = 160.7'
1309					167.1'	"	10 bags	129.2'	37.9'	D/B 133.4' - 6.7' + 2.5' =
1320			154.7'	6.4'	148.3'			145'	3.3'	D/B 148.9' - 6.4' + 2.5' = 145'
					148.3'		4 bags	133.8'	14.5'	137.7' - 6.4' + 2.5'
1440										Pulled remaining 8" casing out of hole
1442	Carbon Steel	10"	145.1'	1.2'	143.9'			140.8'	3.1'	D/B 137.5' - 1.2' + 2.5'
										Added 10" casing for pulling
1500										Shut Down for fine work

MHC-MR-0205

9413223.1019

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-9  
Location S-10 DitchSheet 44 of 44  
Project W-017 S-10Logged by Karen R.O. Barton  
PrintKaren R.O. Barton  
SignDate 5/22/90Drilling Contractor KEHReviewed by S. Goodwin  
PrintS. Goodwin  
SignDate 6/10/90Driller Lydin + WatkinsLithograph Classification Scheme N/AProcedure DO-1Rev No. 0Rig/Equipment Cement truckMeasuring Equipment Engineer's Tape

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
1300										Central Pre-Mix Pouring Concrete Seal and Surface Pad
										Pad is 4'x4'x6" w/wire welded fabric reinforcement. Pad extends 24" Below ground surface
										Ref. WHC-S-014 Rev. 4
										Sec. 4.2.9.1, 4.2.10, 5.3.1
										Guard Posts and 6" Stainless steel Protective Casing are placed according to same Spec. Sections above. Top of 6" casing is 2.5' above Top of 4" Casing. Brass Cap Placed in Pad & Well Locked w/PNL Lock #2431.
										Finished Pad.
										Volume Used = ~ 1.3 yd <sup>3</sup>
										See attached Batch Slip.
										Note: See Also NCR# PNL-90-035 since the annular seal was too high
										5/24 6/10/90
										NOTE: Installed guard posts were painted safety yellow prior to install

WHC-MR-0206

9413223-1020

DAILY COREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-9Sheet 43 of 44Location S-10 DITCH + PONDProject W-017 S-10Logged by S. P. AIRHART  
PrintDate 5/4/90Reviewed by S. GOODWIN  
Print

Sign

Sign

Date 6/10/90Drilling Contractor KEHDriller BETTENDORF, THOMASLithograph Classification Scheme N/AProcedure Do-1Rev No. 0Rig/Equipment CRANE, HYD. JACKSMeasuring Equipment S-TAPE # L300-17

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
1345	Carbon steel	10"			18.9'	Cement	1.5 <sup>bags</sup>	4.6'	26.9'	Mixed 2 batches of cement each containing: 35 gals H <sub>2</sub> O 7 bags Portland 1 & 11 cement, 16 lb of aluminum powder
1400	"	"	18.9'	7.0'	11.9'			15'		
1410					6.1'			23'	9.1'	
1420					—			2'	—	Pulled remaining 10" casing out of hole
										D/B inside 4" S.S. = 204.88'
										below land surface
										Removed top 5' section of 4" S.S. casing. Added a 3' section. Green tag info on this section:
										PLP No. CR 9112 M.O. No. 2006
										P.O. No. 42493 Rel. IL
										stainless casing 4" x 3" sch. 5 T-304
										inspected by R. Stevens 7/29/90

WRC-MR-0205

9413223-1021

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 1 of 54Location S-12 TrenchProject W-017-S10Logged by AW Pearson Alan PearsonDate 3/13/90Drilling Contractor KEHChecked by S. Goodwin  
PrintSign  
A. MonkDate 6/10/90Driller N/ALithologic Classification Scheme FolkProcedure DO-1, Rev. 0Rev No. 0Rig/Method Steam CleanerMeasuring Equipment N/A

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1400			Witnessed Steam Cleaning of (19) lengths of 10" Carbon Steel Casing
							3 were rejected but allowed to remain on truck to be used at site as bridge.				All pipe was cleaned while on flat bed truck & covered with plastic when done.
											It will be allowed to well site tomorrow (3/14/90)
											Ref. WILC-S-011 Rev. 4 Section 7.6
											Steam Cleaning used: Temp. = 180° F
											Press. = 1600 PSI
							Rejected due to paint & cement & holes	1500			(3) ~18' long welded sections cannot be used.
											May be used as + rays

W = wet, M = m, D = dry

A 03 (01/90)

WHC-MR-0206

0.00

345 :- :-



WVA REG #223 01-CE-NT-RP-4231J8

MT REG #3401A

## CONCRETE

**545-8405**

**CRUSHED ROCK**

## SAND & GRAVEL

**FILL**

**CAUTION:** May cause eye or skin injury. Contains Portland cement. Freshly mixed cement, mortar, concrete, or grout may cause skin injury. Avoid contact with skin where possible, and wash exposed skin areas promptly with water. If any cement or cement mixtures get into the eyes, rinse immediately and repeatedly with water and get prompt medical attention. All claims for damages or shortages must be made within 24 hours of delivery.

**UNLOADING**  
ree unloading time 7½ minutes per cubic yard of concrete. Charge thereafter at posted truck rate. This concrete designed in accordance with specifications indicated below.  
We make deliveries inside the curb line at customer's risk only and accept no responsibility whatsoever for damages resulting from such deliveries.

LEAVE PLANT		ARRIVE JOB SITE		START DISCHARGE		FINISH DISCHARGE		ARRIVE PLANT		<input type="checkbox"/> TEST CYLINDERS TAKEN ADDITIONAL WATER ADDED TO THIS CON- CRETE WILL REDUCE ITS STRENGTH.	
11:34		12:18		13:00		14:00				ESTIMATED SLUMP AT UNLOADING <u>4</u> ADDED <u>2</u> GAL. WATER AT CUSTOMER REQUEST.	
SIGNATURE <u>Neil P. Hays 104825-22-90</u>											
ORDER NO.	CUSTOMER NO.	CPM PROJECT NO.	CUSTOMER POLYMER NO.		TICKET NO.		DRIVER				
007064	406010	601002	B2012/REL#34		09757		00009108		MARK H.		1
CUSTOMER				DELIVERY ADDRESS				DATE			
KAISER				200 WEST GATE				22-May-90			
OF INSTRUCTIONS				MAP				TIME DUE			
N FORD				10087				12:00			
QTY.	DELIVERED QTY.	ORDER QTY.	PRODUCT CODE	PRODUCT DESCRIPTION		UNIT PRICE	AMOUNT				
4.00	4.00	4.00	0300H	3000 SSK 3/4 5%							
						WC RATIO ALLOWED <u>152</u> TOTAL WATER ALLOWED <u>1002</u> MOISTURE'S <u>3 1%</u> <u>7450</u> <u>7405</u> <u>2</u> SAND <u>3%</u> <u>6040</u> <u>5864</u> <u>17</u> SUB TOTAL WATER BATCHED TOTAL AVAILABLE <u>10 GAL.</u> <u>8</u>					
LOAD SIZE	MIX NO.	MIX DESCRIPTION		SLUMP	AIR	CG	USE	TRUCK	PLANT	SUBTOTAL	
4.00	0300H	3000 SSK 3/4 5%		4.00	100	0.00		0982	1	TAX	
										TOTAL DUE	

Time 11:23:58 AM

225

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## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 3 of 54Location 200W S-10 trenchProject WCIT S-10Logged by R. Miller (GAI) Graduate Student Date 3/19/90Checked by S. Goodwin Sign A. Miller Date 6/10/90Lithologic Classification Scheme Folk Procedure PO-1 Rev No. 1Measuring Equipment 11ADrilling Contractor KEHDriller David LudtkeRig/Method EE 22W / Cable Tool

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							200E decom pad	0700			inspect rig - still need paint removed from 8" drive barrel.
											still some small grease spots.
											sm drive barrel OK.
								0710			begin to steam clean - rig and new 8" drive barrel temp 210°F
											1500 psi
							steam clean - OK!	0831			Op decom pad - rig completed
							SSD - E. Enloe (KEH) Site Supt, Affair	0850			Ar site - begin set-up
							RPT - Radiation Protection Tech.	0925			rig set-up completed - rig up work zone etc.
								1145			work zone completed - begin
							drive shoe O.D. = 11 3/4" (0.90')				weld-up of drive shoe - 10"
							10" d casing - carbon steel = 11.00'	1157		10.05'	stop - lunch
								1230			resume welding
								1340			J Gibson - WHC arrival site
								1343			J Gibson d parts
								1344			begin to drill w/ drive barrel
5.0	11H	2	RID	44ft	0		SAND (1% gravel, 97% Sand, 2% Alu) 1% fsp,	1355			to 5.0' sample DB
	moist	1	GAI	44ft			2% vcs 10% cs 30% ms 30% ls 25% fcs 2% Alu,				
							well sorted, Grain 100% mic, Sand 80% ms to 20%				
							Calcic, SA-R, vlt gray brn (1.8YR 3.2wt) cont.	1414			

W = wet, M = r. 7 dry

A- J3 (01/90)

WHC-MR-0206

7221 024

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11

Sheet 2 of 54

Location S-10 trench

Project W-017 S-10

Logged by R Miller (GAI) [Signature] Date 3/16/90  
Print Sign

Print

## Sign

Checked by S. Goodwin [Signature] Date 6/10/90  
Print Sign

Print

## Sign

Lithologic Classification Scheme Folk Procedure DD-1 Rev No. 0

Measuring Equipment n/a

Drilling Contractor KEH

Driller Darrel Luetke

Rig/Method BE-22W / Cable Tool[illegible]

W = wet, M = moist, D = dry

**A-1800-003 (01/90)**

7WHC-MR-0206

9443223.1025

## DAILY BOREHOLE LOG

Boring or Well Number 299 W26-11Sheet 5 of 54Location 200 W S-10 trenchProject W017 S-10Logged by R Miller (GAI) G. Miller Date 3/20/90Checked by S. Goodwin A. Miller Date 6/10/90Lithologic Classification Scheme Folk Procedure C-1 Rev No. 0

Measuring Equipment \_\_\_\_\_

Drilling Contractor KEHDriller Carrel LudkeRig/Method EE-22W-16 / Cable Tool

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							SSD. S. Toney (KEH)	1645		9.92'	Dr site - p clarity, 47°F, N-N-E 4-1/2
								1700		(20.00')	resume working 10" = 20.00' total
								1735			begin to drill
15.0	lith	2	P10	4det	0-5M		SAND (3% Gravel 95% Sand 2% Alud) 18mp	1804			to 15.0' - sample CB
	anal	1	GAI	4det			1% fp 1% sp, 10% vcs 20% cs 30% ms 20% fs 15% vcs				
							2% mud, med sorted, Gravel 80% mafic 20% felsic				
							Sand 70% mafic, 30% felsic, SA-R, vdk gray				
							brn (10YR 3/2 wet), med. strong or to 10% HCL,				
							unconsolidated - loose, trace f. micaceous Sand				
20.0	lith	2	P10	4det	0-5M		Slightly Gravelly SAND (6% Gravel, 73% Sand,	1825			to 20.0' - sample DB on (at C 032090
	anal	1	GAI	4det			2% Alud) 1% sp 1% up 2% fp 2% vcs, 15% vcs				
	20.0	2					25% cs 25% ms 15% fs 12% vcs, 2% mud, med			0.91'	at 10' f wild = 20.91' total
	anal	1					sorted, Gravel 80% mafic 20% felsic, Sand 70%			(20.91')	
							mafic 30% felsic, SA-R, vdk gray brn (10YR 3/2				
							wet) med. strong or to 10% HCL, unconsolidated -				
							loose, trace vcs, trace f. micaceous sand,				
							trace caliche, trace cement sand - siliceous?				
							(no or to 10% HCL) prob. interbeds	1935			resume drilling
25.0	lith	2	P10	11/1	0-5M		SAND (95% Sand 5% Alud) 5% cs 10% ms	1946			to 25.0' - sample DB
	anal	1	GAI	4det			35% fs 75% vcs, 5% mud, v. well sorted, 50%	1915			
							mafic 50% felsic, SA-R, vdk gray brn (10YR 3/2				
							wet) strong or to 10% HCL, unconsolidated - loose				

W = wet, M =

D = dry

A

03 (01/90)

WIC-MR-0206



9443223.1026

## DAILY BOREHOLE LOG

Boring or Well Number 299 W26-11Sheet 6 of 54Location 200 W 5-10 trenchProject W017 5-10Logged by R. Miller (GAI) [Signature]Date 3/30/90Drilling Contractor KEHChecked by S. Gossard  
Print

Sign

Date 6/10/90Driller Manuel LudkeLithologic Classification Scheme FolkProcedure AD-1Rev No. 2Rig/Method BE 22W #6 / G.H. Tool

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
30.0'	lith	2	PID	n/t	D-SM		25' sample continued - trace of mud lenses			(23.91')	total 10" casing
	moist	1	GM	4.6t			SAND (2% gravel 96% Sand 2% Mud)	1010			to 30.0' sample - DB
							1% fp 1% vfp, 20% vcs 25% cs 30% ms 11% fs	1015		9.80'	add 10" f well = 33.71' total
							10% vcs, 2% mud, med sorted, Gravel 85%	1040			RPT. R Olver arrives site
							matric 15% felsic, Sand 60% matric 40% f/v	1055			RPT. departs
							SA-R, v dk gray brn (10YR 3/2 wet) strong	1115			resume drilling
							rx to 10% HCL, unconsolidated - loose,				
							trace mp, trace f micaceous sand, trace				
							caliche fragments, inter bedded				
35.0'	lith	2	PID	4.6t	D-SM		SAND (97% Sand 3% Mud) 17% ms 40% fs	1135			to 35.0' sample - DB
	moist	1	GM				40% vcs, 3% mud, v well sorted, 40% matric				
							60% felsic, A-SR, v dk gray brn (10YR 3/2				
							wet), strong rx to 10% HCL, unconsolidated				
							loose to compact, f micaceous sand				
40.0'	lith	2	PID	n/t	D-SM		SAND (97% Sand 3% Mud) similar to 35.0'	1155			to 40.0' sample DB on Col L 032090
	moist	1	GM				sample	1200			stop - lunch
	20.0'	2						1240			resume drilling
	40.0'	2						1245		10.12'	add 10" f well = 40.03' total
	40.0'	2						385			resume drilling

W = wet, M = moist, D = dry

A-1800-003 (01/90)

MHC-MR-0206

9413223.1027

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 7 of 54Location 200W S-10 trenchProject W017 S-10Logged by R. Miller (GAI) [Signature]Date 3/22/90Checked by S. GoodwinSign [Signature]Date 6/10/90Drilling Contractor KEHDriller Carrel LudtkeLithologic Classification Scheme FolkProcedure DD-1Rev No. 0Rig/Method BE-22W "C" / Cable Tool

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
45.0	lith	2	PID	2det	0.3M	45.0	SAND (95% Sand 5% Mud) 5%ms 50%fs	1415		(40.03') total 10" casing	
	moist	1	GAI				40% vfs, 5% mud, v well sorted, 45% matrix			to 45.0' sample DB	
							55% felsic, A-SR, v dk gray brn (10YR 3/2 wet), strong rx to 10% HCL, unconsolidated - compact to dense, f sand is mica.				
50.0	lith	2	PID	2det	0.3M	50.0	SAND (95% Sand 5% Mud) 15%ms 50%fs	1440		to 50.0' - sample DB	
	moist	1	GAI				30% vfs, 5% mud, v well sorted - similar to 45.0' sample.	1453		RPT. R French arrives	
								1459		RPT. departs	
								1500		stop - radio silence per SSO	
							footage = 40'	1515		Dr sh	
							10" casing added = 20.03'				
							H <sub>2</sub> O added = 0 gallons				

W = wet, M = n D = dry

A. J3 (01/90)

WHC-MR-0206

9413223.1028

## DAILY BOREHOLE LOG

Boring or Well Number 299 W26-11Sheet 3 of 54Location 200 N S-10 trenchProject WD17 S-10Logged by R. Miller (SA) [Signature]Date 3/21/90Drilling Contractor KEHChecked by S. Goodwin[Signature]  
SignDate 6/10/90Driller Laurel LittleLithologic Classification Scheme FolkProcedure LD-1Rev No. 1Rig/Method BE-22W-6 / Cable ToolMeasuring Equipment Steel tape 9.30-08

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, BOUNDRINESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1040		(1033')	At site, p chd, 43°F,
							SSD E. Enloe (KEH) reports entrance moved	1100			begin work, tailgate meeting
							to S-SW corner of work zone	1130			meeting concluded - move out
								1200			entrance to work zone to S-SW.
							1d 49.70' b/c - 220'su + 2.50' = 50.00' b/c	1210			take rd - tape " 9.30-08
								1215			begin to drill
							driller has to use 1/2" rod	1240		9.02	add 10" f/wd = 57.05' total
								1025			resume drilling
								1035			RPT - M Copeland arrives - no sup.
								1050			RPT - departs.
55.0'	lith	2	P10	4det	D-SM		SAND (95% Sand 5% Mld) 15%ms 50%fs	1040			to 55.0' sample DB
	moist	1	GAT	4det			30% rfs, 5% sand, v. well sorted, 45% mafic				
							55% felsic, A-SR, v. dk gray bn (DYR 3/2				
							wt), strong rv to 10% HCL, unconsolidated				
							compact to dense, interbedded w/ mud				
							lenses that are cementing, f sand is mica.				
							SAND (95% Sand 5% Mld) - similar to	1055			to 120' sample DB on Col. 032170
100.0'	lith	2	P10	4det	A-SM		55.0' sample - no mud lenses.	1115		9.15'	add 10" f/wd = 67.00' total
	moist	1	GAT	4det				1120			stop - lunch.
	250ml Chem	1						1230			resume welding
	10ml VOA	2						1310			resume drilling
	40ml VOA	1									

W = wet, M = moist, D = dry

A-1800-003 (01/90)

WHE-MR-0206

9443223.1029

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 9 of 54Location 200 W S-10 trenchProject W017 S-10Logged by R Miller (GAI) GaudinDate 3/21/90Drilling Contractor KEHChecked by S. GaudinSign A. GaudinDate 6/10/90Driller Daniel LudtkeLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method BE-22W #6 / Cable Tool

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
65.0	lith	2	PID	Ldet	D-SM		SAND (98% Sand 2% Mud) 3% vcs 15% cs	1325		(67.00)	Total 10' casing
	minst	1	GM	Ldet			40% ms 25% fs 15% vcs, 2% mud, well sorted				to 65.0 sample DB
							40% mafic 60% felsic, SA-R, vdk gray				
							brn. (10YR 3/2 wrt), strong rx to 10% HCL				
							unconsolidated - loose, trace of concretions				
							v. strong rx to 10% HCL - C sand prob interbed				
							1 sand is micaceous				
70.0	lith	2	PID	Ldet	SM		SAND (77% Sand 3% Mud) 7% vcs 20% ms	1340			to 70.0 sample DB
	minst	1	GM	Ldet			40% fs 30% vcs, 3% mud, well sorted, 20% mafic	1400		8.85'	act 10' field = 75.85' total
							80% felsic, dk gray brn (2.5Y 4/2 wrt),	1445			RPT - M Cape land arrives site
							strong rx to 10% HCL, unconsolidated - loose,	1457			RPT - departs
							1 sand is micaceous	1500			stop welding - fire watch
								1516			Up site
							Footage = 20'				
							10' casing added = 27.02'				
							H <sub>2</sub> O added: C gallons				

W = wet, M = m D = dry

A J3 (01/90)

MHC-MR-0206

9443223, 1030

## DAILY BOREHOLE LOG

Boring or Well Number 297-W26-11Sheet 10 of 54Location 200W S-10 TrenchProject W017 S-10Logged by R. Miller (GIA) *R. Miller*Date 3/22/90

Print

Sign

Drilling Contractor KEHChecked by S. GoodwinDate 6/10/90

Print

Sign

Driller David LudtkeLithologic Classification Scheme FolkProcedure M-1Rev No. 0Rig/Method RE-22W 4" / Cable ToolMeasuring Equipment Steel tape L300-03

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							casing too high - no depth to bottom	16-11		(75.05')	At site - cloudy 41°F, N-NW 0-6 mph
							SSO - D. Wright (KEH)	0700			resume welding
								0750			begin drilling
75.0	1/4"	2	PID	Ldet	SM		SAND (91% Sand 9% Mud) 21% ms 25% fs	0810			to 75.0' sample 1B
	1/4"	1	GM	Ldet			35% rfs, 9% mud, well sorted, 15% mafic	0830			getting assist at 77.0' - clay lens
							85% felsic, A-SR, dk gray brn (2.5Y 4/2 wet), strong rx to 10% HCL, unconsolidated loose to compact, f sand is micaceous				in 0.2' thick w/ basalt gravel & VC sand, bedding at an angle ~ 70° not horiz.
76.0	1/4"	2	PID	Ldet	SM-M		Sandy GRAVEL (45% Gravel, 46% Sand, 9% Mud)	0840			to 76.0' - sample 1B on C/LC 0322-90
	1/4"	1	GM	Ldet			3% sc, 5% rfs, 10% ms, 10% fs, 10% rfs	0855			add 10' of water = 89.71' hole!
	1/4"	2					11% ms 10% fs 10% ms 10% fs 5% rfs, 7% mud	1015			resume drilling - advance casing
	1/4"	2					v. poorly sorted Gravel 35% mafic 15% felsic				and drill - not to pull cuttings
							Sand 25% mafic 75% felsic, SA-WR, dk gray brn (2.5Y 4/2 wet), not strong rx to 10% HCL	1030			wait for RPT - for SSO 1/4" hole!
							unconsolidated loose to compact, f sand is micaceous	1050			RPT - M. tape and assist - check
								1100			1A' sample - clean.
											resume drilling
80.0	1/4"	2	PID	Ldet	SM		SAND (95% Sand 5% Mud) 5% ms 20% ms	1105			to 80.0' sample 1B on C/LC 0322-90
	1/4"	1	GM	Ldet			40% fs 30% rfs, 5% mud, well sorted, 20% mafic	1112			RPT - separate
	1/4"	2					80% felsic, A-SR, dk gray brn (2.5Y 4/2 wet)				
	1/4"	2					mud rx to 10% HCL, unconsolidated loose to compact, lg mica flakes				

W = wet, M = moist, D = dry

MHC-MR-0206

9413223-1031

## DAILY BOREHOLE LOG

Boring or Well Number 299-WZ6-11Sheet 11 of 54Location 200 W 3-10 TrenchProject WOIT 3-10Logged by R. Miller (GAI) Grand

Print

Date 3/22/90Checked by S. Goodwin

Print

Sign A. HanksDate 6/10/90Lithologic Classification Scheme FolkProcedure DO-1Rev No. 0Drilling Contractor KEHDriller Daniel LuchteRig/Method BE-22W-46 / Cable Tool

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
85.0	lith	2	PID	4det	0-SAT		SAND (95% Sand 5% Mud) 5% cs 20% ms	1130		(84.71')	to 85.0' sample DB
	moist	1	GAI	4det			40% fs 30% rfs, 5% mud, well sorted, 20% mafic	1140		8.52'	adv 10" found = 93.23' total
							80% felsic, A-SR, dk gray brn (2.5Y 4/2 wet)	1220			Stop welding - lunch
							mod rr to 10% HCL, unconsolidated - loose to	1230			Resume welding
							compact, lg. mica flakes	1330			Resume drilling
90.0	lith	2	PID	4det	SM		SAND (2% Gravel 93% Sand 5% Mud)	1350			to 90.0' sample DB
	moist	1	GAI	4det			2% rfp, 5% rcs 8% cs 20% ms 35% fs 25% rfs,				
							5% mud, well sorted, Gravel 100% mafic Sand				
							30% mafic 70% felsic, A-SR, dk gray brn				
							(2.5Y 4/2 wet) mod to strong rr to 10% HCL,				
							unconsolidated - loose to dense, trace				
							concretions of rt sand (strong rr to 10% HCL)				
							f sand is micaceous.				
95.0	lith	2	PID	4det	SM-M		SAND (92% Sand 8% Mud) 7% ms 50% fs	1425			to 95.0' sample DB
	moist	1	GAI	4det			5% rfs, 8% mud, well sorted, 15% mica 35%	1455			stop - fire watch
							felsic, A-SR, dk gray brn (2.5Y 4/2 wet)	1515			Op site
							mod strong rr to 10% HCL, unconsolidated				
							compact to dense, sand is micaceous.				
							footage = 25'				
							10" casing record = 17.53'				
							H <sub>2</sub> O sat. 1.0 g/gallon				

W = wet, M = n

dry

A

3 (01/90)

WHC-MR-0206

9443223.1032

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 12 of 54Location 200 West S-10 TrenchProject W-017-S10-TrenchLogged by AW Pearson

Print

Alan Pearson

Sign

Date 3/23/90Drilling Contractor KEHChecked by S. Goodwin

Print

A. Goodwin

Sign

Date 6/10/90Driller Darrel LudtkeLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method BE22W/Cable ToolMeasuring Equipment L300-08

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
97.5'								0705		93.23'	Geologist arrives on site
							97.2' - 2.2' su + 2.5' add on = 97.5' D/B	0710			Take D/B
							93.23' + 9.66' = 102.89' Total 10" C.S. Casing	0715		+ 9.66'	Begin welding 10" Carbon
										= 102.89'	Steel Casing.
								0900			Resume Drilling - CB
			PID	< Det				0915			SSD monitors site
100'	Lith	2	GM	< Det	M		SAND: 2% Gravel, 95% Sand, 3% Mud	0920			Take special sample w/CB
	Moist	1					1% FP, 1% VFP, 5% U.S., 10% CS, 20% MS, 30% FS, 10% U.S., 3% M.				Loc # 032390 S10 W2611
	Chem	2				100'	Well - Moderately Sorted				
	WDA	2					Gravel: 60% Basaltic, 5% Qtz, 35% Granitic, SA				
							Sand: 30% Mafic, 10% Qtz, 50% Felsic, 10% Mica SA				
							Wet Color olive brown 2.5 Y 4/4: Weak Reaction				
							w/10% HCL: Unconsolidated:				
								0930			Resume Drilling w/CB
105'	Lith	2			M		SAND: tr Gravel, 92% Sand, 8% Mud	0945			Take Sample w/CB
	Moist	1				105'	tr VFP, 2% U.S., 10% CS, 20% MS, 25% FS, 35% U.S., 8% Mud				
							Well - Moderately Sorted				
							Gravel: 60% basaltic, 5% Qtz, 35% Granitic, SA				
							Sand: 30% mafic, 10% Qtz, 45% Felsic, 15% Mica SA				
							Wet Color olive brown 2.5 Y 4/4: Mod-Strong				
							reaction w/10% HCL: Unconsolidated:				
							Slightly finer grained than 100' sample				

W = wet, M = moist, D = dry

A-1800 003 (01/90)

WMC-MR-0206



9413223, 1033

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 13 of 54Location 200 West S-10 TrenchProject W-017-S10-TrenchLogged by AW Pearson

Print

Alan PearsonDate 3/23/90Drilling Contractor KEHChecked by S. Goodwin

Print

S. GoodwinDate 6/10/90Driller Darrel LudtkeLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method BE22W/Cable ToolMeasuring Equipment L300-08

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							102.89' + 9.10' = 111.99' Total 10" C.S. Casing	1000		111.99'	Begin Welding 10" Carbon
							C. Swanson (WMC) visits site: Wanted B-63	1030			Steel Casing
							GWMP for the completion.	1125			Resume Drilling - CB
110'	Lith	2	GM	<Det	M		SAND: 92% Sand, 8% Mud	1135			Take Sample w/ CB
	Moist	1					2% Qz, 5% CS, 10% MS, 35% FS, 40% VFS, 8% Mud				
							Well-Moderately Sorted				
							Sand: 25% Matrix, 10% Qz, 60% Felsic, 5% Mica, SA				
							Wet Color olive brown 2.5 1/4: Matrix				
							Strong reaction w/ 10% HCL: Unconsolidated				
								1140			Resume Drilling - CB
115'	Lith	2	GM	<Det	M		SAND: 95% Sand, 5% Mud	1150			Take Sample w/ CB
	Moist	1	PID	<Det			tr. CS, 15% MS, 35% FS, 45% VFS, 5% Mud				
							Well Sorted				
							Sand: 20% Matrix, 10% Qz, 60% Felsic, 10% Mica SA				
							Wet Color olive brown 2.5 1/4: Matrix				
							-Strong reaction w/ 10% HCL: Unconsolidated!				
							Becoming finer grained & more well				
							sorted.				
								1200			Break for lunch
							Noticed Thin Graded bedding 1' beds ~ 1/4" Thick	1230			Resume Drilling -
							10% VFS + silt.				

W = wet, M = m

0 = dry

A.

.03 (01/90)

WMC-MR-0206



943223-1034

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 14 of 54Location 200 West S-10 TrenchProject W-017-SK-TrenchLogged by AW PearsonAlan PearsonDate 3/23/90Drilling Contractor KEHChecked by S. Goodwin  
PrintA. Mark  
SignDate 6/10/90Driller Daniel LudtheLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method BE22W / Cable Tool

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
			PID	<Det				1235			SSO monitors site
							111.99' + 7.82' = 119.81' Total 10" C.S. Casing	1300		119.81'	Begin Welling 10" Carbon Steel Casing
								1420			Met Thorenson (KEH) arrives w/Back Hoe to install a dead man (anchor)
								1430			Resume Drilling - CB
								1450			Take Special Sample w/CB
120'	Lith	2	GM	<Det	M		SAND: 92% Sand, 8% Mud				COC# 032390510W2611
	Moist	1					tr. VCS, 2% CS, 15% MS, 25% FS, 50% VFS, 8% Mud				
	Chem	2				120	Well to Moderately Sorted				
	10A	2					Sand: 20% Mfic, 10% Qtz, 60% Fkic, 10% Mica SR				
							Wet color olive brown 2.544/4: Mod. -				
							Strong reaction w/10% HCL: Unconsolidated				
							Moisture content is increasing				
								1500			Resume Drilling - CB
								1520			Quit for Day
							footage = 97 - 120 = 23'				
							Total 10" casing added = 26.58'				
							No H <sub>2</sub> O added to borehole Today				

MHC-MR-0206

W = wet, M = moist, D = dry

A 1800 007 101 0001

DAILY BOREHOLE LOG						Boring or Well Number <u>299-WZ10-11</u>		Sheet <u>15</u> of <u>54</u>	
						Location <u>200 W 5-10 Trench</u>		Project <u>WO17 5-10</u>	
Logged by <u>R. Miller (GAI) General m. j. 11/16/90</u>						Date <u>3/26/90</u>		Drilling Contractor <u>KEH</u>	
Checked by <u>S. Goodwin</u>						Date <u>6/1/90</u>		Driller <u>Harold Ludtke</u>	
Lithologic Classification Scheme <u>Folk</u>						Procedure <u>DN-1</u>		Rev No. <u>0</u>	
Measuring Equipment <u>steel tape #6300-09</u>						Rig/Method <u>FE-22W #6 / Cable Tool</u>			

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								0645		(119.81')	At site - clean, 35°F, N 0-2 in ft.
								0700			grease rig
								0710			f.d. = 120.20' b/c
								0715			begin to drill
								0745			9.30' and 10' found - DB sl. wet.
										(129.11')	
								0930			welding completed - take f.d.
								0935			begin to drill
125.0'	lith	2	P10	n/t	M		SAND (94% Sand 6% Mud) 4% ms 55% b/c	1005			to 125.0' sample DB
	mscl	1	GAI	sdet			35% fs, 6% mud, well sorted, 15% mafic	1030			water in hole.
							85% felsic, A.S.R., ol. brn (2.5X 4/4 wet),				
							strong rx to 10% HCL, unconsolidated -				
							compact to dense, wet, f. sand is mica.				
130.0'	lith	2	P10	0.2 pm	W		SAND (95% Sand 5% Mud) similar to 125.0'	1030			to 130.0' sample DB on Col 603262
	mscl	1	GAI	sdet.			sample.				
	800ml										
	clay	1	P11	7			f.d. 126.70' b/c - 3.65' su + 2.5' cor = 125.55' b/c	1035			1d - 125.55' hole cannot - shut dn.
	100ml	2					10" casing to 126.46' hole caved.	1040			B" casing (162.79' - 9pm)
							shot down until 55 gal drums & liners arrive	1045			RPT - M (operator) arrives
							124.93' b/c - 3.65' su = 121.28' (due to casing)	1105			RPT departs w/ 124.93' b/c
								1200			stop - lunch
								1230			resume activity
							w/c 125.41' b/c - 3.65' = 121.76' b/c	1235			take w/c

W = wet, M = m. = dry

7443223.1036

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 16 of 54Location 200 W 5-10 TrenchProject W017 5-10Logged by P. Miller (GAI) [Signature]Date 3/26/90Drilling Contractor KEHChecked by S. Goodwin

Sign

Sign

Date 6/10/90Driller Daniel LuttkeLithologic Classification Scheme FolkProcedure PO-1Rev No. 0Rig/Method BE-22W #6 / Cat's ToolMeasuring Equipment steel tape # L300-03

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							1d. 126.39' - 3.66' su + 2.5' cur = 125.19' b/s	1240		(129.11')	take fd. - 125.19' b/s (3.03' h <sub>2</sub> o)
							3. Aichert - bailer should be here ~1330h	1250			SS gal drums & liners arrive
							will wait and get water sample				
								1330			M. Kerns arrives site w/
											teflon bailer
								1350			rinse bailer w/ distilled H <sub>2</sub> O
							w/ 121.8' b/s - no conductivity / PH / O <sub>2</sub>	1355			begin sampling - GL-1 9.2.5
							instruments on site, no therm for temp	1400			sample completed
							water v. turbid > 900ntu, no pump to	1407			drill casing & clean out hole
							filter for metals	1500			RPT - M. Copeland arrives
								1520			stop drilling - drilled to site
								1521			RPT. departs site
								1530			finish logging samples & clean
							Resurge = 10'				up area
							10" casing added = 9.30'	1535			Op site
							H <sub>2</sub> O added = 0 gallons				

W = wet, M = moist, D = dry

A-1800-003 (01/90)

MHC-MR-0206

9413223.1037

DAILY BOREHOLE LOG						Boring or Well Number <u>299 W26-11</u>		Sheet <u>17</u> of <u>54</u>	
						Location <u>200 W 5-10 Trench</u>		Project <u>W017 S-10</u>	
Logged by <u>P. Miller (GWR) G. S. D. J. H. ...</u>						Date <u>5/27/90</u>		Drilling Contractor <u>KEH</u>	
Checked by <u>S. Goodwin</u>						Date <u>6/10/90</u>		Driller <u>Charles Lentke</u>	
Lithologic Classification Scheme <u>Folk</u>						Procedure <u>DO-1</u>		Rev No. <u>0</u>	
Measuring Equipment <u>Steel tape # L300-03</u>								Rig/Method <u>PE-22W #6 / Cable Tool</u>	

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							SSO- E. Enloe (KEH)	0643		(129.11')	Ar site - clear 34°F-E 0-d mph
							8' casing - decon witnessed by A Pearson 5/26/90	0700			start rig - prep for w/c
							w/c - 123.12' blc - 2.17' su - 120.95' bls	0705			take w/c = 120.95' bls
							f.d. - 124.90' blc - 2.17' su + 2.5' cor = 125.31'	0708			take fld = 125.31' bls
								0710			prep casing to well
							drum #1 sealed -	0720			begin drilling to clean bit out
								0745			9.66' add 10" f add - 138.77' total
							shot down - per WHC - G. Swanson, B. Williams	0805			call from A. Pearson, stop drilling
							f R. Jackson, split spm required for contact				
								0905			welding completed - begin fire watch
							su 7.25' als				advance 10" to 131.52' bls
								0915			stop activity - continue f.w.
							Surfage = 0'	0939			Ar site for 200E decon
							10" casing added: 9.66'	1000			Ar 200E decon - (2) 4" split
							H <sub>2</sub> O added: 0 gal				take samples (1) sub assay, f(1)
							decon consisted of 190°F @ 1200 psi @				extra catheter added
							200 E temporary decon fluid	1050			call from A. Pearson - poss. issue
							drilling 3/28/90, clean out to bottom of 10% s/s	1120			decon completed OK wrapping
							Carrie Russell 373-5826 for drum #				

W = wet, M = moist, - = dry

A-1800-003 (01/90)

WHC-MR-0206

**322**

# DAILY BOREHOLE LOG

Boring or Well Number 299 W26-11

Sheet . 13 of 54

Location 200 W S-10 Trench

Project W017 S-10

Logged by R. Miller (GAI) [Signature]  
Print

Date 3/3/10

Drilling Contractor KEH

Checked by S. Goodwin  
Print

Sign  
A. Moul.  
Sign

Date 6/10/40

Driller *Darrel Ludtke*

Lithologic Classification Scheme Folk

Procedure As-1

Rev No. 2

Rig/Method EE-22N #6 / 16 1/2 T301

Measuring Equipment steel tape #L300-0A

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							tailgate meeting at 244 W36-B	0700		(13A.TI)	Ar site - clear, 11F, N 0.3m/h
								0720			no driller on site, meet adjourn
							decor of frame witnessed by L. Perennus	1322			frame pipe (178' x 2" 20") arrive
							on 5/20/40 @ 200E temporary decor. and.				on site with ST sample & tools
								1337			rejected tools to be steam clean
							w/k - 129.25' b/c - 7.25' s.u. = 121.00' h	1340			b/c w/k = 121.0' w/s
							H/D - 130.35' b/c - 7.25' s.u. + 2.5' cor = 125.65'	1345			b/c t/b = 125.63' 1/2 5.87' s'ough
							no decor performed on grout plant or hose	1425			grout plant w/ hose & bentonite
							for L. Perennus (grout plant has hyd. leak)				arrive site - no decor.
								1505			Op site - no further activity

WHC-MR-0206

W = wet M = month D = day

4

[illegible]

A 003 (01/90)

WHC-MR-0206

9443223-1040

## DAILY BOREHOLE LOG

Boring or Well Number 299-W21a-11Sheet 20 of 54Location 20W S-10 T10NProject NO17 S-10Logged by R Miller (GAI) [Signature] Date 3/30/90Drilling Contractor KEHChecked by S. Goodwin [Signature] Date 6/10/90Driller Daniel LuetkeLithologic Classification Scheme Folk Procedure DD-1 Rev No. 0Rig/Method BE-22W #6 / Cable ToolMeasuring Equipment steel tape # 6300-08

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1230		(130.71')	Ar site prepare to clean-out
								1235			good off site to get clip barrel
							R Miller Daniel Luetke meeting with	1301			Ar site - SSD D. Wright says
							S Somers, S Turner, D. Wright, & J Keller				not to drill - tailgate meeting
							w/c - 128.00' b/c - 7.20' s.u. = 120.80' b/s	1310			w/c = 120.80' b/s
							1/d - 129.39' b/c - 7.20' s.u. + 2.5' cor = 124.69	1315			1/d = 124.69' b/s (6.03' of drilling)
								1329			begin clean out to 133.0' b/s
							1/d - 136.53' b/c - 5.72' s.u. + 2.5' cor = 133.31'	1405			1/d = 133.31' b/s
								1410			begin change over for 5H
							Lubricate threads w/ vegetable oil - MHC-S-014,	1420			SSD checks cuttings & hole, <det
							Section 7.2				
								1436			begin to take ST
136.5'	lith	2			W		Slightly Muddy SAND (85% Sand 15% A.H.)	1440	24/4/13		to 135.31' - sample ST on ColC
	mod	1	GM	cdet			5% ms 30% fs 50% v/s, 15% mud, v. well sorted				033090
	silt	1					A-SR, of brn (2.5Y 4/4 wet) strong ex to 10%	1513			stop - cleaned out to 135'
							HCL, unconsolidated - compact to dense, &				10" casing to 133.05' b/s (5.72')
							sand is micaceous, trace of silt stringers				
							Footage = 5'				
							10" casing added: 0'				
							H <sub>2</sub> O added: 0 gallons				

MHC-MR-0206

9413223.1041

## DAILY BOREHOLE LOG

Boring or Well Number 299 WZla-11Sheet 21 of 54Location 200W S-10 TrenchProject W017 S-10Logged by R. Miller (GAI) G. J. W. J. L.Date 4/2/90Checked by S. Goodwin

Sign

Sign

Date 6/10/90Lithologic Classification Scheme FolkProcedure NO. 1Rev No. 0Measuring Equipment Steel tape # L300-03Drilling Contractor KEHDriller Harrel LutkeRig/Method BE-22W #6 / Cable Tool

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							p. cloudy, 98°F, N-NW 0-6 mph.	0645		(139.71')	Driller on site - no geol.
								0755			geol. on site - no dr. from fall
							w/c - 126.19' b/c - 5.46' su. = 120.73' b/s	1015			take w/c = 120.73' b/s
							f/d - 135.13' b/c - 5.46' su. + 2.5' cor = 132.17'	0830			take f/d = 132.17' b/s
							casing to 133.31' b/s (sch/ed)	0840			more SS geol. drms. arrive - prep
											to take water sample.
							water sample 12 PBC - 100ml, no PH/corr/temp	0845			take water sample on col C
							etc. taken, silty, @ 120.73' - 123.73'				090290-2 - w/ teflon bailer
								0850			begin to drill
							f/d - 137.45' b/c - 2.04' su. + 2.5' cor = 137.91'	0755			sound f/d - 137.91' b/s
							begin churn #3				
1400	lith	2	PID	Ldet.	M		Sandy MUD (35% Sand, 65% Mud), 5% fs	1005			to 1400' sample DB on Col C 090290
	moist	1	GIM	Ldet.			30% v/s, 65% Mud, r. well sorted, 35% mafic	1015			take f/d - 136.37' b/c - 2.04' +
	250ml	2					65% felsic, SA-SR, H. ol. brn. (2.5Y 5/4 wet)				2.5' cor = 136.83' b/s - casing
	40ml	2					r. strong rx to 10% HCL, slightly consolidated -	1035			shot drilling churn.
	VDA	2					stiff, sand is micaceous, sample is interbedded	1040		0.34'	resume - add 10" - f/d
							Sandy muds. to muds, trace clay, trace of	1100		(147.11')	J. Brodeur & R. Prier - WMC.
							Fe stains in spots.	1110			WMC - departs site
								1115			RPT - M. Capr. and arrives
								1130			RPT - departs
								1200			shop - lunch
								1230			resume welding

W = wet, M = mois., = dry

A-1000-003 (01/90)

WMC-MR-0206



9443223.1042

## DAILY BOREHOLE LOG

Boring or Well Number 299 W26-11Sheet 22 of 54Location 200 W 5-10 TrenchProject W017 5-10Logged by R. Miller (GAI) [Signature]Date 4/2/90Checked by S. Gussow [Signature]Sign  
SignDate 6/10/90Drilling Contractor KEHDriller David LuthkeLithologic Classification Scheme FolkProcedure AD-1Rev No. 0Rig/Method EE-22W 40 / Cable ToolMeasuring Equipment steel tape #L300-08

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION [PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.]	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1250		(147.11')	resume drilling - adv. casing
								1340			casing to 141.0' b's - cont.
							begin drum #9 - for H <sub>2</sub> O from pump				clean-out - 100'
								1400			bailing completed - ~40 gal.
							140 - 144.59' b's - (6.10' 3u + 2.50' 10r) = 140.99' b's	1445			b's fill = 140.99' b's - prep for S/T sample
142.44	lith	2	P10	nfl	W		SAND (92% Sand 8% Mud) 10% ms 22% fs	1445	3/5/91		to 142.99' - sample S/T
	moist	1	G101	Lead			60% ofs, 8% mud, v. well sorted, 20% mafic				w/l - 135.15' b's - 6.10' 3u =
247							80% lithic, sh. SR, H. ol brn (2.5Y 5/4 Ld)				129.05' rising
							strong rx to 10% HCL, unconsolidated - comp.				
							1 sand is micaceous.	1510			stop activity
								1526			driller dp site
								1535			geol dp site
							fracture 7.0'				
							10" casing added = 0.34'				
							H <sub>2</sub> O added = 0 gallons				

MHC-MR-0206

W = wet, M = moist, D = dry

A 1000 007 101 001

9443223.1043

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 23 of 54Location 200W S-10 TrenchProject W017 S-10Logged by R. Miller (GAI) [Signature]Date 4/9/90Drilling Contractor KEHChecked by S. Goosman  
PrintSign  
A. [Signature]  
SignDate 6/10/90Driller Samuel LudtkeLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method EE-22W #6 / Cable ToolMeasuring Equipment steel tape # L300-08

DEPTH	SAMPLES		CONTAMINATION		MOIS- TURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							clear, 49°F, E D-lump	0655		(147.11')	Ar sits - warm rig
							w/c = 137.22' b/c - 6.10' s.u. = 126.12' b/c	0710			take w/c = 126.12' b/c (53.9' b/c)
							t/d = 144.04' b/c - 6.10' s.u. + 2.5' cor = 140.44'	0715			take t/d = 140.44' b/c (141.01')
								0720			begin change to DB
								0730			stand-by for w/c
							w/c = 132.22' b/c - 6.10' s.u. = 126.12' b/c	0810			take w/c = 126.12' b/c
							attempt to drill to 145'	0813			begin to drill
								0830			to 144.9' - silt - from 143.0'
							t/d 140.57' b/c - 6.10' s.u. + 2.5' cor = 144.92' b/c	0835			take t/d = 144.92' b/c
								0840			begin tool change to ST
								0900			drive ST
146.72	lith	2	P10	146.72	M		Sandy MUD (35% Sand 65% Mud) 5% fs				to 146.92' - tool change to DB
	moist	1	GIM				30% w/c, 65% mud, v. well sorted, 35% mafic	0915			t/d 140.57' b/c - 6.10' s.u. + 2.5' = 144.75' b/c
	ST	1					65% f. mafic, 3A. SR, ol. brn (2.5Y 4/4 wet),	0935			take w/c 133.08' b/c - 6.10' = 126.98' b/c
							v. strong rx to 10% HCL, sl. consolidated-	1000			" 132.62' b/c - 6.10' = 126.52' b/c
							firm to hard, trace to some clay	1005			begin to drive 10"
							begin to drive - 144' drive #3 138-14.9	1030			casing to 143.61'
							144.73' b/c - 3.50' s.u. + 2.5' cor = 143.73'	1055			t/d = 143.73' b/c - losing hole?
							w/c 132.05' b/c - 3.50' s.u. = 128.55' b/c	1056			w/c = 128.55' b/c
								1100			continue to drive casing
							t/d 146.72' b/c - 1.02' s.u. 12.5' cor = 147.40' b/c	1130			casing to 145.28' b/c
								1135			tool change to ST

W = wet, M = moist, - dry

A-1000-003 (01/90)

MHC-MR-0206

9W3223.1044

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 24 of 54Location 220W S-10 TrenchProject W017 S-10Logged by R. Miller (GAI) Geo. J. Miller Date 4/3/90Drilling Contractor KEHChecked by S. Goodwin Sign S. Goodwin Date 6/10/92Driller Barrel LudtkeLithologic Classification Scheme Folk Procedure DO-1 Rev No. 0Rig/Method BE-22W 40 / Cable ToolMeasuring Equipment steel tape #L300-08

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1200		(147.11')	stop - lunch.
							146.73' - 1.02' su + 2.50' cor = 147.41' b/s	1235			HD = 147.41' b/s.
							130.61' - 1.02' su = 129.79' b/s	1240			w/c = 129.79' b/s
								1245			drive ST
149.41	1/4	2	PID		M-W		Muddy SAND (15% Sand 35% Mud) 5% ms	1255	5/11/17	6 149.41' - sample on Col. 010390	ST
	midst	1	GAI				20% fs 40% vfs, 35% mud, well sorted,	1305		131.06' b/c - 1.02' su = 129.24' b/s	
	25cm	2					30% mafic 70% felsic, SA SR, ol. brn (2.5Y	1325		132.5' b/c - 1.02' su = 130.68' b/s	
	40cm	2					4/4 wrl), v. strong rx to 10% HCL, unconsolid-	1345		132.5' b/c - 1.02' su = 130.68' b/s	
	VDN						ated - compact to dense, f sand is micaceous	1400		132.40' b/c - 1.02' su = 130.58' b/s	
							trace of fc grains in sand.			10" casing to 145.29' b/s	
								1415		132.29' b/c - 1.02' su = 130.47' b/s	
								1445		132.10' b/c - 1.02' su = 130.28' b/s	
								1502		131.91' b/c - 1.02' su = 130.09' b/s	
							holage = 16.5'	1525		131.78' b/c - 1.02' su = 129.96' b/s	
							10" casing added = 0'	16:35		131.42' b/c - 1.02' su = 129.60' b/s	
							1/20 added = 0.25' casing				lowered transducer into
											borehole. Transducer # 212302
											In Situ PRX 161-D - Full Scale
											Range of 10 psi.
											Transducer reading @ 4.55' set
											reference to that reading.
								1645			Start Test using 1mm. meas

W = wet. M = moist. D = dry

MHC-MR-0206

9443223.1045

## DAILY BOREHOLE LOG

Boring or Well Number 299-W24-11Sheet 25 of 54Location 200 W 5-10 TrenchProject W017 5-10Logged by R. Miller (GAI) [Signature]Date 4/4/90Checked by S. Goodwin  
Print

Sign

Sign

Date 6/10/90Drilling Contractor KEHDriller Darrel LottkeLithologic Classification Scheme FolkProcedure DO-1Rev No. 0Rig/Method BE-22W #6 / Cable ToolMeasuring Equipment steel tape # L300-08

DEPTH	SAMPLES		CONTAMINATION		MOIS- TURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							Clear, 48°F, W 0-2 mph	0700			At site
							tailgate meeting -	0702			stop data logger - (1.26')
							130.29' b/c - 1.82' = 120.47' b/c	0710			w/c = 120.47' b/c
							144.50' b/c - 1.82' su. + 2.5' cor. = 145.10' b/c	0720			H/c = 145.10' b/c stand. by.
								0800			call from B. Ulbricht WTK - log
											truck will be here ~ 0900
								0730			WTK - log truck arrives -
											B. Ulbricht & R. Price & R. Lohman
								0940			begin to set up for special
											gamma log.
							special gamma log.	1100			begin to log borehole
								1500			logging completed to 143.0' b/c
								1510			well secured.
								1525			log truck off hole
								1531			logging crew off site
							w/c 130.14' b/c - 1.82' su. = 120.32' b/c	1532			w/c = 120.32' b/c (probe from
											SGE was in water)
								1536			Op site

W = wet, M = moist, - dry

A-100U-003 (01/90)

MHC-MR-0206

9443223.1046

## DAILY BOREHOLE LOG

Boring or Well Number 299-W210-11Sheet 26 of 54Location 210W S-10 TrenchProject W017 S-10Logged by R. Miller (GAI) G. MillerDate 4/5/90Drilling Contractor KEHChecked by S. GoodwinSign A. MillerDate 6/10/90Driller David LudikeLithologic Classification Scheme FolkProcedure D-1Rev No. 0Rig/Method RE 22W 4/2 / Cable ToolMeasuring Equipment Steel tape # 1300-25

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							Clear, AB <sup>+</sup> , N-O-Zach	0710			At site
							129.98' b/c - 1.82' s.u. = 128.16' b/c	0705			take up = 128.16' b/c
								0730			V. McGeehan - PAUL arrives site
							water temp 14.3°C				to log hole, witness S KOS with
							log of natural gasman	0710			set-up completed. begin to log
							logged from 3.3 to 144.0' b/c	0745			logging completed
								1020			log truck off hole. Dp site
								1030			stand by
							WHL - has decided to advance hole w/	1315			call from S. Ainsworth - r.f.
							3" casing, 11" casing to have 5' of				ECN
							montmorillonite slurry added, then 8" casing will				grout plant to be delivered.
							be placed, hole to be advanced using contin-				
							uous split tube method.	1430			Truck driver here to pick up
											grout plant - Dp site to 200E
								1442			At 200E - slab yard - decou
											in process.
								1505			no decou of grout pump today
								1527			Dp 200E

MHC-MR-0206.

W = wet, M = moist, D = dry

9413223-1047

DAILY BOREHOLE LOG					Boring or Well Number <u>299-W36-11</u>		Sheet <u>27</u> of <u>54</u>	
					Location <u>W02W S-10 T10S</u>		Project <u>W017 S-10</u>	
Logged by <u>P. A. Miller (GAI)</u>					Date <u>4/6/90</u>		Drilling Contractor <u>KE4</u>	
Checked by <u>S. Goodwin</u>					Date <u>6/10/90</u>		Driller <u>David Lutke &amp; Bret Strade</u>	
Lithologic Classification Scheme <u>Folk</u>					Procedure <u>CO-1</u>		Rev No. <u>0</u>	
Measuring Equipment <u>steel tape</u>					Rig/Method <u>BE-23W #6 / Cable Tool</u>			

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							p. cloudy, 48°F, 1' 0-3 mph	0705			At 200E slabyard to witness
							WMC-S-014 Section 7.6, Rev 4, E1N124427	0715			begin decrn - 1400psi 155°F
								0830			decrn completed - decrn a
								0837			w/lt tape for A. Pearson.
								0838			decrn of tape completed
								0910			Up slabyard
							ble - 129.87' ble - 1.82' su = 128.05' ble	0925			At site - discuss Plan of chg
							fl - 143.90' ble - 1.82' su + 2.5' cor = 144.50' ble	0935			ble w/lt = 128.05' ble
								0940			take fl = 144.50' ble
							call to S. Aikant - ref. poss. heaving of fm	0945			begin to bail - 20 gal.
								0950	2°		decide that fm. may heave.
							fl 144.41' ble - 1.82' su + 2.5' cor = 145.09' ble	0951			add 20 gal drill water to prevent
								0955			ble fl = 145.09' ble
								0958			begin to install frame pipe
								1000			21.0' x 0.16' O.D. + 21.0' + 21.0'
								1002			C. Swanson - company arrives site
								1010			C. Swanson reports site
								1015			frame to 145.09' ble (147' fl)
							10' = 0.55' fm fl x 7.40 gal per '3 x 5 = 20.5 gal	1115			prep to mix bentonite - add
								1125			20 gallons fl <sub>2</sub> O.
											pump not working 'up.

WMC-MR-0206

9443223, 1048

# DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11

Sheet 22 of 54

Location 200 W 5-10 Trench

Project W017 5-10

Logged by R. Miller (GAI) Goodwin

Date 4/6/90

Drilling Contractor KEH

Checked by S. Goodwin

Sign A. Miller

Date 6/10/90

Driller Carol Ludtke & Brad Strate

Lithologic Classification Scheme Felt

Procedure 10-1

Rev No. 0

Rig/Method BE-22W #6 / Cable Tool

Measuring Equipment

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
253								1240			stop - lunch
								1230			resume stand-by wait for work
								1240			drain water out of pump
								1255			mechanic arrives
								1345			grout pump is down - replace-
											ment on way to 200E down
								1405			Grout off site to 200E
							to slab yard w/ N'd & grout plant	1430			Ar slab yard 200E - no one
											have to down?
							J. Keller arrives tells O. Amos "to pull	1433			no down to be performed - ?
							grout plant to site, has been rinsed				unit looks clean, some cement
							with site water, not a down hole tool"	1435			confirm w/ S. Aikhart
							Aikhart to call B. Gilkerson	1445			Op 200E
								1455			Ar site inspect grout plant
							grout plant has loose cement inside, hyp.	1500			call S. Aikhart - to wait on
							fluid spilled out side of reservoir,				phone call from E. Swanson
							rejected on site, reasonable doubt				
								1600			call from O. Amos - stand-by
											for weekend
							stand-down OK - may not be kept	1605			call B. Williams
							scal.	1620			Op site

MHC-MR-0206

W = wet, M = moist, D = dry

A 1900 007 101 000

4

WHC-MR-Q206

A-1800.003 (01/90)



WHC-MR-0206

9413223.1051

DAILY BOREHOLE LOG					Boring or Well Number <u>299-WZ6-11</u>		Sheet <u>31</u> of <u>54</u>				
					Location <u>200 W S-10 Ditch</u>		Project <u>W-017 S-10</u>				
Logged by <u>AW Pearson</u> <small>Print</small>			<u>Alan Pearson</u> <small>Sign</small>			Date <u>4/10/90</u>					
Checked by <u>S. Goodwin</u> <small>Print</small>			<u>A. [Signature]</u> <small>Sign</small>			Date <u>6/10/90</u>					
Lithologic Classification Scheme <u>Folk</u>					Procedure <u>DO-1</u>		Rev No. <u>0</u>				
Measuring Equipment <u>L300-08</u>					<u>E-Tape 10997</u>		Drilling Contractor <u>KEH</u>				
							Driller <u>Daniel Ludtke</u>				
							Rig/Method <u>BE22W/Cable Tool</u>				
DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							Cut 1.13' of 10" Carbon Steel Casing	0700			Driller & Geologist on site
							Yesterday 147.11' - 1.13' = 145.98' Total	0705			Clean site.
							10" C.S. Casing Stick up = 0.69'	0720			Resume Welding 8"
											Carbon Steel Casing
							123.00' - 2.69' = 120.31'	0915			Take 9" W = 120.31'
							138.8' - 2.69' S.W. + 2.5' cor. = 138.61'	0925			Take 9" B = 138.61' 7' Top of
											Volclay Pure Gold
							40.46' + 20.57' = 61.03' Total 8" C.S. Casing	0930			61.03' Welding 8" C.S. Casing
								0940			Take Blank VOA
											COC # 041090510WZ6-9
							C. Swanson, B. Williams, & Gilkerson inspect	0945			WMC visit
							site. All looks good.				
							61.03' + 17.15' = 78.18' Total 8" C.S. Casing	0930			78.18' Welding 8" C.S. Casing
							78.18' + 18.49' = 96.67' Total 8" C.S. Casing	1020			96.67' Welding 8" C.S. Casing
			MSA	<Det				1035			SSD monitors site
								1040			Geologist Leaves Site
								1130			Geologist Returns
								1200			Break for Lunch
							96.67' + 17.32' = 113.99' Total 8" C.S. Casing	1230			113.99' Welding 8" C.S. Casing
			MSA	<Det.				1245			SSD monitors site
							113.99' + 21.67' = 135.67' Total 8" C.S. Casing	1335			135.67' Welding 8" C.S. Casing
			MSA	<Det.				1340			SSD monitors sit

WMC-MR-0206

W = wet, M = moist, = dry

A- J-003 (01/90)

WM 3223, 1052

[illegible]

W = wet, M = moist, D = dry

WHC-MR-0206

9413223.1053

## DAILY BOREHOLE LOG

Boring or Well Number 299-W26-11Sheet 33 of 54Location 22W S10 T2N R6EProject NO17 S10Logged by P. Miller (GA) S. Goodman Date 4/11/90Checked by S. Goodman A. J. Smith Date 6/10/90Lithologic Classification Scheme Folk Procedure NO-1 Rev No. 0Measuring Equipment steel tape 13M-02Drilling Contractor KEHDriller Carol LudtkeRig/Method BE-22W #10 / Cable Tool

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							cloudy, 51°F, W 0-3 mph.	0605		(151.69')	As site - discuss well
								0700			resume drilling - 8" casing
								0755			advance 8" - drilling completed.
							SV 3.96' ab - 151.69' = 147.73' ±	0805			casing to 147.73' ±
							Penetration failed into 55 gal drum #10	0810			begin to bail w/ drill valve.
							Total drums = 4 of soils, 1 of groundwater				
							1 of mixed groundwater and bentonite.				
858							This drum is groundwater + bentonite mixed.	0815			Begin to fill drum #7
							1/d. 146.36' ± - 3.96' sv. 22.1' cor =	0835			to 146.36' (253' in 3')
							drum contains groundwater, soil, & bentonite	0906			begin to drill - clean out hole - drum
								0915			advance casing - drill clean out
								0930			to 1500' - begin drilling
								0936			shut-down - PPT arrives E. Clifford
											arrives - poss radon container
								0940			RPT - OK's resume drilling
1550	1 1/2"	2	P.O.	11/1	SM		Mud (5% Sand 95% Mud) 2% fs 3% vfs,	1030			to 1550' - sample AB
	moist	1	GA	400			95% mud, v. well sorted, Sand 100% medium.	1040		7.50'	begin adding 8" casing
							cl. brn. (2.5% 41 mud), v. strong rx to 10% HCL,			(154.19')	Total 8" casing.
							sl. consolidated firm to stiff, trace clay,	1150			resume drilling - advance casing
							trace of ls stains, trace of micaceous sand.	1200			stop - lunch.
							no layering apparent.	1230			resume drilling - bail hole to
											clean out.

W = wet, M = mo. = dry

A-1000-003 (01/90)

MHC-MR-0206

9443223.1054

# DAILY BOREHOLE LOG

Boring or Well Number 279 W26-11

Sheet 32 of 54

Location 200W S10 Trench

Project W017 S10

Logged by R. Miller (GAI) [Signature] - Karen R. O. Barton [Signature] R. O. Barton Date 4/11/90

Drilling Contractor KEH

Checked by S. Grew [Signature] Date 6/10/90

Driller David L. White

Lithologic Classification Scheme Falt Procedure CAI Rev No. 18

Rig/Method RE-22W 46 / Cable Tool

Measuring Equipment Steel tape #6300-08

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
								1300		(159.19)	RPT. B. Clifford arrives
							110-156.90' blc - 4.50' s.u. + 2.5' cor = 159.90'				take 1/2 - 154.90' b's - soft
								1400			Continue drilling
								1405			Drive Casing
								1415			Resume drilling
1160'	LITH	2	PID	<DET.	SL-H		MUDDY SAND: (65% sand 35% Mud.)				to 1100.0' - sample D.B.
	11051	1	GH				10% m.s., 25% f.s., 30% v.f.s., 35% mud.				
	25ml						well sorted, sand: 90% mafic, 10% felsic,				
	40ml	2					olive brown (2.54 4/4 wet) very strong reaction				
	YCA	2					to 10% HCl, (Inconsolidated - compact - dense,				
							trace clay, trace iron staining, trace v.f.				
							micaceous sand, grading toward mud				
							at depth.				
							157.52 - 2.25 s.u. + 2.5' cor. = 157.7'	1450			D/B = 157.7' b.i.s.
							151.38' blc - 2.25' s.u. = 151.13' blc	1510			w/L = 151.13' b.i.s.
							sealage = 10'				
							B' casing used - 7.50'				
							H <sub>2</sub> C added - Capillary				

WHC-MR-0206

9413223.1055

DAILY BOREHOLE LOG						Boring or Well Number <u>299 W26-11</u>		Sheet <u>35</u> of <u>54</u>	
						Location <u>300W S 10 Trench</u>		Project <u>W017 S 10</u>	
Logged by <u>R. Miller (GRI) [Signature]</u>						Date <u>4/12/93</u>		Drilling Contractor <u>KEV</u>	
Checked by <u>S. Goodwin</u>						Date <u>6/10/90</u>		Driller <u>Daniel Ludtke</u>	
Lithologic Classification Scheme <u>Folk</u>						Procedure <u>CS-1</u>		Rev No. <u>3</u>	
Measuring Equipment <u>steel tape 650m-03</u>									

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							clean, -12°F, N-W-N 2-2.5' up			(159.19)	As site stream is in hole - will use sand pump
								07:30			run rig
							11d-153.9' b/c - 2.25' sand = 151.35' b/c	07:30			take w/c 151.35' b/c
							11d-153.160' b/c - 2.25' sand 2.5' core = 153.85' b/c	07:30			take 11d-153.85' b/c
							begin down	07:55			begin in hole w/ sand pump
							11d-159.75' b/c - 2.25' sand 2.5' core = 160.00	07:55			take 11d 160.00' b/c
							Sub-surface for ST arrives - down witnessed by A. Thompson				
								08:55			begin ST.
1620	ST	1	PID	1620	M		140-161.0 MUD (15% Sand 85% Mud) 5% Fe	08:55			to 1620' sample ST
	11d	2	GAM				10% vts, 85% Mud, v. well sorted, Sand 50%	09:00			11d 159.46' b/c - RPT arrives
	moist	1	PH	7			ratio 50% felsic, ol. brn. (2.5Y 4/4 wet)	09:10			w/c 148.67' b/c - hard to get
							v. strong rx to 10% HCL, sl consolidated	09:20			begin clean out.
							firm to stiff, trace clay, trace Fe stains	09:45			7.50 add 6" f well
							no apparent bedding, f. sand is micaceous				(166.69) b/c 1"
							SLIGHTLY MUDY SAND (SPA CL 15/90)				
							161.8-162.0 SAND (8% Sand 15% silt)				
							5% ms 40% fs 40% vts, 15% Mud, v. well				
							sorted, 25% mafic 75% felsic, SA, ol. brn				
							(2.5Y 4/4 wet) v. strong rx to 10% HCL, unconsol.				
							compact to dense, trace Fe stains, trace				
							of mud, sand, silt, P. sand				

W = wet, M = moist, v = dry

A-1800-003 (01/90)

MHC-MR-0206

$$W = wpt \quad M = mnyk \quad D = dco$$

WHC-MR-0206,



9443223.1058

## DAILY BOREHOLE LOG

Boring or Well Number 299 W26-11Sheet 33 of 54Location SW 5.10 TrenchProject W217 5.10Logged by R Miller (GAI) [Signature] Date 4/13/70Drilling Contractor KEHChecked by S. Gaudin Date 6/10/90Driller David LutzkeLithologic Classification Scheme Folk Procedure DO-1 Rev No. 0Rig/Method BE-22W #6 / Cable ToolMeasuring Equipment steel tape #1 300.08

DEPTH	SAMPLES		CONTAMINATION		MOISTURE	GRAPHIC LOG	LITHOLOGIC DESCRIPTION (PARTICLE SIZE DIST., SORTING, MINERALOGY, ROUNDNESS, COLOR, REACTION TO HCL, ETC.)	TIME	H <sub>2</sub> O ADDED	DRILLING COMMENTS (DRILLING RATE, DOWN TIME, BLOW COUNTS, WATER LEVEL, DRILL FLUID, ETC.)	
	TYPE	NO.	INSTRUMENT	READING						CASING	
							cloudy, 42°F, S, 0-3 mph	0650		(166 ft)	At site - prep for w/c, warm rig
							165.21' b/c - 1.8' su + 2.5' cor = 165.91' b/c	0710			take 1/2 = 165.91' b/c - monitor
167.91	ST	1	PID	<det			Muddy SAND (79% Sand 21% Mud) 79% sand	0715			change tools to 12"
	114	2	GMA	<det			35% f.s. 35% v.f.s. 21% mud, well sorted,	0745			begin to drill
	burst	1	PH	6-7			10% mastic 70% f.s. SA-R, pl. brn.	0830			no progress - black sands are
	2.0m	2					(2.5T A/B det), strong vs to 10% f.s.,				erasing into hole - on standby
	10m	2					unconsolidated - cement to above	0840			call vicar S. Almont - clean
											out hole - prep for gravel
											log
								0850			begin clean out
								0855			cleanout done, hole
							168.31' b/c - 1.8' su + 2.5' cor = 169.01' b/c	0950			take 1/2 = 169.01' b/c - dry
							WMC witness S KOS.	1006			V. McGahan arrives site with
											truck - set-up to log
							log w/ natural gamma from 107.0' to 166.0' b/c	1030			begin to log back
								1145			logging complete
							Sealage 1'	1157			log truck departs
							1170-1172 - 0' f.s.	1200			stop lunch
							8" casing 0'	1230			resume - hold cap on well
								1245			well secure - good all site

MHC-MR-0206

DAILY BOREHOLE/WELL COMPLETION LOG				Boring or Well Number <u>299-W26-11</u>		Date <u>4/23/90</u>		Sheet No. <u>39</u> of <u>54</u>	
Location <u>200 EAST SEAB YARD</u>				Project <u>W-017</u>		S-10			
Logged by <u>S.M. Goodwin</u> <u>[Signature]</u>				Date <u>4/23/90</u>		Drilling Contractor <u>KEH</u>			
Reviewed by <u>S.P. Aikhardt</u> <u>[Signature]</u>				Date <u>6/13/90</u>		Driller <u>BRETT STRODE</u>			
Measuring Equip. <u>N/A</u>				Procedure <u>N/A</u>		Rig/Equipment <u>N/A</u>			
Time	Type	Casing/Screen Dia Length	Stickup	Depth	Annular Fill Type	Quantity	Depth	Over lap	Comments
1100									STEAM CLEANING
1100-1130									LUNCH
1240									STEAM CLEANING
1300									FINISHED STEAM CLEANING, STEAM CLEANED GRAB PUMP, 3 1/2" DIA. DART BAILER, 693' OF 1 1/4" DIA. TREMIE PIPE & 2 STEEL TAPES (L500-03 & L300-15) TEMP = ~200 F PRESSURE = ~1600 PSI ALL MATERIALS APPEAR VISUALLY CLEAN; TREMIE PIPE & BAILER WILL BE SEALED IN PLASTIC.

W/C-MR-0206

9403223.1060

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-11Sheet 40 of 54Location S-10 DitchProject W-017 S-10Logged by S. P. AIRHART

Print

Date 4/24/90Reviewed by S. GUDWIN

Print

Sign

Date 6/10/90

Sign

Lithograph Classification Scheme N/AProcedure NO-1Rev No. 0Measuring Equipment S-TAPE L300-17 (add 2.45')Drilling Contractor KEHDriller THOMAS, BETENDORFRig/Equipment Pettibone Crane / Hyd. Jacks

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0715										Geologist @ site - no KEH personnel
0730										Went to KEH steam cleaning pad to
										witness cleaning of equipment for
										U-12 well development.
0850	Carbon Steel	8"	166.69'							Geologist back to site. KEH added
	Add 5.5'		172.19'	7.25'	164.94'	D/Bottom		167.30'		5.50' of 8" casing
										No water in borehole.
2 65										Placed 1 1/2" tremie pipe into borehole
										(same pipe used in grout placement
										earlier on this borehole - has been
										covered w/ plastic) 173' - 7.3' =
										bottom of tremie @ 165.7'
1155										+ pumped
										Mixed 28-30 gals of H <sub>2</sub> O w/ 2 bags
										Volclay pure gold - mud weight = 10.2 lbs/gal
										take w/ Baroid mud balance.
1250										+ pumped
										Mixed ~45 gals of H <sub>2</sub> O w/ 3 bags
										Volclay pure gold @ 10.3 lbs/gal
										Pulled 63' of tremie out of
										hole to determine depth of grout.
1400										flushed ~5 gals of H <sub>2</sub> O through
										tremie to clean out

WMC-MR-0206.

WHC-MR-0206

9443223.1062

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W-26-11Sheet 42 of 54Location S-10 DitchProject W-017 S-10Logged by STEVE AIRIART  
PrintSPNDate 4-25-90Reviewed by S. Goodwin  
PrintA. Moul  
SignDate 6/10/90Lithograph Classification Scheme N/AProcedure 00-1Rev No. 0Drilling Contractor KENDriller THOMAS, BETTENDORFRig/Equipment PETTERONE CRANE / HYD. JACKSMeasuring Equipment S-Tape L300-17 (add-on = 2.45')

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0710										KEN + PNL geologist arrive on site
0740	Carbon Steel	8"	172.19'	7.25'	164.94'	Volclay Pure Guld	—	135'	29.9'	obtained D/slurry
										Decided to remove tremie and pull out 8" casing - Do not want to place too much slurry in borehole (want it to settle @ 153')
0845	"	"	159.19'	6.3'	152.9'					
0905			151.69'	8.6'	143.1'					Unable to determine D/slurry 10" started coming up w/ 8" casing - shut down - waiting for a device to hold 10" down.
0915	"	"	"	"	143.1'	Volclay Pure Guld	—	~131- 132'	~10'	Bottom of 10" now @ 143.23'. Piled ~ 2.2', cutting 25' off 10" casing.
0940										9" stainless steel casing and 10-slot channel-pipe screen installed - 10" green tagged.
1010-1240										Welding on collar which will hold 10" casing down.

WHC-MR-0206: 6

• (10/89)

9443223.1064

DAILY BOREHOLE / WELL COMPLETION LOG						Boring or Well Number <u>299-W26-11</u>			Sheet <u>44</u> of <u>54</u>	
Location <u>S-10 DITCH</u>						Project <u>W-017 S-10</u>				
Logged by <u>S. M. GOODWIN</u> <u>Alm. M. M.</u> Date <u>4/26/90</u>						Drilling Contractor <u>KEH</u>				
Reviewed by <u>S. P. AIRHART</u> <u>S.P.A.</u> Date <u>6/13/90</u>						Driller <u>THOMAS J. BETTERIDGE</u>				
Lithograph Classification Scheme <u>N/A</u> Procedure <u>DO-1</u> Rev No. <u>00</u>						Rig/Equipment <u>CRANE &amp; HYD JACKS</u>				
Measuring Equipment <u>L300-17 &amp; ENG. TAPE</u>										

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0700	CARBON STEEL	10"	149.43	4 15	149.28			140.9	2.30	D/BOTTOM = 140.9
0715										DEPART SITE FOR 200 E SLAR YARD TO
										WITNESS STEAM CLEANING OF BAILER
0730										STEAM CLEANING SAND PUMP
										TEMP = 165° - 190° F
										PRESSURE = 1600 PSI
0800										FINISHED STEAM CLEANING; CLEANED
										2 NEW SAND PUMPS & SEALED THEM
										IN PLASTIC
0830										BEGIN BAILING BOREHOLE
0840										REMOVED 1 BAILER OF MATERIAL FROM
										BOREHOLE; CONTAINS FINE SANDS
										& CONSIDERABLE VOLCANIC GROUT
0845								149.1	5.82	D/BOTTOM = 152.6' + 2.65' - 6.15'
										= 149.1. APPEARS TO BE A GOOD
										TAG, TAPE WAS CUMUL EXCEPT FOR
										ENDS OF WEIGHTS
0850										PREPARING TO RUN TRIMM PIPE
0900								149.6	5.32	D/B = 152.1' + 2.65' - 6.15'; HOLE
										HEAVED UP ~.5'. VOLCANIC MIXED WITH
										SAND AT END OF WEIGHT.
0910										SETTING TAPPING PIPE

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9413223.1065

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-11Sheet 45 of 54Location S-10 DITCHProject W-017 S-10Logged by S. M. Goodwin  
PrintAlvin M. Moul  
SignDate 4/26/90Reviewed by S. P. AIRHAET  
PrintS. P. AIRHAET  
SignDate 6/13/90Lithograph Classification Scheme N/AProcedure DO-1Rev No. 0Measuring Equipment L300-17 1 ENG. TAPEDrilling Contractor KEHDriller THOMAS I BETTENDORFRig/Equipment CRANE 1 HYD. JACKS

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0935	CARBON STEEL	10"	149.43	6.15	143.28					FINISHED SETTING TIE
0940	"	"	"	"	"			148.1	-4.82	D/BOTTOM = 148.1 ; 4.82' OF OPEN HOLE
										STILL GETTING GROUT ON TAPE WEIGHTS
1010	"	"	"	"	"	VOLCLAY PURE	3 SACKS			MIXING VOLCLAY PURE GROUT
						GOLD	BAGS			USED ~45 GALLONS H <sub>2</sub> O / 3 BAGS
1025	"	"	"	"	"	"				POURING VOLCLAY PURE GOLD, BATCH
										= 10.2 LBS/GAL. BOTTOM OF
										TIE PIPE = 134.9'
1035	"	"	"	"	"	"		134.35	8.93	D/GROUT = 134.35'
1040	"	"	"	"	"	"				REMOVING TIE
1110	"	"	"	"	"	"		133.75	9.53	D/GROUT = 133.75' (D/GROUT INCREASE
										DUE TO COLLAPSING OF TIE W/
										~5 GALLONS OF WATER.)
1125	"	"	"	"	"	"				PULLING 10"
1135	"	"	143.55	6.5	137.05	"		137.05	-0.8	PULLED 6.23' ; D/GROUT = 137.05
1200 - 1230	"	"	"	"	"	"				LUNCH
1240	"	"	"	"	"	"		137.35	-0.3	D/GROUT = 137.35 ; GOOD D/B.
										WEIGHTS WENT IN TO GROUT ~1'
										142.2' - 1.0' OF GROUT ON TAPE
										+ 2.65' TIE - 6.5' STICKUP
										= 137.35'. WILL ADD SAND
										FROM HERE

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9443223.1066

DAILY BOREHOLE / WELL  
COMPLETION LOG

Boring or Well Number 244-026-11

Sheet 46 of 54

Location S-10 DITCH

Project 13-017 S-10

Logged by S.M. GORDON

Print

M. H. H. H.

Sign

Date 4/26/90

Reviewed by S.P. AIRHART

Print

S.P. AIRHART

Sign

Date 4/13/90

Lithograph Classification Scheme

N/A

Procedure 10-1

Rev No. 0

Measuring Equipment L300-17 &amp; E116 TAPE

Drilling Contractor KEN

Driller THOMAS J. BETTENDUFF

Rig/Equipment CRANE &amp; HYD. JACKS

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
1245										STANDBY; NO 40-100 OR 40 MESH SAND ON SITE
1315	CARBON STEEL	10"	143.55	6.5	131.05	Volclay PORE		131.35	0.3	40-100 MESH SAND DELIVERED
1320	"	"	"	"	"	GOLD				ADDING SAND
1330	"	"	"	"	"	40-100 MESH ESLO	2 BAGS	136.75	0.3	D/SAND = 136.75; SAND IS STICKING TO SIDES OF GRouted 10" CASING
						(100 LB BAG)				
1332	"	"	"	"	"	"	1 BAG	131.75		ADDING SAND; D/SAND = 131.75?
								(?)		PROBLEMS GETTING GOOD D/SAND;
										SAND MISFIRE BRIDGES IN 10"
										WORKED TAPE DOWN FROM 124.25'
										TO 131.75' - NO GROUT ON TAPE, ONLY SAND PACK.
										WILL BEGIN SETTING SS CASING & SCREEN
1400	TYPE 304 STAINLESS STEEL END CAP	4"	0.32			GREEN TAGGED BY C. HOVEN	2/4/90;			SETTING STAINLESS STEEL SCREEN;
						NO PCP ON P.O. #	ITEM # 22			DRILLER'S WEARING CLEAN COTTON GLOVES
1405	TYPE 304 10 SLOT STAINLESS STEEL CHANNEL PACK CAP	4"	10.01			GREEN TAGGED BY R. STEVENS	1/22/90;			FOR INSTALLATION. ALL MATERIALS PACK-
						PCP # CR4112, P.O. #	42493, ITEM # 1			AGED & STAGED ACCORDING TO SPECS.
1415		4"	10.01							
	TOTAL SCREEN	=	20.34'							
1425	TYPE 304 SCH 5 STAINLESS STEEL CASING	4"	20.00	w/ CENTRALIZERS		GREEN TAGGED BY R. STEVENS				SETTING CASING
				(1/2 MON)		3/24/90; PCP # CR4112, P.O.				

4/26/90 PCL 16, ITEM # 2

A-1800-004 (10/89)

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(10/89)

9413223.1068

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W210-11Sheet 48 of 54Location S-10 DitchProject W-017 S-10Logged by S. P. AIRHART  
PrintS. P. AIRHARTDate 4-27-90Drilling Contractor KEHReviewed by S. Goodwin  
PrintS. GoodwinDate 6/10/90Driller THOMAS, BETTENDORFLithograph Classification Scheme N/AProcedure DO-1Rev No. 0Rig/Equipment PETTIBONE CRANE / HYD. JACKSMeasuring Equipment S-TAPE L300-17

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
0710										Geologist & KEH personnel @ site
0710	Carbon Steel	10"	143.5'	6.5'	137.05'	40-100 sand	—	133.3'	3.75'	
										Released tension of 4" s.c. - bottom is
										soft - settling in - Held s.c. w/
										crane @ 135.38' (5' at stickup)
0755	"	"	"	"	137.05'	20-40 Colorado silica sand	1/2 bag			
	"	"	"	"	137.05'	"	5 1/2 bags	120.5'	16.5'	Added sand and raised & lowered
										s.c. to stabilize bottom
0920	"	"	143'	7.0'	136'	"		121.1'	14.9'	Pulled 10" casing
0947			143'	8.0'	135'	"		120.2'	14.8'	No slag catcher for 10" casing &
1011			141'	7.4'	133.6'	"		120.6'	13'	available ∴ will cut pipe from
										inside out
1015										Site visit by Craig Swanson and
1030	"	"	138.8'	6.2'	132.6'	"		121.5'	11.1'	L. Vance of WHC
1045	"	"	136'	5.7'	130.3'			122.5'	7.8'	
1055	"	"	134'	6.2'	127.8'			122'	5.8'	
					127.2'	"	2 bags	120'	7.8'	
1135	"	"	129.1'	5.5'	123.6'			119.3'	3.8'	
1151	"	"	"	"	123.6'	"	1 bag	119.0'	4.6'	
1155	"	"	126'	6.4'	119.6'			120.4'	1.3'	
1200										Break for lunch.

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9443223.1070

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-11Sheet 50 of 54Location S-10 DitchProject W-017 S-10Logged by Llyn Doremus  
PrintDate 4/30/90Reviewed by S. Goodman  
PrintDate 6/10/90Lithograph Classification Scheme N/AProcedure DO-1Rev No. 0Measuring Equipment TAPE<sup>®</sup> L500-03,Drilling Contractor KEHDriller THOMAS I. BETTENDORF, TruckeeRig/Equipment PETTIBONE CRANE, JACKS

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
7:30										Geologist on site, waiting for drillers and pump rig to bail and settle sand pack
	Carbon Steel	10"	117.0	6.4	110.6			108.8		D/B 113.0 - 6.4 + 2.2
								131.6		D/B 138.0 - 6.4
	Stainless Steel	4"						135.3		D/B 139.7 - 6.4 + 2.2
										Add 7 gallons water (Dionized)
7:45										D/W 131.2 - 6.4 = 124.8
										Drillers and Pump Truck on site
										Prepare to surge, Surge 10 min.
										Bail ~ 9 gallons into barrel
	Carbon Steel	10"						108.8	1.8	D/B 113.0 - 6.4 + 2.2
										Let well recover
										D/W 138.8 - 6.4 = 132.4
9:00										Break down pump rig, move crane over drill hole
										Bail water settle ~ .25" mud in bottom of bucket containing 1 gallon H <sub>2</sub> O
										Pull
9:30	Carbon Steel	10"	117.0	7.4	109.6			109.5	0.1	D/B 114.7 - 7.4 + 2.2 - Top of Sand
						1/2" Volclay Tablets	(2) 5 gal. buckets	106.5	3.1'	D/B 111.7 - 7.4 + 2.2

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9443223.1071

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-1026-11Sheet 51 of 54Location S-10 DitchProject W-017 S-10Logged by Llyn Doremus  
PrintDate 4-30-90Drilling Contractor KEHReviewed by S. Goodwin  
PrintDate 6/10/90Driller G. Thomas, C. PettiboneLithograph Classification Scheme N/AProcedure Do-1Rev No. 0Rig/Equipment Pittibone Crane, JacksMeasuring Equipment Steel Tape # 6500-03

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
9:45	Carbon Steel	10"	117.0	7.4	109.6	1/2" Velocity Tablets	115 gallon bucket	105.3	4.3	D/B 110.5 - 7.4 + 2.2
	"	10"	117.0	8.9	108.1					Pull
								105.3	2.8	D/B 112.0 - 8.9 + 2.2
	"	10"	113.5	6.5	107.0					Pull, Cut 3.5'
								105.6	1.4	D/B 109.9 - 6.5 + 2.2
	"	10"	113.5	7.0	106.5					Pull
								105.8	0.7	D/B 110.6 - 7.0 + 2.2 - Top of Tablets
						8-20 mesh bentonite	25 50 lb bags	64.0	42.5	D/B 68.8 - 7.0 + 2.2
	"	10"	93.2	6.7	86.5	crumbles	bags			Pull to 93.2' weld, Cut
								72.8	13.7	D/B 77.3 - 6.7 + 2.2
10:45						"	25 50 lb bags	34.9	51.6	D/B 39.4 - 6.7 + 2.2
	"	10"	75.9	6.2	69.7		bags			Pull to 75.9' well, Cut
								44.0	25.7	D/B 48.0 - 6.2 + 2.2
11:20						"	(10) 50 lb bags	27.9	41.8	D/B 31.9 - 6.2 + 2.2
	"	10"	57.9	6.5	51.4		bags			Pull to 57.9' weld, Cut
								35.1	16.3	D/B 39.4 - 6.5 + 2.2
						"	(12) 50 lb bags	15.9	35.5	D/B 20.2 - 6.5 + 2.2
11:55							bags			Lunch break
12:30										Resume work
										Site safety officer reads PID < det.
	"	10"	38.7	6.4	32.3					Pull to 38.7' weld, Cut
								23.5	8.8	D/B 27.7 - 6.4 + 2.2

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132  
42  
6.0

9413223.1072

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299 1026-11Sheet 52 of 54Location S-10 DitchProject W-017 S-10Logged by L. Lynn Doremus

Print

Date 4-30-90Reviewed by S. Goodwin

Print

Date 6/10/90Lithograph Classification Scheme N/AProcedure DOTRev No. 0Measuring Equipment Steel Tape # L500-03Drilling Contractor KEHDriller G. Williams, C. BittencourtRig/Equipment Littleton Crane and Jack

Time	Casing/Screen					Annular Fill			Over-lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
	Carbon Steel	10"	38.7	6.4	32.3	820 mesh brick	(4) 50 lb bags	17.3	15	D/B 21.5 - 6.4 + 2.2
			20.9	7.2	21.7	Concrete		21.4	.3	Pull to 28.9' weld, cut
						Portland cement	794 lb			D/B 26.4 - 7.2 + 2.2 - Top of concrete
1315						Type I-II	bags			Mix concrete
						"	(5) 94 lb			Pour
1330	"	10"	20'	7.2	12.8		bags			Mix concrete
										Pour
						"	194 lb			Pull to 20.0' weld, cut
							bags			D/concrete ~ 8'
						"	194 lb			Mix concrete, Pour
1420						"	bags			Pull remaining pipe
								3.5		D/B
						"	194 lb			Mix concrete, Pump
1445							bags	2.0		Top of concrete
										Clear 1/2 site
										Geologist and KEH personnel off site
						Portland cement	14 bags			Total H <sub>2</sub> O Added 8 gallons (DI)
						1/2 inch tablets	3 tablets			Total
										Total
										Total H <sub>2</sub> O Boiled 9 gallons

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WHC-MR-0206



94/3223.1074

DAILY BOREHOLE / WELL  
COMPLETION LOGBoring or Well Number 299-W26-11Sheet 54 of 54Location S-10 DitchProject W-017 S-10Logged by Karen R. O. BartonKaren R. O. BartonDate 5/22/90Drilling Contractor KEHReviewed by S. GoodwinA. MoulDate 6/10/90Driller Lydin & WatkinsLithograph Classification Scheme N/AProcedure DO-1Rev No. 0Rig/Equipment Cement truckMeasuring Equipment Engineers Tape

Time	Casing/Screen					Annular Fill			Over- lap	Comments
	Type	Diameter	Length	Stickup	Depth	Type	Quantity	Depth		
1325										Central Pre-mix Pouring Concrete
										Seal and Surface Pad
										Pad is 4'x4'x6" w/wire welded
										fabric reinforcement. Pad extends
										to 30" below ground - and 12"
										Guard Posts and 6" stainless steel
										Protective Casing are placed in concrete
679										Top of 6" Casing is 2.5' above Top
										of 4" Casing. Brass Cap Placed in
										Pad and Well Locked w/ PNL Lock
										# 2431.
										Ref. WHC-S-014 Rev. 4
										Sec. 4.2.9.1, 4.2.10, 5.3.1.
1541										Finished Pad.
										Volume used = ~ 1.3 yd <sup>3</sup>
										See Attached B.T.L. Slip
										Note: See Also NCR # PNL-90-035
										since the annular seal was too high

MHC-MR-0206



# CENTRAL PRE-MIX CONCRETE CO.

11919 HARRIS ROAD • PASCO, WA 99301

INSPECTORS COPY

WA REG #223 01-CE-NT-PP-M311JB

ID REG #6204-AAA-1-3-3

MT REG #3461A

## UNLOADING

unloading time 7½ minutes per cubic yard  
increases. Charge thereafter at posted truck  
rates. This concrete designed in accordance  
specifications indicated below.  
make deliveries inside the curb line at cus-  
tomer's risk only and accept no responsibility  
except for damages resulting from such  
errors.

CONCRETE

SAND &amp; GRAVEL

545-8405

CRUSHED ROCK

FILL

CAUTION: May cause eye or skin injury. Contains  
Portland cement. Freshly mixed cement, mortar,  
concrete, or grout may cause skin injury. Avoid con-  
tact with skin where possible, and wash exposed  
skin areas promptly with water. If any cement or  
cement mixtures get into the eye, rinse immediately  
and repeatedly with water and get prompt medical  
attention. All claims for damages or shortages must  
be made within 24 hours of delivery.

LEAVE PLANT 7:34	ARRIVE JOB SITE 12:18	START DISCHARGE 13:00	FINISH DISCHARGE 14:00	ARRIVE PLANT :	<input type="checkbox"/> TEST CYLINDERS TAKEN ADDITIONAL WATER ADDED TO THIS CON- CRETE WILL REDUCE ITS STRENGTH.  ESTIMATED SLUMP AT UNLOADING <u>4</u> ADDED <u>2</u> GAL. WATER AT CUSTOMER REQUEST.
SIGNATURE <u>Mark H. 10418-22-90</u>					
ORDER NO. 007064	CUSTOMER NO. 406019	CPM PROJECT NO. 601002	CUSTOMER PROJ. NO. B2012/REL#34	TICKET NO. 09757	DRIVER 00009108 MARK H. 1
STATION KAISER			DELIVERY ADDRESS 200 WEST GATE		DATE 22-May-90
SPECIAL INSTRUCTIONS HANFORD					MAP 12:00
LOAD QTY. 4.00	DELIVERED QTY. 4.00	ORDER QTY. 4.00	PRODUCT CODE 0300H	PRODUCT DESCRIPTION 3000 5SK 3/4 5%	UNIT PRICE AMOUNT WC RATIO ALLOWED <u>1.52</u> TOTAL WATER ALLOWED <u>100.3</u> MOISTURE'S <u>3</u> 1% <u>7450</u> <u>7405</u> <u>75</u> SAND 3% <u>6040</u> <u>5864</u> <u>176</u> SUB TOTAL WATER BATCHED TOTAL AVAILABLE <u>10 GAL.</u> <u>87</u>
LOAD SIZE 4.00	MIX NO. 0300H	MIX DESCRIPTION 3000 5SK 3/4 5%	SLUMP 4.00	AIR 100	CC 0.00
			USE	TRUCK 0982	PLANT 1
			SUBTOTAL TAX TOTAL DUE		

Truck no.: 962  
3000# 5.0SK. 3/4"  
Zero

Batch size: 4.00 Yds.  
Time 11:21:35 AM  
Zero

Mix name: 0300H  
Date 22 May, 1990

3/4 RND 1.0 7595 7480 Lbs C  
ASTM. SAN 3.0 13483 13520 Lbs C  
Zero  
Zero  
WATER 1 674 663 Lbs C  
Zero  
Zero  
Zero

LAF2-1-2 1880 1930 Lbs D  
Zero  
Zero  
Zero

Water trim: -10.0 / Yd.

Time 11:23:58 AM