START

OCT 06 1993

Station # 12

ENGINEERING DATA TRANSMITTAL

1. EDT 160858

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Geosciences	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: 81235	6. Cog. Engr.: L. C. Swanson	7. Purchase Order No.: N/A
8. Originator Remarks: Approval/Release		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: N/A
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 9/30/93

OCT 1993 RECEIVED EDMC

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-EN-DP-070		0	Grout Treatment Facility Borehole Summary Report for 1989 - 1993 Update	3Q	1	1	

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng.L. C. Swanson	LC Swanson	9/30/93							
1	1	Cog. Mgr. R. L. Jackson	R Jackson	10/4/93							
1	1	QA W. R. Thackaberry	WR Thackaberry	10-4-93							
		Safety									
		Env.									
3		EPIC (2)(1)			H6-08						
3		Central Files (2)			L8-04						

18.	19.	20.	21. DOE APPROVAL (if required)
L. C. Swanson LC Swanson 9/30/93 Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	R. L. Jackson Ron Jackson 10/4/93 Cognizant/Project Engineer's Manager Date	Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (07/91) GEF097

INSTRUCTIONS FOR COMPLETION OF THE ENGINEERING DATA TRANSMITTAL

(USE BLACK INK OR TYPE)

BLOCK	TITLE	
(1)*	EDT	• Pre-assigned EDT number.
(2)	To: (Receiving Organization)	• Enter the individual's name, title of the organization, or entity (e.g., Distribution) that the EDT is being transmitted to.
(3)	From: (Originating Organization)	• Enter the title of the organization originating and transmitting the EDT.
(4)	Related EDT No.	• Enter EDT numbers which relate to the data being transmitted.
(5)*	Proj./Prog./Dept./Div.	• Enter the Project/Program/Department/Division title or Project/Program acronym or Project Number, Work Order Number or Organization Code.
(6)*	Cognizant Engineer	• Enter the name of the individual identified as being responsible for coordinating disposition of the EDT.
(7)	Purchase Order No.	• Enter related Purchase Order (P.O.) Number, if available.
(8)*	Originator Remarks	• Enter special or additional comments concerning transmittal, or "Key" retrieval words may be enter[illegible]
(9)	Equipment/Component No.	• Enter equipment/component number of affected item, if appropriate.
(10)	System/Bldg./Facility	• Enter appropriate system, building or facility number, if appropriate.
(11)	Receiver Remarks	• Enter special or additional comments concerning transmittal.
(12)	Major Assm. Dwg. No.	• Enter applicable drawing number of major assembly, if appropriate.
(13)	Permit/Permit Application No.	• Enter applicable permit or permit application number, if appropriate.
(14)	Required Response Date	• Enter the date a response is required from individuals identified in Block 17 (Signature/Distribution).
(15)*	Data Transmitted	
	(A)* Item Number	• Enter sequential number, beginning with 1, of the information listed on EDT.
	(B)* Document/Drawing No.	• Enter the unique identification number assigned to the document or drawing being transmitted.
	(C)* Sheet No.	• Enter the sheet number of the information being transmitted. If no sheet number, leave blank.
	(D)* Rev. No.	• Enter the revision number of the information being transmitted. If no revision number, leave blank.
	(E) Title or Description of Data Transmitted	• Enter the title of the document or drawing or a brief description of the subject if no title is identified.
	(F)* Impact Level	• Enter the appropriate Impact Level (Block 15). Also, indicate the appropriate approvals for each item listed, i.e., SQ, ESQ, etc. Use NA for non-engineering documents.
	(G) Reason for Transmittal	• Enter the appropriate code to identify the purpose of the data transmittal (see Block 16).
	(H) Originator Disposition	• Enter the appropriate disposition code (see Block 16).
	(I) Receiver Disposition	• Enter the appropriate disposition code (see Block 16).
(16)	Key	• Number codes used in completion of Blocks 15 (G), (H), and (I), and 17 (G), (H) (Signature/Distribution).
(17)	Signature/Distribution	
	(G) Reason	• Enter the code of the reason for transmittal (Block 16).
	(H) Disposition	• Enter the code for the disposition (Block 16).
	(J) Name	• Enter the signature of the individual completing the Disposition 17 (H) and the Transmittal.
	(K)* Signature	• Obtain appropriate signature(s).
	(L)* Date	• Enter date signature is obtained.
	(M)* MSIN	• Enter MSIN. Note: If Distribution Sheet is used, show entire distribution (including that indicated on Page 1 of the EDT) on the Distribution Sheet.
(18)	Signature of EDT Originator	• Enter the signature and date of the individual originating the EDT (entered prior to transmittal to Receiving Organization). If the EDT originator is the cognizant engineer, sign both Blocks 17 and 18.
(19)	Authorized Representative for Receiving Organization	• Enter the signature and date of the individual identified by the Receiving Organization as authorized to approve disposition of the EDT and acceptance of the data transmitted, as applicable.
(20)*	Cognizant Manager	• Enter the signature and date of the cognizant manager. (This signature is authorization for release.)
(21)*	DOE Approval	• Enter DOE approval (if required) by letter number and indicate DOE action.

*Asterisk denote the required minimum items check by Configuration Documentation prior to release; these are the minimum release requirements.

J.S.

Date Received: 9/24/93

INFORMATION RELEASE REQUEST

Reference: WHC-CM-3-4

Complete for all Types of Release

Purpose

- [] Speech or Presentation
  - [] Full Paper
  - [] Summary
  - [] Abstract
  - [] Visual Aid
  - (Check only one suffix)
- [] Speakers Bureau
- [] Poster Session
- [] Videotape
- [] Reference
- [X] Technical Report
- [] Thesis or Dissertation
- [] Manual
- [] Brochure/Flier
- [] Software/Database
- [] Controlled Document
- [] Other

ID Number (include revision, volume, etc.): WHC-SD-EN-DP-~~007~~ 020, Rev. 0

List attachments.

Date Release Required: September 24, 1993

Title: Grout Treatment Facility Borehole Summary Report for 1989 - 1993 Update

Unclassified Category: UC- N/A

Impact Level: 3 ~~4Q~~

New or novel (patentable) subject matter? [X] No [] Yes
If "Yes", has disclosure been submitted by WHC or other company?
[] No [] Yes Disclosure No(s).

Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions?
[X] No [] Yes (Identify)

Copyrights? [X] No [] Yes
If "Yes", has written permission been granted?
[] No [] Yes (Attach Permission)

Trademarks?
[X] No [] Yes (Identify)

Complete for Speech or Presentation

Title of Conference or Meeting: NA

Group or Society Sponsoring:

Date(s) of Conference or Meeting:

City/State:

Will proceedings be published? [] Yes [] No
Will material be handed out? [] Yes [] No

Title of Journal: N/A

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature Indicates Approval: Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	[]	[X]			
Patent - General Counsel	[X]	[]	OGC Memo 2/4/93	J.S.	9/24/93
Legal - General Counsel	[X]	[]	OGC Memo 2/4/93	J.S.	9/24/93
Applied Technology/Export Controlled Information or International Program	[]	[X]			
WHC Program/Project	[]	[X]			
Communications	[]	[X]			
RL Program/Project	[]	[X]			
Publication Services	[X]	[]	Approval per telecon Linda Hermann		9/24/93
Other Program/Project	[]	[X]			

Information conforms to all applicable requirements. The above information is certified to be correct.

	Yes	No
References Available to Intended Audience	[X]	[]
Transmit to DOE-HQ/Office of Scientific and Technical Information	[]	[X]

Author/Requestor (Printed/Signature): L. C. Swanson *L C Swanson* Date: 9/24/93

Intended Audience: [] Internal [] Sponsor [X] External

Responsible Manager (Printed/Signature): R. L. Jackson *R L Jackson* Date: 9/24/93

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.

APPROVED FOR PUBLIC RELEASE — DOCUMENT CONTROL — Date 9/24/93

Date Cancelled

Date Disapproved

THIS PAGE INTENTIONALLY
LEFT BLANK

SUPPORTING DOCUMENT

1. Total Pages 253

2. Title

Grout Treatment Facility Borehole Summary Report for 1989 - 1993 Update

3. Number

WHC-SD-EN-DP-070

4. Rev No.

0

5. Key Words

Well 299-E25-37 & -38, Well drilling and completion, Well development

6. Author

Name: L. C. Swanson

L C Swanson

Signature

Organization/Charge Code 81235/R4G41

APPROVED FOR PUBLIC RELEASE

L. Berkland 9/29/93

7. Abstract

This supporting document is a 1993 updated version of document WHC-MR-0203, *Grout Treatment Facility Borehole Summary Report for 1989*, authored by S. S. Teel of Pacific Northwest Laboratory for Westinghouse Hanford Company. The referenced summary report is being reissued and updated to document surface structural modifications to two Grout Treatment Facility wells, 299-E25-31 and 299-E25-37. Summary borehole information was previously reported for well 299-E25-31 in the *Grout Facility Dangerous Waste Permit Application* (DOE-RL 1990, Rev. 2) and WHC-MR-0203 for well 299-E25-37. The documented modifications to these wells demonstrate compliance with the most recent version of the Washington Department of Ecology's *Minimum Standards for Construction and Maintenance of Wells*, Chapter 173-160, Washington Administrative Code.

Swanson, L. C, 1993, *Grout Treatment Facility Borehole Summary Report for 1989 - 1993 Update*, WHC-SD-EN-DP-070, Rev. 0, Westinghouse Hanford Company, for Westinghouse Hanford Company, Richland, Washington.

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.

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

9. Impact Level ~~1Q~~ 3Q

10. RELEASE STAMP

OFFICIAL RELEASE BY WHC (11)

DATE OCT 06 1993

Station # 12

A-6400-073 (11/91) (EF) WEF124

THIS PAGE INTENTIONALLY
LEFT BLANK

CONTENTS

INTRODUCTION 1

DRILLING 5

WELL 299-E25-37 6

WELL 299-E25-38 6

WELL COMPLETION 7

WELL 299-E25-37 7

WELL 299-E25-38 8

WELL DEVELOPMENT 9

REFERENCES 11

APPENDIX A - AS-BUILT DIAGRAMS, GEOLOGIST'S LOGS, WELL COMPLETION/INSPECTION REPORTS, AND GEOPHYSICAL LOGS . . A.1

APPENDIX B - MOISTURE CONTENTS, SIEVE ANALYSIS, AND CHEMICAL SAMPLE DATA AND CHAIN-OF-CUSTODY FORMS B.1

APPENDIX C - NONCONFORMANCE/SURVEILLANCE REPORTS C.1

APPENDIX D - WELL DEVELOPMENT LOGS, ANALYSES RESULTS OF WATER SAMPLES COLLECTED BEFORE AND DURING DEVELOPMENT, AND PUMP INSTALLATION REPORTS D.1

THIS PAGE INTENTIONALLY
LEFT BLANK

INTRODUCTION

This report summarizes the drilling and well completion activities at the Grout Treatment Facility during FY 1989. Two wells were installed, 299-E25-37 and 299-E25-38. The locations of these wells are shown in Figure 1. These locations were chosen based on criteria outlined in DOE (1988) and Weekes et al. (1989). Table 1 shows a summary of drilling, completion, and well development information for the two wells. The following sections present a more detailed discussion.

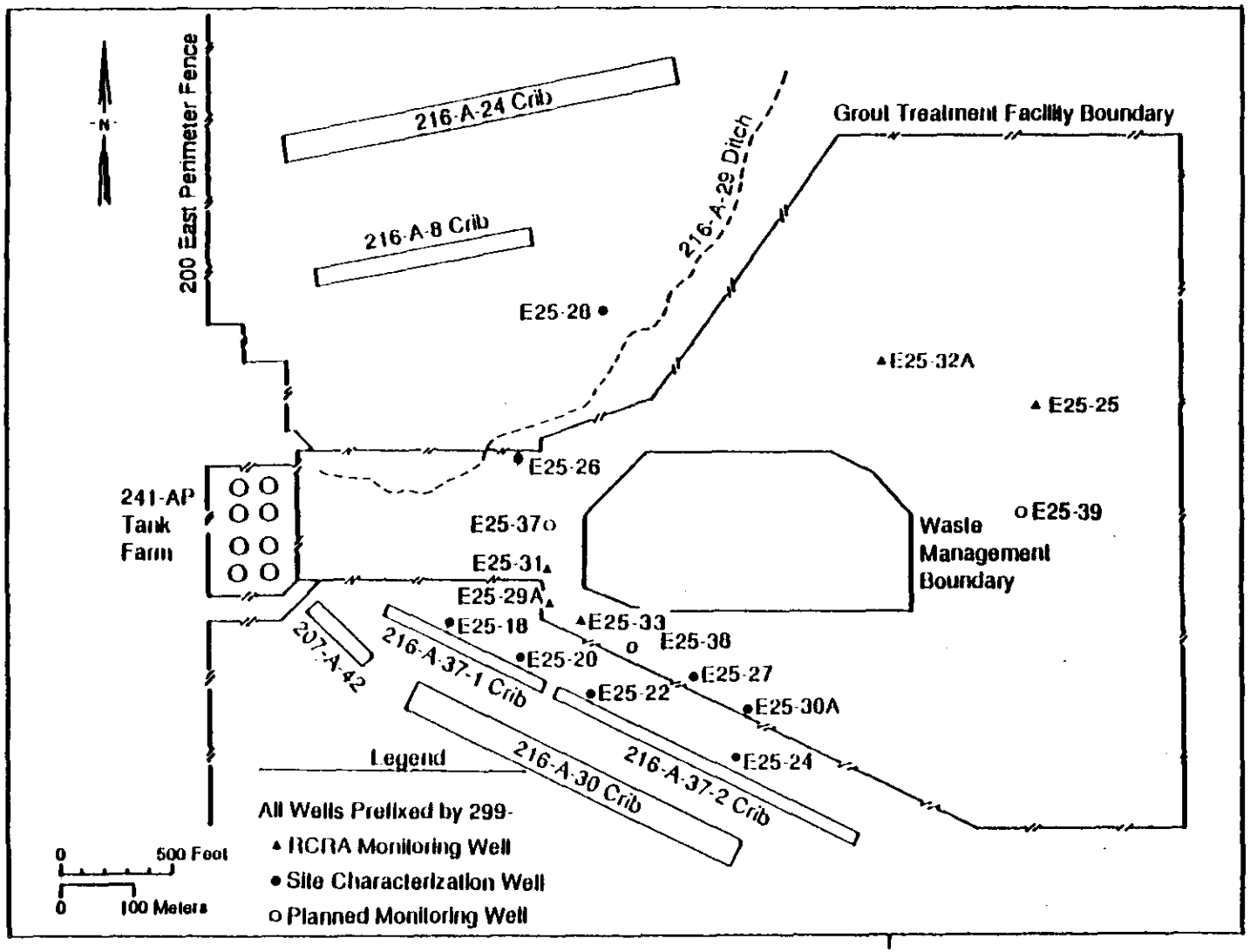


FIGURE 1. Ground-Water Monitoring Wells Near the Grout Treatment Facility

TABLE 1. Drilling, Completion, and Development Information for 1989 Grout Treatment Facility Wells

	Drilling Information			Completion Information				Development Information			
Well Number	Start Date	End Date	Total Depth	Screened Interval	Screen Slot Size	Screen Type	Start Date	End Date	Pump Type	Volume Pumped, gal	Final Turbidity, NTU
299-E25-37	6/14/89	7/13/89	280 ft	258.85 ft - 279.05 ft	10	Channel Pack	9/18/89	9/18/89	Submersible	698	1.1
299-E25-38	6/7/89	7/6/89	283 ft	258.58 ft - 279.63 ft	10	Channel Pack	9/18/89	9/18/89	Submersible	1091	1.4

(a) Turbidity values are in NTUs.

DRILLING

Both wells were drilled by Kaiser Engineers Hanford using the cable-tool drilling method. A drive barrel was used for drilling and sampling unless the material was too coarse to be removed by the drive barrel. In that case, the hard-tool bit was used, and samples were obtained via a bailer. All drill cuttings generated below the water table were contained. The borehole was kept open with temporary carbon steel casing. Pacific Northwest Laboratory (PNL) geologists were responsible for well installation documentation and sample collection and description. The as-built diagrams, geologist's logs, and well completion/inspection reports are shown in Appendix A. Lithologic samples were collected at 5-ft intervals or at changes in lithology. Samples for analysis of percent moisture were collected concurrent with lithologic samples during drive-barrel drilling, provided the moisture content of the sediments was representative (i.e., if no water was added by the driller). Moisture sample data are shown in Appendix B. The elevated moisture content shown in these data generally corresponds to intervals of finer-grained sediments. Samples for possible chemical analyses were collected at approximately 20-ft intervals or at changes in lithology. A total of 30 samples were collected, 13 from well 299-E25-37 and 17 from well 299-E25-38. Twelve of these samples were analyzed by United States Testing Company, Incorporated, for anions, total organic carbon (TOC), gross alpha, and gross beta. No unusual results were reported. Appendix B contains the chain-of-custody forms and analyses data for these samples. Sieve analyses were conducted on samples within the screened interval at both of the wells. These results are also shown in Appendix B. Both wells were logged with the natural gamma geophysical probe. These logs are shown in Appendix A. During the drilling of both of the wells, onsite monitoring was conducted using Geiger-Müller radiation detection meters and organic vapor analyzers. No contamination was detected by these instruments. Nonconformance/surveillance reports are shown in Appendix C. The following paragraphs summarize the specific drilling history of each well.

WELL 299-E25-37

Drilling began June 14, 1989, and continued until July 13, 1989, when total depth was reached (280 ft). A total of 153 ft 8 in. of 10-in. and 283 ft 9 in. of 8-in. temporary carbon steel casing was used. The sediments encountered were sand with varying amounts of mud (silt and clay) and gravel from 0 to 185 ft, from 190 to 195 ft, and from 270 to 275 ft; and sandy gravel to muddy sandy gravel from 185 to 190 ft, 195 to 270 ft, and 275 to 280 ft. The well was drilled using a drive barrel from 0 to 198 ft and a hard-tool bit from 198 to 280 ft. The well was logged with the natural gamma geophysical probe on June 28, 1989 (inside the 10-in. casing), and July 14, 1989 (inside the 8-in. casing). No perched water was encountered during drilling. The static water level measured on July 13, 1989, was 264.7 ft below ground surface. A total of approximately 520 gal of water was added during drilling, 330 gal of which were added below the water table.

WELL 299-E25-38

Drilling began June 7, 1989, and continued until July 6, 1989, when total depth was reached (283 ft). A total of 20 ft of 12-in., 154 ft 8 in. of 10-in., and 286 ft of 8-in. temporary carbon steel casing was used. The sediments encountered were predominantly sand with varying amounts of mud (silt and clay) and gravel from 0 to 175 ft, and 257 to 283 ft; and sandy gravel to muddy sandy gravel from 175 to 257 ft. The well was drilled using a drive barrel from 0 to 202 ft and the hard tool bit from 202 to 283 ft. The well was logged with the natural gamma geophysical probe on July 5, 1989 (inside the 8-in. casing). No perched water was encountered during drilling. The static water level measured on July 5, 1989, was 265.1 ft. A total of approximately 400 gal of water was added during drilling, 250 gal of which were added below the water table.

WELL COMPLETION

After total depth was reached, the wells were cleaned-out with a bailer. Following this, a straightness test was run. This consisted of passing a length of 6-in.-dia., 20-ft-long stainless steel casing to the bottom of the borehole without any binding. Both wells passed the straightness test. Then the drill rig was moved offsite, and the 4-in.-dia., 304 stainless steel permanent casing and screen were set with a pump-setting truck. Factory-welded stainless-steel centralizers were placed every 20 ft beginning at the top of the screen. The temporary carbon steel casing was backpulled with hydraulic jacks; this occurred as the annular fill and seal materials were added. The annular fill and seal materials consisted of Colorado silica sand, ¼-in. bentonite pellets, 8-20 mesh granular bentonite, and a cement grout seal. A concrete pad was then poured with a brass marker, and the 6-in. protective casing was installed. Four guardposts were installed around each well, and the brass marker was stamped with the well number. The following paragraphs describe the details of the well completion activities that occurred at each well. The datum for the measurements listed below is land surface.

WELL 299-E25-37

The 304 stainless steel casing and screen was set on August 10, 1989. A total of 259.95 ft of 304 stainless steel casing and 20.65 ft of 10-slot channel pack screen was used. The screen was placed from 279.50 to 258.85 ft, and the casing was placed from 258.85 to 1.1 ft above land surface. The Colorado silica sand filter pack was then added and the well was bailed to settle the filter pack material. The final placement of the silica sand filter pack was from 279.50 to 255.90 ft. The filter pack consisted of two sizes: 8-12 mesh (279.50 to 265.55 ft) and 10-20 mesh (265.55 to 255.90 ft). The bentonite pellets were placed from 255.90 to 253.20 ft. The granular bentonite was placed from 253.20 to 10.1 ft. The cement grout seal was placed from 10.1 to 3.0 ft. Due to a miscalculation in the amount of 10-in. casing pulled, the bottom of the cement grout seal is 10 ft higher than called for in the drilling specifications.

This was documented on a nonconformance report (Appendix C), but because this seal meets WAC 173-160 requirements, this was not considered to be a concern.

During excavation work in early 1993 along the west side of the Grout Pit, the cement grout seal and surface (concrete) pad at well 299-E25-37 were exposed, and in the case of the surface pad, damaged. A nonconformance report (NCR #050010) was issued against this well since this well no longer met Washington State well construction standards (Washington Administrative Code [WAC] 173-160). The well was remediated to bring it back into conformance. Dirt was recompacted around the cement grout seal to stabilize the upper section of the well (the cement grout seal was not damaged). The surface pad was repoured and extends from 0 to about 3 ft below the surface, and the remaining surface completion brought into compliance with the WAC. a revised well summary sheet for this well is included in Appendix A. The applicable NCR (#050010) is provided in Appendix C.

It should be noted that the same situation was simultaneously encountered at well 299-E25-31. NCR #050010 was also written against this well, and the same remedial action was taken to stabilize the well, complete the surface pad, and bring the well into compliance with the WAC. A revised well summary sheet is contained in Appendix A.

WELL 299-E25-38

The 304 stainless steel casing and screen was set on July 17, 1989. A total of 260 ft of 304 stainless steel casing and 21.05 ft of 10-slot channel pack screen was used. The screen was placed from 379.63 to 258.58 ft, and the casing was placed from 258.58 to 1.42 ft above land surface. The Colorado silica sand filter pack was then added, and the well was bailed to settle the filter pack material. The final placement of the 8-12 mesh silica sand filter pack was from 279.63 to 255.1 ft. The bentonite pellets were placed from 255.1 to 251.5 ft. The granular bentonite was placed from 251.5 to 19.28 ft. The cement ground seal was placed from 19.28 to 2.0 ft. A concrete pad was then poured, and the 6-in. protective casing was installed.

WELL DEVELOPMENT

Both of the wells were developed by pumping. A 7½ h.p. submersible pump was placed in each of the wells and pumped until a consistent turbidity value of less than 5 nephelometric turbidity units (NTU) was reached. All development water was contained. A total of 698 gal were pumped out of well 299-E25-37 with a final turbidity of 1.1 NTU. After 1091 gal were pumped out of well 299-E25-38, the final turbidity was 1.4 NTU. Well development logs are shown in Appendix D.

Ground-water sampling occurred before development at well 299-E25-38. This sampling consisted of the full suite of constituents (see Appendix D) to assist in determining appropriate purge water handling and disposal methods.

Two sets of samples were collected during development at each well, one after the wells were purged and one near the end of development. At well 299-E25-37, the first set collected consisted of the full suite of constituents to assist in determining appropriate purge water handling and disposal methods. All other samples collected during development only consisted of samples for metals and total organic halogen. The analyses results of all samples collected before and during development are shown in Appendix D. None of the analyses results was above the Interim Primary Drinking Water Standards (40 CFR 265, Appendix III).

The HydroStar® pumps were set at both of the wells on October 12 and 13, 1989. The pump installation reports are shown in Appendix D.

® HydroStar is a registered tradename of Instrumentation Northwest, Incorporated, Redmond, Washington.

REFERENCES

40 CFR 265, Appendix III. U.S. Environmental Protection Agency, "Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities." U.S. Code of Federal Regulations.

DOE. 1988. Grout Treatment Facility Dangerous Waste Permit Application. 88-27, prepared by Westinghouse Hanford Company for the U.S. Department of Energy, Richland, Washington.

WAC 173-160. Washington State Department of Ecology, "Minimum Standards for Construction and Maintenance of Wells." Washington Administrative Code.

Weekes, D. C., S. S. Teel, B. N. Bjornstad, and D. R. Newcomer. 1989. Interim Status Ground-Water Monitoring Plan for the Grout Treatment Facility. WHC-SD-EN-AP-006, Westinghouse Hanford Company, Richland, Washington.

THIS PAGE INTENTIONALLY
LEFT BLANK

APPENDIX A

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

WELL SUMMARY SHEET (After repairs - 1993)

Boring or Well No. 299-E25-31
Northing 135772.603 Easting 575948.194
Sheet 1 of 1

Location: Grout Treatment Facility
Project: W017
Elevation: 671.66
Drilling Contractor: Well pad repaired by KEH
Driller: Well pad repair-KEH
Drilling Method ~~and Equipment~~: N/A N/A
Prepared by: WHC (Sign/Print Name)
Reviewed By: [signature] / [signature] (Sign/Print Name) Date: 8-26-93

CONSTRUCTION DATA

Description

0-19' - 10" carbon steel temporary starter casing; no shoe

0-3' - cement grout

3-249' - bentonite slurry

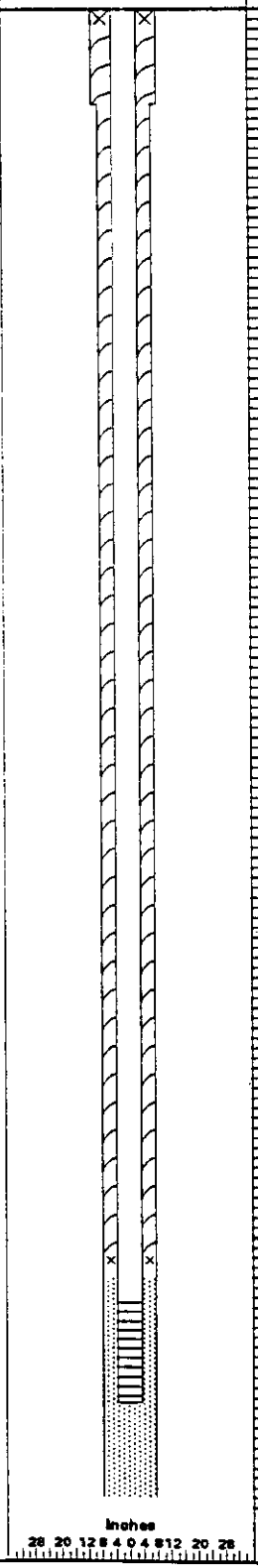
249-254' - betonite pellets

254-298' - 20-30 silica sand

0-298' - 8" carbon steel temporary casing; unknown shoe size

259-279' - 20' of 4" stainless steel screen; 0.020 slot

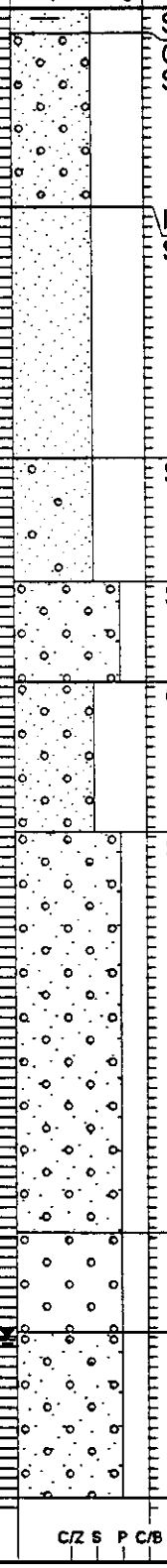
Well Construction



Depth in Feet: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300

GEOLOGIC/HYDROLOGIC DATA

Graphic Log



Lithologic Description

- Slightly Muddy Sand
- Gravelly Sand to Slightly Gravelly Sand
- Increasing fines near or at @40'
- Sand
- Slightly Gravelly Sand
- Sandy Gravel
- Gravelly Sand
- Sandy Gravel
- Gravel
- Sandy Gravel

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E25-37 Geologist TEEL, CHAMNESS, GREENWIN, JENSEN, GILMORE Page 1 of 3

Reviewed by J.L. McElhan Date 10-3-89

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		5		SAND
		10		SLIGHTLY MUDDY SAND
		15		SL. MUDDY GRAVELLY SAND
70'0" of 12" carbon steel		20		SL. GRAVELLY MUDDY SAND
		25		GRAVELLY SAND
		30		" "
		35		SAND
153'9" of 10" carbon		40		" SILT
STEEL CASING		45		"
		50		MUDDY SAND
		55		SAND
		60		"
293'9" of 9" carbon steel		65		SAND/SL. MUDDY SAND
		70		SAND
		75		"
260' of 4" stainless steel		80		SLIGHTLY MUDDY SAND
FINAL CASING		85		SAND
		90		SLIGHTLY MUDDY SAND
		95		SAND
CASING CENTRALIZER		100		MUDDY SAND
		105		SAND
		110		SAND
		115		SAND
		120		SLIGHTLY GRAVELLY SAND
		125		SLIGHTLY MUDDY SAND
		130		SAND

A-1800-198 (3/87)

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 209-E25-37 Geologist Teal Chamness — Goodwin, Jensen, Gilmore Page 2 of 3

Reviewed by [illegible] Date 10-3-89

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
153'9" of 10" Casing		135		Sand
Steel Casing w/ Drive		140		"
Shoe		145		"
"		150		Slightly Gravelly Sand
253'4" of 5" Casing		155		Sand
Steel Casing		160		"
		165		Gravelly Sand
		170		" "
				" "
		177		" "
		180		
		185		Sandy Gravel
260' of 4" Stainless		190		Gravelly Sand
Steel Final Casing		195		Muddy Sandy Gravel
		200		Sandy Gravel
		205		" "
		210		" "
		215		" "
Casing Centralizer		220		" "
		223		" "
		230		" "
		235		" "
		240		" "
		245		" "
		250		Muddy Sandy Gravel
		255		" " "
		260		" " "

A-1800-186 (3/87)

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E25-37 Geologist Teel, Chamness, Goodwin, Jensen, Gilmore Page 3 of 3

Reviewed by [illegible] Date 10-3-89

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
253' of 8" Carbon		265		Muddy Sandy Gravel
Steel Casing w/ Drive		270		Sl. Gravelly Muddy Sand
Shoe		275		Sandy Gravel
23.65' of 4" Dia. Type		280		
304 Stainless Steel				
Channel Pack-Screen				T.D. = 280'
				Completion Depth = 279.5'
Completion Symbols:				
Cement Grout				
Granular Bentonite				
Envirogel Tablets				
Silica Sand Pack				
Casing Joint				
Casing Centralizer				

A-1800-188 (3/87)

WELL SUMMARY SHEET (After repairs - 1993)

Boring or Well No. 299-E25-37
Northing 135818.40 Easting 575949.20
Sheet 1 of 1

Location: Grout Treatment Facility
Project: W017
Elevation: 670.70
Drilling Contractor: Well pad repaired by KEH
Driller: Well pad repair-KEH
Drilling Method and Equipment: N/A N/A
Prepared by: WHC (Sign/Print Name)
Reviewed By: Bruce A. Williams (Sign/Print Name) Date: 8-26-93

CONSTRUCTION DATA

Description

0-20.3' - 12" carbon steel temporary casing; no shoe

0-3' - concrete pad

3-10.1' - cement grout

10.1-253.2' - 8-20 granular bentonite

253.2-255.9' - 1/4" bentonite pellets

255.9-265.55' - 10-20 silica sand

265.55-279.5' - 8-12 silica sand

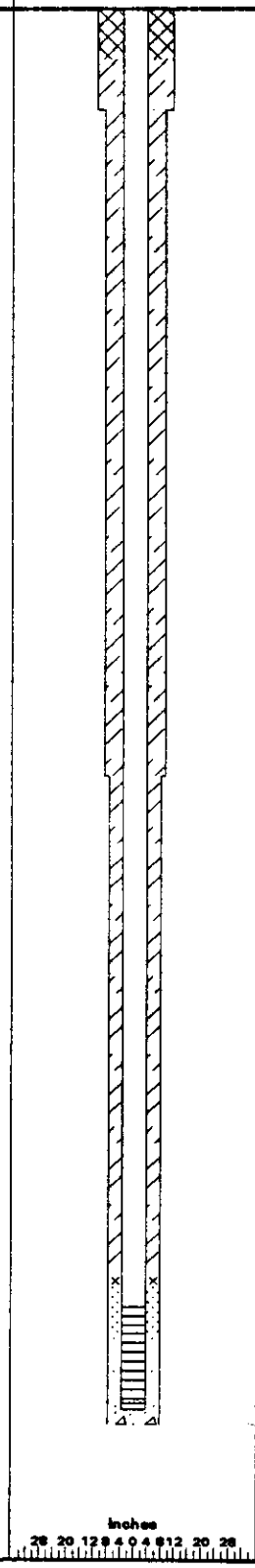
0-153.8' - 10" carbon steel temporary casing; unknown shoe size

279.5-283' - sluff

0-280.69' - 20.65' of 4" stainless steel screen; 0.010 slot

0-283.75' - 8" carbon steel temporary casing; unknown shoe size

Well Construction

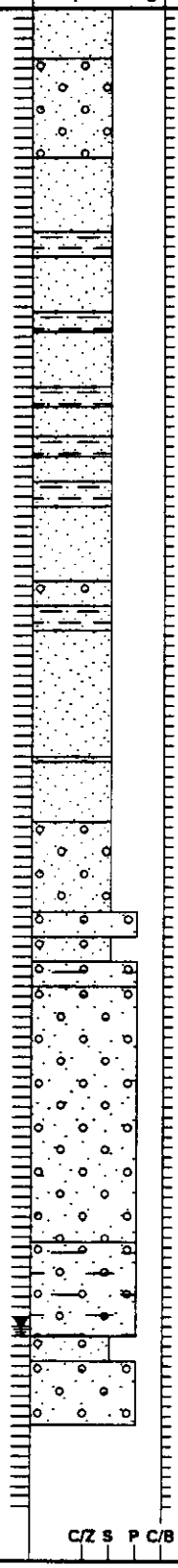


Depth in Feet

10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300

GEOLOGIC/HYDROLOGIC DATA

Graphic Log



Lithologic Description

0-10' Sand

10-30' slightly gravelly Sand

30-45' Sand

30-163' Interbedded Sands and Silty Sands

163-181 gravelly Sand

181-186' sandy Gravel

186-191' gravelly Sand

191-196' silty sandy Gravel

196-247' sandy Gravel

247-266 silty sandy Gravel

266-271' gravelly Sand

271-283.9 sandy Gravel

DRILL LOG

By	File	Well or	Computer Number	Project or Work	No.
S.S. Teel	22-14101 BE 22W Craig Wamsley	299-E25-37	NA	W-017	
Date: 6-14-89		Depth: 0' To 10'		Subcontract No.: NA	

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				(Rig was moved to site 6/13/89 and was set up)	0700	Arrive on site –
				Steam cleaning was done by KEH (not witnessed by PNL)		preparing to drill
	5'	D	Moist	SAND, 50% FS, 42% VFS, 8% mud. Very well sorted.	0820	
				25% basalt & mafics, 75% qtz, qtzite, feldspar, and Si-rich rock fragments. A-SR. Very strong reaction to 10% HCL.		
				Unconsolidated. 1 moisture, 2 pt jars taken.		
10'2" of	12"			Added 10'2" of 12" Casing (no drive shoe)	0845	Preparing to Add Casing
					0930	Drilling
					1000	Safety shuts down
						job because no RPT
					1115	RPT arrives –
						Drilling
	10'	D	Moist	SLIGHTLY MUDDY SAND (8% gravel, 82% sand, 10% mud	1130	
				2% MP, 4% FP, 2% VFP, 10% VCS, 15% CS, 30% MS,		
				20% FS, 7% VFS, 10% mud. Mod sorted. (Gravels):		
				80% basalt, 20% qtz & Si-rich A-SR. (Sand) 20% basalt, 15%		
				Feldspar, 65% qtz, qtzite, and other Si-rich. A-SR.		
				Strong reaction to 10% HCL. Wet color: 10YR 3/3 (dark brown).		

REMARKS: Unconsol. 1 moisture, 2 pt jars taken.

S.S. Teel
6-14-89

PNL-MA-567 DO-1, REV. 0

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

000 021 (5 85)

DRILL LOG	By: S.S. Teel	Rig: 22-14101	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: 10-017
	Date: 6-14-89	Craig	Depth: 10' To 20'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'2" +10'2" 20'4"					1200/1230	Lunch
				Added 10'2" of 12" Casing	1230	Adding Casing
					1340	Drilling
	15'	D	Moist	SLIGHTLY MUDDY GRAVELLY SAND (10% gravel, 80% sand, 10% mud). 2% MP, 6% FP, 2% VFP, trace VCS, 25% CS, 20% MS, 20% FS, 15% VFS, 10% mud. Mod. sorted. (Gravel)- 60% basalt, 40% qtz + Si-rich. (Sand)- 25% basalt + volcanics, 20% feldspar, 55% qtz, qtzite, + Si-rich rock fragments. Very strong reaction to 10% HCL. Unconsolidated. Wet color: 2.5Y 3/2 (very dark grayish brown). More gravel than previous. 1 moisture, 2 pt jars taken.	1430	
	20'	D	Moist	SLIGHTLY GRAVELLY MUDDY SAND (5% gravel, 80% sand, 15% mud). 1% MP, 2% FP, 2% VFP, 10% CS, 30% MS, 30% FS, 10% VFS, 15% mud. Mod-well sorted. (Gravel)- 60% basalt, 40% qtz + Si-rich. A-SR. (Sand)- 85% basalt + mafics; 75% qtz + Si-rich rock fragments. Strong reaction to 10% HCL. Unconsolidated. Wet color: 10YR 3/3 (dark brown).	1500	
					1510	Preparing to add casing
20'4" of 12"				More silt (mud) than previous. 1 moisture, 1 haz chem, 2 pt jars taken. C of C # 61489	1530	End of Day

REMARKS:

S.S. Teel
6-14-89

Pat - 1-567 D0-1, REV. 0

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	22-14101 BE-22W	[illegible]-625-37	NA	W-017
Date: 6-15-89	Craig W.	Dep: 20' To 25'		Subcontract No.: 114

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0700	Arrive on site
						- Greasing rig
20'5"				Added 20'5" of 10" casing and drive shoe	0715	Welding - switching
10' / 30'5"				Added 10' of 10" casing		to 10".
					1030	Drilling
	25'	D	Moist	GRAVELLY SAND (20% gravel, 75% sand, 5% mud).	1110	Sample w/ Core Barrel
				9% small cobble, 13% VCP, 29% MP, FP + VFP, 10% VCS,	1200/1230	Lunch
				40% CS, 15% MS, 5% FS, 5% VFS, 5% mud. Very poorly		
				sorted. (Gravel) - 80% basalt, 20% qtzite + Si-rich rock		
				fragments; A-WR (Sand) - 40% basalt + volcanics, 30% Si-rich		
				rock fragments, 30% qtz + gneiss. A-R. Wet color: 10YR 2/1		
				to 10YR 2/2 (very dark gray to very dark grayish brown).		
				No reaction to 10% HCL. Unconsolidated. Moisture +		
				2 pint jar samples taken.		
30'5"						

REMARKS:

S.S. Teel
6-15-89

PNL-MA-567 DO-1, Rev. 0

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

000 021 (6 86)

DRILL LOG	By: S.S. Teel	Rig: 22-14101 Craig Wansley	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-15-89		Depth: 25' to 30'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
30'5" of 10"						
10'2" 10'7"	30'	D	Moist	GRAVELLY SAND (25% gravel, 70% sand, 5% mud)	1300	
				22% VCP, 3% MP, FP, & VFP, 17% VCS, 25% CS, 18% MS,		
				5% FS, 5% VFS 5% mud. Very poorly sorted. (Gravel) 80% basalt,		
				20% qtzite & Si-rich rock fragments p.wR. (sand) - 30% basalt &		
				volcanics, 30% feldspar & Si-rich rock fragments, 40% qtz &		
				qtzite, A-SR. No reaction to 10% HCL. Wet color: 10YR 3/2		
				to 10YR 2/2 (very dark grayish brown to very dark brown).		
				Unconsolidated. Very similar to previous sample. Moisture	1320	Preparing to well
				and 2 qt jar samples taken.		
				Added 10'2" of 10" casing		
					1415	Drilling. Added
						2 gal H_2O @
						31'.
					1500	Added 2 gal H_2O.
40'7"	of 10"					

REMARKS:

Note: Samples are noticeably more moist at well 299-E25-37 compared to 299-E25-38, from 0-30'.

S.S. Teel
6-16-89

PNL-MA-5 DO-1, REV 0

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

3 3

DRILL LOG	By S.S. Teel	Rig 22-14101 Craig Wamsley	Well Number 699-E25-38	Computer Number NA	Project or Work Order No. W-017
	Date 6-15-89		Depth 30' To 35'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
40' 7"	10'				1530	End of day. Drilled to 35' but couldnot get sample to stay in the barrel.

REMARKS:

S.S. Teel
6-15-89

Total H_2O Added today = 41 gal

Proj. MA-560 Dr. 1, Rev. 0

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. M. GOODWIN	BE 22W	299-E25-37	N/A	W-017
Date: 16 JUNE 1989	#22-14/101	Depth: 35' TO ~38'		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 CRAIG WAMSLEY	0700	SAFETY MEETING
					0800	SERVICING RIG
					0815	DRILLING
	35'	D	M	SAND: TRACE GRAVEL, 95% SAND, 5% MUD,	0825	SAMPLED w/ CORE
				5% VCS, 20% CS, 50% MS, 10% FS, 10% VFS,		BARREL; 2 PT.
				5% MUD. MODERATELY SORTED. SANDS ARE		6" SAMPLES, NO
				40% BASALT, 60% QUARTZ, 0-2 INS, 1 PLAG;		MOISTURE CONTENT
				SA TO SR. WET COLOR IS 10 YR 3/2 (VERY DARK		ADDED 3 GALLONS
				GRAYISH BROWN). FINES REACT MODERATELY TO 10%		H_2O BEFORE SAMPLING
				HCL. UNCONSOLIDATED. LESS GRAVEL THAN 30'	0835	WORKING ON RIG
					0840	DRILLING
				CUTTING & BEVELING CASING	0900	PREPARING TO WELD
					0935	DRILLING
					0945	PROBLEMS w/ CLUTCH
						ON RIG
					1005	CUTTING & BEVELING
						CASING
					1025	KELL MECHANIC WORKING
						ON RIG

REMARKS:

PNL-MA-567 DP-1, REV. 0

6/16/89

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

A-17

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. M. Goodwin	BF 22	299-E25-37	N/A	N-017
Date: 16 June 1989	#22 · 11/101	Depth: ~38' To ~38'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1200 - 1230	LUNCH
					1245	INFORMED BY KEH
						THAT RIG WILL BE
						DOWN FOR THE DAY.

REMARKS:

PNL-MA-567 DI-1, REV. 0

Shelton Mark · 6/16/89

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

JO 021 (5 85)

1 of 1

DRILL LOG	By: MA Chauvenes	Rig: PE 22w 22-1401 Gray?	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W1-017 Grout
	Date: 6/19/89		Depth: 38' To 42		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10'2" of 10'2"	10"			Apparently welded on 10'2" of 10" on Friday. Driller is not here at the moment, so the rig must still be broken down.	720	
30'9" of	10"			Drill rig has been fixed, driller tried it out by drilling a little, down to ~39'-40'. Will take sample from next barrel	1400	
	42'	C	dry	SAND: 1% gravel, 10% vcs, 22% cs, 50% ms, 10% fs, 4% vfs, 3% mud. US Sand - 60% basalt, 25% rk frags, 15% qtz; VA-A No cyn in HCl. Unconsolidated, Dry color: ~10YR5/3 (brown) on fines, overall grayish brown.	1505	
				Haz chem sample collected - c.of.c. # 61989 SSS 10/16/89	1520	quit for day

REMARKS:

PNL-MA-567 DO-1 Rev. 0

MA Chauvenes 6/19/89

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

A-19

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG	By: T Gilmore, Date: 6/30/89	Rig: BE 2000, 22-Ton Kaiser, Craig Chinsky	Well Number: 299-E25-37, Depth: 112' to 145'	Computer Number: N/A	Project or Work Order No.: W-017 Grout, Subcontract No: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
50' 9" of 10"					700	Drilling
9' 9"				Kaiser Safety checked area with CGM Meter - Background	715	check w/ OVA meter - Bak-
60' 6" of 10"				readings		ground readings
				Add 9' 9" of 10" Casing 60' 6" Total of 10" Casing	730	welding casing
					825	Drilling
				Kaiser Safety checked w/ CGM + Explosimeter background	900	Kaiser Safety check
				readings		
	145'	D	Moist	SAND 90% Sand; 10% Silt; 50% vcs, 25% cs, 25% ms, 15% fs,	910	Sample
				5% vfs, 10% silt; Well sorted, 75% BSLT, 25% other incl		
				qtz, qtzite, granite gneiss, some iron staining, Subang,		
				wet color 10YR 4/2 v dk gy brn, slight rxn in HCl, Silt		
				often forms thin ~ 3-4mm thick layers, (mod rxn in HCl in		
				silt layers) No consol, similar to previous 2 geol samples,		
				1 Moisture Smpl taken		

REMARKS:

T Gilmore 6/30/89

PON-MA-567 D2-1, Rev. 0

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

000 021 (5 85)

DRILL LOG	By: T Gilmore	Rig: BE2210 22 - Mike Kaiser Craig Wheatley	Well Number: 299 - E25 - 37	Computer Number: N/A	Project or Work Order No.: W-017
	Date: 6/20/89		Depth: 45' To 55'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10' 6"	50'	D	Moist	SILTY SAND 85% Sand, 15% Silt 3% VCS, 12% CS, 35% MS, 20% FS, 5% VFS, 15% Silt, well sorted, 70% BSLT, 30% Other Trace Fe Stn, Subangular, Wet color 10YR 4/2 v dk gy brn, Slight rxn in HCl, Silt occurs in layer, thinly bedded ~ 4-10 mm Thick, one prominent layer occurs in Sample no consol except in silt layer, incr in silt over previous, Moisture Smpl, 2 gal smpl Taken	955	Sample
70' 7"	of 10"			Add 10' 1" of 10" 70' 7" of 10" Total	1000	Wetting casing
					1121	Drilling
				RPT checked Site & Samples less than 5 ppm (Background)	1125	RPT check Site & Sample
				Kaiser Safety checked Site w/ OVA Background readings	1147	
					12:00	Lunch
	55'	D	Moist	SAND 90% Sand, 10% Silt 5% VCS, 15% CS, 30% MS, 50% FS, 20% VFS, 10% Silt well-mod Sort, 75% BSLT, 25% other, Subangular, Wet color 10YR 4/2 v dk gy brn, Sl rxn in HCl, no consol except in some of the silts appears to be layered approx 5mm thick very similar	1415	Add 2 gal H2O

REMARKS:

Proc: SCT PO-1, Rev. 0

T Gilmore 6/20/89

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

3/3

DRILL LOG	By: T Gilmore	Rig: BE 20W, Rain 22-1401, Craig Wilusky	Well Number: 299-E25-37	Computer Number: N/A	Project or Work Order No.: W017 Grout
	Date: 6/20/89		Depth: 55' To 55'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	55'	Cont		to previous sample, 2 Geol Smpls; 1 moisture sample, Moisture sample believed accurate even though 2 gal H_2O added		sample continued
				Prepare casing to weld	1430	Level casing to weld
				RPT checked site, Background readings	1435	RPT checked site
					1500	Drilling
					1530	End of Day

REMARKS:

PNL-MA-567, Dr-1 Rev. 0

[illegible] 6/20/89

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

0 021 (5 85)

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	BE22W 22-14101 Craig Hensley	299-E25-37	NA	IW-017
Date: 6-21-89		Depth: 55 To 60'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
60'5" of 10"		(Corrected Casing Total)			0700	Arrived on site
10'0"						- preparing to drill
70'5"						
					0720	Drilling
	60'	D	Moist	SAND (90% sand, 8% mud) 5% vcs, 20% cs, 25% ms,	0730	Sample w/ Drive Barrel
				32% FS, 10% VFS, 8% mud. Very well sorted, 50%		
				basalt & other volcanics, 50% qtz, glass, & Si-rich rock		
				fragments. Wet color: 10YR 3/1 (very dark grayish brown).		
				No reaction to 10% HCL. Unconsol. Sim. to previous.		
				Generally A-SA, some SR. No moisture sample taken due		
				to added H_2O. 2 pt samples & 1 bag chem sample taken.	0755	Preparing to weld
				Coll. # 62189		
				Added 10'0" of 10" Casing		
					0900	Drilling
					0955	Added 1 gal H_2O
					1100	Added 1 gal H_2O
70'5"						

REMARKS:

S.S. Teel
6-21-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG	By: S.S. Teel	Rig: BC 22W 22-14101 Craig Wamsley	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-21-89		Depth: 60' to 65'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
70'5"				(@ ≈ 64' see interbedded unconsolidated sands, and slightly silty sands, and semi-consolidated granitic sands - similar to well 299-E25-38 at this depth).	1020	
	65'	D	Moist	SAND / SLIGHTLY SILTY SAND - sample consists of thin (≈ 6" or less) interbedded layers of unconsolidated sand, slightly consolidated slightly silty sand, and occasional semi-consolidated granitic-rich sands. Composite description: (1% gravel, 89% sand, 10% mud) 1% FP & VFP, 25% CS, 20% MS, 20% FS, 14% VFS, 10% mud. (composite - slightly silty sand layers average 15-20% mud, sand layers average 5-8% mud), 30% basalt & other volcanics, 70% qtz, qtzite, and other Si-rich rock fragments (incl. feldspar). A-SA. Wet color: 10YR 4/2 (dark grayish brown) Silt-rich layers have strong HCL reaction. Sand layers have no reaction to 10% HCL. More silt flow 60' sample. Moisture & 2 pt jars taken. Unsure if moisture sample was affected by added H_2O (9:55)	1030 1032 1040	Sample w/ Drive Barrel Working on rig Drilling

REMARKS:

S.S Teel
6-21-89

PNL-MA-567 Do-1, Rev. 0

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

00 021 (6 85)

B o 1

DRILL LOG	By S.S. Teel	Rig BE 220 22-14101	Well Number 299-E25-37	Computer Number	Project or Work Order No. W-017
	Date 6-21-89	Craig W	Depth 65' To 75'	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
70'5" 8'8" 79'1"	70'	D	Moist	SAND (25% MS, 50% FS, 20% VFS, 5% mud).	1130	
				Very well sorted. 25% basalt, 75% qtz, qtzite, and Si-rich,		
				with abundant feldspar. A-SA. Unconsolidated with		
				layers of semi-consolidated material. Wet color: 10YR 2/2		
				(dark brown) - abundant Fe-stain. Slight to mod reaction		
				to 10% HCL. Moisture & 2 pt jar geol. samples taken.		
				"Granitic-rich" composition.		
				Added 8'8" of 10" casing	1150	Preparing to weld
					1350	Drilling
	75'	D	Moist	SAND (trace small cobble, 5% CS, 27% MS, 40% FS,	1425	
				20% VFS, 8% mud). Well sorted. 25% basalt, 75%		
				qtz, qtzite & Si-rich (abundant feldspar). A-SA		
				Wet color: 10YR 3/2 (very dark grayish brown). Unconsol.		
				w/layers of slightly consolidated material. No reaction to		
				10% HCL. Moisture & 2 pt jar geol. samples taken.		
79'1"	of 10"					

REMARKS:

S.S Teel
6-21-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG	By S.S. Teel	Rig 8622W 22-14101	Well Number 299-E25-37	Computer Number NA	Project or Work Order No. W-017
	Date 6-21-89		Depth 75' To 80'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
79'1"					1445	Added 1 gal H_2O
	80'	D	Moist	SLIGHTLY MUDDY SAND (90% sand, 10% mud)	1500	
				Same as previous except slightly more mud. Moisture,		
				Haz chem, and 2-pt geol. jars taken		
				C. of C. # 62189B		
					1530	End of Day

REMARKS:

S.S. Teel
6-21-89

PNL-MA-SL7 Dr-1, Rev. 0

D - Driv[illegible]el H - Hard Tool L - Large M - Medium S - Small VC - Ver[illegible] C - Coarse F - Fine VF - Very Fine ____ Standing Water

300 021 (8 88)

HNF-SD-EN-DP-070, Rev. 0

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
MA Chamness	CE 22W	299-E25-37		W-017 Grout
Date: 10/22/89	22-11101 Craig Hawley	Depth: 80' To 90'	NA	Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
79'1" of 10"					715	started drilling
110'					735	preparing to weld 10'0"
89'1"					825/1035	Driller went to meeting
					1035	Started drilling
	85'	C	moist	SAND: 1% gravel, 96% sand, 3% mud. 1% C vfg, 5% mc, 25% cs, 15% ms, 15% fs, 6% vfs, 23% mud. (US-MS.) Sand: 15% lithic, 20% qtz/qtzite, 15% feldspar, 20% rock frags etc, VA SA. Dry color - 10YR 6/4 (light yellowish-brown), slight to moderate rxn w/ HCl. Unconsolidated, [illegible] angle. [illegible] parts very easily. Some thin layered more muddy sand, occasional [illegible] gravel. Somewhat coarser than previous sample. Looks like parent material was granitic. 2 pt. jars, 1 moisture sample	1115	
					1200ish	Found Leak
				Between 85' and 90' continues to be alternating layers of m-c sand, yes w/ rotten granitic material, and muddy sand, with latter two occuring as thin layers within the m-c sand.		
					1332	Driller added 1 gal H_2O
	90'	C	moist	SLIGHTLY MUDDY SAND: 5% cs, 20% ms, 40% fs, 25% vfs, 10% mud. Some layers are more muddy, to ~20%. US-MS. Sand is 10% lithics, 15% feldspar, 73% qtz, 2% mica (muscovite). VA SA.	1340	

REMARKS:

PNL-MA-567 Dn-1 Rev. 0

MA Chamness 10/22/89

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

DRILL LOG	By: MA Chauncey	Rig: CME 22 w/ 12 pilot, Craig Wanucky	Well Number: 299-E25-37	Computer Number: N/A	Project or Work Order No.: W-017-Grout
	Date: 6/27/89		Depth: 90' To 90'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
85' 1" ol	10"			90' cont'd. Dry color 10YR7/2 (lt. gray) slight to moderate rxn in HCl. Unconsolidated, does not stick in hand or bag. Finer than before, no obvious granitic material. 2 pt jars, 1 moisture sample — didn't look like water added had gotten to it, but there may be some extra moisture.		
19' 10½"						
18' 11½"					1400	preparing to weld 1' 10½"

REMARKS:

PNL-MA-567 DO-1, REV. 0

MA Chauncey 6/27/89

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

0.021 (5.85)

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG	By: T Gilmore	Rig: BE 22 22-Hist, Craig Hawley	Well Number: 299-E25-37	Computer Number: N/A	Project or Work Order No.: W-017 Grant
	Date: 6/23/89		Depth: 90' To 100'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
98' 11½" of 10"				Continue welding 9' 10½" casing for 98' 11½" of 10"	700	Continue to weld casing.
9' 8"	95'	D	Moist	SAND 95% Sand, 5% Silt; 5% VCS, 25% CS, 35% MS,	800	Sample
108' 7½"				20% FS, 10% VFS, 5% Silt, 75% Silica-rich sand pred wht		
				qtz, 25% Mafic sand predom Basalt, Subangular to		
				angular sand, well sort, wet color N6 light		
				gray, "Salt and Pepper" appearance, moderate rxn in		
				HCl a thin (3-5mm) layer of $CaCO_3$ cemented		
				Sand; unconsol for most part, 2 geol smpls,		
				1 moisture smpl taken		
					840	1 gal H_2O added
				Add 9' 8" of 10" 108' 7½" Total 8"	850	welding
					945	Drilling
				Sample would not stay in drive barrel	1035	Add 1 gal H_2O
	100'	D	Moist	SILTY SAND 85% Sand, 15% Silt, 10% MS, 35% FS, 40% VFS	1045	Sample
				15% Silt, very well sorted, 70% Felsic, 30% Mafic, Subangular		
				grains too small to readily discern, wet color 2.5Y 6/2		
				Light gy strong rxn in HCl, occasionally slight consol		

REMARKS:

PNL-MA-567 Do-1, Rev. 0 — T Gilmore 6/23/89

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

A-31

2 of 3

DRILL LOG	By: T Gilmore	Rig: BE 22W, 14/01 Kaiser, Craig Blansky	Well Number: 299-E25-37	Computer Number: N/A	Project or Work Order No.: W-017 Grout
	Date: 6/23/89		Depth: 100' To 110'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	100'	Cont		This Sample has an increase in Silt sand FS, and an increase in CaCO3 over previous sample, 2 Geol Samples, 1 Special Sampl no moisture because water was added to Formation C. of C. # 62389 ESI 10/16/89		
	105'	D	Moist	SAND 95% Sand, 5% Silt, 5% CS, 35% MS, 35% FS, 20% VFS, 5% Silt well sort, 70% Felsic (predom qtz & qtzite) 30% Mafic (predom basalt), Subangular, wet color 2.5Y 6/2 Mod rxn in HCl No consol more Sand than Previous Sampl 2 Geol Sampl, 1 moisture Radiation at Background	1100 1140	Sample RPT checked Site
	110'	D	Moist	SAND 95% Sand 5% Silt 40% MS, 40% FS, 15% VFS 5% Silt well sort 70% felsic 30% Mafic about qtz, subang, wet color 2.5Y 6/2 Mod-strong rxn in HCl No consol very similar to previous 2 geol Sampl, 1 moisture Sampl	1140 1155	Add 1 gal H_2O Sample
					12:1230	lunch

REMARKS:

PRL-MA-567 Do-1, Rev. 0

T Gilmore 6/23/89

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

021 (6 86)

383

DRILL LOG

By	Rig	Well Numi	Computer Number	Project or Work Orde.
TGilmore	BE22W 14101 Kaiser Cir, Hanley	299-E25-37	N/A	W-017 Grant
Date: 6/23/89		Depth: 110' To 112'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	115	D	Moist	SAND 90% Sand, 10% Silt, 5% VCS, 15% CS, 35% MS, 25% FS, 10% VFS, 10% Silt, Moderate-well Sort, 70% Felsic (predom wht qtz & yel qtzite) 30% Mafic (prod BSLT), Subang, wet color 2.5Y 6/2, Moderate reaction HCl, Mod consol, occ thin layers of sand w/ CaCO3 cement, very similar to previous, 2 geol smpls, 1 moisture smpl	1445	
				End of Day	1530	

REMARKS:

TGilmore 6/23/89

PNL-MA-567 DO-1, REV. 0

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

DRILL LOG

By	Rig	Work Number	Computer Number	Project or Work Order No.
S.S. Teel	22-14101 BG-2200	299-625-37	NA	W-017
Date: 6-26-89	Craig Wimsley	Depth: 115 To 121'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
108'7½" + 9'3" (added 6/23) = 117'10½"					0700	Arrive on site
					0720	Drilling
	121'	D	Slightly Moist	SLIGHTLY GRAVELLY SAND (7% gravel, 88% sand, 5% mud)	0800	
				1% MP, 3% FP, 3% VFP, 30% VCS, 28% CS, 15% MS, 10% FS,		
				5% VFS, 5% mud, Mod-well sorted. (Gravel)- 50% basalt &		
				other volcanics, 50% qtzite/Si-rich rock fragments. A-SA.		
				(SAND)- 30% basalt/volcanics, 70% qtz & Si-rich rock		
				fragments, Gen. A-SA, some SR. No reaction to 10%		
				HCL. Unconsolidated. Less silt (more gravel than previous).		
				Wetcolor: 10YR 3/3 (dark brown). 2-pt geot, 1-moist.,		
				and 1 chem. sample taken. (C. of C. # 62689A 10/18/89 JST)	0815	Adding Casing
117'10½" + 8'9" = 126'7½"				Added 8'9" of 8" Casing		
					1045	Drilling
				(see all layers of VCS to CS, and MS from 101-123).		
126'7½"						

REMARKS: Note: Added 7 gal of H_2O 6/23

S.S. Teel 6-26-89

PNL-MA-567 Do-1, Rev. 0

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

200 021 (5 85)

DRILL LOG	By: S.S. Teel	Rig: BE22W 22-14101	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 (GTF)
	Date: 6-26-89		Depth: 121 To 128'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
126'7½" 1'2" 135'9½"	124'	D	Moist	MUDDY SAND (85% FS + VFS, 15% mud).	1180	Sample w/ C.B.
				≈ 10" thick layer, 123'-124'. Wet color: 10YR 3/3		
				Slightly consolidated. Strong reaction to 10% HCL. No moist.		
				sample taken due to added H_2O. 2 pt geol. samples and		
				1 chem sample taken. (C. of C. # 62689B) 10/16/89		
	125'	D	Moist	SLIGHTLY MUDDY SAND (90% sand, 10% mud)	1130	Sample w/ Core Barrel
				25% CS, 40% MS, 15% FS, 10% VFS, 10% mud. Well sorted		
				7% VCS, 8% CS, 40% MS, 20% FS, 15% VFS, 10% mud, 25%		
				basalt/mafics, 75% qtz + Si-rich rock fragments. Wet color:		
				10YR 3/3 (dark brown). Strong reaction to 10% HCL.		
				Unconsolidated. No moisture sample taken due to added H_2O.		
				2 pt geol. samples taken.		
					1200/1230	Lunch
				Added 9'2" of 10"	1230	Adding Casing
					1415	Drilling

REMARKS:

6-26-89
S.S. Teel

PNL-1 -567 Rev-1, Rev. 0

D - Drive Bit. H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse C - Coarse F - Fine VF - Very Fine

A-36

DRILL LOG	By S.S. Teel	Rig BE 22W 27-14101 Craig	Well Number 299-E25-37	Computer Number NA	Project or Work Order No. W-017
	Date 6-26-89		Depth 128 To 135		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
135'1½"	130'	D	Slightly Moist	SAND (3% gravel, 90% sand, 7% mud). Trace MP, 2% FP, 10% CG, 10% VCG, 10% CG, 10% VCG/CG, 1% VFP, 10% VCS, 30% CS, 30% MS, 8% FS, 7% VFS, 7% mud	1425	
10'2"				Mod. well sorted. 25% basalt/mafics, 75% qtz, qtzite, + Si-rich. A-SA. Unconsol. Wet color 10YR3/3 (dark brown).		
146'11½"				Strong reaction to 10% HCL. Moisture + 2 pt. geol. samples taken. Less silt than previous.		
	135	D	Slightly Moist	SAND (3% gravel, 90% sand, 7% mud). Same as previous except moderate reaction to 10% HCL, instead of strong. Moisture + 2pt. geol. samples taken.	1440	
				Adding 10'2" of 10"	1500	Adding Casing
145'11½"					1530	End of Day

REMARKS:

S.S. Teel
6-26-89

PNL-MA-567 DO-1, REV. 0

D - Dri[illegible]ral H - Hard Tool L - Large M - Medium S - Small VC - Very [illegible]e C - Coarse F - Fine VF - Very Fine ____ Standing Water

000 021 (6 86)

DRILL LOG	By: S. M. Goodwin	Rig: BE 22 W #22-11101	Well Number: 299-E25-37	Computer Number: N/A	Project or Work Order No.: W-017 GROUT
	Date: 27 June 1989		Depth: 135' to 145'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS CRAIG WARNSLEY	0700	SERVICING RIG
				DRILLING OUT BELOW 10" CASING BEFORE ADDING	0770	DRILLING
				10'2" SECTION OF PIPE.	0800	WELDING 10"
145' 11 1/2"				ADDED 10'2" SECTION; TOTAL 10" = 145' 11 1/2"	0850	FINISHED WELD;
						SHUTDOWN FOR
						REPAIRS
					0925	DRILLING
	140'	D	MOIST	SAND: 3% GRAVEL, 92% SAND, 5% MUD,	0955	SAMPLE, 2 PT.
				1% FP, 2% VFP, 20% VCS, 40% CS, 17% MS, 10%		GEO. SAMPLES, 1
				FS, 5% VFS, 5% MUD. MODERATELY SORTED.		MOISTURE SAMPLE,
				SANDS ARE 25% BASALT/MAFICS, 70% QUARTZ		& 1 CHEM ANAL.
				& OTHER Si-RICH RX. FRAGS, A-SA. UNCONSOLIDATED.		SAMPLE (500 ml)
				WET COLOR IS 10 YR 4/2 (DARK GRAYISH BROWN).	0957	DRILLING
				MODERATE RX. TO 10% HCL. SIMILAR TO PREVIOUS.		C.of C. # 62789
	145'	D	SLIGHTLY MOIST	SAND: 95% SAND, 5% MUD. 10% VCS, 20% CS,	1110	SAMPLE; 2 PT.
				50% MS, 10% FS, 5% VFS, 5% MUD. MODERATELY		GEO. SAMPLE & 1
				SORTED. SANDS ARE 25% BASALT/MAFICS, 70%		MOISTURE SAMPLE
				QUARTZ, & OTHER Si-RICH RX, TRACE MICA;	1115	DRILLING

REMARKS:

PNL-MA-567 DP-1, REV. 0

Martha Mal. 6/27/89

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. M. Goodwin	BE 22	299-E25-37	N/A	W-017 Grout
Date: 27 June 1989	# 22-1-100	Depth: 115' to 153'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	115'	D	Sl. Moist	(cont.) A to SA. Wet color is 10YR 5/2 (Grayish Brown). Unconsolidated. Moderate Rx. to 10% HCL. Finer than previous sample.		
115'	1'1/4				1130	Preparing to weld
7'	8'1/2"			Added 7'8'1/2" of 10" casing, total 10"	1200-1230	Lunch
153'	8"			Casing = 153'8"	1240	Welding 10"
					1320	Finished weld
					1330	Driving casing
					1340	Drilling
	150'	D	Sl. Moist	SLIGHTLY GRAVELLY SAND (5% gravel, 90% sand, 5% mud) 3% FP, 2% VFP, 25% VCS, 35% CS, 15% MS, 10% FS, 5% VFS, 5% mud. Mod-well sorted. (Gravel)- 60% basalt & other volcanics, 40% qtz, qtzite, & other Si-rich. A-R. (Sand)- 30% basalt/mafics, 70% qtz/Si-rich. A-SA. Wet color: 10YR 4/2 (dark grayish brown. No reaction to 10% HCL. Unconsol. Moisture & 2 pt geol. samples taken. More gravel than previous.	1430	
					1530	End of Day

REMARKS:

S.S. Teel
6-27-89

PNL-MA-567 PO-1, Rev. 0

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

0021 (6 85)

1 of 1

DRILL LOG	By: S.S. Teel	Rig: 22-14101 BE 22W Craig Ukinsky	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 Grout
	Date: 6-28-89		Depth: 153 To 153'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
153'8"	= total	10" casing			0700	Arrive on Site
						- switching to 8" tool string
				Vern McGhan, PNL, arrives to log 10" casing w/ natural gamma probe. Interval logged: 151.7 - 3'	0750	Welding on drive shoe
					0900	Logging Complete
				8" casing Added: 30'4" (with drive shoe)	1000	Adding Casing
				+ 30'0"		
				60'4"		
				+ 30'0"		
				90'4"		
				+ 30'0"		
				120'4"		
				+ 30'0"		
				150'4"		
					1530	End of Day
150'4" of 8"						

REMARKS:

S.S. Teel
6-28-89

PNL-MA-567 Da-1, Rev. 0

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

A-41

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.M. Goodwin	BE 22 W	299-E25-37	N/A	W-017 Grout
Date: 29 June 1989	#22-11101	Depth: 153' To 160'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
150'	"			DRILLER IS CRAIG WAMSLEY	0700	WELDING 8" CASING
11'10"				ADDED 11'10" OF 8" CARBON STEEL CASING; TOTAL	0915	FINISHED WELDING
162'	2"			8" CASING = 162'2"	0920	DRIVING CASING
					0925	DRILLING
	155'	D	SM	SAND: TRACE GRAVEL, 95% SAND, 5% MUD.	0930	SAMPLED w/ CORE
				15% VCS, 30% CS, 30% MS, 8% FS, 7% VFS,		BARREL; 2 PT.
				5% MUD. MODERATELY SORTED. 25% BASALT/MAFICS		GEO 1 1 MOIST.
				75% QUARTZ/FELSIC. A TO SA. WET COLOR IS		SAMPLE
				10YR 3/3 (DARK BROWN). NON-CONSOLIDATED. STRONG RX.	0935	DRIVING CASING
				TO 10% HCL SIMILAR TO PREVIOUS SAMPLE	0940	DRILLING
	160'	D	M	SAND. TRACE GRAVEL, 95% SAND, 5% MUD.	1025	SAMPLED w/ CORE
				SAME AS ABOVE; SLIGHT INCREASE IN MOIST,		BARREL. 2 PT.
				CONTENT. OVA = BACKGROUND FOR 155' &		GEO SAMPLES, 1
				160' SAMPLES. (C. of C. # 62889B SOT 10/16/89)		MOISTURE, 1 1
						1 1 CHEM ANAL
162'	2"				1030	PREPARING TO WELD
10'	10 1/2"			ADDED 10'10½" OF 8" CARBON STEEL CASING; TOTAL 8"	1130	FINISHED WELDING
173'	1/2"			CASING = 173'½"	1145	DRIVING CASING

REMARKS:

PNL-MA-567 DO-1, REV. 0

Stephen Mark 6/29/89

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

0 021 (5 85)

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG	By: S. M. Goodwin	Rig: BC 22 W	Well Number: 299-E 25-37	Computer Number: N/A	Project or Work Order No.: WS-017 GRAUT
	Date: 29 June 1987	[illegible]	Depth: 160' to 170'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1150	DRILLING
					1200	LUNCH
					1240	DRILLING
	165'	D	SM	GRAVELLY SAND: 15% GRAVEL, 80% SAND, 5% MUD.	1325	SAMPLED W/ CORE
				TRACE CP, 3% MP, 4% FP, 8% VFP, 15% VCS, 25%		BARREL; 2 PT.
				CS, 25% MS, 8% FS, 7% VFS, 5% MUD. POORLY		GEO. SAMPLES &
				SORTED. GRAVELS ARE 60% BASALT/MAFICS, 40%		1 MOIST. SAMPLE
				FELSIC (MOSTLY Q-TUFF & GRANITE), A TO R.	1340	DRILLING
				SANDS ARE 30% BASALT/MAFIC, 70% QUARTZ,		
				Q-TUFF, & PLAG.; A TO SA. NO CONSOLIDATION		
				WET COLOR IS 10 YR 3/3 (DARK BROWN).		
				STRONG RX. TO 10% HCL MOST GRAVEL THIN		
				160' OVA = BACKGROUND		
	170'	D	SM	GRAVELLY SAND: 15% GRAVEL, 80% SAND, 5%	1405	SAMPLED W/ CORE
				MUD. SAME AS PREVIOUS SAMPLE EXCEPT		BARREL, 2 PT.
				SANDS ARE 25% BASALT/MAFICS, 75%		GEO SAMPLES &
				FELSIC; SLIGHTLY A IN WET COLOR IS		1 MOIST SAMPLE
				10 YR 3/2 (VERY DARK GRAYISH BROWN)		

REMARKS:

PNL-MA-567 DO-1, REV. 0

[illegible] 6/ /87

D - Drive L H - Hard Tool L - Large M - Medium S - Small VC - Very Co[illegible] C - Coarse F - Fine [illegible]

DRILL LOG

S. M. Goodwin	CE 22..	Well Number 299-E25-37	Computer Number N/A
Date 29 JUNE 1989	H 22 14/101	Depth 170' To ~172'	Project or Work Order No. WJ-0 GAUGE
			Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	170'			(cont.) STRONG RX IN 10% HCL OVA =	1410	DRILLING
				BACKGROUND	1430	PREPARING TO
						WELD
173' 1/2"				ADDING 10' OF 8" CARBON STEEL CASING; TOTAL	1445	WELDING 8"
10'				8" = 183' 1/2"	1530	DONE FOR DAY
= 183' 1/2"						

REMARKS:

PNL-MA-567 DO-1, REV. 0

[signature] 6/29/89

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

00 021 (6 86)

DRILL LOG	By: S. M. Goodwin	Rig: RE 7200	Well Number: 299-E25-37	Computer Number: N/A	Project or Work Order No.: W-017 Grout
	Date: 30 JUNE 1989	# 22-14101	Depth: ~172' to 180'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
183' 1/2'				DRILLER IS CRAIG WAMSLEY	0700	SERVICING RIG
					0710	FINISHING WELD
					0730	DRIVING CASING
					0735	DRILLING
	177'	D	SM	GRAVELLY SAND: 25% GRAVEL, 70% SAND, 5% MUD.	0810	SAMPLED W/ COPE
				TRACE SC, TRACE VCP, 3% CP, 7% MP, 8% FP,		BARREL; 2 PT.
				7% VFP, 20% VCS, 25% CS, 15% MS, 5% FS,		GEO 1 1 MOISTURE
				5% VFS, 5% MUD. POORLY SORTED. GRAVELS		SAMPLE
				ARE 60% BASALT / MAFIC, 40% Q-RICH (Q-SITE	0820	DRILLING
				& GRANITE MASTER), A TO R. SANDS ARE 35%		
				BASALT / MAFIC, 65% FELSIC; A TO R. WET		
				COLOR IS 10YR 3/2 (VERY DARK GRAYISH BROWN).		
				NO EFFERVESCENCE. MODERATE TO STRONG RX TO		
				10% HCL. MORE GRAVEL THAN PREVIOUS. OVA =		
				BACKGROUND		
	180'	D	SM	GRAVELLY SAND: 25% GRAVEL, 70% SAND, 5%	0835	2 PT. GEO, 1
				MUD. SAME AS 177' SAMPLE W/ SLIGHT		MOISTURE, 1 SOIL
				INCREASE IN GRAVEL P. SIZE. OVA = BACKGROUND		CHEM. ANALYSIS
						SAMPLE.

REMARKS: C of C. # 63089D SSI 10/10/89

PNL-MA-567 DO-1, REV. 0

6/30/89

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

DRILL LOG	By: S. M. Gunderson	Rig: BC 7200	Well Number: 299-E25-37	Computer Number: N/A	Project or Work Order No.: WI-013 Grout
	Date: 30 June 1989	# 22-11/101	Depth: 150' to 190'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
183'	1/2"				0850	Drilling
10'				Added 10' of 5" carbon steel casing; total	0930	Welding 5"
193'	1/2"			5" = 193' 1/2"	1030	Driving casing
				Bringing up ~30-35% gravels; increase	1040	Drilling
				in small cobbles & large gravel.		
	185	D	SM	SANDY GRAVEL (40% gravel, 55% sand, 5% mud) 13% VCP,	1100	Sample w/ C.B.
				8% CP, 5% MP, 5% FP, 5% VFP, 15% VCS, 15% CS, 10% MS,		Moisture & pH
				10% FS, 5% VFS, 5% mud. Very poorly sorted. (Gravel)-		geol samples taken
				65% basalt & volcanics, 35% qtzite & Si-rich. A-WR (Sand)- 40%		
				basalt/mafics, 60% qtz/qtzite & Si-rich. A-SR. Wet color: 10YR 4/2		
				(dark grayish brown). No reaction to 10% HCL. Unconsol.		
	190'	D	SM	GRAVELLY SAND (25% gravel, 70% sand, 5% mud)	1150	Sample w/ C.B.
				5% MP, 10% FP, 10% VFP, 20% VCS, 20% CS, 15% MS, 10% FS, 5% VFS,		Moisture & pH
				5% mud. Mod sorted. (Gravel) - 60% basalt/volcanics, 40% qtz		geol samples taken.
				& Si-rich. A-R (Sand)- 40% basalt/mafics, 60% qtz/Si-rich.		
				A-SR. Same color as prev. No reaction to 10% HCL. Unconsol.		
				less gravel than previous.		

REMARKS:

S.S. Teal
6-30-89

PNL-MA-567 PO-1, Rev 0

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

000 021 (6 86)

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. J. Teel	22-14101	299-E25-37	NA	W-017 Grout
Date: 6-30-89	Craig	Depth: 195 To 198		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
193'½" to 203'½"					1200/1230	Lunch
					1230	Drilling
				Added 10' of 8"	1330	Welding
					1430	Drilling
	195'	D	SM	SILTY SANDY GRAVEL (40% gravel, 52% sand, 8% mud) 14% 10/10/89	1445	
				10% VCP, 10% CP, 10% MP, 5% FP, 5% VFP, trace VCS, 10% CS, 14% 10/10/89 12% 10/10/89 12% 10/10/89		
				10% MS, 10% FS, 10% VFS, 8% mud (Gravel) - 60% basalt,		
				volcanics, & porphyry; 40% granite & Si-rich. SR-WR,		
				(Sand) - 30% basalt/mafics, 70% qtz, granite & Si-rich. A-SR,		
				Wet color. 10YR 4/1 (dark grayish brown). Uncorsel. Mod.		
				reaction to 10% HCL. Moist & 2 pt geol. samples taken.		
					1530	End of Day

REMARKS:

S. S. Teel
6-30-89

PNL-MA-567 DO-1 REV. 0

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

DRILL LOG	By: MA Chauvenes	Rig: Craig Vandley 6E 22W	Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 Grout Site
	Date: 7/5/89	4 22 - 14101	Depth: 198' To 200'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
203'1/2" of 8"				Driller still cannot keep gravel in core barrel, wants to switch to hard tool.	755	
				After talking to Olin + John Keller, it was decided to go ahead + switch to hard tool. There is no obvious way to drill with a core barrel and clean out the hole with any kind of bailer (even a "flapper bailer" which is what WHC seemed to want.)	810	
- 3'1/2"						Cutting off 3'1/2" of 8"
200'0"					1020	starting to drill
					1110	has added 1 gal H_2O_2 so far.
+10'5"						Run. welding on 10'5".
210'5"					1200/1230	lunch break
					1305	finished welding
	200'	H	—	SANDY GRAVEL: 40% gravel, 55% sand, 5% mud. 5% vcp, 15% cp, 10% mp, 7% fp, 3% vfp, 25% vcs, 15% cs, 8% ms, 5% fs, 2% vfs, 5% mud.	1410	
				Gravel - 50% basalt, 35% qtz/qtzite, 15% ign. (metam.), VA-A.		
				Sand - 40% basalt, 45% qtz/qtzite, 15% rk frags + feldspar; VA-SR.		
				V-VP sorted. Unconsolidated. Wet color - 2.5Y 3/2 (very dk grayish brown), dry color - 2.5Y 6/2 (lt brownish gray). Very slight rxn to HCl.		

REMARKS:

PDL-MA-567 DO-1, REV. 0

MA Chauvenes 7/6/89

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

WHC-SD-EN-DP-070, Rev. 0

2 of 2

DRILL LOG	By: MA Chamness	Rig: EC 2210 / 422-11101	Well Number: 299-E25-37	Computer Number:	Project or Work Order No.: W-017 Grout Site
	Date: 7/5/89	Craig Wheeley	Depth: 200' To 203'	N/A	Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
210'5"	18"			200' cont'd: Similar to last sample, but less mud. 2 pt geol. samples, 1 special sample C. of C. # 70589 SST 10/10/89		
					1510	Driller added ~23 gal H_2O this afternoon
						Total H_2O added = 30 gal

REMARKS:

PNL-1 - 567 DA-1, Rev. 0

MA Chamness

DRILL LOG

By: EJ Jensen
Date: 7/6/89
Rig: Craig Wamsley, BE 22W #22-14101
Well Number: 299-E25-37
Depth: 205' to 215'
Computer Number: NA
Project or Work Order No.: W-017 Grout Sit
Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	205'	H	—	SANDY GRAVEL, 30% Gravel, 65% sand, 5% mud, gravel and sand is 65% Basalt and other mafics and 35% light colored material, poor sorting, unconsolidated, wet color 10YR 5/2 grayish Brown moderate RXN in 10% HCl.	0800	2 pint jar samples
10'5"				Added 10'5" of 8" casing	0900	
220'10"						
	210'	H	—	SANDY GRAVEL, 45% Gravel, 50% sand, 5% mud gravel is 80% Basaltic and 20% light colored grains, Sand is 60% Basaltic and 40% light colored grains, poor sorting, unconsolidated, wet color 10YR 5/2 grayish Brown, slight RXN in 10% HCl	1055	2 pint jar samples
	215'	H	—	SANDY GRAVEL, 30% Gravel, 65% sand, 5% mud Gravel and sand is 75% Basaltic and 25% light colored grains, poor sorting, unconsolidated, wet color 10YR 5/2 grayish Brown,	1340	2 pint jar samples

REMARKS:

PNL-MA-567 Do-1, Rev. 0

EJ Jensen 7/6/89

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

00 021 (5 85)

DRILL LOG	By: EJ Jensen	Rig: Craig Wardy BE 221V	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-011 Grout site
	Date: 7/7/89	E22-14101	Depth: 220' To 230'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10' 6"				Added 10'6" of 8" dia casing.	0700	40 gallons water
21' 11"						added on 7/6/89
				rig broke down no drilling until 1300 hrs		
	223'	H	—	SANDY GRAVEL, 35% gravel, 60% sand, 5% mud	1350	2 Pint Jar sample
				gravel and sand is 75% Basaltic and 25%		1 special sample
				light colored grains, poor sorting, unconsolidated,		C.of.C. # 70789
				wet color 10 YR 5/2 grayish Brown, Slight rxn		SST 10/16/89
				in 10% HCl.		
	225'	H	—	SANDY GRAVEL, 40% gravel, 55% sand, 5% mud	1435	2 Pint Jar sample
				gravel and sand is 65% Basaltic and 35% light		
				colored grains, poor sorting, unconsolidated,		
				wet color 10 YR 5/2 grayish Brown, Slight rxn in 10% HCl		

REMARKS:

E. J. Jensen 7/7/89

PNL-MA-567 DO-1, REV. 0

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

10 105

DRILL LOG	By: EJ Jensen	Rig: Craig Warnick BE 22 W #22-14101	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: Hr-017 Grout site
	Date: 7/10/89		Depth: 230' To 240'		Subcontract No.: 1 NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10' 6"				Added 10' 6" of 8" pipe	0700	40 gallons water
241' 10"						added on 7/7/89
	230'	H	—	SANDY GRAVEL, 45% gravel, 50% sand, 5% mud	0950	2 pint jar samples
				gravel and sand is 80% Basaltic and 20% light colored		
				grains, poor sorting, unconsolidated, wet color is 10YR		
				5/2 grayish brown, no rxn in 10% HCl		
	235'	H	—	SANDY GRAVEL, 45% gravel, 50% sand, 5% mud,	1025	2 pint jar samples
				gravel and sand is 80% Basaltic and 20% light		
				colored grains, poor sorting, unconsolidated, wet		
				color is 10YR 5/2 grayish brown, slight rxn in 10% HCl		
	240'	H	—	SANDY GRAVEL, 25% gravel, 70% sand, 5% mud	1130	2 pt jar samples SSF 10/10/89
				gravel and sand is 75% Basaltic and 25% light		1 gallon sample
		1		colored grains, poor sorting, unconsolidated,		C.o.C. # 71089
				wet color is 10YR 5/2 grayish brown,		SSF 10/10/89
				no rxn in 10% HCl		

REMARKS:

7/10/89

PNL-MA-567 DO-1 REV. 0

D - Dr ural H - Hard Tool L - Large M - Medium S - Small VC - Ver se C - Coarse F - Fine VF - Very Fine ____ Standing Water

J000 021 (6 86)

A-55

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
EJ Jensen	Craig Warns BE 22 w #22-14101	299-E25-37	NA	W-017 Grout site
Date 7/10/89		Depth 245' To 245'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10' 6"				Added 10' 6" of casing	1150	
152' 4"						
	245'	H	—	SANDY GRAVEL, 20% gravel, 75% sand, 5% mud, gravel and sand is 70% Basaltic and 30% light colored grains, poor sorting, unconsolidated, wet color is 10YR 5/2 grayish brown, no rxn in 10% HCl.	1500	

REMARKS:

Pur-MA-567 PD-1, Rev. 0

7/10/89

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

DRILL LOG	By: MA Chambers	Rig: CK 7260	Well: 299-E10-21	Computer Number: N/A	Project or Work Order No.: 100-07 Grant Site
	Date: 7/11/87	Driller: Greg Hawley	Depth: 245' To 255'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
22'4" of 8"					715	Started drilling
					8:00/5:10	drill pipe, tool, equipment
	250'	H	—	MUDDY SANDY GRAVEL - 60% gravel, 35% sand, 5% mud. 2% vcp,	920	
				5% cp, 33% mp, 12% fp, 8% vfp, 15% vcs, 10% cs, 5% ms, 3% fs, 2% vfs,		
				5% mud. 1/2-vcs Gravel - 55% basalt, 25% igneous/metam rk frags,		
				20% qtz/qtzite; A-R Sand - 40% basalt, 40% qtz/qtzite, 20%		
				rk frags; VA SR. slight to mod. rxn. in HCl. Wet color - 2.5Y4/2		
				(dk grayish brown), dry color - 2.5Y6/2 (lt. brownish gray)		
				Unconsolidated. Getting smaller gravels, may grade down into the		
10'6"				sand found at 255' or so as per FIS 38. 2 pt. jass.	1030	yielding on 10'6" of 8"
242'10"	255'	H	—	MUDDY SANDY GRAVEL: 55% gravel, 40% sand, 5% mud. 3% cp,	1125	
				20% mp, 22% fp, 10% vfp, 10% vcs, 20% cs, 8% ms, 6% fs, 4% vfs,		
				2% mud. 1/2-vcs Gravel - 60% basalt, 15% qtz/qtzite, 25%		
				igneous/metam, mostly ign. rk frags., A-R. Sand - 50% basalt,		
				35% qtz/qtzite, 15% rk frags; VA SR. 1 rounded piece of calcite		
				gravel. Sl. to mod. rxn. in HCl. Wet color - 5Y3/2 (dk olive gray)		
				dry color - 5Y6/2 (lt. olive gray). Unconsolidated. Gravels slightly		
				smaller than below. 2 pt. jass.		

REMARKS:

PNL-MA-567 DO-1, Rev. 0

MA Chambers 7/11/87

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

021 (6 85)

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
MA Chapman	CME 750	299-E25-37	NA	W-067 Grout site
Date 7/11/89	422 Pilot	**Depth** 255' To 255'		**Subcontract No.** NA
	Craig Kimmerly			

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
262'10"	of 8"				1200/1230	lunch break
	260'	H	—	HEAVY SANDY GRAVEL: 53% gravel, 40% sand, 7% mud. 5% vcp,	1500	
				5% cp, 25% mp, 10% fp, 10% vfp, 12% vcs, 10% cs, 8% ms, 6% fs, 4% vfs,		
				1% mud. VC. Gravel - 50% basalt, 25% qtz/qtzite, 25% gran rk		
				frags; A-R. Sand - 45% basalt, 35% qtz/qtzite, 20% rk frags; VA-		
				SA. Unconsolidated. St. rxn to HCl. Wet color - 5Y 3/2 (dk olive gray)		
				Dry color - 5Y 6/2 (lt olive gray). Hit larger gravels at ~250',		
				Gravels are coarser, but there seems to be more fine sand		
				than before, otherwise similar to previous sample. 1 special		
1 10'6"				sample, 2 pt jar C.o.C. # 71189 10/16/89	1515	preparing to weld 10'6"
213'4"	of 8"				1520	finished welding, driving
						casing
					1525	quit for the day

REMARKS:

PROC-MA-567 Do-1, REV. 0

MA Chapman 7/11/89

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Wo[illegible]der No.
S.S Teel	BE 22W	299-E25-37	NA	W-017 Grout
Date 7/12/89	22-14101 Craig Wamsky	De, 260' To 265'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
233'4" of 8"					0710	Drilling
					0805	Driving Casing
					0810	Drilling
					0823	Driving Casing
					0826	Drilling
	265	H	Wet	MUDDY SANDY GRAVEL (60% gravel, 33% sand, 7% mud)	0845	Sample w/ Sand Pump
				30% CP, 15% MP, 10% FP, 5% VFP, 10% VCS, 10% CS, 5% MS,		Bailer
				5% FS, 3% VFS, 7% mud. Very poorly sorted. (Gravel) -	0900	Driving Casing
				- 65% basalt, andesite, + minor porphyry; 35% gneiss	0904	Drilling
				with some gneiss + other ig/met Si-rich. SR-WR on orig	0921	Driving Casing
				surfaces. Max grain size VCP at minimum. Several whole CP	0925	Drilling
				in sample. (Sand) - 50% basalt + other volcanics + mafics; 50%	0947	Driving Casing
				gneiss + other Si-rich. A-R. Wet color: 10YR 3/3 (dark brown)	1950	Drilling
				Unconsolidated. No reaction to 10% HCL. Similar to previous.		
				2 pt. geol. + 1 sieve sample taken.		

REMARKS:

S.S. Teel
7-12-89

PRL-MA-567 Pg-1, Rev. 0

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

DRILL LOG	By: S.S. Teel	Rig: CE 22w 22-Mirel	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 Grout
	Date: 7/12/89	Craig Wamsley	Depth: 265' To 270		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
273'4" of 8"				(Note: Driller says "much more consolidated" at 269' - he is having trouble driving the casing ahead).		
	269'	H	Wet	MUDDY SANDY GRAVEL (50% gravel, 45% sand, 5% mud) 20% VCP, 10% CP, 13% MP, 15% FP, 10% VFP, 7% VCS, 8% CS, 15% MS, 10% FS, 5% VFS, 5% mud. Very poorly sorted.	1000	Sample w/ Sand Pump Bailer
				(Gravel) - 60% basalt, andesite, & other volcanics; 40% qtzite & other Si-rich (granite, diorite, gneiss). SR-WR on orig. surfaces. 1 whole VCP in sample - several whole MP & CP.	1010	Building-up Bit
				(Sand) - 50% basalt, volcanics, mafics; 50% qtz, qtzite, & Si-rich rock fragments. A-SR. Wet color, 2.5Y 4/2 (dark grayish brown). No reaction to 10% HCL. Semi-consolidated? (see note above). More sand & less silt than previous. Otherwise - very sim. to previous. 2 pt. & 1 sieve sample taken.	1037	Drilling

REMARKS:

S.S. Teal
7-12-89

PNL-MA-567 Do-1, Rev. 0

D - Drive Ba H - Hard Tool L - Large M - Medium S - Small VC - Very Coar

DRILL LOG

By	Rig	W. mber	Computer Number	Project or Work Order No.
S.S. Teel	BE 22W 22-K1101 (Craig Wamsley)	299-G25-37	NA	W-017 Grout
Date 7/12/89		Depth 270 to 270'		Subcontract No. NA-

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
273'4" of 8"				(Note: "consolidated" gravels - 269-270')		
+10'5" 283'9"	270'	H	Wet	SLIGHTLY GRAVELLY MUDDY SAND (5% gravel, 60% sand, 35% mud)	1100	Sample w/ Sand Pump Bailer
				(Hard to tell how much gravel is really in the sample due to carry-over from 269'). 5% gravel, 5% VCS, 10% CS,		
				20% MS, 15% FS, 10% VFS, 35% mud. 50% basalt, 50%	1130	Preparing to add
				qtz/Si-rich. Wet color: 5Y 4/2 (olive gray). reaction		casing
				to 10% HCL. Unconsolidated. Unsure of degree of sample	1150	Bailing - Driller
				representativeness due to carry-over. 2 pt jars, 1 sieve		says must have hit
				sample taken.		H_2O @ 270'.
						Will contain all
						spoil.
					1200/1230	Lunch.
				D/water = 267.8 - 2.8 (stick-up) = 265.0'	1245	
				w/ PNL E-tape # 12176		
				Added 10'5" of 8"		
283'9"						

REMARKS:

S.S. Teel
7-12-89

PNL-MA-567 Do-1, Rev. 0

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

.000 021 (6 86)

DRILL LOG	By S.S. Teel	Rig BE 22W 22-14101 Craig	Well Number 299-E25-37	Computer Number NA	Project or Work Order No. W-017
	Date 7/12/89		Depth 270 To 280'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
283'9"					1345	Drilling
					1400	Bailing
					1405	Drilling
	275'	H	Wet	SANDY GRAVEL (30% gravel, 65% sand, 5% mud).	1415	Sample w/ Sand Pump
				8% CP, 7% MP, 10% FP, 5% VFP, 15% VCS, 30% CS, 10% MS,		Bailer
				5% FS, 5% VFS, 5% mud. Very poorly sorted. (Gravel)-		
				60% basalt, andesite, & other volcanics; 40% qtzite, diorite,		
				& other ig/met Si-rich; trace cemented sandstone (Si-cement)	SR-WR	on orig surf.
				(Sand)- 35% basalt, volcanics, & mafics; 65% qtz, qtzite, &		
				Si-rich rock fragments. A-R. Wet color: 2.5Y 4/3 (olive brown).		
				No reaction to 10% HCL. Unconsolidated. Less mud,		
				more sand than previous. 2 pt jars, 1 sieve sample taken.		
	280'	H	Wet	SANDY GRAVEL (30% gravel, 67% sand, 3% mud)	1500	Sample w/ Sand Pump
				trace CP, 10% MP, 10% FP, 10% VFP, 12% VCS, 30% CS, 15% MS,		Bailer
				5% FS, 5% VFS, 3% mud. Very poorly sorted. (Gravel)-		
				55% basalt/volcanics (andesite); 45% qtzite, diorite, & other Si-rich,		
				R-VR on orig. surfaces. (Sand)- 30% basalt/mafics/volcanics,		
				70% qtz, qtzite, & Si-rich rock fragments. A-R. Unconsol.	1530	End of Day
				No reaction to 10% HCL. Similar to previous. 2 pt. jars and 1 sieve sample taken.	S.S. Teel 7-12-89	

REMARKS:

Pnl-MA-567 Do-1, Rev 0.

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

1 of 1

DRILL LOG	By S.S. Teel	Rig BE 22W 22-14101 Craig	Well Number 299-E25-37	Computer Number VA	Project or Work Order No. W-017 Grout
	Date 7-13-87		Depth TD to		Subcontract No. VA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/Bottom = 276.40 + 2.03 (1 joe) − 3.65 (stick-up = 274.78'	0720	
				b.l.s. with PNL steel tape # L300-04.		
				D/water = 268.40 − 3.65 (stick-up) = 264.75 b.l.s.	0723	
				meas. with PNL E-tape # 12176		
					0735	Driving casing
					0738	Bailing w/ Sand Pump
					0800	Drilling
				D/Bottom = 273' and rising − material is steadily	0810	
				heaving. Will backpressure the hole with		
				drilling water and re-drill to depth.		
				Added H_2O summary:	0830	Added 130 gal H_2O
				6/15 4 gal 6/16 8 gal 7/5 30 gal	0840	Drilling
				6/20 7 gal 7/6 40 gal		
				6/21 3 gal 7/7 40 gal		
				6/22 1 gal 7/10 35 gal		
				6/23 12 gal 7/11 45 gal		
				6/30 15 gal 7/12 35 gal		

REMARKS:

S.S. Teel
7-13-87

PNL-MA-567 Do-1, Rev. 0

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

30 021 (5 86)

A-63

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG	By S.S Teal	Rig BE22W 22-14101	Well Number 299-E25-37	Computer Number NA	Project or Work Order No. W-017 Grout
	Date 7-13-89		Depth TD To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/Bottom ≈ 275' b.l.s. Sand is still heaving	0900	
					0902	Bailing w/ Sand Pump
				D/Bottom = 276.5. Still heaving	0910	
					0912	Bailing
					0921	Adding water from the water truck to back pressure
					0940	Drilling / Bailing
				D/Bottom = 280' w/ PVC steel tape 6300-04	1000	
					1020	Preparing to run straightness test
				Passed straightness test. Test was witnessed by KEH personnel.	1025	
				D/Bottom = 279.8'.	1030	
					1035	Breaking-down rig to move off-site
				Total H_2O added ≈ 250 gal.		

REMARKS:

S.S. Teal
7-13-89

PNL-MA-567 Do-1, Rev. 0

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

1 of.

DRILL LOG	By: S.S. Teel Date: 8-7-89	Rig: No Rig	Well Number: 299-E25-37 Depth: TD To	Computer Number: NA	Project or Work Order No.: W-017 GTF Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/Water = 223.41 - 2.2 (stick-up) = 221.2 'b.l.s.		
				meas. w/ PNL. ½-tape # 12176		
				D/Bottom = 278.85 + 2.6 (tape) - 2.2 (stick-up) = 279.25 'b.l.s.		
				meas. w/ PNL steel tape # L300-19		
				Note: H_2O measurement is anomalously high, probably due to added drilling water for backpressuring.		

REMARKS:

S.S. Teel
8-7-89

PNL-MA-567 DO-1, Rev. 0

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

A-65

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	No Rig	299-E25-37	NA	W-017 GTF
Date: 8-9-89		Depth: TD To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/Bottom = 278.9 + 0.6 - 2' = 277.5 w/ PNL	1330	
				steel tape # L 800-14.		

REMARKS:

PNL - SET DO-1, REV. 0

S.S. Teel
8-9-89

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

C 2

DRILL LOG	By: S.S. Teel	Rig: Pump Truck	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 8-10-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Adding stainless steel casing (4") and screen:	0800	
				7 sections of casing w/centralizers		
				6 sections of casing w/o centralizers		
				1 - 10.3 long, 10 slot, channel-pack screen		
				1 - 10.35 long, 10 slot, channel-pack screen		
				Centralizers were placed every 40' starting at the top of the screen.		
				(Casing and screen was stored in original plastic wrap and all threads were wrapped).		
					1010	Moving equipment to site
					1100	Repairing crane
					1200/1230	Lunch

REMARKS:

S.S. Teel
8-10-89

PNL-MA-567 DO-1, REV. 0

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

DRILL LOG	By: S.S. Teel	Rig: Ardillbone Crane + Hyd. Jacks	Well Number: 699-E25-37	Computer Number: NA	Project or Work Order No.: W-017 GTK
	Date: 8-10-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
1¼ bags				Added 1¼ bags of 8-12 Colo. Silica Sand	1440	
				D/sand = 276 + 2.6 - 6.75 = 271.85		
				Pulled 1.5'		
				D/sand = 277.8 + 2.6 - 8' = 272.40		
				Pulled 1.5'		
				D/sand = 280.3 + 2.6 - 9.45 = 273.45		
				Pulled 1.5'		
				D/sand = 283 + 2.6 - 10.8 = 274.80		
					1530	End of Day
1¼ bags of 8-12 sand						
				(All measurements today were done using PNL steel tape # 6300-14		

REMARKS:

S.S. Teel
8-10-89

PNL-MA-567 DO-1, Rev. 0

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

8-11-89	Jacks	Depth Completion To	MA	W-017-67F Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGY DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
1¼ bags of 8-12 Sand				8" casing @ 276 Added ½ bag of 8-12 sand	0730	
1½				D/sand = 275.75 + 2.6 - 6.5 = 271.85		
1¾				Pulled 1.5' (Bottom of casing @ 274.5)		
				D/sand = 272.35 + 2.6 - 7.9 = 272.05		
1½				Added ½ bag of 8-12		
2¼				D/sand = 276.0 + 2.6 - 7.9 = 270.70		
1½				Added ½ bag of 8-12 mesh sand		
2¾				D/sand = 273.5 + 2.6 - 7.9 = 268.20		
				Pulled to 273		
				D/sand = 276 + 2.6 - 9.3 = 269.31		
				Pulled to 271.5		
				D/sand = 278.38 + 2.6 - 11' = 269.98		
				Pulled to 271.0		
1½				Added ½ bag of 8-12 sand		
3¼				D/sand = 272.0 + 2.6 - 6.6 = 268		
1½				Added ½ bag of 8-12 Sand		
3¾ bags of 8-12 Sand				D/sand = 269.35 + 2.6 - 6.6 = 265.35		

REMARKS:

S. S. Teal
8-11-89

PNL-MA-567 DO-1, REV. 0

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

00 021 (5-85)

DRILL LOG	By: S.S. Teel	Rig: Pettibone Crane & Jacks	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 8-11-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
3 3/4 bags of 8-12 mesh sand						
				Pulled 8" casing to 269.5'		
				D/sand = 271.7 + 2.6 - 8' = 266.30		
+ 1/4				Added 1/4 bag of 8-12 mesh		
4 bags of 8-12 mesh total				D/sand = 270.0 + 2.6 - 8' = 264.60		
				Pulled to 268'		
				D/sand = 272.25 + 2.6 - 9.3 = 265.55		
+ 1/2				Added 1/2 bag of 10-20 sand		
				(Out of 8-12 sand)		
				D/sand = 268.65 + 2.6 - 9.3 = 261.95		
				Pulled to 266.5		
				D/sand = 270.8 + 2.6 - 10.6 = 262.80		
+ 1/2				Added 1/2 bag of 10-20 sand		
1 bag of 10-20 mesh sand				D/sand = 264 + 2.6 - 6.6 = 257.66		
				Pulled to 273.33 - 5.2 = 268.13 (corrected D/casing → 273' weld is exposed)		
				D/sand = 266.35 + 2.6 - 7.9 = 261.05		
				Pulled to 273.33 - 6.6 = 266.73		
				D/sand = 268.70 + 2.6 - 6.6 = 264.70		

REMARKS:

S.S. Teel
8-11-89

PNL-MA-367 Do-1, REV. 0

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

DRILL LOG

By	Rig	Well No.	Computer Number	Project or Work Dr... No.
S.S. Teel	Pump Truck Crane + Jacks	299-E25-37	NA	W-017 GTF
Date: 8-11-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
1 bag	10-20			8" Casing @ 266.73		
1 1/2				Added 1/2 bag of 10-20 sand		
1 1/2				D/sand = 265.7 + 2.6 - 11.5 = 256.80		
				Pulled to 273.33 - 2.9 = 265.43		
				D/sand = 263.63 + 2.6 - 6.6 = 259.63		
				Pulled to 264.13		
				D/sand = 266.43 + 2.6 - 8 = 261.03		
1 1/2				Added 1/2 bag of 10-20 mesh sand		
2 bags of 10-20				D/sand = 263.80 + 2.6 - 8' = 258.40		
				Pulled to 262.83		
				D/sand = 265.9 + 2.6 - 9.3 = 259.20		
				Pulled to 261.53		
				D/sand = 268.5 + 2.6 - 10.6 = 260.5		
+ 1				Added 1 bag of 10-20 mesh sand		
3 bags				D/sand = 260.33 + 2.6 - 6.6 = 256.33		
1 1/2				Added 1/2 bag of 10-20		
3 1/2 bags of	10-20			D/sand = 258.3 + 2.6 - 6.6 = 254.30		

REMARKS:

S S Teel
8-11-89

PHL-MA-567 DQ-1, REV.0

D - Drive F H - Hard Tool L - Large M - Medium S - Small VC - Very C C - Coarse F - Fine VF - Very Fine ____ Standing Water J 021 (5-86)

DRILL LOG	By S.S. Teel	Rig Pump Truck Crane, & Jacks	Well Number 299-E25-87	Computer Number NA	Project or Work Order No. W-017-GTF
	Date 8-11-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
3½ bags of 10-20 mesh sand (total)				Pulled 8" to 260.23		
				D/sand: 260.3 + 2.6 − 7.95 = 254.95		
				Pulled to 258.93		
				D/sand = 262.05 + 2.6 − 9.3 = 255.35		
				Pulled to 257.63		
				D/sand = 260.30 + 2.6 − 6.6 = 256.30		
				D/Bottom (inside 4") = 284.18 + 2.6 − 6.6 = 280.18		
				D/water = 271.15 − 6.6 = 264.55		
				(meas. with PNL E-tape # 12176)	1050	Bailing
				Bailer is stuck inside the 4" casing. It went to	1100	
				the bottom with no problem but became stuck		
				on the way up at ≈ 140' b.l.s. It is probably		
				hanging up on the shackle that attaches the		
				bailer to the cable.	1110	Waiting for tremie
						to arrive to use to
						to "bump" the
						bailer and free it.

REMARKS:

S.S. Teel
8-11-89

PNL-MA-567 DO-1, REV. 0

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

A-72

F6

DRILL LOG	By: S.S. Teel	Rig: Pump Truck, Crane, + Jacks	Well Number: 299-E25-37	Computer Number: NA-	Project or Work Order No.: W-017 GTF
	Date: 8-11-89		Depth: Completion To		Subcontract No.: NA-

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1230	Adding Tremie
					1310	Bailer is free;
						removing tremie
					1330	Bailing.
				Water is very turbid but only contains ≈ 1/16 tsp of sand (VFS)	1340	
				per 5 gal. Capacity of bailer is 5 gal. Driller is		
				surging the bailer through the screened interval		
				4-5 times per load. Bailing rate ≈ 1.5 gal/min.		
				Bailer is a dart type. Water is being bailed into		
				a 55-gal drum.		
				Bailing Complete. Total volume bailed ≈ 35 gal.	1400	
				Water still very turbid with almost no sand.		
				D/sand = 261.20 + 2.6 − 6.6 = 257.20	1415	
				8" casing @ 257.63		
				Added 1/2 bag of 10-20 Sand		
				D/sand = 257.0 + 2.6 − 6.6 = 255.0		

REMARKS:

S.S. Teel
8-11-89

PNL-MA-567 DO-1, REV. 0

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

1021 (6 86)

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG	By S.S. Teel	Rig Pellibone crane + Jacks	Well Number 299-E25-37	Computer Number NA	Project or Work Order No. W-017 67F
	Date 8-11-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled 8" to 262.83 - 6.6 = 256.23		
				D/sand = 261.1 + 2.6 - 7.8 = 255.90 ← (Final top of sand)	1400	
				Added 1 bucket of 1/4" enviroplug tablets	1425	
				D/Pellets = 258 + 2.6 - 7.8 = 252.80		
				Added 1 bucket of 1/4" enviroplug tablets	1433	
				D/pellets = 255.5 + 2.6 - 7.8 = 250.30		
				Pulled 8" to 262.83 - 7.9 = 254.93		
				D/pellets = 257.1 + 2.6 - 9.1 = 250.60		
				Pulled 8" to 262.83 - 9.1 = 253.73		
				D/pellets = 259.45 + 2.6 - 10.4 = 251.65		
				Pulled 8" to 252.43		
				D/Pellets = 259.3 + 2.6 - 11.10 = 250.10		
				(cut off casing)		
				D/Pellets = 254.2 + 2.6 - 6.6 = 250.20		
				Pulled 8" to 251.13		
				D/Pellets = 254.35 + 2.6 - 7.9 = 249.05	1515	
				Pellets have bridged. Will have to break the bridge on Monday.	1530	End of Day

REMARKS:
41 bags of 8-12 mesh sand total
3 1/2 bags of 10-20 mesh sand total
[illegible] buckets of bentonite pellets total

Note: All measurements today were done using PNL [illegible] tape #1380-14

S.S. Teel 8-11-89

PNL-MA-567 DD-1, v.0

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

A-74

LL LOG	By: S. S. Teel	Rig: Crane, Jacks, & Pump Truck	Well No: 2-1-E25-37	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 8-14-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/Pellets (bridge) = 254.43 + 2.6 - 7.9 = 249.13	0720	
				Preparing to run a couple pieces of tremie down the hole to loosen the bridge.	0725	
				Tremie pipe started to get stuck. Will run entire length of tremie down hole.	0730	
				D/Bottom (outside tremie) = same as previous		
				D/Bottom (inside tremie) = 259.0 + 2.6 - 8.4 = 253.20		= D/Top of Pellets
				Bottom of 8" casing = 251.13		
					0820	Pulling Tremie Pipe
					0850	Preparing to add crumbles
5 bags				Added 5 bags of 8-20 mesh crumbles	0905	
				D/crumbles = 238.4 + 2.6 - 7.9 = 233.10		
15 / 10 bags of crumbles				Added 5 bags of 8-20 mesh crumbles		
				D/crumbles = 227.35 + 2.6 - 7.9 = 222.05		
				Pulled 8" to 252.33 - 6.6 = 245.73		
				D/crumbles = 230.42 + 2.6 - 6.6 = 226.42	0930	

REMARKS:

S.S. Teel
8-14-89

PNL-MA-567 DO-1, REV. 0

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

DRILL LOG	By: S.S. Teel	Rig: Crane & Hyd. Jacks	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 8-14-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
10 bags				Pulled 8" casing to 241.83 - 6.5 = 235.33		
				D/crumbles = 236.50 - 6.50 + 2.6 = 232.50		
+15				Added 15 bags of 8-20 mesh crumbles		
25				D/crumbles = 193.65 + 2.6 - 6.5 = 189.75		
				Pulled 8" casing to 220.83 - 6.3 = 214.53		(Pulled hard)
				D/crumbles = 207.64 + 2.6 - 6.3 = 203.94		
+10				Added 10 bags of 8-20 mesh	1030	
35				D/crumbles = 176.54 + 2.6 - 6.3 = 172.84	1035	
				Pulled 8" casing to 200' - 6.45 = 193.55	1100	
				D/crumbles = 191.0 + 2.6 - 6.45 = 187.15		
+12				Added 12 bags of 8-20 crumbles		
47				D/crumbles = 153.65 + 2.6 - 6.45 = 149.80		
				Pulled 8" casing to 183' - 6.4 = 176.60	1130	
				D/crumbles = 165.5 + 2.6 - 6.4 = 161.70		
+10				Added 10 bags of 8-20		
57 bags of crumbles				D/crumbles = 135 + 2.6 - 6.4 = 131.20		

REMARKS:

S.S. Teel
8-14-89

PNL-567 Do-1, Rev. 0

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

DRILL LOG	By: S. S. Teel	Rig: Pettibone Crane + Hyd. Jacks	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 8-14-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
57 bags				Pulled 8" casing to 162.16 - 6.9 = 155.26	1240	
				D/crumbles = 149.7 + 2.6 - 6.9 = 145.40		
				Pulling remaining 8" casing	1249	
					1335	Moving Jacks
					1400	Welding Casing
					1445	Preparing to backpull
				D/Bentonite = 153.63 + 2.6 - 6.7 = 149.53		
				Bottom of 10" casing @ 151.67		
+15				Added 15 bags of 8-20 mesh crumbles		
				D/Bentonite 128.2 + 2.6 - 6.7 = 124.10		
+10				Added 10 bags of 8-20 mesh		
77 bags of crumbles				D/Bentonite = 112.2 + 2.6 - 6.7 = 108.10	1500	
				151.67 SX 8/21/89 144.57		
				Pulled 10" casing to 153.67 - 7.1 = 146.57		
				D/Bentonite = 119.54 + 2.6 - 7.1 = 115.04	1515	
					1530	End of Day
				Note: All measurements were with PNL steel tape		
				# L 300-14		

REMARKS:

S. S. Teel
8-14-89

PNL-MA-567 Do-1, REV. 0

D - Dri vial H - Hard Tool L - Large M - Medium S - Small VC - Ver se C - Coarse F - Fine VF - Very Fine ____ Standing Water

3000 021 (5 88)

DRILL LOG	By: S.S. Teel	Rig: Pettibone crane & Hyd. Jacks	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 8-15-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				144.57 SST 8/21/89		
77				10" Casing @ ~~146.57~~		
110				Added 10 bags of bentonite crumbles	0700	
87				D/Bentonite = 103.60 + 2.6 - 7.1 = 99.10		
				Pulled 10" Casing to 135.8 - 6.7 = 129.10		
				D/Bentonite = 109.75 + 2.6 - 6.7 = 105.65		
110				Added 10 bags of 8-20 mesh bentonite		
97				D/Bentonite = 93.6 + 2.6 - 6.7 = 89.5		
				Pulled 10" Casing to 117.88 - 2' = 115.88	0805	
				D/Bentonite = 101.36 + 2.6 - 7' = 96.96		
18				Added 8 bags of bentonite		
105				D/Bentonite = 98.67 + 2.6 - 7' = 84.27		
				Pulled 10" Casing to 98.91 - 6.7 = 92.21		
				D/Bentonite = 93 + 2.6 - 6.7 = 88.90		
125				Added 25 bags of bentonite crumbles		
130				D/Bentonite = 58.25 + 2.6 - 6.7 = 54.15		

REMARKS: Using PNL steel tape L 306-14

S.S. Teel
8-15-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. Teel	Pettibone Power + Hyd. Jacks	299-E25-27	NA	W-017 ETF
Date: 8-15-89		Depth: Completion to		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
120 bags of crumbles				Pulled 10" Casing to 79.08 - 6.8 = 72.28		
				D/Bentonite = 65.58 + 2.6 - 6.8 = 61.38		
+15				Added 15 bags of crumbles		
145				D/Bentonite 42.25 + 2.6 - 6.8 = 39.05		
				Pulled 10" Casing to 60.4 6.7 = 53.70	1015	
				D/Bentonite = 47.23 + 2.6 - 6.7 = 45.18		
+10				Added 10 bags of bentonite crumbles		
155				D/Bentonite = 34.9 + 2.6 - 6.7 = 30.80		
+5				Added 5 bags of bentonite crumbles		
160				D/Bentonite = 26.8 + 2.6 - 6.7 = 22.70		
+5				Pulled 10" casing to 40.58 - 6.7 = 33.88		
165				D/Bentonite = 32.82 + 2.6 - 6.7 = 28.72		
				Added 5 bags of crumbles		
				D/Bentonite = 26.9 + 2.6 - 6.7 = 22.80		
+5				Added 5 bags of crumbles		
170	bags of total	crumbles		D/Bentonite = 18.7 + 2.6 - 6.7 = 14.60		

REMARKS:

S. Teel
8-15-89

Proc - MA - 567 Dr-1, Rev. 0

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

000 021 (5-85)

DRILL LOG	By S. S. Teel	Rig Crane + Hyd. Jacks	Well Number 699-E25-E7	Computer Number NA	Project or Work Order No. W-017 OTF
	Date 8-15-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled 10" to 30.42 - 10.2 = 20.22		
				D/Bentonite = 14.6 + 2.6 - 6.8 = 10.40		
				Pulled 10" to 18'		
				D/Bentonite = 16.5 + 2.6 - 9 = 10.10		
				Bentonite has bridged. Will run tremie pipe down to break it		
				Upon examination of the hole with a mirror, it was discovered the bottom of the 10" casing is 10' below ground surface. A miscalculation must have been made in the amount of 10" casing pulled.	1140	
				There is no bridge in the bentonite.	1150	Removing Tremie pipe
				John Keller and Clin Amos (KEII) arrive.	1200	
				After consultation with Clark Hodge (IUTE), the decision was made to go ahead and pour the grout seal (it will be 8' instead of 18') and the KEII A+I group will write a NCR.	1210 1300	Preparing to mix grout Mixing Grout

REMARKS:

S.S. Teel
8-15-89

PNL-MA-567 PO-1, Rev. 0

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

DRILL LOG

Date	Weldbore	Depth	Computer Number	Project or Work Order No.
S.S. Tool 8-15-89	Crane & Jacks	277-625-37 Completion To	NA	W-017-07F

Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Added 1 batch of cement grout. Batch consisted of 30 gal H_2O, 5 - 100lb bags of portland cement and 1 cup Aluminum powder	1320	Adding Grout
				D/Grout = 8' (only came up 2' from previous) Bottom of 10" casing @ 8' (was 2' open hole before the grout was poured).	1325	
					1330	Mixing Grout
				Added 1 batch of cement grout. Batch consisted of 30 gal H_2O, 6 - 100lb bags, and 1 cup Aluminum Powder.	1345	
				D/Grout = 6' (came up 2' from previous)	1350	Mixing Grout
				Added 1 batch of cement grout. Batch consisted of 25 gal H_2O, 4 100-lb bags of portland cement and 1 cup Aluminum powder.	1410	
				D/Grout = 3'	1420	Moving off site
					1520	End of Day

REMARKS:

SS Tool
8-15-89

PNL-MA-567 DA-1, Rev. 0

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

000 021 (5 85)

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG	By: S.S. Teel	Rig	Well Number: 299-E25-37	Computer Number: NA	Project or Work Order No.: W-017 67F
	Date: 9-14-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/Bottom (inside 4" casing) = 281.05' + 2.71' (tape)		
				− 3.0' (stick-up) = 280.76'		
				measured w/ PUL steel tape # 2800-05		

REMARKS:

S.S. Teel
9-14-89

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

DRILL LOG	By: JP McDonald	Rig: No Rig	Well Number: Z-E25-37	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 10/12/89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				O/W = 267.97' from loc. Tape # L300-14	1125	
				O/W = 267.96' from loc. " "	1128	
				Distance from zero mark on tape (L300-03) and		
				bottom of weight = 2.45'		
				O/B: 281.24' + 2.45' = 283.69'	1135	
				O/B: 281.24' + 2.45' = 283.69'	1136	
				Per conversation with Steve Teel will set		
				pump two feet from bottom of well = 281.69'		

REMARKS:

ANL-MA-567 WL-1, Rev. 1

JP McDonald 10/12/89

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

\6000 021 (5 86)

DRILL LOG	By D.K. Newcomer	Rig Pump-setting Truck	Well Number E25-37	Computer Number NA	Project or Work Order No. W-017 GTF
	Date 10/13/89		Depth Hydro-Star Install. To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 267.98', 267.98' below TOC	0755	Steel tape # L300-05
				Stickup = 3.01' ~~below~~ DKN 10/13/89 above top of cement pad		
				D/B = 281.16' + 2.45' (tape end) = 283.61' below TOC	0805	
				Began installing Hydrostar pump	0815	
				Tagged bottom of well with pump intake – top of last	1100	
				10' section of riser pipe is 1.45' ~~from~~ below DKN 10/13/89 TOC when set on bottom		
				length of pump = 2.25'		
				28-sections of 10' riser pipe = 280'		
				Calculated Total depth to intake = 282.25' below TOC		
				Measured Total depth to intake = 283.61' - 1.45' = 282.16'		
				Finish installing Hydrostar pump	1130	
				Well cap was fitted and locked	1140.	

REMARKS:

Darrell Newcomer 10/13/89

PNL MA-567 DO-3 Rev. 0.

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

A 6000 021 (6 86)

WELL COMPLETION/INSPECTION REPORT

Specification No. WHC-S-014 Rev. No. 3
Project [illegible]
Location [illegible]
Drilling Co. [illegible]
Driller [illegible]
Other (companies) N/A
Geologist(s) S.S. Teel, M.A. Chamness, T.J. Gilmore, E.T. Jensen, S.M. Goodwin

Well No. [illegible] Temp. Well No. NA
Coordinates (Hanford) N40,461.5 W45,749.2
Casing Elev. (top) 673.29 Ground Elev. 670.29 (Brass Cap)

DRILLING METHOD

Rotary - Air N/A Mud N/A
Cable Tool D 0' - 198' H 198' - 280'
Drilling Fluid [illegible]
Other NONE

GEOPHYSICAL LOGGING

Sondes	Interval	Date
Natural Gamma	151 - 3	6/28/89
Natural Gamma	279 - 120	7/14/89
	-	
	-	
	-	

COMPLETION DATA

Drilled Depth 280' SST 11-7-89
Completed Depth ~~279.55~~ 280.69
Date Started 6/14/89
Date Completed 9/18/89
Static Water Level/Date 264.55 (8/11/89)

AQUIFER TESTING

Type NA
Length of Test
Volume Pumped
Drawdown
Date of Test

INSPECTION RESULTS

CLEANING

Inspection Method Visual
Acceptance Criteria As per spec 7.6

	Accept	Reject	Date
Drilling Tools/Rig	SST		6/14/89
Temporary Materials	SST		8/10/89
Permanent Materials	SST		8/10/89

MATERIAL STORAGE/PACKING

Inspection Method Visual
Acceptance Criteria As per spec 4.2, 7.3

	Accept	Reject	Date
Mtl. Handling/Storage	SST		8/15/89
Material Packing	SST		8/15/89

SCREEN

Type	Length	Slot Size
304 Stainless Steel "Channel Pack"	20.65	10

Depth(s) ~~279.50~~ - ~~258.85~~ 260.04 (SST 11-7-89)

Inspection Method PVC steel tape / Engineers tape
Acceptance Criteria As per spec. 4.2
Accept SST Reject Date 8/10/89

LUBRICANTS/ADDITIVES

Inspection Method Visual
Acceptance Criteria As per spec 7.2

	Identify	Accept	Reject	Date
Additives	None	SST		7/12/89
Lubricants	Veg. Oil	SST		7/12/89

STRAIGHTNESS TEST

Inspection Method 20' of 6" casing down hole
Acceptance Criteria As per spec 8.3
Accept SST Reject Date 7/13/89

CASING (permanent)

Type	Size	Placement
304 Stainless Steel	4"	~~265.55~~ 260.04 - +1.1'

Inspection Method PVC Steel tape / Engineers Tape
Acceptance Criteria As per spec 2.1, 4.2
Accept SST Reject Date 8/10/89

WELL PROTECTION

Inspection Method VISUAL
Acceptance Criteria SECT. 4.2.10

	Accept	Reject	Date
Protective Posts	SST		9/18/89
Locks	SST		9/18/89

ANNULAR SEAL

Inspection Method PVC steel tape / Engineers Tape Acceptance Criteria As per spec 4.2, 5.3

Type	Interval	Volume	Accept	Reject	Date
8-12 Mesh Colo. Silica Sand	279.5 - 265.55	4.04 ft³	SST		8/11/89
10-20 Mesh Colo. Silica Sand	265.55 - 255.90	3.75 ft³	SST		8/11/89
1/4" Envirogel Tablets	255.90 - 253.20	1.24 ft³	SST		8/14/89
8-20 Mesh Granular Bentonite	253.20 - 10.1'	120.7 ft³	SST		8/15/89
~~Cement Grout Seal~~	~~10.1' - 3.0'~~	~~9.9 ft³~~	~~SST~~		~~8/15/89~~

OTHER (initial if performed)

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

Reviewed by D.L. McKelvey 10-5-89

For all blanks mark N/A if not applicable.

WESTINGHOUSE HANFORD COMPANY

WELL NUMBER 299-E25-37 (Grout facility) AREA 200 ER

DATE 6/28/89

LOG RUN First LOG TYPE Nat Gamma - Analog

SURVEY COORDINATES NA N NA E

ELEVATION DATUM Top of 10" Casing ELEVATION NA

LOG MEASURED FROM Nominal Surface

LOCATION DESCRIPTION West of Grout Facility, East Side of Excavation Pit *

GROUND SURFACE ELEVATION NA

SURFACE TEMPERATURE 23.4°C WEATHER Fair Light Breeze

BOREHOLE INFORMATION

DRILLER	KEH		
DRILL RIG TYPE	Cable-Tool	BIT TYPE/DIAMETER	10"
BOREHOLE DIAMETER(S)/DEPTH			
DEPTH DRILLER	153'	DEPTH LOGGER	151.7'
LIQUID LEVEL	NA (Dry)	LIQUID APPEARANCE	NA
TEMPERATURE	NA		

CASING RECORD

TYPE	12" Sch-40, Steel	INTERVAL	Surface - 20' (a19' in Ground)
TYPE	10" Sch-40, Steel	INTERVAL	Surface - 152'
TYPE		INTERVAL	
TYPE		INTERVAL	
WELL SCREEN INTERVAL:	NA		

COMMENTS: Material is 90% Fine & Coarse Sand, Seen in Pit Walls. Log is very nearly background in all but one place slight indication of very thin lens at 88-90' (or interbed) 2nd (entry) Casing seen at a19' Surface "Shiny" at ~3'

* Approx 50 yds North of completed well 299-E25-31

EQUIPMENT DATA

LOGGING COMPANY: PNL

OPERATOR(S): K.L. McGahan

EQUIPMENT BRAND: M.L.S. | EQUIPMENT TYPE: Analog - Nat. Gamma

TOOL TYPE: NaI (Gross Gamma) | BASE CALIBRATION DATE: 12-88

SERIAL NO.: CG 27A98 | CALIBRATION REFERENCE: WHC-EP-0296

CALIBRATION / PROBE FACTOR: 8.53×10^{-2} cU (PPM/cps)

DEAD TIME: 7.4 μSec (from WHC-EP-0296) | WARM UP TIME: >15 Minutes

LOGGING INFORMATION

LOG INTERVAL FROM: ~152' TO: ~~101-50'~~ -3.5'

RERUN(S): #1 ~110' TO ~80'

PRE SURVEY CALIBRATION: POSITION 1 ~71% (FS=1000) 298 cell p/m | POSITION 2 ~73% (FS=1000) 57 cell p/m | BACKGROUND ~11% (FS=500) 55 c/s

LOGGING SPEED: 5 FT/MIN

START TIME: 8 30 AM | COMPLETION TIME: 9 15 AM

CHART SPEED(S), FT/IN.: 10 FT/IN

CHART RECORDER HORIZONTAL SCALE, CPS/IN.: 50 cps/in (FS = 500)

RERUN SCALES, CPS/IN.: 50 cps/in

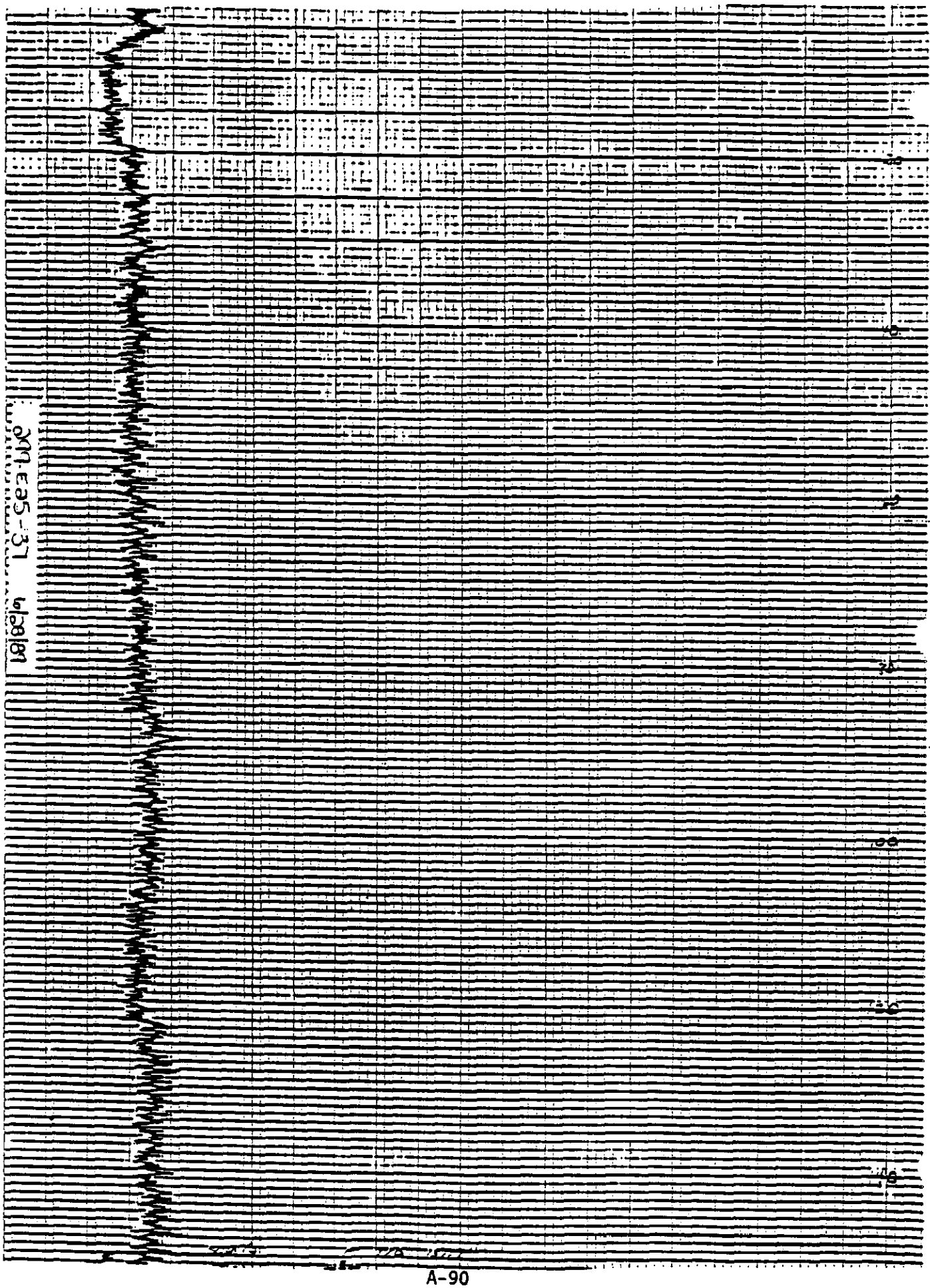
TIME CONSTANT(S): 1 Sec.

POST SURVEY CALIBRATION: POSITION 1 ~70% (FS=5000) 274 cell p/m | POSITION 2 ~71% 66 cell p/m | BACKGROUND ~11% 50 c/s

PERCENT CHANGE: POSITION 1 -1% 1.3% | POSITION 2 ~2% 1.8%

COMMENTS: Dry Hole, log run w/o decentralizing bow spring, some water at bottom added by driller.
No depth return error (< ½")
Good Pre/Post Survey check.

WITNESSED AND VERIFIED BY: J.L. [illegible] 6/28/86


10/28/81
LC-SE3-UC
-20
-30
-40
-50
-60
-70
-80
-90
-100

WESTINGHOUSE HANFORD COMPANY

WELL NUMBER 299-E25-37 AREA 200 E (Grout Facility)

DATE 7/14/89

LOG RUN 2nd Casing LOG TYPE Analog (Nat. Gamma)

SURVEY COORDINATES NA N NA E

ELEVATION DATUM Nat. Ground Surface ELEVATION NA

LOG MEASURED FROM Top of 8" Casing.

LOCATION DESCRIPTION East of 200 E Grout Fac. West Bank of Dry Pit

GROUND SURFACE ELEVATION NA

SURFACE TEMPERATURE 28°C WEATHER Warm light wind

BOREHOLE INFORMATION

DRILLER	KEH		
DRILL RIG TYPE	Cable-Tool	BIT TYPE/DIAMETER	8"
BOREHOLE DIAMETER(S)/DEPTH	10" to 151 / 8" to 279		
DEPTH DRILLER	-NA-	DEPTH LOGGER	-278.6'
LIQUID LEVEL	123.46' (Top of Casing)	LIQUID APPEARANCE	clear
TEMPERATURE	22°C		

CASING RECORD

TYPE	~~Surface to 151' 10" 7/14/89~~	INTERVAL	
TYPE	10" Sch. 40 steel	INTERVAL	-157 to Surface
TYPE	8" Sch. 40 steel	INTERVAL	279 to Surface
TYPE		INTERVAL	

WELL SCREEN INTERVAL: -NA-

COMMENTS: Ground Surface ~ Top of 299-E25-31

Rerun had ~10' line slack ignore last 10' of chart.

EQUIPMENT DATA

LOGGING COMPANY: PNL

OPERATOR(S): VL McGuire

EQUIPMENT BRAND: M.L.S. | EQUIPMENT TYPE: Analog, Nat. Gamma

TOOL TYPE: Na I (Nat. Gamma) | BASE CALIBRATION DATE: 12-88

SERIAL NO.: CG 27A97 | CALIBRATION REFERENCE: WHC-EP-0246

CALIBRATION / PROBE FACTOR: 8.53×10^{-2} cll ($\frac{ppm}{cps}$)

DEAD TIME: 7.4 μSec | WARM UP TIME: > 15 min

LOGGING INFORMATION

LOG INTERVAL FROM: -288' TO: -120'

RERUN(S): #6 -278' to -250'

PRE SURVEY CALIBRATION: POSITION 1 ~69% (FS=5,000) 293 cll ppm | POSITION 2 ~75% (FS=1000) 750 cll ppm | BACKGROUND ~12% (FS=500) 55 c/s

LOGGING SPEED: 5 ft/min

START TIME: 9:25 AM | COMPLETION TIME: 10:30 AM

CHART SPEED(S), FT/IN.: 10 ft/in

CHART RECORDER HORIZONTAL SCALE, CPS/IN.: 50 cps/in (FS-500)

RERUN SCALES, CPS/IN.: 50 cps/in

TIME CONSTANT(S): 1 Sec

POST SURVEY CALIBRATION: POSITION 1 ~70% 294 cll ppm | POSITION 2 ~75% 755 cll ppm | BACKGROUND 65 c/s

See below * PERCENT CHANGE: POSITION 1 +1% 1.4% | POSITION 2 N/C 1.7%

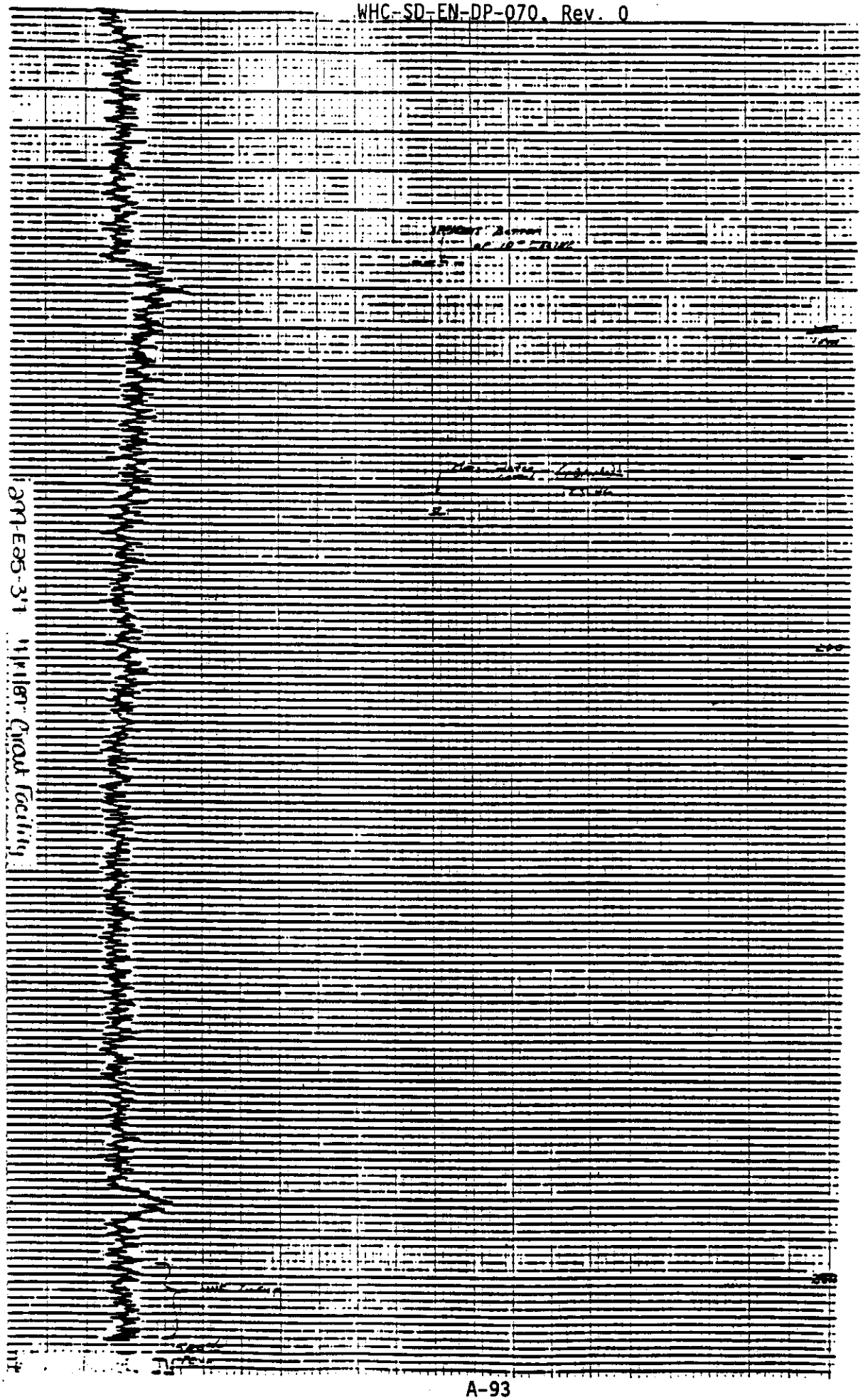
COMMENTS: Noted (Short) kick for clay at 274'-268'

Noted (apparent) bottom of 10" casing at ~ 154.5'

Probe sidewalled w/ single two-spring.

WITNESSED AND VERIFIED BY: L.I. Boyle 7/14/89

*Log is useful for Quantitative Comparison


200-E05-311 Wilber Grout Facility

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E25-38 Geologist Jack Jensen Goodwin, Chamness, Gilmore Page 1 of 3

Reviewed by [illegible] Date 10-3-89

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		5'		SAND
		10'		SANDY GRAVEL
		15'		SAND
20 1/2" of 12" carbon steel casing		20'		SANDY GRAVEL
		25'		SLIGHTLY GRAVELLY SAND
		30'		SAND
260' of 4" DIA STAINLESS		35'		SLIGHTLY GRAVELLY SAND
STEEL FINAL CASING		40'		SAND
		45'		"
		50'		"
		55'		"
10" carbon steel casing		60'		"
(154' 8 3/4")		65'		SLIGHTLY GRAVELLY SAND
		70'		" " "
		75'		" " "
		80'		" " "
		85'		" " "
		90'		SLIGHTLY MUDDY SAND
		95'		" " "
CASING CENTRALIZERS		100'		SLIGHTLY GRAVELLY SLIGHTLY MUDDY SAND
		105'		" " " " "
8" carbon steel casing		110'		SLIGHTLY MUDDY SAND
(236')		115'		SAND
		120'		SLIGHTLY MUDDY SAND
		125'		GRAVELLY SAND
		130'		" "

A-1800-188 (3/87)

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E25-38 Geologist Teel Chamness, Jensen, Goodwin, Gilmore Page 2 of 3

Reviewed by [illegible] Date 10-3-89

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
		135		SLIGHTLY GRAVELLY SAND
		140		SAND
		145		MUDDY SAND
120' 8-5/8" x 10" carbon steel casing		150		SAND
		155		"
		160		"
		165		GRAVELLY SAND
		170		" "
		175		SANDY GRAVEL
CASING CENTRALIZERS		180		" "
		185		" "
		190		" "
		195		" "
256' of 5" carbon		200		" "
steel casing		205		" "
		210		" "
		215		" "
		220		MUDDY SANDY GRAVEL
260' of 4" DIA stainless		225		" " "
steel final casing		230		" " "
		235		" " "
		240		" " "
		245		" " "
		250		SANDY GRAVEL
		255		" " "
		260		SLIGHTLY GRAVELLY MUDDY SAND

(SLIGHTLY GRAVELLY SANDY MUD: 257-258')

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E25-39 Geologist TEEL, CHAMNESS, JENSEN, GOODWIN, GILMORE Page 3 of 3

Reviewed by [illegible] Date 10-3-89

Construction Data		Depth in Feet	Geologic/Hydrologic Data	
Description	Diagram		Diagram Litho.	Lithologic Description
256' OF 5" CARBON		265		SLIGHTLY GRAVELLY MUDDY SAND
STEEL CASING W/ DRIVE		270		GRAVELLY SAND
SHOE		275		SL. GRAVELLY SL. MUDDY SAND
21.04' OF 4" DIA.		280		SL. GRAVELLY SAND
STAINLESS STEEL CHANNEL				
PEEL SCREEN				T.D. = 283'
				COMPLETION DEPTH = 279.63'
COMPLETION SYMBOLS:				
CEMENT GROUT				
GRANULAR BENTONITE				
VOLCLAY TABLETS				
SILICA SAND				
CASING JOINT				
CASING CENTRALIZER				

A-1800-188 (2/87)

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. S. Teel		299-E25-38	NA	W-017
Date: 6-6-89		Depth: — To —		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					0720	Driller & geologist
						arrive on site
					0725	Setting-up rig
					1000	Driller waiting on
						tools ect. to arrive
					1145	Tools arrive
					1200/1230	Lunch
					1230	Pouring rope socket,
						assembling tools, ect.
					1530	End of Day

REMARKS:

S. S. Teel
6-6-89

PNL-MA-567 DO-1, REV. 0

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

000 021 (5 86)

DRILL LOG	By: E.J. Jenson	Rig: 22-14103 BE-601- Louis Watkins	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6/7/89		Depth: 0' To 15'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
no casing	5'	core barrel	moist	FINE SAND, 5% silt, 35% vfs, 40% fs, 10% ms, 3% cs 2% vcs, 5% pebbles, color 10YR 5/3 brown, unconsolidated, no rxn in 10% HCl	0940	8" dia. core barrel Hole started caving 2 pint jars
10'				Added 10' of 12" dia. casing	1120	
10' 1/2"				Added 10' 1/2" of 12" dia. casing	1200	
20' 1/2"						
	10'	core barrel	dry	SANDY GRAVEL, 70% sand, 30% gravel, sands are mostly angular Basaltic, Gravel is rounded Basaltic, color 10YR 3/2 very dark grayish Brown, unconsolidated, no rxn in 10% HCl	1405	2 pint jars
	15'	core barrel	dry	COARSE SAND, 5% silt, 5% vfs, 10% fs, 20% ms 30% cs, 20% vcs, 10% pebbles, sand is angular basaltic, pebbles are subrounded basalt, color 10YR 3/2 very dark grayish Brown, unconsolidated, moderate rxn in 10% HCl	1515	2 pint Jars

REMARKS:

PNL-567 D0-1, Rev. 0

6/7/89

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

A-100

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. S. Teel	22-14103 BE-60L Louis Watkins	299-E25-38	NA	W-017
Date: 6-8-89		Depth: 15' to 20'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliché, Etc.	Time	Drilling Comments
20'½" of 12" Casing Total					0700	Arrive on site
						- working on rig
					0735	Drilling
	20'	D	Dry	SANDY GRAVEL (35% gravel, 60% sand, 5% mud).	0830	Sample w/Core Barrel
				7% VCP, 3% MP, 15% FP, 10% VFP, 20% CS, 15% MS,		
				20% FS, 5% VFS, 5% mud, Mod - poor sorted. (Gravels) -		
				60% basalt & other volcanics (andesite), 40% qtz & Si-rich.		
				Angular to well rounded. (Sand) - 45% basalt & andesite,		
				55% qtz & Si-rich. A-SR. No reaction to 10% HCl, except		
				for small (MP - CP size) weakly-cemented ($CaCO_3$)		
				sand aggregates. Unconsolidated. Similar to previous.		
				Wet color: 10YR 2/2 (very dark brown). 2 1-pint geol.,		
				moisture, and haz. chem sample taken. (C.of C. # 60889 SST 10/2/89)	0850	Repairing welding lead
19'7"				Added 19'7" of 10" Casing	0905	Adding Casing
10 3½"				Added 10'3½" of 10" Casing	1010	Adding Casing
29'10½" of 10"						

REMARKS:

Note: No moisture samples were taken yesterday.

S. S. Teel
6-8-89

PNL-MA-567 DO-1, Rev. 0

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

0 021 (5 85)

DRILL LOG	By: S.S. Tuel	Rig: 22-14103 BE-60L Louis	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-8-89		Depth: 20' To 25'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
29'10½"	of 10"	(with d	ive shoe)		1115	Finished Welding
					1122	Drilling
				(See Sandy Gravel sim to 20' sample @ 01' w/ up to small cobbles). Few gravels at 23'.		
	25'	D	Dry	SLIGHTLY GRAVELLY SAND (8% gravel, 87% sand, 5% mud) 5% FP, 3% VFP, trace VCS, 50% CS, 20% MS, 10% FS, 7% VFS, 5% med. (Gravels) 70% basalt & other volcanics; 30% qtz & Si-rich. Angular to rounded. (Sand) 65% basalt & volcanics, 35% qtz & Si-rich. No reaction to 10% HCL. Wet color: 10YR 2/2 (very dark brown). Unconsolidated. Less gravel than previous. Geol. & Moisture samples taken. (Geo. sample = 2 1-pint jars).	11:53	Sample & Core Barrel
					1200/1230	Lunch
					1239/1250	Safety Meeting
					1310	Drilling

REMARKS:

S.S. Tuel
6-8-89

PNL-MA-567, DO-1, REV. 0

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

DRILL LOG	By: S. S. Teal	Rig: 28-1410S, CC-60L, Louis	Well No.: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-8-89		Depth: 25' To 37'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
29'10½" of 10"						
10 3¾"						
40'2¼"	30'	D	Dry	SAND (5% gravel, 90% sand, 5% mud).	1330	Sample w/ Core Barrel
				3% FP, 2% VFP, trace VCS, 30% CS, 30% MS, 20% FS	1335	Preparing to weld/
				10% VFS, 5% mud. (Gravel) - 65% basalt & volcanics,		- welding
				35% qtz & Si-rich, A-R, (Sand) 55% basalt +		
				volcanics, 45% qtz & Si-rich, A-SR, rare rounded		
				grains. No reaction to 10% HCl. Unconsolidated. Moisture		
				& geol. samples taken. Wet color: 10YR 2/2 (very dark		
				brown). Moisture & Geol samples taken. Slightly less		
				gravel than previous.		
				Added 10' 3¾" of 10" Carbon Steel Casing	1445	Drilling
	35'	D	Dry	SLIGHTLY GRAVELLY SAND (6% gravel, 7% mud	1520	Sample w/ Core Barrel
				87% sand. Same min. as previous. See < 1" thick		
				silt rich layer in sample. Occasional gravel up to 1½"		
				size. Sim. to previous except slightly more silt. Moisture &		
				Geol samples taken.		
					1530	End of Day
40'2¼" of 10"						

REMARKS:

S. S. Teal
6-8-89

PNL-MA-567 Do-1, REV. 0

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

10 021 (5-85)

1 of 2

DRILL LOG	By: ES Jensen	Rig: 22-14103 BE-60L Louis	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6/9/89		Depth: 37' To 50'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	40'	core barrel	dry	MEDIUM SAND, 5% silt, 15% fs, 35% ms, 30% cs, 10% vcs, 5% small pebbles, mostly angular basaltic, color 10YR 3/2 very dark grayish brown, unconsolidated, slight rxn in 10% HCl	0805	2 pint jars and 1 moisture sample 1 chemical sample (c.of.c. # 60989) SST 10/16/89
9'				Added 9' of 10" casing	0840	
49' 1/4"						
	45'	core barrel	dry	MEDIUM SAND, 5% silt, 20% fs, 45% ms, 25% cs, 5% vcs, mostly angular basaltic, color 10YR 3/2 very dark grayish brown, unconsolidated, moderate rxn in 10% HCl	1000	2 pint jar samples 1 moisture sample
	50'	core barrel	dry	MEDIUM SAND, 5% silt, 20% fs, 40% ms, 25% cs, 5% vcs, 5% pebbles, mostly angular basaltic sand, pebbles are rounded Basalt, color 10YR 3/2 very dark grayish brown, unconsolidated, no rxn in 10% HCl	1050	2 pint jar samples 1 moisture sample
10' 1/4"				Added 10' 1/4" of 10" casing	1100	
59' 1/2"						

REMARKS:

PNL-MA-567 Do-1, Rev. 0

6/9/89

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

A-105

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG

By: EJ Jensen
Date: 6/9/89
Rig: 22-14105 BE-60L LOUIS
Well Number: 219-E25-38
Depth: 50' to 60'
Computer Number: NA
Project or Work Order No.: W-017
Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	55'	core Barrel	Dry	MEDIUM SAND, 5% silt, 20% fs, 45% ms, 25% cs 5% vcs, mostly angular Basalt, color 10YR 3/2 very dark grayish Brown, unconsolidated, no rxn in 10% HCl	1330	2 pint jar samples 1 moisture sample
	60'	core Barrel	Dry	MEDIUM SAND, 5% silt, 20% fs, 40% ms, 25% cs, 5% vcs, 3% pebbles, 2% cobbles, mostly angular Basalt, pebbles and cobbles are rounded Basalt, Color 10YR 3/2 very dark grayish Brown, unconsolidated, slight rxn in 10% HCl	1420	2 pint jar samples 1 moisture sample 1 chemical sample (C. ofc. # 60889) SST 10/16/89
9'5½" 68'8"				Added 9'5½" of 10" casing	1430	

REMARKS:

PNL-MA-567 Do-1, Rev. 0

6/9/89

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

21 (5 86)

lot 3

DRILL LOG	By: S. S. Teel	Rig: 22-14103 BE-60L	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-12-89	Louis Watkins	Depth: 60' to 70'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
6.8'8					0700	Arrive on site –
						preparing to drill
					0730	Drilling
				(@ 63' see very thin silt layer – ≈ 1-2" thick, and		
				alt med and coarse sand layers ≈ 1 ft thick).		
	65'	D	Dry	SLIGHTLY GRAVELLY SAND (5% gravel, 90% sand, 5% mud)	0800	Sample w/ Core Barrel
				3% FP, 2% VFP, 5% VCS, 40% CS, 20% MS, 15% FS, 10% VFS,		
				5% mud. (Gravels) – 70% basalt & volcanics, 30% qtz & Si-		
				rich. A-SR. (Sand) – 75% basalt & volcanics, 25%		≈ 68' – Sand with
				qtz & Si-rich, trace mica. A-SR. Uncensol. Wet color:		weakly consolidated
				10YR 2/2 (very dark brown). No reaction to 10% HCL.		chunks that look like
				Mod. sort. Geol. & moisture samples taken.		weathered granite
	70'	D	Dry	SLIGHTLY GRAVELLY SAND (6% gravel, 89% sand, 5% mud)	0905	Sample w/ Core Barrel
				3% FP, 8% VFP, 5% VFS, 40% CS, 20% MS, 14% FS, 10% VFS,		
				5% mud. Sands & Gravels are 70% basalt & volcanics w/		
				30% qtz & Si-rich, and are A-SR. Uncensol. Mod-well sorted,		
				Wet color: 10YR 2/2 (very dark brown). No reaction to		
68'8"	0(10"			10% HCL. Geol & Moisture samples taken.		

REMARKS:

PNL-MA-567 PO-1, REV. 0

MA Chamberlin 6/13/89

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

DRILL LOG	By: S.S Teel	Rig: 22-14103	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017 Grout
	Date: 6-12-89	Louis Drilling	Depth: 70' to 75'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
68'6" 9'8" 78'4"				Added 9'8" of 10" casing	0915	Adding Casing
					1040	Drilling
						70-75' - Sand w/
						occasional VCP-
						small cobble.
	75'	D	Dry	SLIGHTLY GRAVELLY SAND (5% gravel, 88% sand, 7% mud). 4% FP, 1% VFP, trace VCS, 25% CS, 30% MS, 20% FS, 13% VFS, 7% mud. Well sorted. (Gravel)- 30% basalt/mafics, 70% qtz, qtzite, feldspar, and granitic. A-SR. (Sand) - 35% basalt/mafics, 30% feldspar, 35% qtz, qtzite, & Si-rich rock fragments. A-SA. No reaction to 10% HCL. Unconsolidated. Note general granitic comp. of sample. Wet color: 10YR 2/2 (very dark brown). Geol. & Moisture samples taken	1145	
					1200/1230	Lunch
				MA Chauvin took over for SS Teel	1230/1245	Filling under travels
78'4"						

REMARKS:

PNL-MA-567 Do-1, Rev. 0

MA Chauvin 6/12/89

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

00 021 (5 86)

DRILL LOG	By: MAChaunsen	Rig: 22-41103	Well Number: 299-E25-28	Computer Number: NA	Project or Work Order No.: WD017 Grant
	Date: 6/12/89	Louis Hawkins	Depth: 75' To 85'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
78'4" of 10"						
	80'	C	dry	SLIGHTLY GRAVELLY SAND: 8% gravel, 90% sand, 2% mud	1305	
				8% vfg, 5% vcs, 28% cs, 45% ms, 10% fs, 2% vfs, 2% mud. WS.		
				Gravel: 50% basalt, 25% granitic, 15% qtz/qtzite, 10% other, VA-R.		
				Sand: 70% basalt, 10% qtz, 10% feldspar, 10% rk frags., VA-SR.		
				Dry color - gray dk black-brown (~ 2.5Y3/2). No rxn in HCl.		
				Unconsolidated, occasional piece of granitic rich sand w/ feldspars		
				altering to clay that holds the sands together. Similar to last		
				sample, less mud. along w/ some $CaCO_3$		
				2 pt jars, 1 moisture sample, 1 special sample.	1315	cutting casing, prep. for welding
				(C. of C. # 61289 SPL 10/16/89)	1340	changing air hoses
110'1"					1355/1450	welding 10'1" of 8"
98'5" of 10" RS		C	sl. damp	SLIGHTLY MUDDY SAND: 90% sand, 10% mud. 1% cs, 19% ms,	1525	
				45% f, 25% vfs, 10% mud. WS. Sand - 25% basalt, 40% qtz, 35%		
				rk frags + feldspar, tr. mica, VA-R. Dry color - 2.5YR6/2 (lt. brownish		
				gray), wet - 2.5YR4/2 (dk grayish brown). Mod-strong rxn in HCl.		
				Unconsolidated. Gradually becomes finer in the last 2-3 ft, thin		
				layers of silty sand present. Finer than previous sample.		

REMARKS: 2 pt. jars, 1 moisture sample

PNL-MA-567 DO-1, REV. 0

MA Chaunsen 6/12/89

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

DRILL LOG	By: S. S. Teel	Rig: 22-14103 BE-601 Louis Watkins	Well Number: 699-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-13-89		Depth: 85' to 92'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
88'5" of 8"					0700	Arrive on site
					0715	Drilling
	90'	D	Slightly Moist	SLIGHTLY MUDDY SAND (1% gravel, 84% sand, 15% mud). 1% FP + VFP, 5% VCS, 15% CS, 40% MS, 14% FS, 10% VFS, 15% mud. Well sorted. (Sand)- 30% basalt & mafics, 30% feldspar, 10% qtz and Si-rich rock fragments. A-SA. No reaction to 10% HCL. Unconsolidated. Wet color: 0.5Y 3/2 (very dark grayish brown). Sample consists of sand interbedded w/ numerous thin (<1" thick) muddy sand layers. 1 - moisture, 2 - pt jars taken.	0800	88' - see thin sand layers interbedded w/ numerous very thin (<1" thick) muddy sand layers.
	92'	D	Slightly Moist	SLIGHTLY MUDDY SAND. (90% sand, 10% mud) Sample consists of a semi-compacted, granitic sand w/ feldspars that have altered to clay, approximately 4" thick. Same comp and grain size as previous sample. It may be a weathered cobble. There was a isolated vcp of glass in the core barrel that this was found. 2 pt jars taken. 1 moisture sample taken. No reaction to 10% HCL.	0815	

REMARKS:

S. S. Teel
6-13-89

PNL-MA-567 DO-1, Rev. 0

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

0021 (5 86)

DRILL LOG	By: S.S. Teel	Rig: 22-14103 BE-60L Louis	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-13-89		Depth: 92' to 100'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
88'5" 10'2" 98'7"	95'	D	Slightly Moist	SLIGHTLY MUDDY SAND (3% gravel, 82% sand, 15% mud)	0830	
				2% FP, 1% VFP, 2% VCS, 20% CS, 30% MS, 20% FS, 10% VFS,		
				15% mud. Well sorted. (Gravel) - 85% basalt & volcanics,		
				15% qtz & Si-rich. A-R. (Sand) - 30% basalt/mafics,		
				30% feldspar, 40% qtz, qtzite, & Si-rich rock fragments,		
				trace mica. A-SR. Moderate HCL reaction. Wet color: 2.5Y 3/2.		
				Numerous chunks of semi-compacted weathered granite sand.		
				Similar to previous two samples. 1 moisture, 2 pt jars taken.	0840	Adding Casing
						Added 10'2" of 10"
					1030	Drilling
	100'	D	Slightly Moist	SLIGHTLY GRAVELLY SLIGHTLY MUDDY SAND (7% gravel,	1115	95-100' see continuation
				83% sand, 10% mud). 1% VCP, 2% MP, 2% FP,		of basically the same -
				2% VFP, 8% VCS, 15% CS, 25% MS, 25% FS, 10% VFS,		- slightly muddy sands
				10% mud. Mod. well sorted. (Gravel) - 80% basalt, 20%		with alt. thin layers
				qtz, qtzite, and Si-rich rock fragments. (Sand) - 80% basalt		of semi-compacted and
				and mafics, 20% qtz, feldspar, and Si-rich rock fragments, trace mica.		unconsolidated sands.
				Sand & Gravel is A-SR. Strong reaction to 10% HCL.		
98'7"				Has layers of semi-consolidated sands of granitic comp.		

REMARKS:

Wet color: 2.5Y 3/2 (very dark grayish brown). 1 moisture, 1 hazchem, and 2 pt jar samples taken. N.O.C.-# 61389 10/10/89

S.S. Teel 6-13

PNL-MA-567 Do-1, Rev. 0

D - Drive Bar H - Hand Tool L - Large M - Medium S - Small VC - Very Coarse

A-112

DRILL LOG	By S.S. Teel	Rig 22-14103	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017
	Date 6-13-89	Lewis	Depth 100' To 110'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
98'7" 9'11" 108'6"	105'	D	Slightly Moist	SLIGHTLY GRAVELLY SLIGHTLY MUDDY SAND	1150	
				(5% gravel, 80% sand, 15% mud). 2% VCP, 3% VP + VFP,		
				15% CS, 30% MS, 20% FS, 15% VFS, 15% mud, Well sorted.		
				(Gravels) - 50% basalt, 50% qtz + Si-rich rock fragments.		
				(Sand) - 25% basalt/mafics, 45% feldspar + Si-rich rock		
				fragments, 25% qtz + qtzite. A-SA. Strong reaction to		
				10% HCL. Wet color: 2.5Y 3.5/2 (very dark to dark grayish brown).		
				Similar to previous → semi-consolidated layers of		
				granitic comp. 1 moisture, 2 pt jar samples taken.		
					1200/1230	Lunch
					1230	Adding Casing
					1430	Drilling
	110'	D	Slightly Moist	SLIGHTLY MUDDY SAND (3% gravel, 82% sand, 15% mud)	1615	
				Same as previous except less less gravel. 1 moisture,		
				2 pt jar samples taken		
					1530	End of Day
108'6" of 10"						

REMARKS:

S.S. Teel
6-13-89

PNL-MA-567 Dw-1, Rev. 0

D - Dr[illegible]ral H - Hard Tool L - Large M - Medium S - Small VC - Ver[illegible]e C - Coarse F - Fine VF - Very Fine ____ Standing Water

300 021 (5 85)

DRILL LOG	By: S.S. Teel	Rig: 22-14103 BE 60L Louis Watkins	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-14-89		Depth: 110' to 115'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
108'6" of 10"					0700	Arrive on site
110'						- preparing to drill
113'6" of 10"					0730	Drilling
	115	D	Slightly Moist	SAND (1% gravel, 94% sand, 5% mud).	0800	
				1% FP + VFP, 30% CS, 30% MS, 30% FS, 4% VFS, 5% mud.		
				Very well sorted. 25% basalt + mafics, 30% feldspar and		
				Si-rich rock fragments, 15% qtz + qtzits, trace mica.		
				A-9A. No reaction to 10% HCL. Wet color: 2.5Y 3/2 (very dark		
				grayish brown). Unconsolidated. Coarser than previous (less mud).		
				1 moisture, 2 pt. jars taken.		
				Added 10' of 10" Casing	0810	Adding Casing
					0955	Drilling
					1000	Safety shuts down
						job because no RPT
					1120	Drilling - RPT
						on-site
118'6"						

REMARKS:

S.S. Teel
6-14-89

PNL-MA-567 DO-1, REV. 0

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

A-115

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	22-14103	299-E25-38	NA	W-017
Date: 6-14-89	Louis W.	Depth: 120' to 125'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
118'6"	120'	D	Moist	SLIGHTLY MUDDY SAND (3% gravel, 87% sand, 10% mud)	1150	
				1% MP, 1% FP, 1% VFP, 9% VCS, 30% CS, 25% MS, 20% FS,		
				10% VFS, 10% mud. Mod-well sorted. (Gravel)- 60%		
				basalt + other volcanics, incl. porphyry; 40% qtz, qtzite, and		
				other Si-rich rock fragments. (Sand)- 25% basalt + mafics,		
				35% feldspar + Si-rich rock fragments, 40% qtz, qtzite,		
				trace mica. Gravels are A-SR. Sands are A-SA. No reaction		
				to 10% HCL. Wet color 2.5Y 3/2. Generally unconsolidated		
				with local semi-consolidated (compacted) layers as was	1200/1230	Lunch
				previous. Still see general granitic comp. 1-moisture,	1300	Drilling
				1-haz chem, and 2-pt jars taken. More silt + gravel		
				than the 115' sample. Similar to 110' sample. (C.of C. # 61489)		SST 10/16/89
	125'	D	Slightly Moist	GRAVELLY SAND (10% gravel, 85% sand, 5% mud)	1315	
				4% FP, 6% VFP, 20% VCS, 35% CS, 20% MS, 5% FS, 5% VFS,		
				5% mud. Moderately sorted. (Gravels)- 80% basalt + other		
				volcanics, 20% qtz, qtzite, + other Si-rich A-SR (Sand) 25% basalt		
				+ mafics, 15% feldspar, 60% qtz + qtzite. A-SA. Wet color		
118'6"				10YR 4/2. No reaction to 10% HCL. Unconsolidated. Coarser		

REMARKS: than previous. 1 moisture, 2 pt jars taken.

S.S. Teel
6-14-89

PRI MA SCI No. 1, Rev. 0

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

21 (6-85)

DRILL LOG	By S.S. Teel	Rig 22-14103	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017
	Date 6-14 89	Louisville	Depth 125' to 125'		Subcontract No. NA-

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
118'6"				Added 8' 5½" of 10"	1345	Adding Casing
8'5½"					1515	Drilling
126'11½"					1530	End of Day
126'11½"						

REMARKS:

S.S. Teel
6-14-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG	By: S.S. Teel Date: 6-15-89	Rig: PE 601. 22 14103 Louis Walkins	Well Number: 299-C25-38 Depth: 125' to 135'	Computer Number: NA	Project or Work Order No.: W-017 Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
126'11½"					0700	Arrive on site
					0715	Drilling
	130'	D	Dry	GRAVELLY SAND (12% gravel, 82% sand, 6% mud)	0830	Sample w/ Core Barrel
				2% MP, 6% FP, 4% VFP, 27% VCS, 35% CS, 10% MS, 5% FS,		
				5% VFS, 6% mud. Moderately sorted. (Gravel)- 70% basalt &		
				andesite; 30% qtz, qtzite, & Si-rich rock fragments. A-R.		
				(Sand)- 20% basalt & volcanics, 20% Si-rich rock fragments (weathered		
				granite/gneiss), 60% qtz & qtzite, trace mica. A-SR. No reaction		
				to 10% HCL. Wet color: 10YR 3/2 (very dark grayish brown).		
				Unconsolidated. Very sim. to previous. 1 moisture, 2 pt jars taken.		
	135'	D	Dry	SLIGHTLY GRAVELLY SAND (5% gravel, 90% sand, 5% mud).	0855	Sample w/ C.B.
				3% FP, 22% VFP, 25% VCS, 35% CS, 15% MS, 10% FS, 5% VFS,		
				5% mud. Mod-well sorted. Same mineralogy & roundness as		
				previous. No reaction to 10% HCL. Unconsolidated. Wet color:		
				10YR 3/2 (very dark grayish brown). Very sim. to previous. 1 moisture,		
				2 pt jar samples taken.		
				Added 8' 5¼" of 10"	0900	Adding casing

REMARKS:

S.S. Teel
6-15-89

PNL-MA-567 DO-1, REV. 0

D - Dri[illegible]rel H - Hard Tool L - Large M - Medium S - Small VC - Ver[illegible] C - Coarse F - Fine VF - Very Fine ____ Standing Water

100 021 (6 86)

DRILL LOG	By S.S. Teel	Rig 22-14103	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017
	Date 6-15-89	Louis	Depth 135' To 145		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
126'11½					1030	Drilling
+ 8'5¾						
136'4¾	140'	D	Dry	SAND (3% gravel, 92% sand, 5% mud). 2% FP, 1% VFP,	1055	Sample w/ Core Barrel
				10% VCS, 30% CS, 35% MS, 10% FS, 7% VFS, 5% mud.		
				Very well sorted. (Sand) - 20% basalt & other volcanics,		
				15% Feldspar & other Si-rich rock fragments, 65% qtzite & qtzite.		
				A-SR. No reaction to 10% HCL. Unconsolidated. Very sim to		
				previous. Wet color: 10YR 3/2 (very dark grayish brown).		
				Haz chem, 1-moisture, and 2 1-pt jars taken.		
	142-143'	D	Moist	MUDDY SAND 70% VFS, 30% mud. Layer is ≈ 1' thick	1115	
				(142-143'). Moisture, haz chem, and 2 pt jars taken.		
				Wet color: 10YR 4/2 (dark grayish brown). No reaction to		
				10% HCL. Slightly consolidated. C. of C. # 61589 SST 10/16/89		
	145'	D	Dry	SAND (3% gravel, 92% sand, 5% mud). Same as 140'	1135	
				sample. No reaction to 10% HCL. Unconsolidated.		
				Moisture and 2 pt jar samples taken.		
135'4¾	"of 10"					

REMARKS:

S.S. Teel
6-15-89

PNL-MA-567 Do-1, Rev. 0

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

DRILL LOG

By	Rig	Well	Computer Number	Project or Work Order No.
S.S. Teel	22-14103 BE 60L Louis Watkins	299-E25-38	NA	W-017
Date 6-15-89		**Depth** 145' to 155'		**Subcontract No.** NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
135'4¾" + 10' = 145'4¾"				Added 10' of 10" Casing	1150	Adding Casing
					1200/1230	Lunch
					1400	Drilling
	150'	D	Dry	SAND (3% gravel, 92% sand, 5% mud),	1445	
				2% FP, 1% UFP, 12% VCS, 40% CS, 25% MS, 10% FS,		
				5% VFS, 5% mud. Mod-well sorted. (Gravel) - 70%		
				basalt & volcanics, 30% qtzite & Si-rich rock fragments		
				including Ca-cemented sandstone. A-SR. (Sand) - 80%		
				basalt & volcanics, 20% Feldspar & Si-rich rock fragments,		
				60% qtz & qtzite. A-SR. No reaction to 10% HCl. Same		
				color as previous. Unconsol. Moisture & 2 pt jar samples taken.		
	155'	D	Dry	SAND (3% gravel, 92% sand, 5% mud). Same as	1520	
				previous. Moisture & geol. samples taken	1530	End of Day
145'4¾" of 10"						

REMARKS:

S.S. Teel
6-15-89

PNL-MA-567 DO-1, Rev. 0

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

021 (5 86)

DRILL LOG	By	Rig	Well Number	Computer Number	Project or Work Order No.
	S. M. GOODWIN	BE 60L	299-E25-38	N/A	W-017
	Date: 16 JUNE 1989	# 22-14103	Depth: 155' To 155'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS LOUIS WATKINS	0700	SAFETY MEETING
					0800	PREPARING TO WELD
145' 4 3/4"				ADDED 9'4" OF 10" CARBON STEEL CASING; TOTAL	0830	WELDING 10" CASING
9' 1"				10" CASING = 154' 8 3/4"	0940	DRIVING 10"
154' 8 3/4"					1000	DRILLING
					1010	DRIVING CASING
					1020	DRILLING
					1030	DRIVING CASING
					1040	PREPARING TO RUN
						8" CASING
					1100	WELDING DRIVE SHOE
						ON 8" CASING
					1200-1230	LUNCH
					1240	WELDING SHOE
				WILL GET 8" TOTAL ON MONDAY A.M.	1300	RUNNING 8"

REMARKS:

PNL-MA-567 DO-1, REV. 0

6/16/89

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
MA Chamness	Pecker 27-11/03 Louis Watkins	299-E25-38	N/A	W-017 Grout
Date: 6/19/89		Depth: 155' To 160'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
31'8½"	of 8" } from Friday				707	welding 20'10¾" of 8"
20' 10½"						
52'7"						
20'10¾"						
73'5¾"						
20' 11¾"					820	
94'5"						
20'10¾"						
115'3¾"					930	
20'11¾"						
136'3½"					1040	
20'10½"						
157'2"					1145	
10'						
167'2"	of 8"				1200/1230	lunch
					1245	
					1430	started drilling
					1515	drill rig died, 160' sample is in the cave level

REMARKS:

PNL-MA-567 DO-1, Rev. 0

MA Chamness 6/19/89

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

10 021 (5 85)

183

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
T Gilmore	DE 60L 22-14103 Kaiser Louis Wilkins	299-E25-38	N/A	W017 Grout
Date: 6/20/89		Depth: 160' To 160'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Drilling needs propane to run the rig; No drilling	700	
				Driller filling propane tank	800	
				Kaiser Safety checked area for organic vapors -	825	Kaiser Safety check
				Bad ground Tremblings (very windy day)		
				Rig will not run Mechanic working on Rig	830	
				Rig started up - Sample in core barrel from yesterday	900	Rig Running
	160	D	Dry	SAND 5% gravel 86% Sand, 9% Silt, 5% VFP, 25% VCS, 25% CS, 20% MS, 8% FS, 8% VFS, 9% Silt, Moderate-well Sort, 30% BSLT, 70% Silica-rich predom qtz, occasional F-spar, qtzite, other Trace Fe-Stn, Subangular Wet color 5Y 7/1 light gray, very slight rxn in HCl, Al consol, 1-good Smpls, 1 special Smpl Taken no moisture taken because sample was in core barrel overnight near the surface. C. of C # 62089 SST 10/16/89	900	Sample

REMARKS:

T Gilmore 6/20/89

PRL-MA-567 DO-1, Rev. 0

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
T Gilmore	BE 60W 12.1/4 Tri-cone Rock Bit	299 - E25 - 38	N/A	W-017 Grout
Date: 6/30/89		Depth: 165' To 170'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
167' 3" / 10' 8" / 177' 10'	165'	D	Dry	GRAVELY SAND 20% Gravel, 65% Sand, 15% Silt, 5% Cp,	1025	Sample
				5% Mp, 5% Ep, 5% VEp, 10% VCS, 10% CS, 8% MS, 17% FS,		lith change
				20% VFS, 15% Silt, poor Sort, 30% BSLT, 70% other,		
				Incl wht granite, qtzite, qtz, Sands are Subang,		
				Gravels are Subround, Mod-good sphericity, wet color		
				10YR 5/3 brown, Moderate rxn in HCl, No consol,		
				incr in HCl rxn and gravel content at good smpl sand		
				1. moisture sample hit gravels at approx 165'		
177' 10" of 8"				All 10'6" of 8" 177'10" of 8" Total	1100	Welding Casing
					12-1230	Lunch
					1230	Welding Casing
					1310	Drilling
					1340	Add 4 gal H_2O
	170'	D	Dry	GRAVELY SAND 20% Gravel, 70% Sand, 10% Silt;	1445	Sample
				5% Cp, 7% Mp, 5% Ep, 5% VEp, 5% VCS, 20% CS, 5% MS		
				8% Ep, 7% VEp, 10% Silt, poor Sort, 30% BSLT, 70%		
				Si-rich Felsic rocks, gravels are Subround, Mod sphericity Sands		
				are Subangular, wet color 10YR 5/3 brown, Mod		

REMARKS:

PRC-MA-567 DO-1, REV. 0

T Gilmore 6/30/89

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

JO 021 (6 85)

DRILL LOG 1	By T Gilmore	Rig BE Bow 33 Mobil Rise Louis Kutting	Well Number 299 E25 38	Computer Number N/A	Project or Work Order No. W-217 Grout
	Date 6/30/89		Depth 170' To 170'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	170' Cont.			rxn in HCl unconsol, very similar to previous Smpl 2 geol, 1 moisture Smpl		Add 6 gal H_2O
	175'	D	Moist	SANDY GRAVEL 35% Gravel, 60% Sand, 5% Silt; 5% Small Cobble, 6% UCp, 6% Cp, 6% Mp, 6% Fp, 6% UEp, 15% UCS, 15% CS, 15% MS, 10% FS, 5% UFS 5% Silt Poor sort, 30% BSLT, 60% Si-rich Felsics, Gravels Subrd, Sands Subang, Mod rxn in HCl, No consol More gravels than previous 2 Geol Smpls demoisture smpl (water added)	1514	Add 4 gal H_2O
					1530	End of Day

REMARKS:

PNL-MA-567 DO-1, Rev. 0

T Gilmore 6/30/89

Total 14 gal H_2O Added

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

C2

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	BE 60L 22-14103 Louis Watkins	299-E25-38	NA	W-017
Date: 6-21-89		Depth: 175' to 185'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
177'10"					0700	Arrive on site
10' 6"						
188'4"					0715	Drilling
	180'	D	Moist	SANDY GRAVEL (55% gravel, 43% sand, 2% mud)	0830	Cont. # 62189 B SST 10/16/89
				5% WCP, 5% MP, 15% FP, 30% VFP, 18% VCS, 15% CS, 5% MS,		
				5% FS & VFS, 2% mud. Moderately sorted. (Gravel)-		
				65% basalt & volcanics, 35% qtzite & Si-rich rock fragments. A-R.		
				(Sand)- 40% basalt & volcanics, 60% qtz, qtzite, & Si-rich,		
				A-SA. Wet color: 10YR 3/2 (very dark grayish brown). No HCL reaction.		
				Unconsol. Chem sample, 2-pt jars & moist, sample taken. (may be affected by added H_2O)		
				Added 10'6" of 8" Casing	0855	Reparing tools
					1000	Drilling
	184.6'	D	Dry	SANDY GRAVEL (30% gravel, 67% sand, 3% mud).	1100	
				5% MP, 5% FP, 00% VFP, 25% VCS, 20% CS, 5% MS,		
				15% FS, 2% VFS, 3% mud. (Gravel)- 70% basalt &		
				volcanics, 30% qtzite & Si-rich. Generally A-SR, some Rounded.		
				(Sand)- 40% basalt & volcanics, 60% Si-rich, A-SR. Wet color:		
				2.5Y 3/2 (very dark grayish brown). No reaction to 10% HCL.		
188'4"				Unconsol. Moisture & 2 pt jars taken. Max grain size smaller than previous.		

REMARKS:

S.S. Teel
6-21-89

PNL-MA-567 DO-1, Rev. 0

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

00 021 (6-86)

DRILL LOG	By: S.S. Teel	Rig: BE 60L 22-14103 Louis Watkins	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: WI-017
	Date: 6-21-89		Depth: 185' To 200'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
188'4"	190'	D	Dry	SANDY GRAVEL (35% gravel, 60% sand, 5% mud)	1140	
10'6½" 198'10½"				15% FP, 20% VFP, 45% VCS, 5% CS, 5% MS, 5% FS +	1200/1230	Lunch
				VFS, 5% mud. Moderately sorted. (Gravel) - 70% basalt	1230	Adding Casing
				+ volcanics, 30% qtz + Si-rich. A-R (Sand) - A-R.		
				40% basalt + volcanics, 60% qtz + Si-rich. Hue color:		
				10YR 3/2 (very dark grayish brown). No reaction to 10%		
				HCl. Unconsolidated. Similar to previous. Moisture +		
				2 pt geol. samples taken.		
				- Added 10'6½" of 8" Casing	1350	Drilling
	195	D	Dry	SANDY GRAVEL (35% gravel, 60% sand, 5% mud)	1445	
				5% small cobble, 5% VCP, 7% CP, 8% MP, 5% FP, 5% VFP,		
				30% VCS, 10% CS, 5% MS, 10% FS, 5% VFS, 5% mud		
				Same min as prev. Same color. Strong reaction to 10% HCl.		
				Unconsol. Moist + 2 pt. samples taken		
	200'	D	Dry	SANDY GRAVEL (35% gravel, 60% sand, 5% mud).	1505	
				Same as previous except sand fraction coarser (same		
198'10½"				as 190' sample. Moisture, Chem, + 2 pt geol samples taken		
REMARKS:				A.ofC. # 69189 1st 10/4/89	1530	End of Day

S.S. Teel
6-21-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG	By: MA Chamness	Rig: Flow. 22-14103 Louis Watkins	Well Number: 299 E25-38	Computer Number: N/A	Project or Work Order No.: W-017 Grout
	Date: 6/22/89		Depth: 200' To ~203'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
198' 10¾" od 8"					710	preparing to weld 10'6"
10' 6"					855/1025	Driller went to meeting
207' 4½"					1040	continuing to weld
					1050	started drilling
					1130	Sediment wont stay in
						barrel, driller thinks his
						in gravel
					1200/1250	lunch break
					1330	Sediment still wont
						stay in, switching to
						hand tool at 202'
					1500	started drilling, added
						16 gal H_2O
					1525	quit for day

REMARKS:

PNL-MA-517 DO-1, REV. 0

MA Chamness 6/22/89

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

00 021 (5 86)

DRILL LOG	By: T Gilmore	Rig: BE-601, 22-14103 Kaiser, Louis Hilkins	Well Number: 299-E25-38	Computer Number: N/A	Project or Work Order No.: W-017 Grout
	Date: 6/23/89		Depth: 203' To 205'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
209' 11½" 10 6"					700	working on Rig
					730	Drilling
2 19' 10½"					100	Kaiser Safety check
					905	5gal H_2O added
	205'	H	wet	SANDY GRAVEL 45% Gravel, 50% Sand, 5% silt	945	Sample
				15% MP, 20% FP, 10% VFP, 10% VCS, 15% CS, 15% MS, 5% FS,		
				5% VFS, 5% Silt, poor sort, many gravels fragmental		
				Gravel: 55% BSLT, 45% Felsic predom qtzite, Subround when		
				preserved, Sand: 40% BSLT, 60% Felsic, about eqt		
				qtz, some qtzite, Tr rd sandstone, Tr grn metamorphics,		
				Subangular, Inert color 5Y 4/2 olv gy, no rxn in		
				HCl, No consol, 2gal smpls Taken		
					950	5gal H_2O added
219' 10½" Total				Add 10'6" of 8" 219 10½" Total of 8",	955	welding
				RPT checked area, Radiation at background	1100	Drilling; RPT
					12-1230	Lunch
				Rig stopped will not restart - Driller cutting Pipe until it can be Fixed	1230	Rig Broke down

REMARKS:

T Gilmore 6/23/89

PNL-MA-567 DO-1, REV. 0

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

2 of 1

DRILL LOG	By: T Gilmore Date: 6/23/89	Rig: BE UL [illegible]	Well Number: 299 E25 38 Depth: 205' to 210'	Computer Number: N/A	Project or Work Order No.: W-017 Grant Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
					1348	Rig Started up; Drilling
	210'	H	Wet	SANDY GRAVEL 60% Gravel, 35% Sand, 5% Silt; 5% Small cobble, 2% vcp, 15% cp, 30% mp, 10% Fp, 10% vcs, 15% cs, 5% ms, 5% fs, 5% silt, poor srt, 60% BSLT, 40% felsic, chert, quartzite, granuls subrd when preserved, sands subang, wet color 10YR 3/2 vdk gy brn, No rxn in HCl, no consol, Similar to previous sample 2 Geol Smpls taken	1430	Sample
				Radiation readings at soil and site background	1445	RPT checked site
				End of Day	1530	

REMARKS:

PNL-MA-567 DO-1, REV. 0

T Gilmore 6/23/89

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

3-021 (5-86)

DRILL LOG	By: S.S. Teel	Rig: 66 60L 27-14103 Louis Watkins	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017 Grout
	Date: 6-26-89		Depth: 210' To 215'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc	Time	Drilling Comments
219' 8½" (Corrected Casing Total)					0700	Arrive on Site
10' 6"						
230' 2½"					0720	Drilling
	215'	H	Wet	SANDY GRAVEL (55% gravel, 41% sand, 4% silt)	0740	Sample w/ Dart Bailer
				10% VCP, 10% CP, 15% MP, 10% FP, 10% VFP, 8% VCS, 15% CS,		
				10% MS, 6% FS, 5% VFS, 4% silt. Very poorly sorted.		
				(Gravel) - 65% basalt/mafics, 35% qtzite + other Si-rich		
				ig./met. rock fragments. SR-R on orig. surfaces. Max grain size		
				VCP at minimum (whole VCP in sample). (Sand) - 40%		
				basalt/mafics, 60% qtz, qtzite, + other Si-rich. A-SA.	0845	Preparing to Add
				Unconsolidated. Wet color: 10YR 3/3 (dark brown). Dry Color:		Casing
				10YR 6/1.5 (gray to lt. brownish gray). No reaction to 10%		
				HCL. 2 pt. geol. samples taken.		
				Added 10'6" of 8" Casing	1020	Driving Casing
					1025	Preparing to Drill
					1030	Total water added
						so far today = 10 gal
230' 4½"					1030	Drilling

REMARKS:

Total H_2O added 6/23 was 30 gal.

S.S. Teel
6-26-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG	By S.S. Teel	Rig BE 60L 22-14103 Louis	Well Number 217-E25-38	Computer Number NA-	Project or Work Order No. W-017 (GTF)
	Date 6-26-89		Depth 215' to 228'		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
230'4½" 10'6" 240'10½"	220'	H	Wet	MUDDY SANDY GRAVEL (60% gravel, 30% sand, 8% mud)	1120	
				12% small cobble (or larger), 13% VCP, 10% CP, 10% MP, 10% FP		
				5% VFP, 7% VCS, 8% CS, 6% MS, 6% FS, 5% VFS,		
				8% mud. (Gravel) - 60% basalt, and other volcanics (andesite,		
				porphyry); 40% qtzite + other ig/met Si-rich rock fragments,		
				SR-WR on orig surfaces. (Sand) - 40% basalt/mafics,		
				60% qtz, qtzite + Si-rich. A-SR. Wet color: 5Y 3/2 (dark		
				olive gray). No reaction to 10% HCL. More mud than		
				previous. Unconsolidated. Several whole CP in sample.		
				2 pt geol. + 1 chem sample taken. C. of C. # 626871	10/16/89 1200	
					1200/1230	Lunch
					1230	Drilling
	225'	H	Wet	SILTY SANDY GRAVEL (60% gravel, 35% sand, 5% mud).	1405	
				20% CP (and larger), 24% MP, 10% FP, 10% VFP, 8% VCS,		
				8% CS, 7% MS, 7% FS, 5% VFS, 5% mud. Very poorly		
				sorted. (Gravels) 60% basalt + volcanics, 40% qtzite +	1420	Welding
				Si-rich rock fragments. SR-R on orig surfaces. (Sand) -		Added 10'6" of 8"
240'10½"				40% basalt + volcanics, 60% qtz, qtzite + Si-rich. A-SA.	1530	End of Day

REMARKS:
Wet color: 5Y 4/2 (olive gray). Unconsol, No reaction to 10% HCL.
2 pt geol. samples taken.

S.S. Teel
6-26-89

PNL-MA-567 DO-1, Rev. 0

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

J21 (6 85)

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S M. Goodwin	BE 60 L	299-E25-38	N/A	W-017 GROUT
Date: 6-27-89	#22-1/103	Depth: 228' To 235'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
240' 10¾"				DRILLER IS LOUIS WATKINS	0700	FINISHING WELD
					0740	DRILLING
					0800	DRIVING CASING
					0810	DRILLING
					0830	DRIVING CASING
					0840	DRILLING
	230'	H	WET	MUDDY SANDY GRAVEL: 60% GRAVEL, 32% SAND, 8%	0855	SAMPLED W/ DART
				MUD. 5% VCP, 5% CP, 12% MP, 2% FP, 18%		BAILER
				VFP, 5% VCS, 10% CS, 12% MS, 3% FS, 2% VFS,	0900	DRIVING CASING
				8% MUD. VERY POORLY SORTED. GRAVELS ARE 60%	0910	DRILLING
				BASALT, 40% QUARTZITE & GRANITE, TRACE	0930	DRIVING CASING
				PORPHYRY & DARK META, A TO R. SANDS ARE	0940	DRILLING
				40% BASALT, 60% QUARTZ, Q-ZITE, & FY.		
				FRAGS; A TO SA. WET COLOR IS 5Y 4/2 (OLIVE		
				GRAY) UNCONSOLIDATED. NO RX TO 10% HCL.		
				2 PT. GEO. SAMPLES TAKEN.		
	235'	H	WET	MUDDY SANDY GRAVEL: 60% GRAVEL, 32% SAND,	1110	SAMPLED W/ DART
				8% MUD. COMPOSITION VERY SIMILAR TO PREVIOUS		BAILER

REMARKS:

PNL-MA-567 DO-1, REV. 0

Shawn Mark 6/27/89

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. M. Goodwin	BC 600	299-E25-38	n/A	W-017 Gauss
Date: 27 JUNE 1989	0 27 14/103	Depth: 235' to 240'		Subcontract No.: n/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
240'10½"	235'	H	WET	(cont.) SAMPLE; OVERALL INCREASE IN SIZE OF	1110	DRILLING
				GRAVEL & SANDS. 5% VCF, 10% CF, 15% MF,		
				15% FF, 15% VFP, 10% VCS, 12% CS, 5% MS,		
				3% FS, 2% VFS, 8% MUD. VERY POORLY SORTED.		
				GRAVELS ARE 60% BASALT, PORPHYRY, & ANDESITE,		
				40% QUARTZITE & GRANITE; A TO WR. SANDS		
				ARE 40% BASALT / MAFICS, 60% QUARTZ, FELD,		
				& Q-RICH; A TO SA. WET COLOR IS 5Y 4/2		
				(OLIVE GRAY). UNCONSOLIDATED. NO REACTION TO		
				10% HCL. COARSER THAN 230'. 2 PT. OFF.	1200-1230	LUNCH
				SAMPLES TAKEN.	1245	DRILLING
				Added 10' 5¾ of 10"	1300	PREPARING TO WELD
					1500	RPT Coverage
				(S.S. Teel takes over for S. M. Goodwin @ 1345)		Background readings

REMARKS:

S S Teel
6-27-89

PNL-MA-567 DO-1, REV 0

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

00 021 (5 86)

3 of 3

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	BE 60L	299 E25-38	NA	W-017 Grant
Date: 6-27-89	22-14103	Depth: 240' To 243'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	240'	H	Wet	MUDDY SANDY GRAVEL (65% gravel, 30% sand, 5% mud).	1505	
				10% CP, 15% MP, 20% FP, 20% VFP, 8% VCS, 8% CS, 7% MS,		
				4% FS, 3% VFS, 5% mud. Very poorly sorted. (Gravel)-		
				60% basalt, andesite & other volcanics, 40% qtzite & other Si-rich		
				met. rock fragments. R-WR on orig surf. (Sand)- 40% basalt/mafics		
				60% qtz, qtzite, & other Si-rich rock fragments. A-SR.		
				Wet color: 5Y 3/2 (dark gray). No reaction to 10% HCl.		
				Uncons. Sim. to prev. 2 pt geol & 1 chem sample taken.		
				C. of C. # 62789 SST 10/12/89		
					1530	End of day

REMARKS:

PRL-MA-567 DO-1, REV. 0

S.S. Teel 6-27-89

414 gal H_2O added 6/27
36 " " " 6/26

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

F4

DRILL LOG

By	Rig	W. Number	Computer Number	Project or Work Order No.
S. S. Teel	BE 60L	219-625-38	NA	W-017
Date: 6-28-89	22-14103	Depth: 243' To 250'		Subcontract No.: NA
	Louis Watkins			

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
251'4 1/4" 10'3" 261'7 1/4"						
					0700	Arrive on site
	245'	H	Wet	MUDDY SANDY GRAVEL (55% gravel, 40% sand, 5% mud)	0715	Drilling
				2% CP, 13% MP, 25% FP, 15% VFP, 15% VCS, 10% CS, 5% MS,	0750	Sample w/ Dart Bailer
				5% FS, 5% VFS, 5% mud. (Very poorly sorted) (Gravel) - 70%		
				basalt, andesite, & porphyry; 30% qtz, qtzite, & Si-rich		
				met. R-WR on orig surfaces. (Sand) - 30% basalt/mafics,		
				70% qtz, qtzite, & Si-rich rock fragments. A-SA. Wet color:		
				5Y 4/3 (olive). Mod. reaction to 10% HCL. (Inconsolidated.		
				Similar to previous. 2 pt. geol. samples taken.	0840	Preparing to add
				Grain size of gravels not representative		casing
				Added 10'3" of 8" casing		
					1005	Drilling
	250'	H	Wet	SANDY GRAVEL (40% gravel, 55% sand, 5% mud)	1015	Sample w/ Dart Bailer
				2% MP, 20% FP, 18% VFP, 15% VCS, 15% CS, 10% MS, 8% FS,		
				5% VFS, 5% mud. Very poorly sorted. (Gravel) - 70%		
				basalt, andesite, & other volcanics; 30% qtzite & other Si-rich		
261'7 1/4"				rock fragments (mostly metamorphic). (SAND) - 70% qtz, qtzite & Si-rich →		

REMARKS:

PNL-MA-567 Pg-1 REV. 0

S.S. Teel
6-28-89

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

100 021 (5 85)

DRILL LOG	By: S.S Teel	Rig: BE 60L 22-14103 Louis Watkins	Well Number: 299 E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-28-89		Depth: 250' To 255'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
241'7½"				(250' continued) 30% basalt/mafics. Gravels are SR-WR on orig. surfaces. Sands are A-SR. Wetcolor: 2.5Y 4/2 (dark grayish brown). Moderate to strong reaction to 10% HCL. Unconsolidated. Less gravel/more sand than previous. 2 pt. geol. samples taken.	1050	RPT coverage - background w/GM
	255'	11	Wet	SANDY GRAVEL (35% gravel, 60% sand, 5% mud). 2% CP, 15% MP, 10% FP, 8% UFP, 20% VCS, 20% CS, 10% MS, 5% FS, 5% VFS, 5% mud. Very poorly sorted. (Gravel) ~ 70% basalt, andesite, and other volcanics (minor rhyolite porphyry); 30% qtzite, granite, and other Si-rich. SR-WR on orig. surfaces. Wetcolor: 2.5Y 4/4 (olive brown). Mod. reaction to 10% HCL. Unconsol. Very sim to prev. 2 pt geol. + 1 chem sample taken. C. of C. # 62889A	1130 SST 10/18/89	Sample w/ Dart Bailer

REMARKS:

S.S Teel
6-28-89

PNL-MA-567 DD-1, REV. 0

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	BE 60L 22-14103 Louis Watkins	299-E25-38	NA	W-017
Date: 6-28-89		Depth: 255 to 260'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
261'7 1/4"						
	258	H	Wet	SLIGHTLY GRAVELLY SANDY MUD (5% gravel, 25% sand, 70% mud). 3% FP, 2% VFP, 5% VCS, 5% CS, 5% MS, 5% FS, 5% VFS, 70% mud. Sands + Gravel is 50% basalt/mafics, 50% qtz, qtzite, + Si-rich. A-R. Wet color: 5Y 4/3 (olive). Moderate reaction to 10% HCL. Unconsolidated. Much more mud than previous. Unit started at ≈ 257. 2 pt geol + 1 chem sample taken. C. of C. # 62889 D SST 10/16/89	1200	Sample w/ Dart Bailer
					1200/1230	Lunch.
	260'	H	Wet	SLIGHTLY GRAVELLY MUDDY SAND (5% gravel, 55% sand, 40% mud.). trace MP, 3% FP, 2% VFP, 20% VCS, 15% CS, 5% MS, 5% FS, 10% VFS, 40% mud. Mod sorted. (Gravel) - 60% basalt/volcanics, 40% qtzite/Si-rich. R-WR on orig. surfaces. (Sand) - 80% basalt/mafics, 20% qtz, qtzite, + Si-rich. A-SR. Wet color: 2.5Y 4/4 (olive brown). Mod. reaction to 10% HCL. Unconsol. Less mud than previous. 2 pt. geol, 1 chem sample, + 1 extra pt for possible sieve analysis taken. C. of C. # 62889A SST 10/16/89	1245	Sample w/ Dart Bailer

REMARKS:

S.S. Teel
6-28-89

PNL-MA-567 DO-1, REV. 0

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

0.021 (5 86)

DRILL LOG	By: S.S. Teel	Rig: BE 60L 22-M103 Louis Watkins	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-28-89		Depth: 260' to 269'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
261'5½" (corrected) 10 6 271'11½"				Added 10'6" of 8"	1300	Adding Casing
					1407	Drilling
	265'	H	Wet	SLIGHTLY GRAVELLY MUDDY SAND (5% gravel, 65% sand, 30% mud) 3% FP, 3% UFP, 16% VCS, 15% CS, 15% MS, 10% FS, 10% VFS, 30% mud. Mod-poorly sorted.	1450	
				(Gravel): 80% basalt/volcanics, 20% qtzite/Si-rich.		
				A-R. (Sand)- 20% basalt/mafics, 80% qtz/Si-rich.		
				A-SR. Unconsol. Wet color: 2.5Y 4/4 (olive brown).		
				reaction to 10% HCL. 2 pt geol, 1 chem, and		
				one sieve sample taken. C. of C. # 63889 A		
					"	
				Driller thinks he hit water @ ≈ 269'. Sand is heaving	1515	
				up the borehole. D/water is approximately 261'; however,		
				this may not be accurate because there is a plug in		
				the borehole. Will try to drill ahead of the casing		
				tomorrow morning so an accurate measurement and	1530	End of Day
				a water sample can be taken.		

REMARKS:

Total H2O 6/26 = 36 gal
" " 6/27 = 14 gal

S S Teel
6-28-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG	By: S. M. Gonzales	Rig: Gardner	Well Num.: 299-E25-38	Computer Number: N/A	Project or Work Order No.: W-017 Group
	Date: 29 June 1989	# 22 14103	Depth: 269' to 269'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 265.35' - 3.05' STICKUP = 262.30'	0705	D/WATER
				(PNL 700' E. MAP # 3134)		
				D/B = 264.65' + 2.3' MAP - 3.05' STICKUP	0710	D/BOTTOM
				= 263.9' (PNL C300-02)		
				BOTTOM OF 8" = 268.89'; ~5' OF PLUG INSIDE	0712	BOTTOM OF 8"
				8" CASING, WILL ATTEMPT TO CLEAN OUT HOLE		
				TO ALLOW SAMPLING.		
				DRILLER IS LOOK WATERING	0715	SEARCHING RIG
					0720	DRILLING
				CLEANED PLUG OUT OF 8" CASING & NOW	0830	PREPARING TO WELD
				HAVE OPEN HOLE & NO WATER. CAME IN	0915	WELDING 8"
				MUDDY SANDS; WILL WELD ON 8" CASING		
				& CONTINUE DRILLING. DRILLER THINKS H2O		
				IN HOLE COULD HAVE BEEN DRILL H2O WHICH		
27' 11 1/4"				WAS ADDED & TRAPPED ABOVE HEAVING SANDS.		
10' 6"				ADDED 10' 6" OF 8" CARBON STEEL CASING, TOTAL	0945	FINISHED WELD
282' 5 1/4"				8" = 282' 5 1/4"	0950	DRIVING CASING
					0955	DRILLING

REMARKS:

PNL-MA-567 DO-1, REV. D

S. M. Gonzales 6/29/89

D - Drive Br H - Hard Tool L - Large M - Medium S - Small VC - Very Coa C - Coarse F - Fine VF - Very Fine ____ Standing Water A 121 (5 85)

DRILL LOG	By: S. M. Goodwin	Rig: BE 60L	Well Number: 299-E25-38	Computer Number: N/A	Project or Work Order No.: W-017 Grout
	Date: 29 June 1989	422-1/167	Depth: 269' to 275'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	270'	H	WET	GRAVELLY SAND 15% GRAVEL, 77% SAND, 8% MUD.	1000	SAMPLED W/ DART
				2% CP, 3% MP, 5% FP, 5% VFP, 15% VCS, 45% CS, 10%		BAILER, 2 PT.
				MS, 4% FS, 3% VFS, 8% MUD. POORLY SORTED		GEO. SAMPLES, 1
				GRAVELS ARE 50% BASALT/MAFICS, 50% FELSIC/QUARTZ		PT. SIEVE SAMPLE
				PIEGE; A TO R. SANDS ARE 25% BASALT/MAFICS,	1005	DRILLING
				75% QUARTZ, Q-SITE, & PLAG; A TO SA. LVCT.		
				COLOR IS 2.5Y 4/4 (OLIVE BROWN) NO CONSOLIDATION		
				STRONG RX. TO 10% HCL. MORE GRAVEL & LESS		
				SILT. DRILLER SAYS HE'S IN WATER; WHILE		
				DRILL CASING OUT & GETS GOOD D/W AFTER		
				LUNCH. DVA = BACKGROUND		
	275'	H	WET	SLIGHTLY GRAVELLY SLIGHTLY MUDDY SAND: 8%	1125	SAMPLED W/ DART
				GRAVEL, 80% SAND, 12% MUD. TRACE MP, 4%		BAILER, 2 PT.
				FP, 4% VFP, 15% VCS, 40% CS, 15% MS, 5%		GEO. SAMPLES &
				FS, 5% VFS, 12% MUD. MODERATELY SORTED,		1 SIEVE SAMPLE
				MINERALOGY, ROUNDNESS, & COLOR SAME AS	1130	DRILLING
				270', STRONG RX. TO 10% HCL. LESS	1140	BAILING
				GRAVEL & MORE SAND THAN 270'.		

REMARKS:

PNL-MA-567 DO-1, REV. 0

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S. M. Goodwin	B-60 L	299-E25-38	N/A	W-017 Order
Date		**Depth**		**Subcontract No.**
29 June 1989	4 21 44 1-3	275' To 277.5'		N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/B = 277.5', D/W = 268.5', 9'	1155	D/B + D/W
				of H_2O in Borehole, Heavier Gravel	1200-1210	Lunch
				Are still obtaining a plug in the		
				8" Casing. Bottom of 8" = 274.9'		
				J.P. McDonald, PNL, obtaining water	1230	H_2O Samples
				Samples for rapid analysis by U.S.	1430	Finished w/ H_2O
				Testing.		Sampling; Pre-
						Parking to weld
						8" Casing
287'	4'1/4"			Adding 10'11" of 8" Carbon Steel Casing;	1445	Welding 8"
10'11"				Total 8" = 293'4'1/4"	1530	End of Shift
293'	4'1/4"					

REMARKS:

PNL - MA - 567 Do-1, Rev. 0

[illegible] 6/29/89

D - Dri[illegible]rel H - Hard Tool L - Large M - Medium S - Small VC - Var[illegible]e C - Coarse F - Fine VF - Very Fine ____ Standing Water

000 021 (5 85)

DRILL LOG	By S.H. Goodwin	Rig BE 604	Well Number 299-E25-38	Computer Number N/A	Project or Work Order No. W-017 GAUST
	Date 30 JUNE 1989	# 22-14103	Depth 277.5' To 279'		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				DRILLER IS LOUIS WATKINS	0700	SERVICING RIG
				D/W = 279.1' - 14.42' STICKUP = 264.68' (PNL	0710	D/WATER
				E. TAPE # 3134). COULD BE ACTUAL STATIC,	0720	DRIVING CASING
				BUT NOT CERTAIN; TOO MUCH STICKUP TO	0730	DRILLING
				GET D/B & DETERMINE IF CASING IS	0740	SWITCHING FROM
				PLUGGED WILL DRILL OUT TO 280' &		DART BAILER TO
				ALLOW H2O TO RETURN TO STATIC		SAND PUMP.
					0750	CLEANING OUT HOLE
292'	11'/4"			CASING ADDED 6/29 @ 1445 WAS 10'6" INSIGNIFICANT	0805	DRILLING
				10'11"; 8" CASING TOTAL = 292' 11'/4'.		
				D/W @ 0710 = 279.1 - 14' STICKUP =		
				265.1'		
				D/B = 281' + 2.3' TAPE - 12' STICKUP = 279.3'	0915	D/BOTTOM
				(PNL 300' # 1300-02) SANDS ARE HEAVING		
				UP CASING QUITE RAPIDLY. DRILLER HAS		
				BEEN BAILING CLEAN SANDS, MOSTLY VCS &		
				CS. D/B = 285' + 2.3' - 12' = 279.3'	0915	D/BOTTOM
				BOTTOM OF 8" CASING = 280', 6' OF PLUG		
				IN HOLE.		

REMARKS:

PNL - MA-567 DO-1, RSJ-0

Arthur Mark 6/30/89

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
G. M. Gonzalez	CC 604	299-E25-38	N/A	WI-017 GRANT
Date: 30 JUNE 1987	11 22 1 1 1 1	Depth: 279' To 280'		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
292'	11'/4"				0930	BAILING SANDS
5'				REMOVED 5' OF 8" CASING; TOTAL 8" CASING	1000	CUTTING CASING
287'	11'/4"			= 287' 11'/4"	1010	BAILING SANDS
				D/B = 277.6'	1025	D/BOTTOM
				D/B = 275.7'	1027	D/BOTTOM
				D/W = 267.3'; RISING UP IN BOREHOLE WHILE	1035	D/WATER
				TAKING MEASUREMENTS.		
				D/W = 266.3'	1045	D/WATER
				D/W = 265.8'	1055	D/WATER
				D/W = 265.2'	1120	D/WATER
				WILL ASSUME STATIC H.D IS BETWEEN 265'-		
				267' & DRILL TO 287'. DRILLER WILL		
				HAVE TO BACKPRESSURE WELL W/ DRILL SUPPLY		
				H2O TO KEEP BOREHOLE CLEAR OF HEAVING		
				SANDS		
				S.S. Teel takes over for S.M. Goodwin	1130	

REMARKS:

S S Teel
6-30-89

PNL-MA-567 DO-1, REV. 0

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

1021 (8-85)

DRILL LOG	By: S.S. Teel	Rig: BE 60L 22-14109	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 6-30-89		Depth: 280' to 282'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
	280'	H	Wet	SLIGHTLY GRAVELLY SAND (5% gravel, 92% sand,	1135	Sample w/Sand Pump
				3% mud), 3% FP, 2% VFP, 10% VCS, 50% CS, 20% MS,		
				7% FS, 5% VFS, 3% mud. Very well sorted. (Gravel) -		
				70% basalt/volcanics, 30% qtz/Si-rich. A-WR on		
				orig. surf. (Sand) - 80% basalt/mafics, 20% qtz, qtzite,		
				& Si-rich. A-R. Wet color: 10YR 4/2 (dark grayish brown)		
				No reaction to 10% HCL. Unconsol. Less mud than		
				previous. 2 pt geol., 1 chem, and 1 sieve sample taken.		
				"Heaving Sand". C.o.C. # 63089A 1ST 10/10/89	1200/1230	Lunch
					1	Adding Water
					1300	Drilling
				D/Bottom = 226.5 + 2.8 - 5.75 = 283.05	1330	
				w/PNL steel tape # L300-02		
				D/water ≈ 251		
				D/Bottom = 226.75 + 2.8 - 5.75 = 282.80	1340	
				Will log the well on Wed. 7/5/89 if hole has not		
				heaved any more.		
				Bottom of 8" Casing @ 282.4'	1530	End of Day

REMARKS:

Total H_2O added = 150 gal.

S.S. Teel 6-30-89

PNL-MA-567 DI-1, REV. 0

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

A-151

DRILL LOG	By: MA Chauncey	Rig: CE 600	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W7-017, Grout Site
	Date: 11/5/89	1122-1403	Depth: 277.27' to 277.27'		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W w/ PNL E-tape, Sec. 4 313.4 = 270.7' - 5.6' stickup = 265.1'	720	Driller (Gene Watkins)
				D/B w/ PNL steel tape L30002 = 286.2' - 5.6' stickup - 2.33' (tape) = 277.27'	730	is at another site today
				Have 12.17' of water in hole, bottom of casing is at 282.4',		
				so sand has heaved in 5.13'+ will have to be cleaned out some		
				before setting screen. Straightness test will be run tomorrow,		
				and then they will clean out the well + set the screen.		
				Vern McGhee is here to geophysically log the well. WHC	1000/1002	
				could not supply a witness, so Vern was alone.		

REMARKS:

PNL - MA - 567 Do-1, Rev. 0

MA. Chauncey 11/5/89

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

021 (5 86)

DRILL LOG	By S.S. Teel	Rig BE60L 22-14603 Mel Thompson	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017 Grout
	Date 7-6-89		Depth FD To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/B = 277.27 (7/5/89 w/ PNL steel tape		
				# L300-02)		
				D/water = 270.15 − 5.7 = 264.95		
				w/ PNL E-tape # 3134		
				Bottom of 8" casing @ 282.4		
				Bailing w/ sand Pump (Added ≈ 30 gal H_2O)	0920	
				D/Bottom = 284.75 + 2.30 − 5.7 = 281.35	1015	
				D/water = 265'		
				Will assume that static is 265'. Will set screen		
				@ 280'.		
					1045	Waiting for witness
						for straightness test,
						and for sand and
						lifting bails
				KEH A&T inspector arrives	1115	
				21.7' piece of 6" casing passes to bottom.	1120	

REMARKS:

S.S. Teel
7-6-89

PNL-MA-567 DQ-1, REV. 0

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

A 6000-021 (6-86)

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S S Teel	BE 60L 22-14103 Ak/Thompson	299-E25-38	NA	W-017 Grout
Date: 7-6-89		Depth: TD To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
287'11 1/4"				Bottom of 8" @ 282.4		
- 1'11 1/4				Cut off 1'11 1/4" of 8"	1130	Cutting Casing
286'0"				D/Bottom = 282.7 + 2.3 - 3.7 = 281.3	1140	
				Want to set screen @ 280'		
				Need to add ≈ 1/2 bag of sand to set screen on		
				Added 1/2 bag of 8-12 mesh solo. Silica Sand	1158	
				D/Bottom = 281.5 + 2.3 - 3.7 = 280.1	1140	
				Added 1/4 bag of 8-12 mesh sand	1145	
				D/Bottom = 281.0 + 2.3 - 3.7 = 279.6		
					1200	Lunch
					1230	Cleaning-up site, preparing to pull 12" casing, preparing to move rig.
					1530	End of Day

REMARKS:

PNL-MA-567 DO-1, Rev. 0

S.S. Teel
7-6-89

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

00 021 (6 86)

DRILL LOG	S.S. Tech	PE 001. 22-14103	299-E25-38	Computer Number	Project or Work Order No. W-017 Grout
	Date 7-7-89		Depth D To	NA	Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				No activity at site today		

REMARKS:

S.S. Tech
7-7-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG	By: S.S. Teel	Rig: None	Well Number: 299-E25-88	Computer Number: NA	Project or Work Order No.: W-017 Grout
	Date: 7/12/89		Depth: TD 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
				D/Bottom = 279.65 + 2.03 − 2.3' (stick-up) = 279.38' b.l.s.	1300	
				meas. with PNL steel tape # L300-04		
				D/Water = 266.23 − 2.3 = 263.93 b.l.s.		
				meas. w/ PNL E-tape # 12176		
					1330	Moving jacks to site

REMARKS:

S.S. Teel
7/12/89

PNL-MA-567 Do-1, Rev. 0

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

000 021 (6 86)

WHC-SD-EN-TD-070, Rev. 0

DRILL LOG	By S.S. Teel	Rig Pump Rig	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017
	Date 7-17-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/Bottom = 279.2 + 2.43 - 2.35 (stick-up) = 279.28'	0700	Arrive on site
				L.I.S. meas. w/ PNL steel tape L300-05.		- Waiting on drillers
						to arrive
				D/water = 266.83 - 2.35 = 264.48 meas. w/ PNL	0800	
				E-tape # 12176		
					0845	Pumptruck arrives -
						preparing to set
						stainless
				10.65' Channel Pack w/ bottom cap	0950	Adding Casing
				10.4' Channel Pack Section		
				Added 7 sections of 20' long 4" dia casing w/centralizers		
				" 6 " " " " " " w/o centralizers		
				Centrallizers were placed every 40' starting at the top of		
				the screen.		
				Added one piece of 5' long stainless steel which will		
				be temporary during casing pull-back		

REMARKS:

S.S. Teel
7-17-89

PNL-MA-567 PO-1, Rev. 0

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

DRILL LOG	By: S.S. Teel	Rig: Pelliboric Crane	Well Number: 219-E25-38	Computer Number: NA	Project or Work Order No.: N-017 Grout
	Date: 7-17-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pump truck develops hydraulic leak (no oil goes down hole or on ground). Will set rest of stainless with crane	1110	
					1200/1230	Lunch
					1230	Moving jacks, welding casing in prep. for pulling casing
				Added 5' of 8" casing. Total 8" now 289'6"		
				Bottom of 8" casing @ 280.15		
				D/Bottom = 284.4 + 2.7 (tape - new weight) - 7.6 = 279.5' b.l.s. W/PNL steel tape L300-05	1355	
1.5	bags of	8-12 mesh		Added 1½ bags of 8-12 sand		
				D/Bottom = 276.15 + 2.7 - 6.5 = 272.35		
				Pulled 8" to 280.15		
				D/Sand = 279.4 + 2.7 - 8.3 = 273.8		
				Pulled 8" to 277.35' b.l.s.		
				D/Sand = 280.5 + 2.7 - 9.5 = 273.5		
				Pulled to 276.0		
				D/Sand = 273.5		
+1				Added 1 bag of sand		
2.5	bags of	8-12 mesh		D/Bottom = 271.5		
				Pulled to 274.5		

REMARKS:

S.S. Teel
7-17-89

PDL - MA-567 Dr-1, Rev 0

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

10 021 (5-85)

DRILL LOG	By: S.S. Teel	Rig: Pettibone Crane & Casing Jacks	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017 Grout
	Date: 7-18-89		Depth: Completion To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
2.5 bags			D/sand	= 279.2 + 2.7 - 9.2 = 272.7		
+1				Added 1 bag of 8-12 mesh sand		
3.5				Pulled 8" Casing to 272.5		
				D/sand = 268' L.L.S.		
				Went sand at ≈ 262		
+1				Added 1 bag of 8-12 mesh.		
4.5 bags of 8-12 mesh				D/Bottom = 267.8 + 2.7 - 6.6		
				Pulled to 269.5		
				D/sand = 272.70 + 2.7 - 9.3 = 266.1		

REMARKS:

S.S. Teel
7-17-89

PNL-MA-567 DO-1, REV. 0

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

DRILL LOG	By S.S. Teel	File Pellibone Crane & Casing Jacks	Well No. 299-E25-38	Computer Number NA	Project or Work Order No. W-017
	Date 7-18-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
4.5 bags of 8		12 mesh		Bottom of 8" casing @ 269.5		
				D/sand = 266.1		
11				Added 1 bag of 8-12 mesh sand		
5.5				D/sand = 267.5 + 2.4 - 9.2 = 260.7 (PVC steel tape # 2300-14)		
				Pulled 8" to 267.5	0720	
				D/sand = 267 + 2.4 - 7 = 262.4		
+1				Added 1 bag of 8-12 mesh sand		
6.5				D/sand = 261.5 + 2.4 - 7' = 256.9		
				Pulled 8" casing to 264.9		
				D/sand 259.3'		
+1				Added 1 bag of 8-12 mesh		
7.5				D/sand = 259.7 + 2.7 - 7.1 = 255.0		
				Pulled 8" casing to 260.5	0820	
				D/sand = 268.0 + 2.4 - 6.9 = 263.5		
				(Sand dropped 8.5' on a pull of 4.9'. Now		
				have 3' open hole).		
+1				Added 1 bag of 8-12 mesh sand		
8.5	bags of	8-12		D/sand = 267.5 + 2.4 - 6.9 = 263.0 (only gained .5'; must		

REMARKS: have a large void outside of the casing.

S.S. Teel
7-18-89

Proc. MA-567 DO-1, Rev. 0

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

.021 (6 85)

DRILL LOG	By S.S. Teel	Rig Pettibone Crane & Casing Jacks	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017
	Date 7-18-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
8.5 bags of 8-12				8" casing @ 260.5		
+1				Added 1 bag of 8-12 mesh		
9.5 bags				D/sand = 267.8 + 2.6 (longer weight) - 6.9 = 263.5		
+1				Added 1 bag of 8-12 mesh		
10.5 bags				D/sand = 267.6 + 2.6 - 6.9 = 263.3		
+1				Added 1 bag of 8-12 mesh		
11.5 bags				D/sand = 267.4 + 2.6 - 6.9 = 263.1		
				D/Bottom inside the 4" casing =		
				284.0 + 2.6 - 6.9 = 279.7' b.l.s.		
				Still have ≈ 3' open hole. Waiting on more sand	0945	
+2.5				Added 2½ bags of 8-12 mesh	1020	
14 bags				D/sand = 266.8 + 2.6 - 6.9 = 263.5		
+1				Added 1 bag of 8-12 mesh		
15 bags				D/sand = 266.6 + 2.6 - 6.9 = 263.2		
+2				Added 2 bags of 8-12 mesh		
17 bags				D/sand = 264.4 + 2.6 - 6.9 = 260.1		
+1				Added 1 bag of 8-12 mesh		
18 bags of 8-12 mesh				D/sand = 260.0 + 2.6 (taper) - 6.9 = 256.7		

REMARKS:

S.S. Teel
7-18-89

PRC-MA-567 DS-1, REV. 0

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

DRILL LOG	By S.S. Teel	Rig Pellibone Drilling and Casing Jacks	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017 Grout
	Date 7-18-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
18 bags of 8-12 mesh				8" Casing @ 260.5		
				D/sand = 256.7		
11				Added 1 bag of 8-12 mesh		
19				D/sand = 255.8 + 2.6 - 6.9 = 251.5'		
				Pulled 8" to 258.5		
				D/sand = 260.0 + 2.6 - 9' = 253.6		
1½				Added ½ bag of 8-12 mesh		
19.5	bags of	8-12 mesh		D/sand = 257.4 + 2.6 - 9' = 251.0		
				Pulled 8" to 255.9 (261.7' weld)		
				D/sand = 258.1 + 2.6 - 7.1 = 253.6' b.l.s.	1130	
				Ready to begin bailing as soon as pump truck arrives.		
				3½" od dart bailer won't go down well. Need to get a smaller dia. bailer.	1145	
					1200/1230	Lunch
					1230	Waiting for a Bailer
					1415	End of Day
				Note: all depth measurements made today were done using PNL steel tape # L300-14		

REMARKS:

S.S. Teel
7-18-89

PNL-MA-567 DO-1, REV. 0

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

00 021 (5 85)

2.6'

0 2

DRILL LOG	By T Gilmore	Rig Pettibone Crane and Casing Jacks	Well Number 299-E25-38	Computer Number N/A	Project or Work Order No. W-017 Grout
	Date 7/19/89		Depth Completion To		Subcontract No. N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				PNL Geologist; Kaiser Safety/inspector; Crane operator at site	700	
				Casing is at 255.9' Sand is at 253.6'		
				Need sand at ~255.5' Bailing well to settle sand pack		
				using PNL Steel Tape # L 300-14		
				waiting on bailer		
				Depth to water 271.3' from top of stainless steel casing	725	
				Bailing well; approx 8.5 gal/bailer load	730	
				all water contained in 55gal drums		
				Bailer does not work, will have to use old bailer	745	Modify Bailer
				and modify to fit in well; does not work, go back		
				to new bailer and retry		
				1st bailer load ~1gal, very Turbid w/v fine sands	845	Bailing
				2nd bailer load ~1gal Very Turbid w/vfs; bailer	900	
				is not working well, will work on old bailer again,		Modify bailer
				approx 2½ gal/bailer load Water is very Turbid w/	940	Bailing
				vf-medium sands (not filter pack) ~ 2 Teaspoons vfs/silts		
				per bailer load		

REMARKS:

T Gilmore

PNL-MA-567 DQ-1, Rev. 0

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

A-167

WHC-SD-EN-DP-070, Rev. 0

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
T Gilmore	Pettibone Crane Casing Tools	299-E25-38	N/A	W-017 Grout
Date: 7/19/89		Depth: Completion To		Subcontract No.: N/A

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				14 bailer loads approx 35gal still v Turbid, less sediment	1020	
				D/B in screen 279.3 D/B Sand 253.65 bls	1010	
				Pull Casing 1.5' to 254.4'		
				D/ Sand 255.1 Casing at 254.4 bls.		
				Add (2) 5gal buckets 1/4" Tablets Volclay	1050	
				D/ Pellets 251.5' Add 2gal H_2O (Bailed water)		
				Pull Casing to 253.9' bls.		
				Add (5) 50lb Crumbles 8-20 Mesh Bentonite	1105	
				D/Crumbles 255.7' b.l.s.		
				Crain broke down; Casing was at 251.7 bls. need	1115	Crain Broke down
				Casing to about ~245' to expose 251' weld		
					12-1230	Lunch
				Crane needs to be taken to the shop possible broken	1310	Shut down
				crank.		
				(Need to Measure D/Crumbles when Casing cut)		

REMARKS:

(2) 5gal buckets Volclay
(5) 50lb bags Bentonite crumbles

Casing at 251.7' bls

T Gilmore

PNL-MA-567 Dr-1, Rev. 0

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

1021 (6 85)

DRILL LOG	By: S.S. Teel	Rig: Pettibone crane + Jacks	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 8/7/89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
5 bags of 8-20 crumbles					0700	Geologist arrives on site
				Bottom of 8" casing @ 251.7' b.l.s.		
					0905	KEH personnel arrive w/ jacks
				D/crumbles = 240.15 + 2.6 − 9.75' (stick-up) = 233.0	1010	
				Pulled casing to 249.7' b.l.s.	1015	Waiting on tremie pipe
				D/crumbles = 233.0 (no change)		
				Crumbles did not drop as casing was pulled.		
				May have a bridge in the casing.		
				Pulled slug and transducer at BP-5	1040	
					1130	Tremie pipe arrives
				Pulled 8" casing to 248'	1140	
				No change in depth / crumbles		
					1150	Preparing to add tremie
					1200/1230	Lunch

REMARKS:

S.S. Teel
8-7-89

PNL-MA-567 DO-1, REV. 0

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

DRILL LOG	By S.S. Teel	Rig Rotibone Crane + Jacks	Well Number 299-E25-38	Computer Number NA-	Project or Work Order No. W-017 GTF
	Date 8/7/89		Depth Completion To		Subcontract No. NA-

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Adding tremie pipe, preparing to blow-out crumbles	1230	
				Bottom of 8" casing @ 248'		
				D/Bottom = 234.5 + 2.5 − 7' = 230.0		
				D/Bottom w/ E-tape through tremie = 238.3		(½" dia tremie)
				(245.3 − 7' = 238.30.) (PUL E-tape # 12176		
				Pulled 8" to 247'	1400	
				D/Bottom w/ E-tape through tremie = 245.5 − 8' (stick-up) = 237.50'. Therefore, since the depth only changed ~.2' with a 1 ft pull, the crumbles must be bridged. Will blow-out the crumbles w/ air.		
				The steel tape must have been hanging up on either a partial bridge or an obstruction (centralizer) or just wedging inside the casing.		
				Tried blowing-out the hole. Tremie pipe is too small to have enough volume.		

REMARKS:

S.S. Teel
8-7-89

PNL-MA-567 DO-1 REV. 0

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

10 021 (5 86)

3013

DRILL LOG	By: S.S Teel	Rig: Pellibone crane + Jacks	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017 E.IF
	Date: 8/7/89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Pulled casing 1 ft., depth only changed 2".	1445	
				Will add 1" tremie and then blow the hole out.		
				8" casing now @ ≈ 246'		
					1530	End of Day
				Note: All steel tape measurements today were with		
				PNL tape # L700-141		

REMARKS:

S.S. Teel
8-7-89

PRI-DIA-517 DO-1, REV. 0

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

DRILL LOG	By S.S. Teel	Rig Bellilone Crane / Pumping + Casing Jacks	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017 GTF
	Date 8-8-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Bottom of 8" casing now at 245.15 ' b.l.s.	0700	Cutting casing
				(251'4" weld almost exposed)		Preparing to set 1"
						tremie w/ Pump Truck
					0845	Tremie set -
						blowing-out the hole
				Compressor does not have enough volume to blow the	0848	
				crumbles out. Will move the tremie up and down		
				and then re-measure to see if the bridge breaks.		
				D/crumbles (inside tremie) = 251.0 + 2.5 - 8.15 = 245.35 ' b.l.s.		→ probably not true
				D/crumbles (outside tremie) = 243.85 + 2.5 - 6.8 = 239.55 ' b.l.s.		depth; The tremie
				Still don't know if measurement outside the tremie is true		can go to the bottom
				or not (due to possible restrictions in the casing).		of the 8" with the
				Will continue to run the tremie up and down with air	0920	air on, but not
				to hopefully break any bridges until the crane comes		with the air off.
				back from B-Pond so that 1-2' of casing can be		
				pulled to see if the crumbles are dropping.		

REMARKS:

S.S. Teel
8-8-89

Form - NA - 5611 Rev. 1, Rev. 0

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

DRILL LOG	By: S.S. Teel	Rig: Pettibone Crane/Pump Truck + Casing Jacks	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017
	Date: 8-8-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
5 bags of crumbles				(Noticed that end of steel tape was a little wet + sticky from bentonite. Moisture from condensation(?), or from when water was poured in with the pellets?)		
				A measurement was made outside the tremie with the air turned on. The tape dropped from 238' to 245' as the crumbles became air-entrained. Therefore it appears that the measurement outside the tremie is valid and that the bridge is probably broken. Will pull the tremie and then continue to back pull.	0945	
					1140	Crane Arrives
				D/Bentonite = 244.25 + 2.5 − 6.8 = 239.95		
				Pulled 8' to 244.30		
				D/Bentonite = 246.7 + 2.5 − 8.6 = 240.60		
					1200/1230	Lunch
+8				Added 8 bags of crumbles	1240	
13 bags of crumbles				D/Bentonite = 221.15 + 2.6 − 7.65 = 216.10' b.l.s.		

REMARKS:

S.S. Teel
8-8-89

PNL-MA-567 DO-1, Rev. 0

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	Pettibone Crane + Jacks	299-E25-38	NA	W-017 GTF
Date: 8-8-89	Depth: Completion To			Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
13 bags of 8-20 mesh crumbles						
				Pulled 8" casing to 234.38		
				D/Bentonite = 227.2 + 2.6 − 6.5 = 223.30		
110				Added 10 bags of crumbles		
23				D/Bentonite = 177.6 + 2.6 − 6.5 = 173.70	1300	
				Pulled 8" casing to 225.0		
				The ground is starting to give beneath the jacks.	1315	
				Will stop pulling until it can be stabilized.		
				Pulling casing − jacks were stabilized with soil.	1400	
				Pulled casing to 219.77 − 6' = 213.77		
				D/Bentonite = 211.10 + 2.6 − 6' = 207.70		
115				Added 15 bags of 8-20 mesh crumbles		
38				D/Bentonite = 167.7 + 2.6 − 6.0' = 164.30	1425	
				Pulled 8" casing to 198.67 − 6.3 = 192.37	1445	
				D/Bentonite = 180.74 + 2.6 − 6.3 = 177.00		
110				Added 10 bags of 8-20 mesh crumbles		
48 bags of crumbles				D/Bentonite = 150.33 + 2.6 − 6.3 = 146.63		
				Pulled 8" casing to 177.67 − 6.6 = 171.07	1515	
				D/Bentonite = 164.5 + 2.6 − 6.6 = 160.5		S.S. Teel 8-8-89
					1530	End of Day

REMARKS:
PNL-MA-567 DO-1, REV 0

All measurements done w/ PUL steel tape # L300-14

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

0 021 (5 85)

DRILL LOG	By S.S. Teel	Rig Pettibone crane + Hyd. Jacks	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017 GTF
	Date 8-9-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
48 bags of crumbles					0730	Arrive on site -
				(8" casing @ 171.07)		no KEH personnel
					0750	KEH personnel arrive
						- unloading crumbles
						from truck
				Added 15 bags of 8-20 mesh crumbles	0915	
+15				D/Bentonite = 110.55 + 2.6 - 6.6 = 106.55' b.l.s.	0925	Pulling casing
63				Pulled 8" casing to 157.16 - 6.6 = 150.56'		
				(inside the 10" casing)		
				D/Bentonite = 124.75 + 2.6 - 6.6 = 120.75		
				Pulling remaining 8" casing	0940	
				D/Bentonite = 138.11 + 2.6 - 6.8 = 133.91	1145	
				Bottom of 10" casing @ 155'		
110				Added 10 bags of 8-20 mesh		
73				D/Bentonite = 124.0 + 2.6 - 6.8 = 119.46		
5				Added 5 bags of 8-20 mesh		
78	bags of	crumbles		D/Bentonite = 116.10 + 2.6 - 6.8 = 111.90		

REMARKS:

S.S. Teel
8-9-89

PRC-MA-507 Dar 1, Rev 0

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

DRILL LOG	By S. S. Teel	Rig Pettibone Crane & Jacks	Well Number 299-E25-38	Computer Number Nf	Project or Work Order No. W-017 GTF
	Date 8-9-89		Depth Completion To		Subcontract No.

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
78 bags of crumbles				Pulled 10" casing to 145.37 - 6.7 = 138.67		
				D/Bentonite = 138 + 2.6 - 6.7 = 133.90		
+13				Added 13 bags		
91				D/Bentonite = 114.65 + 2.6 - 6.7 = 110.55		
+25				Added 25 bags of 8-20 mesh bentonite		
116				D/Bentonite = 94.15		
				Pulled 10" casing to 127 - 6.85 = 120.15		
				D/Bentonite = 106.65 + 2.6 - 6.85 = 102.40		
+15				Added 15 bags of 8-20 mesh		
131				D/Bentonite = 81.28 + 2.6 - 6.85 = 83.88		
				Pulled 10" casing to 108.5 - 6.5 = 102'		
				D/Bentonite = 87 + 2.6 - 6.5 = 83.10		
+12				Added 12 bags of 8-20 mesh bentonite		
143 bags of crumbles				D/Bentonite = 67.65 + 2.6 - 6.5 = 63.75		
				Pulled 10" casing to 88.41 - 6.2 = 82.21	1515	
				D/Bentonite = 73.0' + 2.6 - 6.2 = 69.40		
				(All measurements were done w/ PNL steel tape #L300-14)	1530	End of Day

REMARKS:

S. S. Teel
8-9-89

PNL-MA-567 DO-1, REV. 0

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

30 021 (6 86)

DRILL LOG	By S.S. Teel	Rig Pettibone Crane & Jacks	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017 671
	Date 8-10-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
1 1/2 bags of crumbles				D/Bentonite = 69.40	0700	Arrive on site
				10" Casing @ 82.21		
115				Added 15 bags of 8-20 mesh	0715	Adding Bentonite
158				D/Bentonite = 48.0' + 2.6 - 6.2 = 44.40		
				Pulled 10" casing to 68.67 - 6.6 = 62.10		
				D/Bentonite = 54.3 + 2.6 - 6.6 = 50.3		
115				Added 15 bags of 8-20 mesh bentonite		
173				D/Bentonite = 27.95 + 2.6 - 6.6 = 23.95		
				Pulled 10" casing to 49.18 - 6.6 = 42.58		
				D/Bentonite = 33.63 + 2.6 - 6.6 = 29.63		
110				Added 10 bags of 8-20 mesh bentonite		
183	bags of	bentonit	crumbles total	D/Bentonite = 17.2 + 2.6 - 6.6 = 13.2'		
				Pulled 10" casing to 29.38 - 7.2 = 22.16		
				D/Bentonite = 23.88 + 2.6 - 7.2 = 19.28'	0838	
					0840	Mixing Grout

REMARKS:

S.S. Teel
8-10-89

PNL-MA-567 DI-1, Rev. 0

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
S.S. Teel	Pettibone Crane & Tools	299-E25-38	NA	W-017 G7F
Date: 8-10-89		Depth: Completion To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Added 1 batch of cement grout. Batch consisted	0715	
				of 40 gal H_2O, 5 bags (100 lb) of portland		
				cement, and 1 cup of Aluminum powder.		
				Pulled 10" casing to 13'	0940	
				D/grout = 7'		
				Added 1 batch of cement grout (same as previous)		
				Pulled remaining 10" casing		
				D/Grout = 2' below land surface		
					1010	Preparing to move
						to well 299-E25-37

REMARKS:

S.S. Teel
8-10-89

PNL-MA-567 DO-1, Rev. 0

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

10 021 (5 86)

DRILL LOG	By S.S. Teel	Rig No Rig	Well Number 299-E25-38	Computer Number NA	Project or Work Order No. W-017 GTF
	Date 8-14-89		Depth Completion To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/Water = 266.25 - 1.5' (stick-up) = 264.75	0840	
				meas. w/ PNL E-tape # 12176		
				D/Bottom = 278.53 + 2.6 (tape) - 1.5' (stick-up) =	0845	
				279.63' meas. w/ PNL steel tape 1300-14		

REMARKS:

S S. Teel
8-14-89

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

DRILL LOG

By	Rig	Well Number	Computer Number	Project or Work Order No.
JP McDonald	Pump-setting Truck	2-E25-38	NA	W-017 GTF
Date 10/12/89		Depth Hydro-star Install. To		Subcontract No. NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				D/W = 267.77' from loc. Tape # 1300-14	1055	2' 20'
				D/W = 267.98' " " " "	1058	10' 10'
				Distance from zero mark on tape (1500-03) to bottom		10' 10'
				of weight = 2.45'		10' 10'
				D/B: 280.56 + 2.45 = 283.01' Tape # 1500-03	1109	10' 100' 10'
				D/B: 280.56 + 2.45 = 283.01' " "	1110	10' 10'
				Per conversation with Steve Teel, will set		10' 10'
				pump two feet from bottom of well = 281'		10' 10'
						10' 10'
				A total of 28 sections of 10' pipe	1510	200' 10' 10'
				was installed + pump. Drillers tagged		10' 10'
				bottom of well to verify that the		10' 10'
				pump was near the bottom of well. Each		10' 10'
				length of 10' pipe is approximately		280' 10'
				9.77' in actual length.		

REMARKS:

PNL MA-567 DO-3 Rev. 0.

JP McDonald 10/12/89

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

00 021 (5 86)

DRILL LOG	By: JP McDonald	Rig:	Well Number: 299-E25-38	Computer Number: NA	Project or Work Order No.: W-017 GTF
	Date: 10/17/87		Depth: To		Subcontract No.: NA

Total Casing	Depth	Drill Method	Wet/Dry Sample	LITHOLOGIC DESCRIPTION % Each Grain Size, Color, Roundness, Caliche, Etc.	Time	Drilling Comments
				Casing is 3.02' above cement pad.	1330	
				Top of cement pad is .10' above		
				ground surface.		

REMARKS:

ANL-MA-567 DO-3 Rev. 0

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

A 6000 021 (6 86)

WELL COMPLETION/INSPECTION REPORT

Specification No. WHC-S-014 Rev. No. 3
Project [illegible]
Location [illegible]
Drilling Co. Kaiser Engineers [illegible]
Driller [illegible]
Other (companies) NA
Geologist(s) S.S. Teel, M.A. Chamness, T.E. Gilmore, E.T. Jensen, S.M. Goodwin

Well No. 699-625-38 Temp. Well No. NA
Coordinates (Hanford) N40,056.4 W45,469.0
Casing Elev. (Geo) 673.52 Ground Elev. 670.54 (Brass Cap)

DRILLING METHOD

Rotary - Air N/A Mud N/A
Cable Tool D 0-202' H 202'-259'
Drilling Fluid Hanford Site System Water
Other None

GEOPHYSICAL LOGGING

Sondes	Interval	Date
Not Y	0 - 222'	7/5/89

COMPLETION DATA

Drilled Depth 259'
Completed Depth 279.63'
Date Started 6/7/89
Date Completed 9/18/89
Static Water Level/Date 255.1'/7/5/89

AQUIFER TESTING

Type N/A
Length of Test
Volume Pumped
Drawdown
Date of Test

INSPECTION RESULTS

CLEANING

Inspection Method Visual
Acceptance Criteria As per spec. 7.6

	Accept	Reject	Date
Drilling Tools/Rig	SST		6/6/89
Temporary Materials	SST		6/30/89
Permanent Materials	SST		7/17/89

MATERIAL STORAGE/PACKING

Inspection Method Visual
Acceptance Criteria As per spec 4.2, 7.3

	Accept	Reject	Date
Mtl. Handling/Storage	SST		7/17/89
Material Packing	SST		7/17/89

SCREEN

Type	Length	Slot Size
4" via Channel Pack	21.05'	10
—	—	—

Depth(s) 279.63' - 258.58'

Inspection Method PNL steel tape / Engineer's tape
Acceptance Criteria As per spec. 4.2
Accept SST Reject Date 7/17/89

LUBRICANTS/ADDITIVES

Inspection Method Visual
Acceptance Criteria As per spec 7.2

	Identity	Accept	Reject	Date
Additives	None	SST		6/30/89
Lubricants	Veg. Oil	SST		6/22/89

STRAIGHTNESS TEST

Inspection Method Visual
Acceptance Criteria As per spec 8.3
Accept SST Reject Date 7/6/89

CASING (permanent)

Type	Size	Placement
304 Stainless Steel	4"	259.58' - 7.42'
(Type 304 SS 4.5)	—	— - —

Inspection Method PNL steel tape / Engineer's tape
Acceptance Criteria As per spec 3.1, 4.2
Accept SST Reject Date 7/17/89

WELL PROTECTION

Inspection Method Visual
Acceptance Criteria Sect. 4.2.10

	Accept	Reject	Date
Protective Posts	SST		9/18/89
Locks	SST		9/18/89

ANNULAR SEAL

Inspection Method PNL steel tape / Engineer's Tape Acceptance Criteria As per spec 4.2, 5.2

Type	Interval	Volume	Accept	Reject	Date
3-in. [illegible] Gravel	279.63 - 255.1	19.70 ft³	SST		7/18/89
1/4" Volclay Tablets	255.1 - 251.5	1.24 ft³	SST		7/19/89
Bentonite Crumbles	251.5 - 19.28	129.93 ft³	SST		9/10/89
Cement Grout	19.28 - 2.0'	6.6 ft³	SST		9/10/89

OTHER (initial if performed)

Well Abandonment — Downhole TV Inspection — SST Complete As-Built Diagram, Driller's/Geologist's Logs
Well Development

Reviewed by V.L. McGlew 10-5-89

For all blanks mark N/A if not applicable.

WESTINGHOUSE HANFORD COMPANY

WELL NUMBER 299-E25-38 AREA 200-EAST
DATE 7-5-89
LOG RUN #1 LOG TYPE NATURAL GAMMA
SURVEY COORDINATES NA N NA E
ELEVATION DATUM Top of 8" CASING ELEVATION NA
LOG MEASURED FROM GROUND SURFACE
LOCATION DESCRIPTION NEAR the GROUT FACILITY
GROUND SURFACE ELEVATION NA
SURFACE TEMPERATURE 18.2°C WEATHER CLEAR

BOREHOLE INFORMATION

DRILLER

DRILL RIG TYPE CABLE TOOL	BIT TYPE/DIAMETER 8"
BOREHOLE DIAMETER(S)/DEPTH 8" to 283'	
DEPTH DRILLER 283'	DEPTH LOGGER 283'
LIQUID LEVEL 264.87	LIQUID APPEARANCE CLEAR
TEMPERATURE 17.7°C	

CASING RECORD

TYPE 12"	INTERVAL 20'
TYPE 10"	INTERVAL 154.8
TYPE 8"	INTERVAL 282.4
TYPE	INTERVAL

WELL SCREEN INTERVAL:

COMMENTS:

EQUIPMENT DATA

LOGGING COMPANY PNL

OPERATOR(S) V.L. McGhan

EQUIPMENT BRAND MLS — EQUIPMENT TYPE PULSE

TOOL TYPE 1 1/16" GAMMA RAY — BASE CALIBRATION DATE 12-88

SERIAL NO. CG 27A97 — CALIBRATION REFERENCE WHC-EP-0246

CALIBRATION / PROBE FACTOR 8.53×10^{-2} eV

DEAD TIME 7.4 μ SEC. — WARM UP TIME 25 MIN.

LOGGING INFORMATION

LOG INTERVAL FROM 283' TO 0'

RERUN(S) #1 283'-250' #2 283'-250 #3 270-260

PRE SURVEY CALIBRATION: POSITION 1 3400 c/s 285 cell P/min POSITION 2 800 c/s 67 cell P/min BACKGROUND 60 c/s

LOGGING SPEED 5'/MIN.

START TIME 0930 — COMPLETION TIME 1100

CHART SPEED(S), FT/IN. 10'/IN.

CHART RECORDER HORIZONTAL SCALE, CPS/IN. 500 c/s 50 c/s/IN.

RERUN SCALES, CPS/IN. 500 c/s 50 c/s/IN.

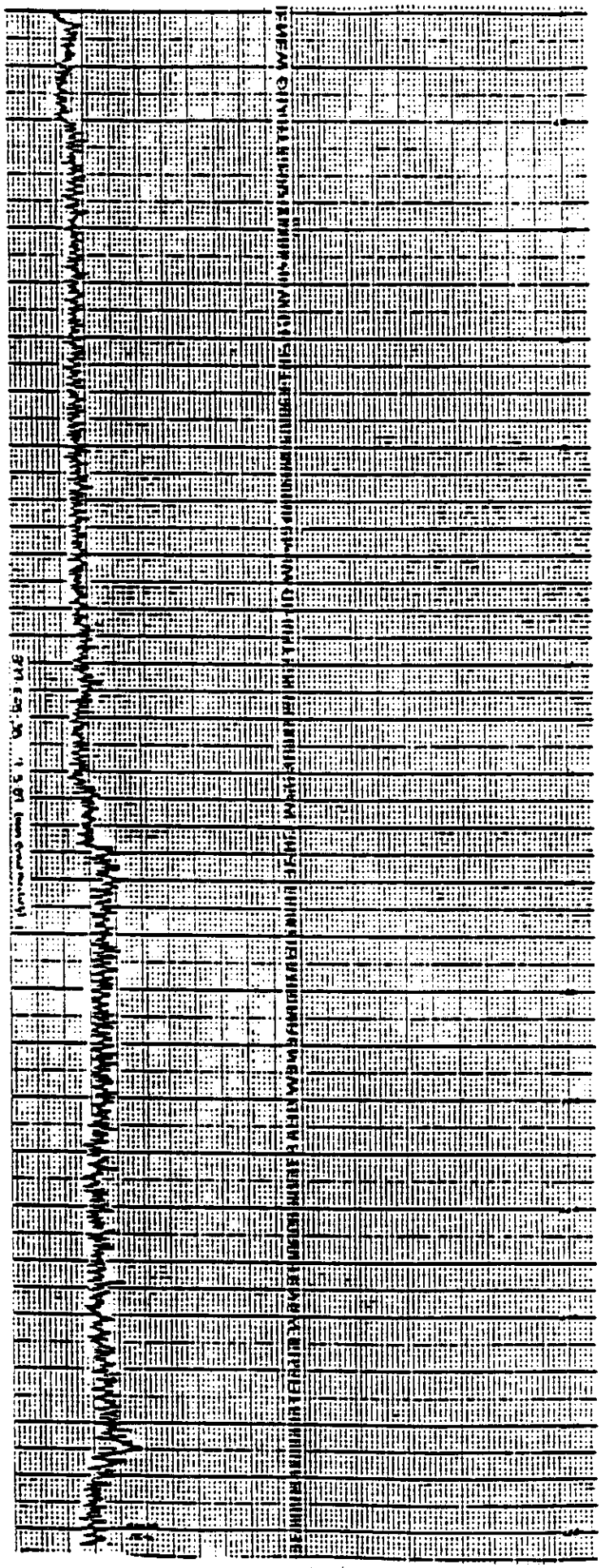
TIME CONSTANT(S) 1

POST SURVEY CALIBRATION: POSITION 1 3400 c/s 285 cell P/min POSITION 2 710 c/s 55 cell P/min BACKGROUND 60 c/s

PERCENT CHANGE: POSITION 1 0% POSITION 2 14%

COMMENTS:

WITNESSED AND VERIFIED BY: Witness Not Available



APPENDIX B

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

Moisture Sample Analyses Results from Well 299-E25-37

Depth (ft)	Percent H_2O
5	10.78
10	8.35
15	7.08
20	16.70
25	6.02
30	6.30
42	4.87
45	5.10
50	4.25
55	5.79
65	11.56
70	15.09
75	12.34
80	15.77
85	15.28
90	12.30
95	3.53
105	7.60
110	6.66
115	4.91
121	4.20
130	4.82
135	4.14
140	6.76
145	12.93
150	5.95
	4.91
155	6.21
160	9.90
165	4.34
170	3.86
177	3.12
180	4.01
185	2.89
190	4.62
195	3.94

Moisture Sample Analyses Results from Well 299-E25-38

Depth (ft)	Percent H_2O
20	3.19
25	3.15
30	3.46
35	4.84
40	3.05
45	4.58
50	3.23
55	3.24
60	3.55
65	5.24
70	5.39
75	7.76
80	7.49
85	10.52
90	9.17
92	29.94[a]
95	8.27
100	12.50
105	33.17[a]
110	13.93
115	3.44
120	13.97
125	5.41
130	4.30
135	2.78
140	3.30
142	22.15
145	2.50
150	3.47
155	2.31
165	2.03
170	2.85
180	6.19
184.5	2.66
190	2.70
195	2.51
200	1.83

(a) Results appear anomalous.

Sediment Sieve Analysis from Well 299-E25-37
Within the Screened Interval

Depth	Mesh Size	Percent Less Than
265 ft	4.00	63.14
	2.00	50.73
	1.00	40.73
	0.50	30.42
	0.25	22.35
	0.125	15.31
	0.063	10.64
	0.045	8.33
	Pan	0.60
269 ft	4.00	77.04
	2.00	61.67
	1.00	46.93
	0.50	34.49
	0.25	24.44
	0.125	15.00
	0.063	9.78
	0.045	6.32
	Pan	0.14
270 ft	4.00	80.98
	2.00	64.39
	1.00	49.30
	0.50	34.54
	0.25	26.06
	0.125	20.13
	0.063	13.08
	0.045	10.35
	Pan	0.49
275 ft	4.00	87.73
	2.00	73.31
	1.00	56.60
	0.50	25.33
	0.25	12.92
	0.125	7.31
	0.063	4.36
	0.045	3.39
	Pan	0.31
280 ft	4.00	88.73
	2.00	76.88
	1.00	54.26
	0.50	26.64
	0.25	14.47
	0.125	8.93
	0.063	5.58
	0.045	4.31
	Pan	0.08

Sediment Sieve Analysis from Well 299-E25-38
Within the Screened Interval

Depth	Mesh Size	Percent Less Than
260 ft	4.00	98.81
	2.00	94.48
	1.00	82.97
	0.50	64.74
	0.25	51.26
	0.125	30.32
	0.063	17.64
	0.045	14.35
	pan	0.64
265 ft	4.00	99.22
	2.00	96.96
	1.00	82.30
	0.50	39.77
	0.25	22.93
	0.125	12.80
	0.063	7.56
	0.045	5.80
	pan	0.49
270 ft	4.00	94.38
	2.00	87.11
	1.00	74.06
	0.50	32.69
	0.25	13.76
	0.125	7.58
	0.063	4.54
	0.04	3.53
	pan	0.44
275 ft	4.00	99.89
	2.00	98.28
	1.00	85.93
	0.50	40.46
	0.25	17.28
	0.125	9.33
	0.063	5.33
	0.045	4.26
	pan	0.35
280 ft	4.00	97.99
	2.00	92.41
	1.00	72.29
	0.50	28.47
	0.25	7.13
	0.125	3.01
	0.063	1.49
	0.045	1.05
	pan	0.22

Analytical Results of Sediment Samples Collected During Drilling at the Grout Treatment Facility

Sample ID	Depth, ft	NO_3^- (ppm)	$SO_4^=$ (ppm)	F^- (ppm)	CL^- (ppm)	PO_4 (ppm)	BR^- (ppm)	NO_2^- (ppm)	TOC (ppm)	BETA (pCi/g)	Alpha (pCi/g)
299-E25-37	20	2.99	66.20	<1.0	34.20	<2.0	<1.0	<1.0	<20	17.0 ± 3.0	3.95 ± 2.38
299-E25-37	60	<1.0	3.58	<1.0	<1.0	<2.0	<1.0	<1.0	<20	15.4 ± 2.7	2.46 ± 1.98
299-E25-37	124	3.60	16.10	(a)	<1.0	<2.0	<1.0	<1.0	<20	24.4 ± 3.4	7.22 ± 3.09
299-025-37	180	<1.0	4.30	<1.0	<1.0	<2.0	<1.0	<1.0	<20	20.0 ± 3.1	3.79 ± 2.26
299-E25-37	260	<1.0	14.20	(a)	1.20	<2.0	<1.0	<1.0	<20	16.0 ± 2.8	2.52 ± 2.25
299-E25-38	40	1.85	5.83	<1.0	1.12	<2.0	<1.0	<1.0	<20	15.3 ± 2.7	NA
299-E25-38	60	7.34	19.30	<1.0	4.28	<2.0	<1.0	<1.0	<20	17.5 ± 2.9	NA
299-E25-38	80	5.42	11.60	<1.0	1.56	<2.0	<1.0	<1.0	<20	14.3 ± 2.7	<1.0
299-E25-38	120	8.39	23.50	<1.0	1.68	<2.0	<1.0	<1.0	<20	16.14 ± 2.9	<1.5
299-E25-38	200	5.06	21.40	<1.0	1.26	<2.0	<1.0	<1.0	<20	18.1 ± 2.9	<1.0
299-E25-38	258	<1.0	12.00	<1.0	4.10	<2.0	<1.0	<1.0	<20	21.8 ± 3.3	<2.5
299-E25-38	280	<1.0	5.50	<1.0	1.10	<2.0	<1.0	<1.0	<20	20.7 ± 3.1	3.22 ± 2.26

(a) Unknown Chemical Interference During Analysis
NA = Not Analyzed

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

61289

Company Contact: Chris Olsen Telephone: 376-4116

Samples Collected by: MA Chamnen Date: 6/17/89 Time: 1305

Sample Location: 299-E25-38 Grout Site

Ice Chest No.: TAIL ice chest Field Logbook Page No.:

Remarks: DO NOT SEND ON TAPE

Method of Shipment:

Sample Identification

-500-6-

299-E25-38 ~~25~~ '80'	111, 212, ~~6~~
SST ~~8~~	C69, 742

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
MA Chamnen	Steve Teel	6/17/89 1625
Relinquished by:	Received by:	Date/Time:
Steve Teel	UST by J. Ryan	6-22-89 1205
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

BC-1200-345 (7-88)

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

61489

Company Contact: Khris Olsen Telephone:

Samples Collected by: S. S. Teel Date: 6-14-89 Time: 1500

Sample Location: 299-E25-38 299-E25-37, Grout Site

Ice Chest No.: PNL Ice Chest Field Logbook Page No.:

Remarks: Do not enter on tape

Method of Shipment:

Sample Identification

1-500ml-G- 299-E25-37, 20'	111, 212, C69, 742
1-500ml-G-299-E25-38, 120'	

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Steve Teel	UST J. Reyes	6-22-89 1205
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

BC-1200-348 (7-88)

Battelle
Pacific Northwest Laboratories
P.O. Box [illegible]
Richland, Washington 99352

CHAIN OF CUSTODY

62189

Company Contact: Khris Olsen Telephone: 6-4114

Samples Collected by: S. S. Teel Date: 6-21-89 Time: 0730/1505

Sample Location: 299-E25-37, 299-E25-38, Grout Site

Ice Chest No.: PNL Ice Chest Field Logbook Page No.: Geologist Logs

Remarks: Do not enter on tape.

Method of Shipment:

Sample Identification

1-500ml-G-299-E25-37, 60'
1-500ml-G-299-E25-38, 200'

III, 212, 669, 742

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Steve Teel	UST J Royer	6-22-89 1205
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

SC-1200-348 (7-88)

SOIL

Battelle
Pacific Northwest Laboratories
P.O. Box 1000
Richland, Washington 99352

CHAIN OF CUSTODY

62689 B

Company Contact: Khris Olsen Telephone:

Samples Collected by: Steve Teel Date: 6/26/89 Time:

Sample Location: 299-E25-37, Grout Treatment Facility

Ice Chest No.: PNL Ice Chest Field Logbook Page No.: Geologist Log

Remarks: Do not enter on tape. Send results to Khris Olsen, K6-96. Charge to M54090.

Method of Shipment:

Sample Identification

1-500ml-G - 299-E25-37, 124'	111, 212, 669, 742

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Steve Teel	[illegible]	7-20-89 14:30
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

SC-1200-348 (7-88)

SOIL

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

628898

Company Contact: Khris Olsen Telephone:

Samples Collected by: Steve Teel Date: 6/28/89 Time: 1200

Sample Location: 299-E25-38, Grout Treatment Facility

Ice Chest No.: PNL Ice Chest Field Logbook Page No.: Geologist Log

Remarks: Do not record on tape. Send Directly to Khris Olsen, K6-96; Charge to M54090

Method of Shipment:

Sample Identification

1-500ml-G - 299-E25-38, 258' } 111, 212, C69, 742

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Steve Teel	[illegible]	7-10-89 14:30
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

BC-1200-348 (7-88)

SOIL

Battelle
Pacific Northwest Laboratories
P.O. Box [illegible]
Richland, Washington 99352

CHAIN OF CUSTODY

6 30 89 A

Company Contact: Khris Olsen Telephone:

Samples Collected by: Steve Teel Date: 6/30/89 Time:

Sample Location: Well 299-E25-38, Grout Treatment Facility

Ice Chest No.: PNL Ice Chest Field Logbook Page No.: Geologist Log

Remarks: Do not enter on tape. Send Results to Khris Olsen

Method of Shipment:

Sample Identification

1-500 ml - G - 299-E25-38, 280'	111, 212, C69, 742

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Steve Teel	By K. [illegible]	7-20-89 14:30
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

BC-1200-345 (7-88)

SOIL

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

63089 B

Company Contact: Chris Olsen Telephone:

Samples Collected by: S. M. Goodwin Date: 6/30/89 Time: 0700 - 1530

Sample Location: GROUT TREATMENT FACILITY

Ice Chest No.: PNL Field Logbook Page No.: —

Remarks: DO NOT RECORD RESULTS ON TAPE; SEND DIRECTLY TO CHARGE TO M54090

Method of Shipment: GOV'T VEHICLE

Sample Identification

WGU 299-E25-37: 150' 500 ML GLASS @ 0835. ANALYZE FOR 111, 212, C69, 742

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
[signature]	Steve Teel	6/30/89 1600
Steve Teel	[signature]	7-20-89 1430

BC-1200-348 (7-85)

SOIL

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

71189

Company Contact: Khris Olsen Telephone:

Samples Collected by: M. A. Chamness Date: 7/11/89 Time: 1300

Sample Location: Well 299 - E25-37, Grout Treatment Facility

Ice Chest No.: PNL Ice Chest Field Logbook Page No.: Geologist Log

Remarks: Do not enter on tape. Send result to Khris Olsen, KG-96. Charge to M54090

Method of Shipment:

Sample Identification

1-500N-6-299-E25-37, 260'	111, 212, C69, 742

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
MA Chamness	Steve Teal	7/11/89 1600
Relinquished by:	Received by:	Date/Time:
Steve Teal	[illegible]	7-10-89 14:30
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

BC-1200-348 (7-88)

APPENDIX C

NONCONFORMANCE/SURVEILLANCE REPORTS

RL-404 (2-80)
(34-2098-404)

CONSTRUCTION NONCONFORMANCE REPORT

Page 1 of 1

(1A) Project, Location or WO	(1B) Title	(1C) NCR No.
W-017	Ground Water Monitoring Well	W-017-3 (KEH-2)

(1D) Requirements
(1E) Nonconformance Description

Requirements:

Per the requirements of Westinghouse Specification WHC-S-014, Ref. 3, Section 5.3.1, Sub Para. H, requires that 18' of cement grout be placed in the Annular Seal from the ground surface.

Nonconformance Description:

On well #299-E25-37, there was only 8' of cement grout placed in the Annular Seal, 2' of open hole from ground surface was left open.

(1J) Distribution

WHC
*C. E. Hodge
*Project Files
W. R. Tooseberry

KEH
*Originator
*A. I. Files
Central Doc Control
*Const Doc Control
*Engrg Doc Control
*Performance Assmnt
*W. H. Bodily
*J. F. Keller
*T. L. Walton

*Preliminary copy

(1F) Tag No.	(1G) Originator, Company and Date	(1H) Supervisor's Review
Blue #3	M. D. Evarts/jag 8-24-89 KEH/Acceptance Inspection	

(2A) Disposition

- [x] Accept As Is
- [ ] Conditional Accept
- [ ] Rework
- [ ] Repair
- [ ] Reject
- [ ] Other (Specify)

(2B) Instructions
(2C) Justification

Although the cement grout does not meet the specification requirements it does meet the RCRA requirements per WAC codes. (concrete to below the frost zone).

(2D) Additional Doc Required

- [ ] As-Builts
- [ ] DFC No. ____
- [ ] Other Specify ____
- [x] N/A

(2E) Contr. Approval (Signature and Date)	(2F) A-E Approval (Signature and Date)		(2G) Opr. Contr. Approval (Signature and Date)	(2H) Concurrence (Signature and Date)
Engr. 9-8-89	Design NA	Safety NA	Engr. 9-5-89	AI (ASME) NA
QA NA	QA NA	PE NA	QA 9-5-89	DOE NA

(2I)
- [x] Disposition Effected As Directed. NCR Closed
- [ ] Other (Specify)

Originator or Representative: M. D. Evarts — Date: 9-8-89

(4A) List of Documents Affected: N/A

(4B) Documents Revised — By ____ Date ____

Version 12/07/88

PNL QUALITY ASSURANCE DEPARTMENT
SURVEILLANCE REPORT

Surveillance Report No.: DRD-89-002

PLANNING

Project/Activity Title: E&ESC RCRA Groundwater Monitoring Projects
Client: DOE-RL/WHC
QA Plan No.: OHE-1 Project No.: various, see Summary Impact Level: II
Other applicable document: See also surveillance report DRD-89-001
Source of Requirement(s): PNL-MA-70 administrative procedure PAP-70-1701, Records System, §4.2.1.

PERFORMANCE

Date initiated: 01/19/89 Location: Sigma V Org. Code: D7D34,

Contacts: SP Luttrell, SS Teel, TJ Gilmore, RM Fruland, SH Hall

RESULTS

Main Statement: A number of the RCRA groundwater monitoring projects surveyed did not accurately identify the location of safety training records for project contributors.

Summary: A sample of projects, including the RCRA Separations Area, Solid Waste Landfill, NRDW Landfill, 183-H Area, Grout Treatment Facility, and 1324-N/1324-NA Groundwater Monitoring Projects, were evaluated to verify that the location of safety training records (specifically, those related to OSHA 40-hour training and annual 8-hour refreshers) identified in Project File Indexes. In the following cases the training records were not found in the location referenced in the PFI:

RCRA Separations Area Groundwater Monitoring Project
Solid Waste Landfill Groundwater Monitoring Project
NRDW Landfill Groundwater Monitoring Project
1324-N/1324-NA Groundwater Monitoring Projects

The project file in each case contained an indexed folder matching the PFI but the folder was found to be empty.

(continued on page 2)
Describe attachments: None.

CORRECTIVE ACTION

[ ] None Required [x] Complete
[ ] Reference Followup Corrective Action Document:

REPORTING

QAD Trend Codes: DC = B(1) CC = B Surv. Type: C

Distribution: Cogn. Mgr (Record Copy): RM Smith, QAD (w/o att.),
QE: DR Dahl, RM Fruland, SP Luttrell, [redacted] TJ Gilmore, SH Hall,

Surveillance performed by: DR Dahl Date: 1/23/89

Version 12/07/88

Surveillance DRD-89-002
Page 2 of 2

Summary: (continued)

In the following two cases the training records identified in the PFI were found but were incomplete when compared to PNL Laboratory Training Coordination records for the same personnel:

183-H Area Groundwater Monitoring Project
Grout Treatment Facility Groundwater Monitoring Project

Corrective action for all cases was completed on the spot by either a) inserting a memo/DSI/etc. to file in the appropriate folder indicating that safety training records may be found at PNL Laboratory Training Coordination (LTC), or b) red-lining the PFI to indicate that PNL LTC is the custodian of the safety training records and that the records may be found at RTL/Blue Room.

PNL QUALITY ASSURANCE DEPARTMENT
SURVEILLANCE REPORT

Surveillance Report No.: DRD89040

PLANNING

Project/Activity Title: W-017 Support Drilling, Grout Treatment Facility Groundwater Monitoring Project Well Installation
Client: WHC
QA Plan No.: OHE-18 Project No.: 12090 Impact Level: II
Other applicable document: None
Source of Requirement(s): PNL-MA-567, Procedure DO-1, Revision 0, Collection and Documentation of Borehole Samples and Well Construction Data

PERFORMANCE

Date initiated: 10/13/89 Location: Sigma V Org. Code: D7D34
Contacts: SS Teel

RESULTS

Main Statement: Minor documentation problems were identified as noted on the attached checklist. All corrective action has been completed.

Summary: *The purpose of this surveillance was to verify the implementation of procedure DO-1. Specifically, the documentation of all aspects of well construction. Specific areas examined and the corresponding results are presented in the surveillance checklist (Attachment A). The surveillance was performed by review of Grout Treatment Facility Groundwater Monitoring Project Drill Logs, As-Built Diagrams, and Well Completion/Inspection Reports on file in the project files. This documentation was examined for wells 299-E25-37 and 299-E25-38.*

Some minor documentation problems were noted but all were corrected.

Describe attachments: Surveillance Checklist (Attachment A)

CORRECTIVE ACTION

[ ] None Required [√] Complete
[ ] Reference Followup Corrective Action Document:

REPORTING

QAD Trend Codes: DC: C-T-4 CC: P NQA-1 Criteria: 11 Surv. Type: C

Distribution: Cogn Mgr/Task-Ldr (Record Copy): [redacted] MA Chamness, TJ Gilmore, EJ Jensen, SM Goodwin, MS Hanson, Process Quality Department

Surveillance performed by: DR Dahl DR Dahl *Date: 11/7/89*

SURVEILLANCE DRD89036 CHECKLIST

Topic: PNL-MA-567, DO-1, Rev. 0, Collection and Documentation of Borehole Samples and Well Construction Data
Location: Siama V *Date: 10/13/89* *Contacts: SS Teel*

Documents Reviewed:

Well Number	As-Built	Comol/Insp Report	Drill Log
299-E25-37	✓	✓	✓
299-E25-38	✓	✓	✓

Requirement	Yes	No	N/A	Comments
Was a Well Completion/Inspection Report prepared?	✓			
Is the Well Completion/Inspection Report up to date, legible, and complete?		✓		The dates that well protection was accepted were missing. Although the correct form was used, it incorrectly referenced an outdated procedure at the top. Both problems were corrected.
Was a Drill Log being prepared?	✓			
Is the Drill Log up to date and complete including:				
-geologist's name?	✓			
-date?	✓			
-rig type and identification and driller's name?	✓			
-well number and location?	✓			
-starting depth (D/W and D/B)?	✓			
-ending depth (D/W and D/B)?		✓		Missing on some pages. Corrected.
-time of measurements?	✓			
-computer number?			✓	
-project number?	✓			
-subcontract number?			✓	
-construction activities including,				
decontamination	✓			
casing totals	✓			
lubricants	✓			
drill method	✓			
water used	✓			
drill depths and rates	✓			
down time	✓			

SURVEILLANCE DRD89036 CHECKLIST

Requirement	*Yes*	*No*	*N/A*	*Comments*
Are pages of the Drill Log signed and dated each day by the Well-Site Geologist?		√		*Missing from 1 page. Corrected.*
Verify by review of the Drill Log that cutting samples were been taken at least every five feet. If not, does the Drill Log give an explanation why?		√		*The 299-E25-37 Drill Log didn't indicate that a cutting sample was taken at 240'. Project records indicate that the sample was indeed taken. The log was corrected.*
Were hazardous chemical samples taken at least every twenty feet?		√		*The 299-E25-3Z Drill Log didn't indicate that a hazardous chemical sample was taken at 40' as it should have. Project records indicate a sample was taken. The discrepancy was corrected*
Is the chain-of-custody form number referenced for hazardous chemical samples?		√		*The numbers were added and the problem corrected.*
Does the Drill Log note any significant changes in lithology? Verify that a sample was collected at that depth.	√			
Are the number and type of sample collected noted on the Drill Log after the sample description?	√			
Are sample descriptions included in the Drill Log for all sampled identified?	√*			
Was an As-Built Diagram prepared?	√			
Is the As-Built Diagram up to date and complete including:				
-location and type of samples?	√			
-geologic and hydrologic observations?	√			
-depth labeled in feet?	√			

** Several instances were noted in which percentages used in sample descriptions did not add to 100%. This was discussed with the project manager and the inconsistencies corrected.*

1. Date: 12/1/89 2. Location: Well 299-E25-38
3. Discovered By: SS Teel (Name) Organization: D7034 (where found)
4. QA Plan No.: OHE-18, Rev. 0 Project Title: W-017, Grout Treatment Facility
5. Requirement and Source of Requirement (Document Title, No., and Revision): Impact Level: II

QA Plan OHE-18, Rev. 0, Section 8, page 1: "The chain-of-custody of samples submitted for radionuclide and hazardous constituent analysis must be controlled in accordance with PNL-MA-567 procedure AD-4, Sediment Sample Chain of Custody."

PNL-MA-567, AD-4, Rev. 0, page 2: "Deliver the samples to the analytical laboratory and transfer custody of the samples to authorized laboratory personnel."

Reference Surveillance: N/A

6. Description of Deficiency:

The 40' and 60' special sediment samples to be analyzed for radionuclide and hazardous constituents from well 299-E25-38 were delivered to US Testing without a chain-of-custody form on approximately June 12, 1989.

Cause of Deficiency:

Miscommunication between sampling staff and personnel responsible for transferring special sediment samples to the appropriate analytical laboratory.

These samples were not intended to go to US Testing for analysis. However, the personnel transferring the samples inadvertently included them in a group of samples transported there. The personnel neglected to bring the appropriate chain of-custody form.

Deficiency Codes: I-2 Cause Codes: P
NCR Required? ✓ No ___ Yes, NCR No. ___
7. Originator's Signature: S.S. Teel Date: 12/5/89

8. Evaluation and Corrective Action:
a. Effect of Deficiency on Validity and Integrity of Project Results (Check One):
✓ None ___ Significant Effect
Explain: Although C-of-C wasn't documented/maintained, actual physical control of samples by PNL staff was maintained at all times until delivery to the lab. Sample container seals were intact upon delivery.
b. If Significant Effect, Location of Project Results Effected: N/A

c. Corrective Action to Correct Deficiency:

In this specific case, analytical results were for indication only and were not entered into the Hanford Ground Water Database. Also, analytical results were not adversely impacted. Therefore, remedial corrective action is not deemed to be necessary.
d. Corrective Action to Preclude Recurrence:

This appears to be an isolated case caused by a miscommunication. Implementation of formal corrective action measures are not felt to be necessary.

e. Contact Sponsor: ___ Yes ✓ No
If Yes:
Contacted ___ (Name) on ___ (Date) by ___ (Name)
Method: ___
Sponsors Response:

IR/UOR Required? ✓ No ___ Yes, No. ___
9. Cog Mgr Signature S.S. Teel Date 12/5/89
10. QE Signature DR Dahl Date 12/5/89

11. Closeout/Corrective Action Complete: ✓ Yes ___ No Signature DR Dahl Date 12/5/89
Comments:

Distribution: [redacted], GV Last, MS Hanson, DR Dahl, PQD

THIS PAGE INTENTIONALLY
LEFT BLANK

APPENDIX D

WELL DEVELOPMENT LOGS, ANALYSES RESULTS OF WATER SAMPLES COLLECTED BEFORE AND DURING DEVELOPMENT, AND PUMP INSTALLATION REPORTS

PNL TECHNICAL PROCEDURE

WELL DEVELOPMENT LOG

Well Number 299-E25-37
Location Grout Treatment Facility
Procedure PNL-MA-567, GC-7, Rev. 0

Start Date/Time 9/18 0955
End Date/Time
Page 1 of

Well Depth 280.76 Pump Depth (Intake) ≈ 280' Initial Water Level 268.0

Date	Time	Flow Rate	Turbidity	Person Meas.	Person Rec.	Comments
9/18/89	0800					Calibrated Turbidimeter w/ 40 NTU standard
	1000	5	>100	JVB	JVB	Changed Turbidimeter S/N 88D3336 calibrated 8.00 NTU standard
	1010	5	12	JVB	JVB	
	1025	4.8	2.95	JVB	JVB	recalibrated Turbidimeter SN 88D3336 to 0.9 NTU standard
	1055	4.8	1.4	JVB	JVB	will take WST sample then increased flow
	1107	10	8.7	JVB	—	
	1120	9.5	1.1	JVB	—	

Note: Unless otherwise noted, the following units are assumed:
Flow rate - gpm
Turbidity - NTU
Water Level - ft

Equipment:
Make: Hatch Turbidimeter
Model: 16800
Serial #: 88D03409

FIGURE 1. Well Development Log Form

Procedure No.	Revision No.	Effective Date	Page
GC-7	0		2 of 6

PNL TECHNICAL PROCEDURE

WELL DEVELOPMENT LOG

Well Number E25-38
Location Grout
Procedure PNL-MA-567, GC-7, Rev. 0

Start Date/Time 9/18/89 1350/1516
End Date/Time 9/18/89 1455/1536
Page 1 of 1

Well Depth 283.69 Pump Depth (Intake) 280.48 Initial Water Level 267.90
7½ HP Pump

Date	Time	Flow Rate	Turbidity	Person Meas.	Person Rec.	Comments
9/18				JJB	JJB	Kaiser noted to check pump had difficulty starting — very
				JJB	JJB	muddy pump worked on + off pump ~ 7 gal JJB
	1400			SST	SST	Calibrated Turbidimeter w/ 9.0 NTU standard
	1405	8.0	2.9			
	1411	8.0				Re-calibrated w/ 9.0 NTU standard
	1405	8.0	2.0			
	1413	8.0	0.5			
	1429	14.0	0.7			
	1438	24.0	1.40			

Note: Unless otherwise noted, the following units are assumed:
Flow rate - gpm
Turbidity - NTU
Water Level - ft

Equipment:
Make: Hach Turbidimeter
Model: 16800
Serial #: 880903409

FIGURE 1. Well Development Log Form

Procedure No.	Revision No.	Effective Date	Page
GC-7	0		2 of 6

RESULTS OF PRE-DEVELOPMENT GROUND-WATER SAMPLE ANALYSES
FROM WELL 299-E25-37 AT THE GROUT FACILITY (September 18, 1989, 1045)

GROUP	DESCRIPTION	CODE	NAME	RESULT
1 METALS				
728	ICP Metals			
		A01	Beryllium	<DL
		A03	Strontium	1.19E-02 1.48E-01
		A04	Zinc	4.23E-02 6.66E-01
		A05	Calcium	2.28E-04 2.93E-03
		A06	Barium	2.70E-01 3.71E-00
		A07	Cadmium	<DL
		A08	Chromium	<DL
		A10	Silver	<DL
		A11	Sodium	1.59E-04 1.98E-03
		A12	Nickel	<DL
		A13	Copper	2.02E-02 2.49E-01
		A14	Vanadium	3.38E-01 5.60E-00
		A15	Antimony	<DL
		A16	Aluminum	<DL
		A17	Manganese	7.00E-00 1.77E-00
		A18	Potassium	5.05E-03 5.79E-02
		A19	Iron	1.40E-02 1.77E-01
		A50	Magnesium	8.13E-03 9.98E-02
		P01	Boron	1.50E-01 4.09E-00
		P02	Cobalt	<DL
		P03	Lithium	<DL
		P04	Molybdenum	<DL
		P05	Silicon	1.70E-04 2.38E-03
		P06	Tin	<DL
		P07	Titanium	<DL
		P08	Zirconium	<DL
741	Filtered ICP Metals			
		H18	Zinc	2.00E-02 3.35E-01
		H19	Calcium	2.10E-04 2.78E-03
		H20	Barium	2.50E-01 3.63E-00
		H21	Cadium	<DL
		H22	Chromium	<DL
		H23	Silver	<DL
		H24	Sodium	1.42E-04 1.50E-03
		H25	Nickel	<DL
		H26	Copper	<DL
		H27	Vanadium	3.00E-01 5.31E-00
		H28	Aluminum	<DL
		H29	Manganese	<DL
		H30	Potassium	4.77E-03 5.47E-02
		H31	Iron	<DL
		H32	Magnesium	5.84E-03 9.51E-02
		H33	Beryllium	<DL
		H35	Strontium	1.13E-02 1.41E-01
		H36	Antimony	<DL
		H86	Boron	2.30E-01 4.92E-00
		H87	Cobalt	<DL
		H88	Lithium	<DL
		H89	Molybdenum	<DL
		H90	Silicon	1.67E-04 2.74E-03
		H91	Tin	<DL
		H92	Titanium	<DL
		H93	Zirconium	<DL

GROUP	DESCRIPTION	CODE	NAME	RESULT
A26	Arsenic			
		A26	Arsenic	8.00E-00 2.95E-00
A22	Selenium			
		A22	Selenium	<DL
A51	Lead			
		A51	Lead	2.10E-01 4.84E-00
H37	Filtered Arsenic			
		H37	Arsenic	6.00E-00 2.57E-00
H39	Filtered Selenium			
		H39	Selenium	<DL
H41	Filtered Lead			
		H41	Lead	7.00E-00 2.83E-00
2 PESTICIDES & HERBICIDES				
728	Pesticides			
		A33	Endrin	<DL
		A34	Methoxychlor	<DL
		A35	Toxaphene	<DL
		A36	Alpha-BHC	<DL
		A37	Beta-BHC	<DL
		A38	Gamma-BHC	<DL
		A39	Delta-BHC	<DL
737	Herbicides (Enhanced)			
		H13	2,4-D	<DL
		H14	2,4,5-TP silvex	<DL
		H15	2,4,5-T	<DL
3 RAD ANALYSES				
998	Gamma scan			
		#18	CO-60	<DL
		#24	CS-137	<DL
		#34	RU-106	<DL
108	Tritium			
		108	TRITIUM	3.21E-03 pci/l
111	Gross Beta			
		111	BETA	7.22E-00 pci/l
112	Alpha, High DL			
		112	ALPHAHI	<DL

RESULTS OF PRE-DEVELOPMENT GROUND-WATER SAMPLE ANALYSES FROM WELL 299-E25-37 AT THE GROUT FACILITY (September 18, 1989, 1300)

GROUP	DESCRIPTION	CODE	NAME	RESULT
1 METALS				
726	ICP Metals			
		A01	Beryllium	7.00E+00 1.57E+00
		A03	Strontium	1.10E+02 1.37E+01
		A04	Zinc	2.14E+02 3.44E+01
		A05	Calcium	2.12E+04 2.73E+03
		A06	Barium	2.70E+01 3.71E+00
		A07	Cadmium	<DL
		A08	Chromium	<DL
		A10	Silver	<DL
		A11	Sodium	1.39E+04 1.58E+03
		A12	Nickel	<DL
		A13	Copper	<DL
		A14	Vanadium	3.20E+01 5.50E+00
		A15	Antimony	<DL
		A16	Aluminum	<DL
		A17	Manganese	1.00E+01 1.94E+00
		A18	Potassium	4.90E+03 5.72E+02
		A19	Iron	1.02E+02 1.44E+01
		A50	Magnesium	5.02E+03 9.47E+02
		P01	Boron	<DL
		P02	Cobalt	<DL
		P03	Lithium	<DL
		P04	Molybdenum	<DL
		P05	Silicon	1.60E+04 2.71E+03
		P06	Tin	<DL
		P07	Titanium	<DL
		P08	Zirconium	<DL
741	Filtered ICP Metals			
		H18	Zinc	7.70E+01 1.34E+01
		H19	Calcium	2.00E+04 2.54E+03
		H20	Barium	2.40E+01 3.40E+00
		H21	Cadium	<DL
		H22	Chromium	1.90E+01 5.00E+00
		H23	Silver	<DL
		H24	Sodium	1.31E+04 1.47E+03
		H25	Nickel	<DL
		H26	Copper	<DL
		H27	Vanadium	2.50E+01 4.84E+00
		H28	Aluminum	<DL
		H29	Manganese	<DL
		H30	Potassium	4.51E+03 5.17E+02
		H31	Iron	3.90E+01 9.90E+00
		H32	Magnesium	5.50E+03 9.00E+02
		H33	Beryllium	<DL
		H35	Strontium	1.00E+02 1.35E+01
		H36	Antimony	<DL
		H50	Boron	1.30E+01 3.90E+00
		H87	Cobalt	<DL
		H88	Lithium	<DL
		H89	Molybdenum	<DL
		H90	Silicon	1.51E+04 2.03E+03
		H91	Tin	<DL
		H92	Titanium	<DL
		H93	Zirconium	<DL

GROUP	DESCRIPTION	CODE	NAME	RESULT
A20	Arsenic			
		A20	Arsenic	7.90E-00 2.81E-00
A22	Selenium			
		A22	Selenium	<DL
A51	Lead			
		A51	Lead	1.90E-01 4.54E-00
H37	Filtered Arsenic			
		H37	Arsenic	5.90E-00 2.53E-00
H39	Filtered Selenium			
		H39	Selenium	<DL
H41	Filtered Lead			
		H41	Lead	<DL
2 MISC.				
H42	TOX			
		H42	Total Organic Halogen, LDL	<DL

RESULTS OF PRE-DEVELOPMENT GROUND-WATER SAMPLE ANALYSES FROM WELL 299-E25-38 AT THE GROUT FACILITY (September 18, 1989, 1422)

GROUP	DESCRIPTION	CODE	NAME	RESULT
1 METALS				
726	ICP Metals			
		A01	Beryllium	<DL
		A03	Strontium	1.85E-02 1.31E-01
		A04	Zinc	1.37E-02 2.20E-01
		A05	Calcium	1.95E-04 2.51E-03
		A06	Barium	2.80E-01 3.03E-00
		A07	Cadmium	<DL
		A08	Chromium	<DL
		A10	Silver	<DL
		A11	Sodium	1.41E-04 1.59E-03
		A12	Nickel	<DL
		A13	Copper	2.80E-01 4.73E-00
		A14	Vanadium	3.70E-01 5.99E-00
		A15	Antimony	<DL
		A16	Aluminum	<DL
		A17	Manganese	<DL
		A18	Potassium	4.72E-03 5.42E-02
		A19	Iron	3.80E-01 9.50E-00
		A50	Magnesium	5.20E-03 8.50E-02
		P01	Boron	1.20E-01 3.80E-00
		P02	Cobalt	<DL
		P03	Lithium	<DL
		P04	Molybdenum	<DL
		P05	Silicon	1.70E-04 2.80E-03
		P06	Tin	<DL
		P07	Titanium	<DL
		P08	Zirconium	<DL
741	Filtered ICP Metals			
		H18	Zinc	4.30E-01 8.17E-00
		H19	Calcium	1.84E-04 2.30E-03
		H20	Barium	1.70E-01 2.91E-00
		H21	Cadium	<DL
		H22	Chromium	<DL
		H23	Silver	<DL
		H24	Sodium	1.33E-04 1.50E-03
		H25	Nickel	<DL
		H26	Copper	<DL
		H27	Vanadium	2.90E-01 5.22E-00
		H28	Aluminum	<DL
		H29	Manganese	7.00E-00 1.77E-00
		H30	Potassium	4.33E-03 4.97E-02
		H31	Iron	<DL
		H32	Magnesium	4.91E-03 8.00E-02
		H33	Beryllium	1.40E-01 2.37E-00
		H35	Strontium	9.90E-01 1.24E-01
		H36	Antimony	<DL
		H86	Boron	<DL
		H87	Cobalt	<DL
		H88	Lithium	<DL
		H89	Molybdenum	<DL
		H90	Silicon	1.55E-04 2.70E-03
		H91	Tin	<DL
		H92	Titanium	<DL
		H93	Zirconium	<DL

GROUP	DESCRIPTION	CODE	NAME	RESULT
A20	Arsenic			
		A20	Arsenic	1.30E-01 3.50E-00
A22	Selenium			
		A22	Selenium	<DL
A51	Lead			
		A51	Lead	1.50E-01 3.35E-00
H37	Filtered Arsenic			
		H37	Arsenic	1.10E-01 3.37E-00
H39	Filtered Selenium			
		H39	Selenium	<DL
H41	Filtered Lead			
		H41	Lead	5.00E-00 2.35E-00
2 MISC.				
H42	TOX			
		H42	Total Organic Halogen, LDL	<DL

RESULTS OF PRE-DEVELOPMENT GROUND-WATER SAMPLE ANALYSES FROM WELL 299-E25-38 AT THE GROUT FACILITY (September 18, 1989, 1525)

GROUP	DESCRIPTION	CODE	NAME	RESULT
1 METALS				
728	ICP Metals			
		A01	Beryllium	<DL
		A03	Strontium	9.86E-01 1.23E-01
		A04	Zinc	8.18E-01 1.48E-01
		A05	Calcium	1.81E-04 2.33E-03
		A06	Barium	2.18E-01 3.22E-00
		A07	Cadmium	<DL
		A08	Chromium	<DL
		A10	Silver	<DL
		A11	Sodium	1.24E-04 1.40E-03
		A12	Nickel	<DL
		A13	Copper	<DL
		A14	Vanadium	3.70E-01 5.99E-00
		A15	Antimony	<DL
		A16	Aluminum	<DL
		A17	Manganese	5.30E-00 1.57E-00
		A18	Potassium	4.35E-03 5.00E-02
		A19	Iron	5.40E-01 1.00E-01
		A50	Magnesium	4.91E-03 7.99E-02
		P01	Boron	1.50E-01 4.20E-00
		P02	Cobalt	<DL
		P03	Lithium	<DL
		P04	Molybdenum	<DL
		P05	Silicon	1.70E-04 2.79E-03
		P06	Tin	<DL
		P07	Titanium	<DL
		P08	Zirconium	<DL
741	Filtered ICP Metals			
		H18	Zinc	4.30E-01 8.17E-00
		H19	Calcium	1.80E-04 2.42E-03
		H20	Barium	2.20E-01 3.30E-00
		H21	Cadium	<DL
		H22	Chromium	<DL
		H23	Silver	<DL
		H24	Sodium	1.31E-04 1.47E-03
		H25	Nickel	<DL
		H26	Copper	1.10E-01 2.90E-00
		H27	Vanadium	4.20E-01 5.49E-00
		H28	Aluminum	<DL
		H29	Manganese	<DL
		H30	Potassium	4.50E-03 5.20E-02
		H31	Iron	<DL
		H32	Magnesium	5.12E-03 8.34E-02
		H33	Beryllium	8.00E-00 1.40E-00
		H35	Strontium	1.04E-02 1.30E-01
		H36	Antimony	<DL
		H00	Boron	1.80E-01 4.40E-00
		H07	Cobalt	<DL
		H08	Lithium	<DL
		H09	Molybdenum	<DL
		H90	Silicon	1.79E-04 2.93E-03
		H91	Tin	<DL
		H92	Titanium	<DL
		H93	Zirconium	<DL

GROUP	DESCRIPTION	CODE	NAME	RESULT
A20	Arsenic			
		A20	Arsenic	1.20E-01 3.52E-00
A22	Selenium			
		A22	Selenium	<DL
A51	Lead			
		A51	Lead	5.00E-00 2.53E-00
H37	Filtered Arsenic			
		H37	Arsenic	1.10E-01 3.37E-00
H39	Filtered Selenium			
		H39	Selenium	<DL
H41	Filtered Lead			
		H41	Lead	<DL
2 MISC.				
H42	TOX			
		H42	Total Organic Halogen, LDL	<DL

Constituents Exceeding Primary or Secondary Maximum Contaminant Levels

Constituent	Result	Analytical Uncertainty	MCL
Manganese	16,600	± 1680	50
Iron	10,600	± 1050	300
Manganese (filtered)	10,400	± 1050	50
Iron (filtered)	6710	± 681	300
pH	8.5	± 0.1	8.5
Turbidity	200	± 31.4 ntu	1 ntu

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

SST 9/15/89

CHAIN OF CUSTODY

890918W1
JUB 9/18/89

Company Contact: ~~Jane Borghese~~ JUB 9/18/89 | Steve Teel

Telephone: 376-8334 JUB 9/18/89

Samples Collected by: Jane V. Borghese Date: 9/18/89 Time: 1045

Sample Location: Well # 2-E25-37

Ice Chest No.: Field Logbook Page No.: —

Remarks: Do not report results on tape: Send results to Jane Borghese (K6-96) Charge to MS0289

Method of Shipment: Government Vehicle

Sample Identification

99-E25-37

250ml G - H60	~~(2) 250ml G - H62~~ MRK 8-31-89
500ml P - H17	1LP - 111, 112
250ml P - 207, 088	4LG - 728
(2) 250ml G - H42	1LP - 998, ~~721~~ MRK 8-31-89
250ml G - C69	125ml P - 108
1LP - 726, A20, A22, A51	
500ml G - A21	
1LP - 741, H37, H39, H41 (F)	
500ml G - H38 (F)	
125ml P - 742	
(2) 40ml G - 731	
4LG - 737	

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Jane V Borghese	Steve Teel	9/18/89 1600
Steve Teel	[illegible]	9/18/89 16:30

SC-1200-345 (7-85)

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

890918W2

Company Contact: Steve Teel (K6-96) Telephone: 376-0712

Samples Collected by: JV Borghese Date: 9/18/89 Time: 1300

Sample Location: Well # 2-E25-37

Ice Chest No.: Field Logbook Page No.:

Remarks: Do not report on tape send results to Steve Teel (K6-
Charge to M50289

Method of Shipment: Goverment Vehicle

Sample Identification

299-E25-37
" -(2) 250ml G - H42
" - 1LPWC - 726, A20, A22, A51
" - 1LPWC - 741, H37, H39, H41

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Jane V Borghese	Steve Teel	9/18/89 1600
Steve Teel	[illegible]	9/18/89 18:30

SC-1200-348 (7-88)

RAPID

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

8906294W

Company Contact: Jane Borghese Telephone: 376-8334

Samples Collected by: JP McDonald Date: 6/29/89 Time: 1250-1405

Sample Location: Well # 2-E25-38

Ice Chest No.: Field Logbook Page No.:

Remarks: Do not ~~send~~ Report results on tape; send results to Jane Borghese (K6-96)

Method of Shipment: Government Vehicle

Sample Identification

250ml G - H60	(2) 250ml G - H62
500ml P - H17	1LP - 111, 112
250ml P - 207, 088	4LG - 728
(2) 250ml G - H42	1LP - 997, 121
250ml G - C69	125ml P - 108
1LP - 726, A20, A22, A51	
500ml G - A21	
1LP - 741, H37, H39, H41 (F)	
500ml G - H38 (F)	
125ml P - 742	
(2) 40ml G - 731	
4LG - 737	

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
[signature]	[signature]	6/29/89 11:15
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

BC-1200-345 (7-85)

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

890918W3

Company Contact: Steve Teel Telephone: 376-0712

Samples Collected by: S. S. Teel Date: 9/18/89 Time: 1422

Sample Location: Well # 2-E25-38

Ice Chest No.: IWSS #4 Field Logbook Page No.:

Remarks: Do not report on tape. Send results to Steve Teel (K6-96) Charge to: ~~AA2M50289~~ MRY 9-18-89

Method of Shipment:

Sample Identification

2-E25-38 — (2) 250 mlG — H42
" — 1LP — 741, H37, H39, H41
" — 1LP — 726, A20, A22, A51

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Steve Teel	W.T. Guy T. Robertson	9/18/89 16:30
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

BC-1200-346 (7-88)

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington 99352

CHAIN OF CUSTODY

390918 W4

Company Contact: Steve Teel Telephone: 376-0712

Samples Collected by: S.S. Teel Date: 9/18/89 Time: 1525

Sample Location: Well # 2-E25-38

Ice Chest No.: IWSS #4 Field Logbook Page No.: ——

Remarks: Do not reprint on Tape. Send results to Steve Teel (K6-96) Charge to M50299

Method of Shipment:

Sample Identification

2-E25-38 -(2) 250 ml G - H42
" - 1LP - 741, H37, H39, H41
" - 1LP - 726, A20, A22, A51

CHAIN OF POSSESSION

Relinquished by:	Received by:	Date/Time:
Steve Teel	W.J. Buck Ostenberg	9/18/89 16:30
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time

SC-1200-345 (7-88)

SAMPLING PUMP INSTALLATION FORM

Project: W-017 Grout Facility Well Number: E25-37

Pump Type: Positive Displacement Piston Pump Model: Hydrostar HS-8001

Date Installed: 10/13/89 Installed by: Darrell Ludke, KEH driller

Depth-to-Water: 267.98' 267.98' below TOC (Steel tape # L300-05) Depth-to-Bottom: 283.61' below TOC

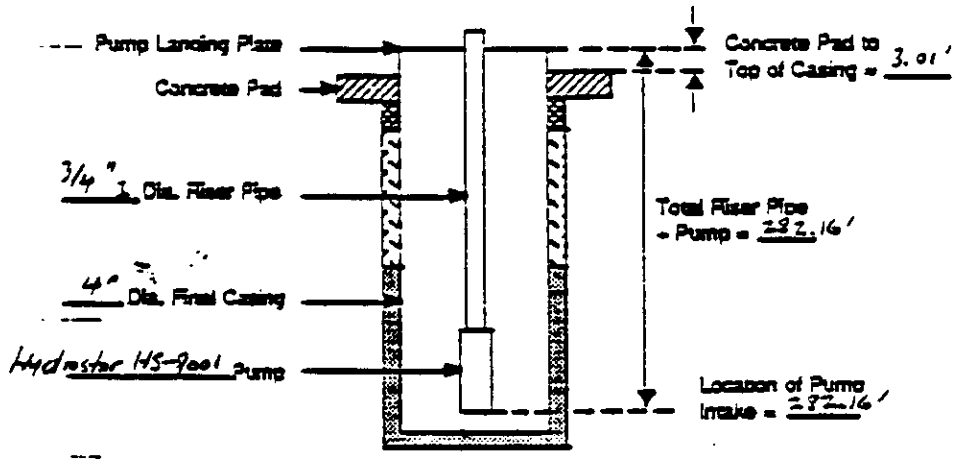
Reported Depth-to-Bottom: 279.63 Date: 8/14/89

Screened Interval: 258.35' to 279.35' below ground surface Saturated Screened Interval: 267.98' to 282.31' below TOC

Pump Riser Pipe Description: 28 lengths of 10' riser pipe + pump (2.25'). Tagged bottom with pump and pull back riser pipe 1.45' so that top of last 10' length is flush with top of casing.

Additional Comments: All threads are taped with teflon tape and all couplings are new. Driller wore clean cotton gloves. All pump installations materials are new (i.e. packaged in plastic wrap in containers).

Sketch of Pump Installation:



Completed By: Darrell Nuccomis Date: 10/13/89

SAMPLING PUMP INSTALLATION FORM

Project: W-017 Grout Treatment Facility Well Number: 299-E25-28

Pump Type: Positive displacement piston Pump Model: Hydrostar HS-8001

Date Installed: 12 October 1989 Installed by: Darrell Ludke, Gary Ludin (KEH)

Depth-to-Water: 267.99' below toc (6200-m) Depth-to-Bottom: 283.01' below toc (6500-m)

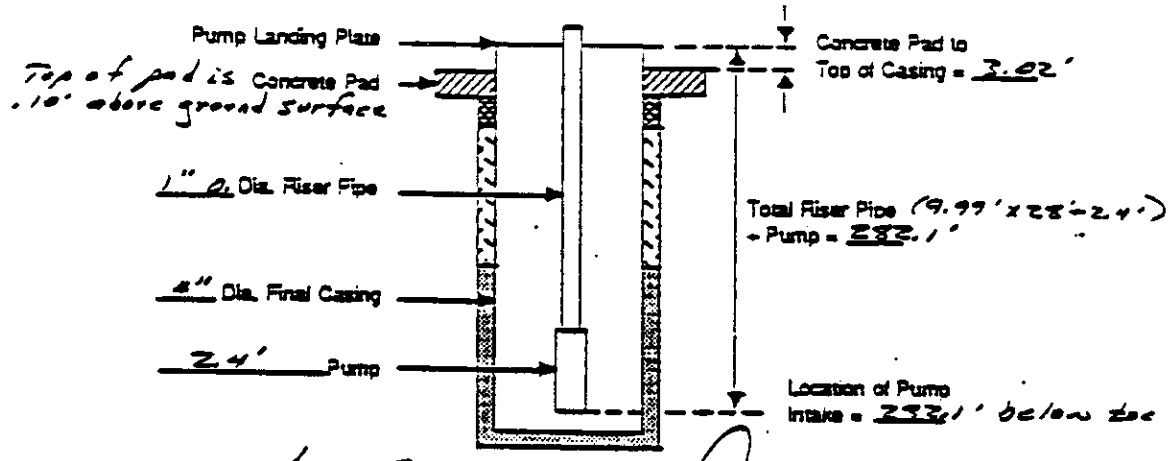
Reported Depth-to-Bottom: Drill depth: 283' Completed depth: 279.63' below ground surface Date: 6/7/89

Screened Interval: 279.63' - 258.53' below ground surface Saturated Screened Interval: 264.87' - 279.63' (267.99' - 3.12') below ground surface

Pump Riser Pipe Description: 28 sections of 10' riser pipe and pump (pump length = 2.4 ft.).

Additional Comments: Riser pipes were kept above ground surface on the pump setting rig and in cardboard cartons lined with plastic. New riser pipe couplings were installed by the drillers and all joints were wrapped with teflon tape. Landing plate was installed correctly.

Sketch of Pump Installation:



Completed By: [signature] Date: 10/17/89

PNL MA-567 DO-3 Rev 0.

A-1850-008 (4/89)
S8902068.1

Westinghouse Hanford Company

NONCONFORMANCE REPORT

1. Page 1 of 9

2. Preprinted No. 050010

QA Log No. EGA-92-109

3. P. O., W. O., or Job Control No.	4. System/End Use	5. Item/Material	6. Dwg./Spec./Other No.	7. Rev.
N/A	RCRA Groundwater Monitoring	Groundwater Monitoring Well	WHC-S-014	7

8. Program/Project/Other: Tank Waste Remediation / B-714 Project and RCRA Groundwater Monitoring

9. Safety Class: 3

10. ASME Code Items: ☐ Yes ☒ No (If yes, notify authorized inspector)

11. Supplier Name/Address: David A. Mowat (General Contractor - Project B-714) Kaiser Engineers Hanford (Construction Mgr)

12. Notification of Potential Occurence Required: ☐ Yes ☒ No

13. Code: Lot/Heat/Serial	14. Lot Size	15. Sample	16. Qty. Acc.	17. Inspection Criteria
Well # 299-E25-37, 299-E25-31	TWO	TWO	0	☐ Dwg. ☒ Spec. ☐ Insp. Plan ☐ Other WHC-S-014 rev 7

18. Item	19. Description of Nonconformance (list serial no. where applicable)	22. Disposition, Justification, and Instructions
1,2	Required: Groundwater monitoring well Surface protection includes 4'x4'x6" Concrete Pad (bearing on soil) installed around the well, extending approx 3' down the borehole to the top of the grout annular seal.	1,2 Rework per attached DSI KD Reynolds to W.R Thackaberry 11/30/92
	Four metal posts installed around the well	
1.	299 E25-37, Actual: The 4 metal posts are gone. The surface pad has been completely undermined due to an adjacent utility trench excavation operation. The contact between the concrete and the grout annular seal has spalled and the bottom of the 6" protective casing as well as the 4" casing is visible.	
	The 6" protective casing as well as the surface pad may have subsided rendering the existing survey data invalid.	
	The concrete surface pad has been damaged (possibly due to heavy equipment impacts). The condition of the 4" stainless steel schedule 5 casing is unknown, nor is the condition of the dedicated sampling pump known.	
2	299-E25-31 The surface pad has been undermined and two of the metal posts are gone.	

20. Originator's Signature: W.R. Thackaberry — Date: 11-24-92

21. Cognizant QA Manager's Signature: S.J. Smith — Date: 11/24/92

23. Design Document Change Required? ☒ Yes, Doc. No. WHC-MR-0203 ☐ No

24. Corrective Action Required? ☐ Yes, No. ☒ No

Disp. App.

25. Cognizant Engineer	Date	26. Technical Rep.	Date	Signature/Org.	Date
TW STAEHR	4-5-93	KD Reynolds	4/2/93		

QA Engineer	Date	Signature/Org.	Date	Signature/Org.	Date
WR THACKABERRY	4-2-93				

Close

27. ~~EGN 172203 approved~~ 10/6/93

Accept 2 Reject 0 Follow on NCR

QA/C Personnel: W.R. Thackaberry — Date: 8-27-93

A-7310-104 (10/91)

DON'T SAY IT --- *Write it!*

DATE: 11/30/92
FROM: KD REYNOLDS

TO: W R Thackaberry

SUBJECT: Plan for Disposition of 299-E25-37 and 299-E25-31

The following are the basic steps I would propose to bring the two cited wells back into compliance.

299-E25-37

- All remediation actions will be verified by Geoscience field personnel.
- The total depth and integrity of the well will be checked by visual examination. The Hydrostar pump will be removed to facilitate verification of screen integrity.
- Cleanliness of the hydrostar pump and riser pipe will be maintained by handling, wrapping and storage in accordance with EII 6.4.
- All replacement materials and work performed will comply to WHC-S-014.
- All loose material and damaged concrete will be removed from the surface seal and surface pad area. A splitter or chipping hammer will be used for removal of the cement seals and pad to preclude any further possibility of damaging the permenent casing.
- A replacement for the portion of the seal removed and for the entire surface pad will be placed. New posts and a brass survey marker will be placed.
- The completed well will be resurveyed, relabled and the hydrostar reinstalled.
- The data package for the well will have an ECN filed reflecting this reconstruction (as per agreement with WDOE).

699-E25-31

- All remediation actions will be verified by Geoscience field personnel.
- The total depth and integrity of the well will be checked by visual examination. If observation indicates the possibility that the Hydrostar or the screen interval is damaged the pump will be removed.
- Cleanliness of the hydrostar pump and riser pipe will be maintained by handling, wrapping and storage in accordance with EII 6.4.
- All replacement materials and work performed will comply to WHC -S-014.
- All loose material and damaged concrete will be removed from the surface pad area and the surface seal. A splitter or chipping hammer will be used for the removal of the cement seals and pad to preclude any further possibility of damaging the permenent casing.
- A replacement for the portion of the seal removed and for the entire surface pad will be placed.
- A new brass survey marker and the missing posts will be placed.
- The completed well will be resurveyed, relabled and the hydrostar

reinstalled.

- The data package for the well will have an ECN filed reflecting this reconstruction (as per agreement with WDOE).

NOTE: All work performed on theses wells will be in compliance with WAC 173-160 and W-014, REV 7 specifications. •• If damaged screens are encountered the disposition of the NCR will be reviewed and the appropriate adjustments made.

KAISER ENGINEERS HANFORD	SURVEY DATA REPORT	Request No. —9 3 2 —1 2 2
Project/W.O. No. B-714	Title 200E RCRA WELLS SURVEY	File No. 2 9 9 —E 2 5
TH Job No. 3188	Prepared By V. Coyne	Date 3/25/93	Reviewer V. Coyne 1 1

DESCRIPTION OF WORK	ACCEPTABILITY (Within Plan Tolerance)	DISTRIBUTION	
Vertical survey of wells 299-E25-31, 299-E25-37	Yes ☐	Survey File	OR
	No ☐	Field Project File	1
	NA ☒	JB Geiger	1
	TBD by Requestor ☐	DC Weekes	1
		JT Rieger	1
		MA Chamness	1

SURVEY RESULTS AND COMMENTS

VERTICAL DATUM NGVD-29 (Feet)

WELL NO.	TOP OF BRASS CAP IN CONC.	TOP OF PUMP BASE PLATE N. SIDE	TOP OF CASING N. SIDE
299-E25-31	671.66	674.66	674.64
299-E25-37	670.70	673.66	673.64

Vertical Control Monuments used to establish elevations on wells were part of a vertical network with misclosure of all run sections less than 8mm K. Holding USC & GS benchmarks J-317, K-317 and L-317.

KEH-159.1 (6-84)

THIS PAGE INTENTIONALLY
LEFT BLANK