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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT

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2. To: (Receiving Organization) Those Listed		3. From: (Originating Organization) M.J. Hartman, Geosciences		4. Related EDT No.: N/A													
5. Proj./Prog./Dept./Div.: Environmental		6. Cog. Engr.: K.D. Reynolds		7. Purchase Order No.: N/A													
8. Originator Remarks: This document is being distributed for review of the draft and subsequent distribution of the completed package. Address comments on the draft to M.J. Hartman, H6-06.				9. Equip./Component No.: N/A													
				10. System/Bldg./Facility: N/A													
11. Receiver Remarks: <div style="text-align: center;">JUN 06 1994 OSTI</div>				12. Major Assm. Dwg. No.: N/A													
				13. Permit/Permit Application No.: N/A													
				14. Required Response Date: 16 February 1994													
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-082		0	Borehole Completion Data Package for Well 199-N-81	3Q 179H 2/23/94	4/1	1										
16. KEY																	
Impact Level (F)		Reason for Transmittal (G)			Disposition (H) & (I)												
1, 2, 3, or 4 (see MRP 5.43)		1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)			1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged												
(G)	(H)	17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)						(G)	(H)								
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.						
1	1	Cog. Eng. K.D. Reynolds	KDR	3/24/94	H6-06	EPIC (2)		H6-08		3							
1	1	Cog. Mgr. R.L. Jackson	R.L. Jackson	3/28/94	H6-06	Central Files (2)		L8-04		3							
1	1	QA W.R. Thackaberry	W.R. Thackaberry	3-31-94	H4-12												
		Safety N/A															
1	1	Env. B.A. Williams	B.A. Williams	3-31-94	H6-06												
4	5	L.C. Swanson	L.C. Swanson	3/24/94	H6-06												
18. M.J. Hartman Signature of EDT Originator Date 24 Mar 94												19. _____ Authorized Representative for Receiving Organization Date		20. R.L. Jackson Cognizant/Project Engineer's Manager Date 3/31/94		21. DOE APPROVAL (if required) Ltr. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	

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

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BD-7400-172-1 (07/91)

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			ID Number (include revision, volume, etc.) WHC-SD-EN-DP-082, Rev. 0		
			List attachments.		
			Date Release Required <div style="text-align: center;">April 6, 1994</div>		
Title: Borehole Completion Data Package for Well 199-N-81				Unclassified Category UC- N/A	Impact Level Q
New or novel (patentable) subject matter? ☒ 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? ☒ No ☐ Yes (Identify)		
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Review Required per WHC-CM-3-4		Yes	No	Reviewer - Signature Indicates Approval	
				Name (printed) Signature Date	
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Other Program/Project	☐	☒			
Information conforms to all applicable requirements.				The above information is certified to be correct.	
References Available to Intended Audience ☒ Yes ☐ No Transmit to DOE-HQ/Office of Scientific and Technical Information ☒ Yes ☐ No Author/Requester (Printed/Signature) Date M. J. Hartman 3/31/94				INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP Stamp is required before release. Release is contingent upon resolution of mandatory comments. <div style="text-align: center;"> </div>	
Intended Audience ☐ Internal ☐ Sponsor ☒ External Responsible Manager (Printed/Signature) Date R. L. Jackson 3/31/94				Date Cancelled Date Disapproved	

SUPPORTING DOCUMENT		1. Total Pages 79
2. Title Borehole Completion Data Package for Well 199-N-81		3. Number WHC-SD-EN-DP-082
		4. Rev N. 0
5. Key Words Borehole completion, Monitoring well, 100-N-Area, Groundwater monitoring		6. Author Name: M. J. Hartman <i>(A. Stone for)</i> Signature Organization/Charge Code 81235/R4G41
APPROVED FOR PUBLIC RELEASE <i>5/5/94 D. Soler</i>		
7. Abstract Well 199-N-81 was drilled in 1993 as a RCRA groundwater monitoring for the 1324-N network. The well is completed at the top of the uppermost aquifer, in the Ringold Formation. This data package includes information on drilling, construction, development, and aquifer testing. Hartman, M. J., 1994, <i>Borehole Completion Data Package for Well 199-N-81</i> , WHC-SD-EN-DP-082, Rev. 0, Westinghouse Hanford Company, Richland, Washington.		
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9. Impact Level Q		

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1.0 INTRODUCTION

One new groundwater monitoring well was installed in the 100-N Area in 1993. Well 199-N-81 will serve as a downgradient monitoring well for the 1325-N Liquid Waste Disposal Facility. The well is completed at the top of the uppermost aquifer, and it replaces nearby wells that have gone dry. The location of well 199-N-81 is illustrated in Figure 1. Coordinates and elevations are listed in Table 1. For convenience, the well number is often shortened in this document by dropping the "199-" prefix.

The groundwater monitoring plan for the 1301-N and 1325-N sites (Hartman 1993b) describes the hydrogeology of the 100-N Area, and provides justification for the new well and its location. The well was constructed to the specifications described by Westinghouse Hanford Company (WHC) (1992).

This document is a compilation of data and information on drilling, construction, and development of the new well. Copies of forms, notes, and diagrams completed in the field comprise the bulk of this document. Few interpretations are included. Lithologic contacts were picked by the site geologist. An attempt was made to interpret aquifer test data.

The following are included in appendices.

- Appendix A:
 - Well construction report
 - Borehole log
 - Survey data report
 - Nonconformance report
- Appendix B:
 - CaCO_3 data
 - Moisture content data
- Appendix C:
 - Well development record
 - Pump installation record
- Appendix D:
 - Drawdown and recovery data
 - Slug test data
 - Aquifer test analysis

Chain-of-custody forms, decontamination records, daily field records, and training records are not included in this document, and are maintained by WHC.

Figure 1. Location of Well 199-N-81.

Table 1. Survey Data for Well 199-N-81.

Coordinates of center of casing			Elevation (ft NGVD29-93)		
Lambert (m)	100-N Grid (ft)	Hanford Grid (ft) ^a	Brass marker in concrete	Top of HydroStar ^b plate	Top of outer casing
N 149,866.086 E 572,019.160	N 8,308.36 W 4,467.96	N 58,525.5 W 86,592.0	459.74	462.73	462.71

^aHanford coordinates were converted from 100-N coordinates with the formulae:
 Hanford West = $57,659.1 + (100\text{-N West})(\cos 23^\circ) - (100\text{-N North})(\sin 23^\circ)$.
 Hanford North = $77,198.3 + (100\text{-N West})(\sin 23^\circ) + (100\text{-N North})(\cos 23^\circ)$.

^bA trademark of Instrumentation Northwest, Inc.

NGVD'29-93 = National Geodetic Vertical Datum of 1929 (based on a survey by the U.S. Corps of Engineers in 1993).

2.0 DRILLING

Well N-81 was drilled with a cable-tool rig. Drilling began on 16 March 1993, and was completed on 24 March, 1993 at a total depth of 93.25 ft below land surface (bls). Temporary, carbon steel casing was used during drilling: 10-in. diameter casing from surface to 21 ft bls; 8-in. diameter casing from surface to total depth. Drilling information is presented in Appendix A.

The borehole and soils were monitored regularly for organic vapors and radioactive contaminants. Contaminants were below action levels throughout the borehole. Samples were collected at approximately 5-ft intervals for calcium carbonate analysis, moisture content, and lithologic archiving. Calcium carbonate and moisture data are included in Appendix B.

Sediments were primarily sandy gravel to gravelly sand (see borehole log and well summary sheet in Appendix A). The site geologist identified the contact between the Hanford and Ringold formations at approximately 46 ft bls, where silt content increased and basalt content decreased.

A gross gamma geophysical log was not run in well N-81 because of mechanical problems with the logging truck. A nonconformance report was filed (Appendix A). No corrective action is required, since geophysical logs are available for other nearby wells.

3.0 WELL COMPLETION

Permanent materials were installed in well N-81 between 29 and 31 March, 1993. Static water level was 73.6 ft bls. Formation slough filled the borehole from total depth to 91.1 ft bls. A 4-in. diameter, 20-slot stainless steel screen was placed from 89.8 to 69.7 ft bls. The sand pack comprised 8- to 10-mesh silica sand from 91.1 to 90.8 ft bls, and 10- to 20-mesh silica sand from 90.8 to 66.8 ft bls. The annular seal consisted of 0.25-in.

bentonite pellets from 66.8 to 62.5 ft bls, 20- to 30-mesh bentonite crumbles from 62.5 to 10.1 ft bls, and Portland cement from 10.1 ft to 2 ft bls. The remaining annulus was filled with concrete when a 4- by 4-ft pad was poured at the well head. A 6-in. protective casing with a locking cap was also installed at the wellhead. Four protective steel posts were set in concrete around the well. A brass marker stamped with the well number was set into the concrete. The centerline of the well was surveyed to Lambert and 100-N Area coordinates. Elevation was surveyed to the National Geodetic Vertical Datum of 1929 and to the North American Vertical Datum of 1988. Elevations were established for the top of the outer casing (north side), the top of the pump plate (north side), and the brass marker set in the concrete pad. Well completion documents and a survey report are compiled in Appendix A.

The only additives during drilling and completion were water and "well guard," a non-petroleum-based lubricant.

4.0 WELL DEVELOPMENT AND PUMP INSTALLATION

Well N-81 was developed between 20 and 22 April, 1993. A temporary submersible pump was used to pump the well for development. The initial pumping rate was 1.5 gal/min. Turbidity was still high after 2.5 hr of pumping. Development resumed the following day at a pumping rate of 1.8 gal/min. The pumping rate decreased during 6 hr of pumping; a clogged screen was suspected. The well was surged, bringing fine sediments to the surface. The well was surged again the next day. Development pumping continued at a rate of 2.3 gal/min until the turbidity reached 4.2 NTU. A total of 1,052 gal of water were pumped from the well during the 3-day development. A well development log is included in Appendix C. Water level data were recorded with a transducer and data logger during the first two pumping sequences, and are included in Appendix D.

A HydroStar¹ sampling pump was installed in well N-81 on 22 April, 1993. Its intake is at 90.75 ft below top of casing (approximately 88 ft bls). A pump installation form is included in Appendix C.

5.0 AQUIFER TESTING

Water level data were collected during development, as described in Section 4.0, but hydraulic conductivity could not be determined due to changes in the pumping rate associated with screen clogging. Slug injection and withdrawal tests were conducted after development. Hydraulic conductivity of the screened interval was estimated at 2.6 ft/d for slug injection and 5.5 ft/d for slug withdrawal. These values are an order of magnitude lower than values estimated from similar tests in the 100-N Area (e.g., Hartman 1992a, 1993). The slug test results are believed to be unrepresentative. Aquifer test data and their interpretation are included in Appendix D.

¹ Hydrostar is a trademark of Instrumentation Northwest, Inc.

6.0 REFERENCES

- Hartman, M. J., 1993a, *Borehole Completion Data Package for Wells 199-N-75, 199-N-76, and 199-N-77*, WHC-SD-EN-DP-056, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- Hartman, M. J., 1993b, *Groundwater Monitoring Plan for the 1301-N and 1325-N Facilities*, WHC-SD-EN-AP-038, Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- Hartman, M. J., 1992, *Borehole Completion Data Package for Wells 199-N-71, 199-N-72, 199-N-73, and 199-N-74*, WHC-SD-EN-DP-040, Rev. 0, Westinghouse Hanford Company, Richland, Washington.
- WHC, 1992, *Generic Specification--Groundwater Monitoring Wells*, WHC-S-014, Rev. 7, Westinghouse Hanford Company, Richland, Washington.

APPENDIX A

DRILLING AND CONSTRUCTION DATA

This appendix includes the following records:

1. Well summary sheet
2. Well construction report
3. Borehole log
4. Nonconformance report
5. Survey data report

WELL SUMMARY SHEET

Boring or Well No. 199-N-81Sheet 1 of 1Location 100-N Area 1325 NProject W-152Prepared By Marty Melham Date 3/31/93Reviewed By Edward R. Fure Date 09/10/93(Sign/Print Name) Kent D. Reynolds

(Sign/Print Name)

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
10" diameter C.S. temporary casing set at 21.35'		0		0'-1.5': Sandy Gravel (50% gravel, 50% sand)
8" diameter C.S. temporary casing is set at 93.25'		5		1.5'-2.0': Sandy Gravel (40% gravel, 60% sand)
4 1/2" diameter stainless steel casing and screen set at 89.8' BLS w/ 3.5' stickup		10		2.0'-7.5': Sandy Gravel (70% gravel, 30% sand)
20-30 mesh Bentonite		15		7.5'-19': Sandy Gravel (70% gravel, 30% sand)
Crumbles 10.1' to 62.5'		20		19'-28': Sandy Gravel (70% gravel, 30% sand)
		25		28'-38': Sandy gravel (50% gravel, 50% sand)
		30		38'-42': Sandy gravel (30% gravel, 70% sand)
		35		42'-46': Sandy gravel (50% gravel, 50% sand). Abrupt contact with
		40		46'-54': Silty sandy gravel (40% gravel, 40% sand, 20% silt) - Ringold Formation
		45		54'-65': Silty sandy gravel (40% gravel, 50% sand, 10% silt)
1/4" Bentonite Pellets 62.5' to 66.8'		50		65'-74': Gravelly sand (20%-50% gravel, 80%-95% sand)
Static Water 73.6' on 3/31/93		55		74'-85': Sandy gravel (30%-40% gravel, 60%-70% sand)
		60		85'-93': Sandy gravel (30%-40% gravel, 60%-70% sand), well-cemented
		65		
		70		
		75		
		80		
		85		
		90		
		93'		
Sand from 66.8' to 91.1'				
20 slot T-304 stainless steel screen 69.7' to 89.8'				
Fill-slag from Formation from 93.25 to 91.1				

WELL CONSTRUCTION REPORT

VALIDATED

KDR 12/15/93

SIGNATURE/DATE

Page 1 of 2

Specification No. WHC-S-014 Rev No. 7ECNs 150145, 166764Project W0152Location 100-N AreaDrilling Company K.E.H.Driller L. Watkins

Other (Companies) _____

Geologist(s) Monty Mehlhorn - WHC/HEPCOBrett Thompson - WHC/MCEKent D Reynolds WHCL.D. Lockard WHC ReviewWell No. 199-N-81 Temp. Well No. 1325NCoordinates N58450/W86500Casing Elev. 462.71' Ground Elev. 459.74'

Drilling Method

Verification Method Visual ObservationCriteria WHC-S-014, S.2, S.3, 7.5 EIT

Initials Date

Rotary Air _____ Mud _____

Cable Tool D 0'-85' mm 85'-93' 3-16-93Drilling Fluid (1) NA (2) Raw water MM 3-24-94

Other _____

Geophysical Logging

Sondes

Interval

Date

Gross Casing S.F. 93.3 3/25/93

Completion Data

Drilled Depth 93.25'Completed Depth 89.8'Date Started 3-16-93Date Completed 3/31/93Static Water Level/Date 73.5' 3-23-9373.6' 3-31-93

Aquifer Testing

Type Instantaneous SlugFlow Meter I.D. No. N/ACal. Due Date N/ALength of Test 1 hrVolume Pumped N/ADrawdown N/ADate of Test 4/22/93

Completion Results

Cleaning

Verification Method Visual Observation and Doc. ReviewCriteria WHC-S-014, 4.22, 7.1, 7.7, EIT S.4, WHC-CM-7.2-S.4

Initials

Date

Drilling Tools/Rig MM 3-16-93Temporary Materials MM 3-16-93Permanent Materials KDR 3-31-93

Material Storage/Packing

Verification Method Visual ObservationCriteria WHC-S-014 7.2

Initials

Date

Mtl. Handling/Storage KDR 3/31/93Material Packing KDR 3/31/93

Lubricants/Additives

Verification Method Visual ObservationCriteria WHC-S-014 7.2

Identify

Initials

Date

Additives Raw Hg Columbia River KDR 3/1/94Lubricants Well Guard BRT 3-17-93

Screen

Type

Length

Slot Size

Stainless Steel 20.11' 20 slotKDR 3/31/93 KDR 3/31/93Stainless Steel 72.89' 72.89'Depth(s) 73.19 69.69' - 89.8'

Straightness Test

Verification Method Visual ObservationCriteria WHC-S-014 8.2Initials MM Date 3-23-93Verification Method Steel Tape MeasurementCriteria WHC-014-4.2.3, 4.2.5, 12.2.1, 4.2.1Initials KDR Date 3/29/93

WELL CONSTRUCTION REPORT (continuation sheet)				199-N-81	Page <u>2</u> of <u>2</u>
Type	Casing (permanent) Size	Placement	Well Protection		
<u>Stainless Steel</u>	<u>4 1/2"</u>	<u>+3.5' - 89.8</u>	Verification Method <u>Visual Inspection with tape</u>		
_____	_____	_____	Criteria <u>WHC-S-014 4.2.10</u>		
_____	_____	_____	<div style="display: flex; justify-content: space-between;"> <div>Protective Posts</div> <div>Initials <u>KDR</u></div> <div>Date <u>9/16/93</u></div> </div>		
_____	_____	_____	<div style="display: flex; justify-content: space-between;"> <div>Protective Casing</div> <div>Initials <u>KDR</u></div> <div>Date <u>9/16/93</u></div> </div>		
Verification Method <u>Measurement with Steel Tape</u>			<div style="display: flex; justify-content: space-between;"> <div>Site Restored</div> <div>Initials <u>KDR</u></div> <div>Date <u>9/16/93</u></div> </div>		
Criteria <u>WHC-S-014 4.2.1, 4.2.4, 4.2.5, 4.2.1</u>			<div style="display: flex; justify-content: space-between;"> <div>Cap, Hasp and Lock</div> <div>Initials <u>KDR</u></div> <div>Date <u>9/16/93</u></div> </div>		
Initials <u>KDR</u> Date <u>3/31/93</u>			<div style="display: flex; justify-content: space-between;"> <div>Surface Pad</div> <div>Initials <u>KDR</u></div> <div>Date <u>9/16/93</u></div> </div>		
Annular Seal/Filter Pack					
Verification Method <u>Measurement with Steel Tape</u>			Criteria <u>WHC-S-014, 4.2.5, 4.2.7, 4.2.8, 4.2.9</u>		
Type	Interval	Volume	Initials	Date	
<u>8/10 Sand</u>	<u>90.8 - 91.3</u>	<u>1/2 100# sks</u>	<u>KDR</u>	<u>3/24/93</u>	
<u>10/20 Sand</u>	<u>66.8 - 90.8</u>	<u>8 100# sks</u>	<u>KDR</u>	<u>3/31/93</u>	
<u>1/4" Bentonite pellets</u>	<u>62.5 - 66.8</u>	<u>2 50# b kts</u>	<u>KDR</u>	<u>3/31/93</u>	
<u>20-30 mesh Bentonite Crumbs</u>	<u>10.1 - 62.5</u>	<u>38 50# sks</u>	<u>KDR</u>	<u>3/31/93</u>	
<u>Type I-II Portland Cement</u>	<u>-2 - 10.1</u>	<u>12 100# sks</u>	<u>KDR</u>	<u>3/31/93</u>	
Well Survey/Labeling			Pump Installation		
Verification Method <u>Review of Survey Report</u>			Verification Method <u>Visual Observation</u>		
Criteria <u>WHC-S-014</u>			Criteria <u>WHC-S-014 4.2.11, 4.2.3</u>		
Measurement Point/Surveyed	Initials <u>KDR</u>	Date <u>7/6/93</u>	Pump Decon/Prep	Initials <u>R/E</u>	Date <u>4/22/93</u>
Protective Casing/Brass Cap Surveyed	Initials <u>KDR</u>	Date <u>7/6/93</u>	Installed	Initials <u>R/E</u>	Date <u>4/22/93</u>
Well Number Stenciled	Initials <u>ECR</u>	Date <u>9/14/93</u>	Pump Tested	Initials <u>R/E</u>	Date <u>4/22/93</u>
Brass Cap Labeled	Initials <u>R/E</u>	Date <u>4/22/93</u>			
Other (initial if performed)					
Well Abandonment _____		Downhole TV Inspection <u>KDR</u>	Complete As-Built Diagram, Driller's/Geologist's Logs		
<u>R/E 4/20/93</u> Well Development					
Comments/Remarks <u>(1) 200 gallons of Columbia water was used in this well for drilling purposes. No Geophysical gamma run on this well because of mechanical problems.</u>					

Reviewed By (Sign/Print Name)

Kent Reynolds / Kent D. RyderDate 12/15/93

BOREHOLE LOG

VALIDATED
KDR 6/1/93
SIGNATURE/DATE

Boring or Well No. 199-N-81

Sheet 1 of 5

Location 100-N Area, 1325N

Project W-152

Prepared By Monty Mehlman / Monty Mehlman Date 3-17-93
(Sign/Print Name)

Reviewed By EDUARDO RIVERA / ^{Edward} Rivera Date 03/22/93
(Sign/Print Name)

Depth (Ft)	Sample		Graphic Log	Sample Description	Comments
	Type and No.	Blows or Recovery		Group Name, Group Symbol, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
mm 3/16/93 5	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 0-5'		0'-1.5': Sandy Gravel (50% gravel, 50% sand) ~10% cobbles, 10% ucp, 30% cp, 30% mp, 20% fp, 30% vcs, 10% cs, 30% ms, 20% fs, moist, 2.5 Y 6/2, sand consists of 10% basalt, 80% quartz, and 10% feldspar, is subrounded, spheroidal, moderately sorted. Gravel is well rounded, poorly-sorted (spheroidal- discoidal), with ~80% basalt, 20% granite and calcite occurs as silt coatings. Gradation Strong reaction with HCl. Abrupt contact with:	3-16-93, Drilling begins at 1237 with 11.0' of 8" cs casing, Hanford Sediments
				1.5'-2.0' sandy gravel (40% gravel, 60% sand) ~10% cobbles, 10% ucp, 30% cp, 30% mp, 20% fp, 30% vcs, 10% ms, 10% fs, 80% ufs, moist, 5YR 5/4, sand is well sorted, well rounded (spheroidal), consists of 90% quartz, 10% feldspar, gravel is poorly sorted, rounded (spheroidal) with similar lithologies as 0'-1.5'. Abrupt contact with:	
mm 3/16/93 15	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 5'-10'		2.0'-7.5': Sandy Gravel (70% Gravel, 30% sand), 10% ucp, 20% cp, 10% mp, 40% fp 20% ufp, 20% vcs, 70% ms, 10% fs, 10YR 7/1 dry, 7.5YR 6/2 wet, moist, sand is moderately sorted, sub-rounded, with ~20% basalt, 10% feldspar, 70% quartz, gravel is rounded (spheroidal), in vadose zone. poorly sorted, consists of 80% basalt, 10% metasediments, 10% granite. Strong reaction with HCl, calcite coats some gravel clasts.	Drilling stops at 1432 3-17-93: Drilling begins at 0738; 10.95' of 10" Q diameter casing is added Sediments are dry, drilling
				7.5'-19': Sandy gravel (70% gravel, 30% sand); 20% cobbles, 20% ucp, 20% cp, 20% mp, 10% fp, 10% fs, 10% cs, 80% ms, 10% fs; 7.5YR 7/2, dry, sand is moderately sorted, subrounded, with ~5% basalt, 80% quartz, 15% feldspar; gravel is sub rounded (spherical to discoidal), poorly sorted, consists of ~80% basalt, 10% meta sediments, 10% granite, strong reaction with HCl, carbonate occurs as coatings on gravel clasts.	
mm 3/16/93 25	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 10'-15'		19'-20': Sandy gravel (70% gravel, 30% sand); 20% cobbles, 20% ucp, 20% cp, 20% mp, 10% fp, 10% fs, 10% cs, 80% ms, 10% fs; 7.5YR 7/2, dry, sand is moderately sorted, subrounded, with ~5% basalt, 80% quartz, 15% feldspar; gravel is sub rounded (spherical to discoidal), poorly sorted, consists of ~80% basalt, 10% meta sediments, 10% granite, strong reaction with HCl, carbonate occurs as coatings on gravel clasts.	
mm 3/16/93 35	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			
mm 3/16/93 40	Irad 2 lith 1 moisture tin 1 CsCO ₃	DB 15'-20'			

BOREHOLE LOG

Boring or Well No. 199-N-81Sheet 2 of 5Location 100-N Area, 1325NProject W-152Prepared By Monty Mehlhorn / Monty Mehlhorn Date 3-18-93
(Sign/Print Name)Reviewed By Edward C. Rapa / Edward C. Rapa Date 03/22/93
(Sign/Print Name)

Depth (<u>ft</u>)	Sample		Graphic Log	Sample Description Group Name, Group Symbol, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Comments Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
	Type and No.	Blows or Recovery			
20'	1 rad 2 lith. 1 Moisture tin (CaCO ₃ + H ₂ O)	DB 20'-25'		sand); 20% cobbles, 20% ucp, 20% cp, 20% mp, 10% fp, 10% vfp, 20% wcs, 30% cs, 30% ms, 15% fs, 2.5% ufs, 2.5% silt, 10 YR 6/1, dry, sand is poorly sorted, sub rounded with 30% basalt, 6% quartz, 10% feldspar; gravel is sub rounded (spherical), poorly sorted, consists of 80% basalt, 10% metasediments, 10% granite; weak reaction with HCl. Grades into:	10" casing with drive shoe is set at 21.35'
25'		DB 25'-31'			
30'	1 rad 2 lith. 1 Moisture tin (CaCO ₃ + H ₂ O)	DB 31'-35'		28'-38": Sandy gravel (50% gravel, 50% sand); 5% cobbles, 10% ucp, 20% cp, 30% mp, 20% fp, 15% ufp, 20% wcs, 20% cs, 30% ms, 20% fs, 10% ufs, dry (slightly moister than -28"; 10 YR 4/1; sand is poorly sorted and sub rounded with 40% basalt, 40% quartz, 10% feldspar, 10% sediments; gravel is poorly sorted, rounded (spherical-prismoidal), consists of 80% basalt, 10% metasediments, 10% quartzite. Weak reaction with HCl.	Drilling stops at 26' with 7.48' of stickup (8" casing, Ø 6.5"), 8" casing to 29.35' at 1432. 3-18-93: Drilling begins at 0729 e 26' 9.58' of 8" casing is added; there is now 41.83' of casing in the hole.
35'		DB 35'-39.5'			
40'	1 rad 2 lith. 1 Moisture tin (CaCO ₃ + H ₂ O)	ST 39.5'-41.5'		38'-42": Sandy gravel (30% Gravel, 70% sand) 5% cobbles, 10% ucp, 5% cp, 10% mp, 30% wfp, 40% ufp, 30% wcs, 10% cs, 50% ms 5% fs, 5% ufs, dry, 10 YR 6/2, gravel is poorly sorted, well rounded (spheroidal)	9.31' of casing added, now 51.4' of casing in hole.

BOREHOLE LOG				Boring or Well No. 199-N-81	
				Sheet 3 of 5	
Location 100-N Area, 1325N			Project 199-N-81 W-152		
Prepared By <u>Mandy Mehlhorn</u> Date <u>3-19-93</u>			Reviewed By <u>EDWARD C. ROFAE</u> Date <u>03/22/93</u>		
(Sign/Print Name)			(Sign/Print Name)		
Depth (Ft)	Sample Type and No.	Blows or Recovery	Graphic Log	Sample Description Group Name, Group Symbol, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Comments Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
40	Split-tube Sample 39.5'- 42.5'	ST 39.5'-42.5'		with 80% basalt, 5% granite, 5% quartzite	Split-tube sample 39.5'-
	2 lith 1 rad 1 moisture tin	DB 42.5'-45'		5% metasediments, 5% volcanics (latite).	42.5', 2 keuhc liners (41.0'-
				sand is poorly sorted, sub rounded, and	40.5' and 40.0'-40.5'),
				consists of 50% basalt, 40% quartz, 10%	1-moisture tin 41.8'-41.5'
				feldspar. Strong reaction with HCl;	Blow counts are per 6" at
				calcite coats gravel cists. Grades	2, 6, 10, 12, 13, 13 - split
				into:	tube was driven 36" because
				42' - 46': Sand, gravel (50% sand, 50%	of loose sediments.
				gravel; 30% cp, 40% mp, 15% fp,	
				15% ufg, 25% ucs, 20% cs, 10% ms,	
				4 mm 3/16" 30% fs, 16% ufs, 3% silt,	
				dry, 5 YR 6/2, gravel is poorly sorted,	
				rounded (spherical) with 60% basalt,	
				10% quartzite, 20% metasediments	
				and 10% granite; sand is poorly	
				sorted, rounded, consists of 30%	
				basalt, 50% quartz, 10% feldspar, 10%	
				granite. Weak reaction with HCl;	
				abrupt contact with:	Split tube 50.2'-52.2';
				46' - 54': Silty sand gravel (40% gravel, 50%	mm 3/16" 75% Recovery,
				sand, 10% silt); 5% cobbles, 10% ucp,	blows (in: 25, 30, 31, 53,
				20% cp, 10% mp, 20% fp, 35% ufp,	rejected liners 3 (50.2'-51.2')
				10% ucs, 10% cs, 20% ms, 20% fs,	4 (50.2'-50.7'), sampled 2nd
				20% ufs, 75% silt; moist (increases at	mm 3/16" 1 liner (51.2'-51.7') -
				49'), 7.5 YR 7/4, gravel is sub	lexan liner, 1st liner -
				rounded (spherical-discoidal), poorly	moisture tin (51.7'-52.2').
				sorted with ~10% basalt, 40% granite,	
				40% gneissic, 10% quartzite; sand is	
				sub rounded, poorly sorted with 5%	
				basalt, 70% quartz, ~25% felsic(?)	Drilling stops at 55' with
				fragments; FeOx coatings along	62.48' of casing (8, 8") in
				fractures, minor carbonate coatings on	the hole; 10' of stickup.
				gravel cists. Light reaction to HCl;	
				Transition in lithologies Represents	3-19-93: Drilling begins
				Contact from Hanford Formation to	at 0731.
				Ringold Formation. Grades into:	
				54' - 65': Silty Sandy Gravel (40% gravel, 25%	
				% sand, ~10% silt); 10% ucp, 10% cs, 40%	
				mp, 30% fs, 10% ufg, 10% ucs, 20% cs, 70%	
				% ms, 30% fs, 20% ufs, 10-15% silt, moist,	

BOREHOLE LOG

Boring or Well No. 199-N-81Sheet 4 of 5Location 100-N Area, 1325NProject W-152Prepared By Monty Medburn / Monty Medburn Date 3-22-93
(Sign/Print Name)Reviewed By Edward C. Rapp / Edward C. Rapp Date 03/26/93
(Sign/Print Name)

Depth (<u>ET</u>)	Sample		Graphic Log	Sample Description Group Name, Group Symbol, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl	Comments Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
	Type and No.	Blows or Recovery			
60	2 1/4 1 Rad 1 Moisture tin	DB 60'-65'		7.5YR7/4, gravel is rounded (spheroidal - prismatic), poorly sorted with 10% basalt, 20% granite, 30% gneiss, 20% quartzite, 10% andesite, 10% metasediments; sand is sub rounded, poorly sorted and consists of 5% basalt, 80% quartz, 15% feldspar. Strong reaction with HCl, Calcite coats gravel clasts; minor FeOx staining. Strong CaCO ₃ cement at 58'. Grades into: 6.5' - 74': Gravelly sand (20-5% gravel, 80%-95% sand) 5% ca, 20% mg, 30% fg, 45% 45% uf, 10-5% us, 10%-5% cs, ~40% ms, 50% fs, 2% vls, dry, 10YR7/2, gravel is poorly sorted, well rounded (spherical) with 10% basalt, 40% quartzite, 30% granite, 20% metasediments/ sand is moderately sorted, sub angular, and consists of 5% basalt, 80% quartz, 15% feldspar; calcite coats gravel clasts, strong reaction to HCl. Makes gradational contact with:	9.26' of 8" Ø C.S. casing is added; there is now 71.74' of 8" casing in the hole. Drilling stops at 11:04 with 71.74' of 8" C.S. casing, and approximately 9' of stickup at 64.0". Drilling begins on 3-22-93 mm 3/22/93, mm 3/22/93 / at 0750;
65		DB 65'-67.5'			
70		DB 67.5'-70'			
70		DB 70'-74'			10.88' of 8" C.S. casing is added to hole; there is now 82.62' of casing in hole
75	2 1/4 1 Rad 1 Moisture tin	DB 74'-80'		74'-85' Sandy gravel (30%-40% gravel, 60%-70% sand), ~5% chbble, 10% ucp, 10% cp, 30% mp, 30% fp, 15% uf, 5% ucs, 10% vls, 50% ms, 25% fs, 10% ufs, moist, 10YR7/3; gravel is poorly sorted, well rounded (spheroidal - prismatic) with 15% basalt, ~20% andesite/latite, 20% quartzite, 20% granite, 25% meta- sediments, sand is poorly sorted and sub rounded, consists of 5% basalt, 80% quartz, 13% feldspar, 2% mica; weak reaction with HCl.	STATIC WATER TABLE 73.5 Feet on 3/23/93
75					
75					
75					
80	2 1/4 1 Rad 1 Moisture tin				

Sheet 5 of 5

Project W-152

Reviewed By Edward C. Lafine / Edward C. Lafine Date 03/26/93
(Sign/Print Name)

A-6000-382 (01/93)

Westinghouse Hanford Company		NONCONFORMANCE REPORT			1. Page <u>1</u> of <u>1</u>	2. Preprinted No. 050965 QA Log No. EQA-99-005
3. P. O., W. O., or Job Control No. W-152	4. System/End Use 1325 N Facility 100 N Area	5. Item/Material RCRA Groundwater Monitoring Well	6. Dwg./Spec./Other No. WHC-SD-EN-AP-038, Sec. 3.4.3; WHC-S-014	7. Rev. 1 7		
8. Program/Project/Other Groundwater Monitoring Well for 1325 N Facility 100 N Area			9. Safety Class 3	10. ASME Code Items ☐ Yes ☒ No (If yes, notify authorized inspector)		
11. Supplier Name/Address Kaiser Engineers Hanford P.O. Box 888 Richland, Washington 99352			12. Notification of Potential Occurrence Required ☐ Yes ☒ No			
13. Code: Lot/Heat/Serial Well #199-N-81	14. Lot Size 1	15. Sample 1	16. Qty. Acc. 0	17. Inspection Criteria ☐ Dwg. ☒ Spec. ☐ Insp. Plan WHC-S-014, Rev. 7 & WHC-SD-EN-AP-038, rev		
18. Item	19. Description of Nonconformance (list serial no. where applicable)			22. Disposition, Justification, and Instructions		
1	Requirements: WHC-S-014, Rev. 7, Sec. 6.4 and WHC-SD-EN-SP-038, Rev. 1, Sec. 3.4.3 state, borehole geophysical logging will be performed in each well as directed by the cognizant engineer or well-site geologist in accordance with borehole geophysical logging procedure WHC-CM-7-7, EII 11.1 Actual: No logs were run due to mechanical problem with the logging truck.			Accept as is: Enough data is available from drilling samples of this well and geophysical logs from an adjacent well to adequately characterize this well.		

20. Originator's Signature L. D. Lockard Date 1/13/94		23. Design Document Change Required? ☐ Yes, Doc. No. ☒ No	
21. Cognizant QA Manager's Signature T. L. Pennington Date 1-21-94		24. Corrective Action Required? ☐ Yes, No. ☒ No	
Disp. App.	25. Cognizant Engineer K. D. Reynolds Date 1/13/94	26. Technical Rep. M. J. Hartman Date 1/13/94	Signature/Org. N/A
	QA Engineer W. R. Thackaberry Date 1-13-94	Signature/Org. J. F. Keller - Projects Date 1/21/94	Signature/Org. N/A
Close	27. Accept <u>1</u> Reject <u>0</u> Follow on NCR <u>N/A</u> 1-21-94 QA/C Personnel Date		

KAISER ENGINEERS HANFORD		SURVEY DATA REPORT		Request No. — 9 3 3 1 — 2 1 1 0	
Project/W.O. No. W-152		Title 100N RCRA WELL SURVEY		File No. 1 N 8 1 1 — 1 1 0 1 0	
KEH Job No. CR9997		Prepared By V. Coyne		Date 7/6/93	Reviewer <i>M Polster</i>
DESCRIPTION OF WORK			ACCEPTABILITY (Within Plan Tolerance)		DISTRIBUTION
Horizontal and vertical survey well			Yes ☐		Survey File OR
199-N-81			No ☐		Field Project File 1
			NA ☒		JR Geiger 1
			TBD by		DC Weekes 1
			Requestor ☐		JT Rieger 1
					MA Chamness 1
					LA Dietz 1
SURVEY RESULTS AND COMMENTS					

WELL NO.	COORDINATES C/L CASING		ELEVATIONS			
	100N AREA (FEET)	WCS83S (METERS)	VERT. DATUM	TOP OF BRASS CAP	TOP OF HYDROSTAR PLATE	TOP OF CASING
199-N-81	N: 8,308.36	N: 149,866.086	NAVD88 (METERS)	141.161	142.071	142.067
	W: 4,467.96	E: 572,019.160	NGVD29(93) (FEET)	459.74	462.73	462.71

NGVD29(93) Elevations are based on a survey by the U.S. Army Corp of engineers 1993.

Vertical control benchmarks held for this survey were USCE BM,s well 199-N-36 & 199-N-62. Misclosure of all run lines were less than 12mm/K.

Horizontal survey of wells was performed by conventional method with a closure that meets the requirements of WHC-S-014, Rev.-7, 3.4 well survey. Control monuments used were 100N-1 & 100N-2.

APPENDIX B
SEDIMENT SAMPLE DATA

This appendix includes calcium carbonate and moisture content data.

JY Fannin
17-09/6-1859

193 of 3
6/21/93

Well #199-N-81 Test Result Summary Sheet

Page 1

Sample No.	Well No.	Operable Unit	Depth	Sat K (cm/s)	SpG/F	SpG/C	SpG/Avg	Mois (%)	Por (%)	Den/D (g/cc)	CC (%)	Notes
3-0763	199-N-81	RCRA	5	N/R	N/R	N/R	N/R	2.13	N/R	N/R	<1	
3-0764	199-N-81	RCRA	10	N/R	N/R	N/R	N/R	1.53	N/R	N/R	<1	
3-0765	199-N-81	RCRA	15	N/R	N/R	N/R	N/R	1.75	N/R	N/R	<1	
3-0766	199-N-81	RCRA	20	N/R	N/R	N/R	N/R	3.08	N/R	N/R	<1	
3-0767	199-N-81	RCRA	25	N/R	N/R	N/R	N/R	2.96	N/R	N/R	<1	
3-0768	199-N-81	RCRA	31	N/R	N/R	N/R	N/R	2.84	N/R	N/R	<1	
3-0769	199-N-81	RCRA	35	N/R	N/R	N/R	N/R	2.50	N/R	N/R	<1	
3-0770	199-N-81	RCRA	39.5	N/R	N/R	N/R	N/R	2.64	N/R	N/R	<1	
3-0771	199-N-81	RCRA	45	N/R	N/R	N/R	N/R	2.61	N/R	N/R	<1	
3-0772	199-N-81	RCRA	46	N/R	N/R	N/R	N/R	4.41	N/R	N/R	<1	
3-0773	199-N-81	RCRA	50	N/R	N/R	N/R	N/R	5.38	N/R	N/R	<1	
3-0774	199-N-81	RCRA	55	N/R	N/R	N/R	N/R	2.53	N/R	N/R	1.8	
3-0775	199-N-81	RCRA	60	N/R	N/R	N/R	N/R	1.90	N/R	N/R	1.3	
3-0776	199-N-81	RCRA	65	N/R	N/R	N/R	N/R	3.77	N/R	N/R	<1	
3-0777	199-N-81	RCRA	67.5	N/R	N/R	N/R	N/R	2.22	N/R	N/R	<1	
3-0778	199-N-81	RCRA	70	N/R	N/R	N/R	N/R	3.24	N/R	N/R	<1	
3-0779	199-N-81	RCRA	74	N/R	N/R	N/R	N/R	9.36	N/R	N/R	<1	
3-0780	199-N-81	RCRA	80	N/R	N/R	N/R	N/R	5.37	N/R	N/R	<1	
3-0781	199-N-81	RCRA	85	N/R	N/R	N/R	N/R	6.96	N/R	N/R	<1	
3-0782	199-N-81	RCRA	90	N/R	N/R	N/R	N/R	19.92	N/R	N/R	<1	
3-0783	199-N-81	RCRA	93	N/R	N/R	N/R	N/R	14.98	N/R	N/R	<1	
3-0784	199-N-81	RCRA	40.5-41	N/R	N/R	N/R	N/R	2.00	N/R	N/R	<1	
3-0785	199-N-81	RCRA	41.5-41.8	N/R	N/R	N/R	N/R	2.37	N/R	N/R	<1	
3-0786	199-N-81	RCRA	51.2-51.7	N/R	N/R	N/R	N/R	1.89	N/R	N/R	<1	
3-0787	199-N-81	RCRA	51.7-52.2	N/R	N/R	N/R	N/R	2.10	N/R	N/R	<1	

N/R Not Requested
N/A Not Applicable

B-3

WHC-SD-EN-DP-082, Rev. 0

APPENDIX C

WELL DEVELOPMENT AND PUMP INSTALLATION

This appendix includes the following information:

1. Well development information checklist
2. Equipment Configuration and wellhead diagram
3. Sample pump installation
4. Sampling pump installation form.

For Information Only

Well Development Information Checklist

Well No. 199-N81

Date: 04/20/93

WELL INFORMATION

- A. Outer Casing Diameter 6"
- B. Inner Casing Diameter 4"
- C. Difference in stick-up 2.00'
- D. Stick-up of outer casing 3.00'
- E. Thickness of well pad 0.5'
- F. Depth to Water (BTOC) 77.20'
- G. Total depth of Hole (BTOC) 93.33'
- H. Screened Interval (BTOC) 73.33- 93.33'
- I. Screen length 20.0'

DEVELOPMENT INFORMATION

- J. Depth of Development pump intake. 92.12' BTOC
- K. Depth (below water) of Transducer during drawdown/recovery. 12.65'
- L. Depth (below water) of Transducer during slug test. 12.919'

EQUIPMENT INFORMATION

	Serial #	Calibration date
Hermit	2K-459	N/A
E-Tape	ET-4	7/27/93
Transducer	2303	7/09/93
Slugging Rod dimensions <u>BR-2 (0.194 ft³)</u>		

Comments: Development started on 4/20 and completed on 4/22 after pumping a total of 1,052 gallons and reaching 4.2 NTU. Pumping rate averaged 2.2 to 1.6 gpm during development with some surging being performed to help unclog screen. Slug Test performed on 04/22, slug injected 1135, withdrawn 1216. The well screen seemed to be clogging as indicated by the drop in pump rate.

BTOC = Below Top Of Casing.

BLS = Below Land Surface

Page 1 of

93.33' Btoc 6"

discharge pipe

sample ports

data logger #2

electric tape #6

pump #1

pressure transducer #3

pump intake #4

screen interval #5

Diagram

Date 04-23-93

VALIDATED

KDR 6/1/93

SIGNATURE/DATE

SAMPLE PUMP INSTALLATION

Well No.: 199-N81Project: W152Installation Date: 4/22/93Installed By: B. Stode (KTH), R. Edgington (WHC)Pump Type: Positive DisplacementPump Model: HS-8001/Hydrostar

PUMP AND RISER PIPE INFORMATION

Pipe: 3/4" SSPump Length: 4.34'Pump Screen Length: 1.89'Material Cleaning: Manufacturer

PUMP TESTING INFORMATION

Pump Efficiency = $\frac{\text{calculated strokes/volume @ 100\%}}{\text{observed strokes/volume}} \times 100$

Test Date: 4/22/93Strokes/5 gals: 52

Pump Eff. $\frac{10 \text{ strokes/1 gal}}{\text{x strokes/1 gal}} \times 100 = \underline{96.15\%}$

PUMP INSTALLATION DRAWING

Total Material Length: 92.64'

Comments: Hydrostar produced 5.16
gpm when tested. No complications
during installation.

Report By: R.S. EdgingtonReviewed By: E.C. RuffeTitle: Advanced Scientist (Hydrologist)Title: ETC Date: 04/23/93Signature: [Signature]Signature: [Signature]

For Information Only**SAMPLING PUMP INSTALLATION FORM**Project: W152Well Number: 199-N81Pump Type: HydrostarPump Model: 8001Date Installed: 04/22/93Installed By: B. StrodeDepth to Water: 77.07 Ft BTOC*Depth to Bottom: 93.33 Ft BTOCReported Depth of water: 76.99' (4/21/93)Screened Interval: 73.33- 93.33 Ft BTOC**Pump/Riser Pipe Description:**Pipe: 3/4" Stainless steelPump Length: 4.34'Pump Screen Length: 1.89'Material Cleaning: ManufacturerDistance pump off bottom: 0.69'

Comments: Pump tested on 04/22/93, produced 5 gallons in 58.13 secs and 52 strokes; 5.16 gpm @ 53.67 strikes/min.

PUMP INSTALLATION SKETCHTotal Material Length: 92.64 Ft
 Depth to Pump intake: 90.75 Ft BTOC
 Top of Casing (T.O.C.)
Completed By: R. S. EdringtonDate: 04/22/93

* BTOC - Below Top Of Casing

APPENDIX D

AQUIFER TESTS IN WELL N-81

This appendix includes descriptions and interpretations of aquifer tests conducted in well N-81 in 1993. Test summaries and data plots are also included, followed by raw data.

D.1 SUMMARY OF AQUIFER TEST RESULTS

Data collected during well development could not be used to estimate hydraulic properties because a clogging well screen caused pumping rates to fluctuate. The well was surged to unclog the screen.

Slug test data were interpreted to estimate hydraulic conductivity. However, the resulting estimates were lower than expected and are believed to be unrepresentative of the aquifer in the 100-N Area. The low estimates may be due to some residual clogging of the screen or to low-conductivity sediments in the immediate vicinity of the well.

D.2 WELL DEVELOPMENT TESTS

D.2.1 Field Procedures

The well was pumped after completion to develop the sand pack and reduce turbidity. The well was pumped three separate times on consecutive days. The water level was measured with an electrical tape before development and a pressure transducer was calibrated to the measured level. In the data tables that follow, the "reference" value is the measured depth to water in feet. The water level was monitored with a pressure transducer while the well was pumped during the first two pumping sequences. Water levels were monitored during recovery after the first episode of pumping. Recovery data were not collected following the 2nd and 3rd pumping sequences.

D.2.2 Data Analysis

Graphs of drawdown versus time are included with the raw data that follow this discussion. Changes in pumping rates due to screen clogging and surging are evident in the graphs. Data were not analyzed to estimate aquifer properties.

D.3 SLUG INJECTION AND SLUG WITHDRAWAL TESTS

Slug tests can often provide an estimate of aquifer properties in the immediate vicinity of a borehole. Slug injection and withdrawal were performed in well N-81 after completion and development.

D.3.1 Field Procedure

The water level was measured with an electrical tape before the test and a pressure transducer was calibrated to the measured level. A solid slugging rod (0.194 ft³ in volume) was suddenly submerged in the water column of the well. The water level was measured with a pressure transducer until it had returned to nearly static. The slugging rod was then withdrawn from the water column, and the water level was monitored until it returned to static.

D.3.2 Data Analysis

Slug test data were analyzed by the Bouwer and Rice (1976) method (as modified by Bouwer 1989). The Bouwer and Rice method is designed for fully or partially penetrating wells in unconfined aquifers. Time is plotted on the (linear) horizontal axis and depth to water or change in water level on the (logarithmic) vertical axis. The updated method (Bouwer 1989) also accounts for the sand pack around the screen, which effectively increases the diameter of the screened interval.

The 100-N slug test data were plotted using commercially available software. A best-fit line was chosen visually. A computer program was used to perform Bouwer and Rice calculations. The program requires inputting the y-intercept of the line and the water level at some time (t); it uses these data to calculate the slope of the line. It also calculates an effective casing radius and other parameters required by the Bouwer and Rice method.

Input parameters to the Bouwer and Rice method include aquifer thickness and sand pack porosity. Well N-70 is near N-81, and penetrates the uppermost aquifer. The aquifer thickness at well N-81 was estimated to be 38 ft, based on the elevation of the bottom of the aquifer at well N-70. Sand pack porosity was assumed to be 30%.

Results of Bouwer and Rice calculations yielded the following estimates of hydraulic conductivity: 2.6 ft/d for slug injection; 5.5 ft/d for slug withdrawal. These estimates are an order of magnitude lower than similarly conducted slug tests in other 100-N Area wells (Hartman 1992, 1993), which are in turn lower than data from pumping tests and other methods of estimating aquifer properties (e.g., Gilmore et al. 1992). The low hydraulic conductivity values could be attributed to (1) a clogged screen, or (2) the well being completed in a low-conductivity unit. The screen did appear to be clogging during development, although fine-grained sediments were not noted by the geologist during drilling. The formation may have a low hydraulic conductivity near well N-81 due to cementation; greater consolidation was noted during drilling. In either case, the low hydraulic conductivity does not appear to be representative of the uppermost aquifer on a larger scale.

D.4 REFERENCES

- Bouwer, H., 1989, "The Bouwer and Rice Slug Test -- An Update," in *Ground Water*, v. 27, no. 3, pp. 304-309.
- Bouwer, H., and R. C. Rice, 1976, "A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells," in *Water Resources Research*, Vol. 12, No. 3, pp. 423-428.
- Gilmore, T. J., F. A. Spane Jr., D. R. Newcomer, and C. R. Sherwood, 1992, *Applications of Three Aquifer Test Methods for Estimating Hydraulic Properties Within the 100-N Area*, PNL-8335, Pacific Northwest Laboratory, Richland, Washington.

Hartman, M. J., 1992, *Borehole Completion Data Package for Wells 199-N-71, 199-N-72, 199-N-73, and 199-N-74*, WHC-SD-EN-DP-040. Rev. 0, Westinghouse Hanford Company, Richland, Washington.

Hartman, M. J., 1993, *Borehole Completion Data Package for Wells 199-N-75, 199-N-76, and 199-N-77*, WHC-SD-EN-DP-056, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

**AQUIFER TEST SUMMARY
WELL N-81 DEVELOPMENT AND RECOVERY**

Purpose of Tests: The well was pumped for development. Water levels were measured for use in estimating aquifer properties.

Hydrogeologic Unit Tested: The uppermost aquifer (Ringold unit E), comprising sandy gravel.

Thickness of Aquifer: 38 ft. (Elevation of bottom of aquifer at N-70 was used to estimate aquifer thickness at N-81.)

Depth of Screened Interval Exposed to Aquifer During Test: Screened 73.3 to 93.3 ft below top of casing; water level at 77.2 ft below top of casing; tested thickness = 16.1 ft.

Diameter of Well Casing: 4 in. (0.333 ft).

Diameter of Well Screen: 4 in. (0.333 ft).

Diameter of Screen plus Sand Pack: 8 in. (0.667 ft).

Date of Tests: 20, 21, and 22 April, 1993.

Pumping Rate: Variable between 1.8 and 1.4 gal/min.

Duration of Test:

First pumping sequence . . .	2.6 hr
Recovery monitored	14.4 hr
Second pumping sequence . .	5.7 hr
Recovery (not monitored)	
Third pumping sequence . . .	2.3 hr
Water levels (not monitored)	

Water-Level Measurement Methods: Pressure transducer with data logger.

Maximum Change in Water Level:

First pumping sequence . . .	4.6 ft
Second pumping sequence . .	6.2 ft

Results: Pumping rate varied because screen was clogging. Well was surged to aid development. Data too irregular to interpret.

Figure D-1. Drawdown Versus Time in Well N-81 During Development (first pumping sequence).

Figure D-2. Residual Drawdown Versus Time in Well N-81 During Recovery (first pumping sequence).

Figure D-3. Drawdown Versus Time in Well N-81 During Development (second pumping sequence).

AQUIFER TEST SUMMARY
WELL N-81 SLUG INJECTION AND WITHDRAWAL

Purpose of Tests: A slug test was performed to estimate hydraulic conductivity of the aquifer.

Hydrogeologic Unit Tested: The uppermost aquifer (Ringold unit E), comprising sandy gravel.

Thickness of Aquifer: 38 ft. (Elevation of bottom of aquifer at N-70 was used to estimate aquifer thickness at N-81.)

Depth of Screened Interval Exposed to Aquifer During Test: Screened 73.3 to 93.3 ft below top of casing; water level at 77.2 ft below top of casing; tested thickness = 16.1 ft.

Diameter of Well Casing: 4 in. (0.333 ft).

Diameter of Well Screen: 4 in. (0.333 ft).

Diameter of Screen plus Sand Pack: 8 in. (0.667 ft).

Date of Tests: 22 April, 1993.

Pumping Rate: Volume of slugging rod = 0.194 ft³.

Duration of Test: Injection . . . 40 min.
Withdrawal . . . 17 min.

Water-Level Measurement Methods: Pressure transducer and data logger.

Maximum Change in Water Level: Injection . . . 6.78 ft (oscillations).
Withdrawal . . . 1.84 ft (oscillations).

Results:

Some oscillations in water level were observed in very early times after slug injection and withdrawal. Expected head displacement from a 0.194 ft³ in a 4-in. diameter well is 0.5 ft. The y-intercept for slug injection was 0.45 ft, very close to the expected value. The y-intercept for slug withdrawal was 1 ft. Water levels recovered within approximately 10 min. during slug injection and 3 min. for slug withdrawal.

The Bouwer and Rice method was applied, yielding the following estimates for hydraulic conductivity: 2.6 ft/d for slug injection; 5.5 ft/d for slug withdrawal. These values are an order of magnitude lower than the results of previous slug tests in the 100-N Area, and several orders of magnitude lower than estimates based on other methods. Screen clogging was noted during development. The screen and sand pack may not have been completely clear when the slug tests were conducted. The resultant values are believed to be nonrepresentative of aquifer properties near the well.

Figure D-4. Change in Water Level Versus Time During Slug Injection at Well N-81.

WELL N-81 SLUG INJECTION

 THE BELOW HYDRAULIC CONDUCTIVITY VALUE WAS CALCULATED
 USING THE BOUWER AND RICE SLUG TEST METHOD.
 SOURCE= "THE BOUWER AND RICE SLUG TEST-AN UPDATE"
 GROUND WATER, VOL 27, NO. 3, MAY-JUNE 1989.

 RADIUS OF CASING USED IN CALCULATIONS HAS BEEN
 CORRECTED FOR THE THICKNESS OF GRAVEL OR SAND
 PACK DUE TO WATER LEVEL CHANGES IN THE SCREEN OR
 OPEN INTERVAL OF WELL.

Rc (ft)	Rw (ft)	Le (ft)	Lw (ft)	H (ft)
.1667	.3333	16.1000	16.1000	38.0000

 Le/Rw = 48.3048300
 A = 3.0530930
 B = 4.990199E-001
 C = 2.6454010
 SANDPACK POROSITY = 3.000000E-001
 t (min) = 4.0000000
 1/t = 2.500000E-001
 Yo = (ft) 5.500000E-001
 Yt = (ft) 1.000000E-001
 1/t ln(Yo/Yt) = 4.261870E-001
 ln[(H-Lw)/Rw] = 4.1851990
 ln(Re/Rw) = 2.5632730

K (ft/day) = 2.5784690

T OF THE SATURATED SCREEN INTERVAL
 (ft²/day) = 41.5133600

Figure D-5. Change in Water Level Versus Time
During Slug Withdrawal at Well N-81.

WELL N-81 SLUG WITHDRAWAL

 THE BELOW HYDRAULIC CONDUCTIVITY VALUE WAS CALCULATED
 USING THE BOUWER AND RICE SLUG TEST METHOD.
 SOURCE= "THE BOUWER AND RICE SLUG TEST-AN UPDATE"
 GROUND WATER, VOL 27, NO. 3, MAY-JUNE 1989.

 RADIUS OF CASING USED IN CALCULATIONS HAS BEEN
 CORRECTED FOR THE THICKNESS OF GRAVEL OR SAND
 PACK DUE TO WATER LEVEL CHANGES IN THE SCREEN OR
 OPEN INTERVAL OF WELL.

Rc (ft)	Rw (ft)	Le (ft)	Lw (ft)	H (ft)
.1667	.3333	16.1000	16.1000	38.0000

Le/Rw = 48.3048300
 A = 3.0530930
 B = 4.990199E-001
 C = 2.6454010
 SANDPACK POROSITY = 3.000000E-001
 t (min) = 2.0000000
 1/t = 5.000000E-001
 Yo = (ft) 1.0000000
 Yt = (ft) 1.600000E-001
 1/t ln(Yo/Yt) = 9.162908E-001
 ln[(H-Lw)/Rw] = 4.1851990
 ln(Re/Rw) = 2.5632730

K (ft/day) = 5.5436410

T OF THE SATURATED SCREEN INTERVAL
 (ft²/day) = 89.2526200

WELL DEVELOPMENT FORM

page 1 of 1

Well Designation: 199-N81Well Depth: 93.33' BTOCScreened Interval: 73.33 - 93.33' BTOCDate Well Devel. Performed 04/20-22/93BAILING

Water Level Prior to Bailing: _____ Time of Measurement: _____

Volume of Bailer: _____ Number of Bails Removed: _____ Gallons: _____

Summary Description of Water Removed: _____

Water Level After Bailing: _____ Time of Measurement: _____

SURGE BLOCK:

N.A.

Type of Surge Block: _____ Dimensions of Surge Block: _____

TD Before	Stroke Length	Stroke Frequency	Surge Interval	Surge Time	TD After	TD Difference

AIRLIFT:

N.A.

Depyh to Eductor Pipe: _____ Airlift Start Time: _____

Flow Rate: _____ Accumulated Flow: _____ Airlift Stop Time: _____

Turbidity (NTU): _____

MECHANICAL PUMPING:Pumping Technique: Constant Discharge Pump Depth: 92.12' BTOC Pump Start Time: 1154/04-20Flow Rate: 1.8-1.37 Accumulated Flow: 1,052 gallons Pump Stop Time: 1020/04-22Turbidity (NTU): 200+ 49 27 27 22 17 24 5.2 4.7* 200+ 5.2 4.2

COMMENTS: * Pumping rate had decreased and seemed to indicate that the screen was clogging, the well was surged at this point and development continued.

Recorded by: R S Edrington Date: 04-23-93

Sign and Print Name

WELL N-81 BASELINE BEFORE DEVELOPMENT

SE2000
Environmental Logger
04/22 15:13

Unit# 459 Test 0

INPUT 1: Level (F) TOC

Reference 77.200
SG 1.000
Linearity 0.000
Scale factor 50.170
Offset 0.000
Delay mSEC 50.000

Step 0 04/20 11:04:06

Time:min Time:hrs D-T-W:Ft

-----	-----	-----
0	0.00	77.20
1	0.02	77.20
2	0.03	77.20
3	0.05	77.20
4	0.07	77.20
5	0.08	77.20
6	0.10	77.18
7	0.12	77.20
8	0.13	77.20
9	0.15	77.20
10	0.17	77.20
11	0.18	77.20
12	0.20	77.18
13	0.22	77.18
14	0.23	77.18
15	0.25	77.18
16	0.27	77.18
17	0.28	77.18
18	0.30	77.18
19	0.32	77.20
20	0.33	77.18

WELL N-81 DRAWDOWN DURING DEVELOPMENT
first pumping sequence

Q = 1.45 GAL/MIN

SE2000
Environmental Logger
04/22 15:10

Unit# 459 Test 1

INPUT 1: Level (F) TOC

Reference 77.200
SG 1.000
Linearity 0.000
Scale factor 50.170
Offset 0.000
Delay mSEC 50.000

Step 0 04/20 11:54:30

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.000	0.00000	78.055	0.855	0.250	0.00417	79.418	2.218
0.008	0.00014	77.073	-0.127	0.258	0.00431	79.37	2.170
0.017	0.00028	77.897	0.697	0.267	0.00444	79.402	2.202
0.025	0.00042	77.722	0.522	0.275	0.00458	79.386	2.186
0.033	0.00056	77.897	0.697	0.283	0.00472	79.37	2.170
0.042	0.00069	78.087	0.887	0.292	0.00486	79.386	2.186
0.050	0.00083	77.691	0.491	0.300	0.00500	79.37	2.170
0.058	0.00097	78.372	1.172	0.308	0.00514	79.386	2.186
0.067	0.00111	77.786	0.586	0.317	0.00528	79.37	2.170
0.075	0.00125	78.039	0.839	0.325	0.00542	79.37	2.170
0.083	0.00139	77.865	0.665	0.333	0.00556	79.402	2.202
0.092	0.00153	77.802	0.602	0.350	0.00583	79.386	2.186
0.100	0.00167	77.802	0.602	0.367	0.00611	79.402	2.202
0.108	0.00181	77.738	0.538	0.383	0.00639	79.418	2.218
0.117	0.00194	78.594	1.394	0.400	0.00667	79.449	2.249
0.125	0.00208	77.643	0.443	0.417	0.00694	79.465	2.265
0.133	0.00222	78.15	0.950	0.433	0.00722	79.497	2.297
0.142	0.00236	78.372	1.172	0.450	0.00750	79.497	2.297
0.150	0.00250	78.293	1.093	0.467	0.00778	79.528	2.328
0.158	0.00264	78.562	1.362	0.483	0.00806	79.56	2.360
0.167	0.00278	78.657	1.457	0.500	0.00833	79.576	2.376
0.175	0.00292	78.784	1.584	0.517	0.00861	79.576	2.376
0.183	0.00306	78.926	1.726	0.533	0.00889	79.608	2.408
0.192	0.00319	79.037	1.837	0.550	0.00917	79.623	2.423
0.200	0.00333	79.148	1.948	0.567	0.00944	79.639	2.439
0.208	0.00347	79.275	2.075	0.583	0.00972	79.655	2.455
0.217	0.00361	79.402	2.202	0.600	0.01000	79.687	2.487
0.225	0.00375	79.402	2.202	0.617	0.01028	79.703	2.503
0.233	0.00389	79.227	2.027	0.633	0.01056	79.734	2.534
0.242	0.00403	79.481	2.281	0.650	0.01083	79.734	2.534

WELL N-81 DRAWDOWN DURING DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.667	0.01111	79.766	2.566	6.800	0.11333	80.558	3.358
0.683	0.01139	79.782	2.582	7.000	0.11667	80.574	3.374
0.700	0.01167	79.798	2.598	7.200	0.12000	80.606	3.406
0.717	0.01194	79.814	2.614	7.400	0.12333	80.637	3.437
0.733	0.01222	79.829	2.629	7.600	0.12667	80.637	3.437
0.750	0.01250	79.845	2.645	7.800	0.13000	80.669	3.469
0.767	0.01278	79.861	2.661	8.000	0.13333	80.685	3.485
0.783	0.01306	79.893	2.693	8.200	0.13667	80.685	3.485
0.800	0.01333	79.893	2.693	8.400	0.14000	80.717	3.517
0.817	0.01361	79.909	2.709	8.600	0.14333	80.733	3.533
0.833	0.01389	79.925	2.725	8.800	0.14667	80.764	3.564
0.850	0.01417	79.925	2.725	9.000	0.15000	80.78	3.580
0.867	0.01444	79.94	2.740	9.200	0.15333	80.796	3.596
0.883	0.01472	79.925	2.725	9.400	0.15667	80.812	3.612
0.900	0.01500	79.956	2.756	9.600	0.16000	80.828	3.628
0.917	0.01528	79.956	2.756	9.800	0.16333	80.843	3.643
0.933	0.01556	79.94	2.740	10.000	0.16667	80.891	3.691
0.950	0.01583	79.972	2.772	11.000	0.18333	80.986	3.786
0.967	0.01611	79.972	2.772	12.000	0.20000	81.065	3.865
0.983	0.01639	79.972	2.772	13.000	0.21667	81.16	3.960
1.000	0.01667	79.988	2.788	14.000	0.23333	81.239	4.039
1.200	0.02000	80.02	2.820	15.000	0.25000	81.319	4.119
1.400	0.02333	80.02	2.820	16.000	0.26667	81.398	4.198
1.600	0.02667	80.035	2.835	17.000	0.28333	81.461	4.261
1.800	0.03000	80.035	2.835	18.000	0.30000	81.541	4.341
2.000	0.03333	80.067	2.867	19.000	0.31667	81.588	4.388
2.200	0.03667	80.083	2.883	20.000	0.33333	81.604	4.404
2.400	0.04000	80.099	2.899	21.000	0.35000	81.683	4.483
2.600	0.04333	80.13	2.930	22.000	0.36667	81.746	4.546
2.800	0.04667	80.146	2.946	23.000	0.38333	81.81	4.610
3.000	0.05000	80.162	2.962	24.000	0.40000	81.794	4.594
3.200	0.05333	80.194	2.994	25.000	0.41667	81.731	4.531
3.400	0.05667	80.21	3.010	26.000	0.43333	81.699	4.499
3.600	0.06000	80.226	3.026	27.000	0.45000	81.651	4.451
3.800	0.06333	80.257	3.057	28.000	0.46667	81.62	4.420
4.000	0.06667	80.289	3.089	29.000	0.48333	81.588	4.388
4.200	0.07000	80.305	3.105	30.000	0.50000	81.556	4.356
4.400	0.07333	80.321	3.121	31.000	0.51667	81.541	4.341
4.600	0.07667	80.352	3.152	32.000	0.53333	81.541	4.341
4.800	0.08000	80.368	3.168	33.000	0.55000	81.525	4.325
5.000	0.08333	80.384	3.184	34.000	0.56667	81.493	4.293
5.200	0.08667	80.416	3.216	35.000	0.58333	81.477	4.277
5.400	0.09000	80.431	3.231	36.000	0.60000	81.445	4.245
5.600	0.09333	80.447	3.247	37.000	0.61667	81.398	4.198
5.800	0.09667	80.479	3.279	38.000	0.63333	81.382	4.182
6.000	0.10000	80.511	3.311	39.000	0.65000	81.382	4.182
6.200	0.10333	80.511	3.311	40.000	0.66667	81.335	4.135
6.400	0.10667	80.527	3.327	41.000	0.68333	81.335	4.135
6.600	0.11000	80.542	3.342	42.000	0.70000	81.303	4.103

WELL N-81 DRAWDOWN DURING DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
43.000	0.71667	81.303	4.103	92.000	1.53333	80.321	3.121
44.000	0.73333	81.287	4.087	93.000	1.55000	80.336	3.136
45.000	0.75000	81.271	4.071	94.000	1.56667	80.321	3.121
46.000	0.76667	81.271	4.071	95.000	1.58333	80.305	3.105
47.000	0.78333	81.239	4.039	96.000	1.60000	80.305	3.105
48.000	0.80000	81.224	4.024	97.000	1.61667	80.305	3.105
49.000	0.81667	81.16	3.960	98.000	1.63333	80.321	3.121
50.000	0.83333	81.081	3.881	99.000	1.65000	80.305	3.105
51.000	0.85000	81.002	3.802	100.000	1.66667	80.289	3.089
52.000	0.86667	80.954	3.754	101.000	1.68333	80.305	3.105
53.000	0.88333	80.907	3.707	102.000	1.70000	80.305	3.105
54.000	0.90000	80.843	3.643	103.000	1.71667	80.305	3.105
55.000	0.91667	80.812	3.612	104.000	1.73333	80.321	3.121
56.000	0.93333	80.764	3.564	105.000	1.75000	80.321	3.121
57.000	0.95000	80.764	3.564	106.000	1.76667	80.305	3.105
58.000	0.96667	80.717	3.517	107.000	1.78333	80.321	3.121
59.000	0.98333	80.669	3.469	108.000	1.80000	80.321	3.121
60.000	1.00000	80.653	3.453	109.000	1.81667	80.305	3.105
61.000	1.01667	80.606	3.406	110.000	1.83333	80.321	3.121
62.000	1.03333	80.59	3.390	111.000	1.85000	80.321	3.121
63.000	1.05000	80.574	3.374	112.000	1.86667	80.305	3.105
64.000	1.06667	80.527	3.327	113.000	1.88333	80.321	3.121
65.000	1.08333	80.495	3.295	114.000	1.90000	80.321	3.121
66.000	1.10000	80.495	3.295	115.000	1.91667	80.305	3.105
67.000	1.11667	80.479	3.279	116.000	1.93333	80.321	3.121
68.000	1.13333	80.463	3.263	117.000	1.95000	80.321	3.121
69.000	1.15000	80.431	3.231	118.000	1.96667	80.321	3.121
70.000	1.16667	80.431	3.231	119.000	1.98333	80.321	3.121
71.000	1.18333	80.416	3.216	120.000	2.00000	80.321	3.121
72.000	1.20000	80.4	3.200	121.000	2.01667	80.321	3.121
73.000	1.21667	80.384	3.184	122.000	2.03333	80.321	3.121
74.000	1.23333	80.368	3.168	123.000	2.05000	80.321	3.121
75.000	1.25000	80.368	3.168	124.000	2.06667	80.305	3.105
76.000	1.26667	80.352	3.152	125.000	2.08333	80.289	3.089
77.000	1.28333	80.336	3.136	126.000	2.10000	80.289	3.089
78.000	1.30000	80.336	3.136	127.000	2.11667	80.289	3.089
79.000	1.31667	80.336	3.136	128.000	2.13333	80.289	3.089
80.000	1.33333	80.321	3.121	129.000	2.15000	80.289	3.089
81.000	1.35000	80.321	3.121	130.000	2.16667	80.321	3.121
82.000	1.36667	80.321	3.121	131.000	2.18333	80.321	3.121
83.000	1.38333	80.321	3.121	132.000	2.20000	80.305	3.105
84.000	1.40000	80.336	3.136	133.000	2.21667	80.305	3.105
85.000	1.41667	80.321	3.121	134.000	2.23333	80.305	3.105
86.000	1.43333	80.321	3.121	135.000	2.25000	80.289	3.089
87.000	1.45000	80.321	3.121	136.000	2.26667	80.289	3.089
88.000	1.46667	80.368	3.168	137.000	2.28333	80.289	3.089
89.000	1.48333	80.368	3.168	138.000	2.30000	80.289	3.089
90.000	1.50000	80.352	3.152	139.000	2.31667	80.289	3.089
91.000	1.51667	80.321	3.121	140.000	2.33333	80.305	3.105

WELL N-81 DRAWDOWN DURING DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)
141.000	2.35000	80.289	3.089
142.000	2.36667	80.273	3.073
143.000	2.38333	80.273	3.073
144.000	2.40000	80.273	3.073
145.000	2.41667	80.273	3.073
144.000	2.40000	80.273	3.073
145.000	2.41667	80.273	3.073
146.000	2.43333	80.257	3.057
147.000	2.45000	80.273	3.073
148.000	2.46667	80.257	3.057
149.000	2.48333	80.273	3.073
150.000	2.50000	80.257	3.057
151.000	2.51667	80.257	3.057
152.000	2.53333	80.273	3.073
153.000	2.55000	80.257	3.057
154.000	2.56667	80.241	3.041
155.000	2.58333	80.257	3.057
156.000	2.60000	80.241	3.041

WELL N-81 RECOVERY AFTER DEVELOPMENT
first pumping sequence

Q = 1.45 GAL/MIN

SE2000
Environmental Logger
04/22 14:58

Unit# 459 Test 2

INPUT 1: Level (F) TOC

Reference 77.200
SG 1.000
Linearity 0.000
Scale factor 50.170
Offset 0.000
Delay mSEC 50.000

Step 0 04/20 14:30:51

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.000	0.00000	80.241	3.041	0.250	0.00417	79.307	2.107
0.008	0.00014	80.257	3.057	0.258	0.00431	79.275	2.075
0.017	0.00028	80.146	2.946	0.267	0.00444	79.259	2.059
0.025	0.00042	80.115	2.915	0.275	0.00458	79.212	2.012
0.033	0.00056	80.099	2.899	0.283	0.00472	79.196	1.996
0.042	0.00069	80.051	2.851	0.292	0.00486	79.164	1.964
0.050	0.00083	80.02	2.82	0.300	0.00500	79.132	1.932
0.058	0.00097	79.988	2.788	0.308	0.00514	79.117	1.917
0.067	0.00111	79.956	2.756	0.317	0.00528	79.101	1.901
0.075	0.00125	79.909	2.709	0.325	0.00542	79.069	1.869
0.083	0.00139	79.877	2.677	0.333	0.00556	79.037	1.837
0.092	0.00153	79.845	2.645	0.350	0.00583	78.99	1.79
0.100	0.00167	79.814	2.614	0.367	0.00611	78.942	1.742
0.108	0.00181	79.782	2.582	0.383	0.00639	78.895	1.695
0.117	0.00194	79.75	2.55	0.400	0.00667	78.863	1.663
0.125	0.00208	79.719	2.519	0.417	0.00694	78.815	1.615
0.133	0.00222	79.703	2.503	0.433	0.00722	78.768	1.568
0.142	0.00236	79.671	2.471	0.450	0.00750	78.72	1.52
0.150	0.00250	79.639	2.439	0.467	0.00778	78.673	1.473
0.158	0.00264	79.608	2.408	0.483	0.00806	78.625	1.425
0.167	0.00278	79.576	2.376	0.500	0.00833	78.594	1.394
0.175	0.00292	79.544	2.344	0.517	0.00861	78.546	1.346
0.183	0.00306	79.528	2.328	0.533	0.00889	78.499	1.299
0.192	0.00319	79.497	2.297	0.550	0.00917	78.467	1.267
0.200	0.00333	79.465	2.265	0.567	0.00944	78.435	1.235
0.208	0.00347	79.433	2.233	0.583	0.00972	78.404	1.204
0.217	0.00361	79.418	2.218	0.600	0.01000	78.372	1.172
0.225	0.00375	79.386	2.186	0.617	0.01028	78.34	1.14
0.233	0.00389	79.354	2.154	0.633	0.01056	78.309	1.109
0.242	0.00403	79.322	2.122	0.650	0.01083	78.277	1.077

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.667	0.01111	78.261	1.061	6.800	0.11333	77.532	0.332
0.683	0.01139	78.229	1.029	7.000	0.11667	77.548	0.348
0.700	0.01167	78.198	0.998	7.200	0.12000	77.548	0.348
0.717	0.01194	78.182	0.982	7.400	0.12333	77.548	0.348
0.733	0.01222	78.166	0.966	7.600	0.12667	77.548	0.348
0.750	0.01250	78.134	0.934	7.800	0.13000	77.548	0.348
0.767	0.01278	78.118	0.918	8.000	0.13333	77.548	0.348
0.783	0.01306	78.103	0.903	8.200	0.13667	77.548	0.348
0.800	0.01333	78.087	0.887	8.400	0.14000	77.548	0.348
0.817	0.01361	78.055	0.855	8.600	0.14333	77.532	0.332
0.833	0.01389	78.039	0.839	8.800	0.14667	77.532	0.332
0.850	0.01417	78.023	0.823	9.000	0.15000	77.532	0.332
0.867	0.01444	78.007	0.807	9.200	0.15333	77.532	0.332
0.883	0.01472	77.992	0.792	9.400	0.15667	77.532	0.332
0.900	0.01500	77.976	0.776	9.600	0.16000	77.532	0.332
0.917	0.01528	77.96	0.76	9.800	0.16333	77.532	0.332
0.933	0.01556	77.944	0.744	10.000	0.16667	77.532	0.332
0.950	0.01583	77.944	0.744	11.000	0.18333	77.532	0.332
0.967	0.01611	77.928	0.728	12.000	0.20000	77.548	0.348
0.983	0.01639	77.912	0.712	13.000	0.21667	77.548	0.348
1.000	0.01667	77.897	0.697	14.000	0.23333	77.548	0.348
1.200	0.02000	77.833	0.633	15.000	0.25000	77.532	0.332
1.400	0.02333	77.802	0.602	16.000	0.26667	77.532	0.332
1.600	0.02667	77.786	0.586	17.000	0.28333	77.532	0.332
1.800	0.03000	77.754	0.554	18.000	0.30000	77.532	0.332
2.000	0.03333	77.738	0.538	19.000	0.31667	77.516	0.316
2.200	0.03667	77.722	0.522	20.000	0.33333	77.516	0.316
2.400	0.04000	77.706	0.506	21.000	0.35000	77.516	0.316
2.600	0.04333	77.706	0.506	22.000	0.36667	77.516	0.316
2.800	0.04667	77.691	0.491	23.000	0.38333	77.516	0.316
3.000	0.05000	77.675	0.475	24.000	0.40000	77.516	0.316
3.200	0.05333	77.675	0.475	25.000	0.41667	77.501	0.301
3.400	0.05667	77.659	0.459	26.000	0.43333	77.501	0.301
3.600	0.06000	77.643	0.443	27.000	0.45000	77.501	0.301
3.800	0.06333	77.643	0.443	28.000	0.46667	77.501	0.301
4.000	0.06667	77.627	0.427	29.000	0.48333	77.501	0.301
4.200	0.07000	77.627	0.427	30.000	0.50000	77.516	0.316
4.400	0.07333	77.627	0.427	31.000	0.51667	77.501	0.301
4.600	0.07667	77.627	0.427	32.000	0.53333	77.501	0.301
4.800	0.08000	77.611	0.411	33.000	0.55000	77.501	0.301
5.000	0.08333	77.611	0.411	34.000	0.56667	77.485	0.285
5.200	0.08667	77.611	0.411	35.000	0.58333	77.501	0.301
5.400	0.09000	77.596	0.396	36.000	0.60000	77.501	0.301
5.600	0.09333	77.596	0.396	37.000	0.61667	77.501	0.301
5.800	0.09667	77.596	0.396	38.000	0.63333	77.501	0.301
6.000	0.10000	77.58	0.38	39.000	0.65000	77.501	0.301
6.200	0.10333	77.58	0.38	40.000	0.66667	77.501	0.301
6.400	0.10667	77.58	0.38	41.000	0.68333	77.501	0.301
6.600	0.11000	77.564	0.364	42.000	0.70000	77.501	0.301

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
43.000	0.71667	77.485	0.285	92.000	1.53333	77.469	0.269
44.000	0.73333	77.485	0.285	93.000	1.55000	77.469	0.269
45.000	0.75000	77.485	0.285	94.000	1.56667	77.469	0.269
46.000	0.76667	77.485	0.285	95.000	1.58333	77.453	0.253
47.000	0.78333	77.485	0.285	96.000	1.60000	77.469	0.269
48.000	0.80000	77.469	0.269	97.000	1.61667	77.469	0.269
49.000	0.81667	77.485	0.285	98.000	1.63333	77.469	0.269
50.000	0.83333	77.485	0.285	99.000	1.65000	77.469	0.269
51.000	0.85000	77.469	0.269	100.000	1.66667	77.453	0.253
52.000	0.86667	77.485	0.285	101.000	1.68333	77.453	0.253
53.000	0.88333	77.485	0.285	102.000	1.70000	77.453	0.253
54.000	0.90000	77.485	0.285	103.000	1.71667	77.437	0.237
55.000	0.91667	77.485	0.285	104.000	1.73333	77.453	0.253
56.000	0.93333	77.469	0.269	105.000	1.75000	77.437	0.237
57.000	0.95000	77.469	0.269	106.000	1.76667	77.453	0.253
58.000	0.96667	77.485	0.285	107.000	1.78333	77.453	0.253
59.000	0.98333	77.485	0.285	108.000	1.80000	77.453	0.253
60.000	1.00000	77.485	0.285	109.000	1.81667	77.453	0.253
61.000	1.01667	77.485	0.285	110.000	1.83333	77.453	0.253
62.000	1.03333	77.485	0.285	111.000	1.85000	77.437	0.237
63.000	1.05000	77.469	0.269	112.000	1.86667	77.453	0.253
64.000	1.06667	77.469	0.269	113.000	1.88333	77.453	0.253
65.000	1.08333	77.469	0.269	114.000	1.90000	77.437	0.237
66.000	1.10000	77.469	0.269	115.000	1.91667	77.453	0.253
67.000	1.11667	77.469	0.269	116.000	1.93333	77.453	0.253
68.000	1.13333	77.469	0.269	117.000	1.95000	77.453	0.253
69.000	1.15000	77.469	0.269	118.000	1.96667	77.453	0.253
70.000	1.16667	77.469	0.269	119.000	1.98333	77.453	0.253
71.000	1.18333	77.469	0.269	120.000	2.00000	77.453	0.253
72.000	1.20000	77.469	0.269	121.000	2.01667	77.453	0.253
73.000	1.21667	77.469	0.269	122.000	2.03333	77.437	0.237
74.000	1.23333	77.469	0.269	123.000	2.05000	77.437	0.237
75.000	1.25000	77.453	0.253	124.000	2.06667	77.437	0.237
76.000	1.26667	77.469	0.269	125.000	2.08333	77.453	0.253
77.000	1.28333	77.469	0.269	126.000	2.10000	77.453	0.253
78.000	1.30000	77.469	0.269	127.000	2.11667	77.453	0.253
79.000	1.31667	77.469	0.269	128.000	2.13333	77.453	0.253
80.000	1.33333	77.469	0.269	129.000	2.15000	77.453	0.253
81.000	1.35000	77.469	0.269	130.000	2.16667	77.453	0.253
82.000	1.36667	77.469	0.269	131.000	2.18333	77.453	0.253
83.000	1.38333	77.469	0.269	132.000	2.20000	77.453	0.253
84.000	1.40000	77.469	0.269	133.000	2.21667	77.453	0.253
85.000	1.41667	77.469	0.269	134.000	2.23333	77.437	0.237
86.000	1.43333	77.469	0.269	135.000	2.25000	77.437	0.237
87.000	1.45000	77.453	0.253	136.000	2.26667	77.437	0.237
88.000	1.46667	77.453	0.253	137.000	2.28333	77.437	0.237
89.000	1.48333	77.453	0.253	138.000	2.30000	77.453	0.253
90.000	1.50000	77.453	0.253	139.000	2.31667	77.453	0.253
91.000	1.51667	77.453	0.253	140.000	2.33333	77.453	0.253

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
141.000	2.35000	77.453	0.253	190.000	3.16667	77.437	0.237
142.000	2.36667	77.453	0.253	191.000	3.18333	77.437	0.237
143.000	2.38333	77.437	0.237	192.000	3.20000	77.437	0.237
144.000	2.40000	77.437	0.237	193.000	3.21667	77.437	0.237
145.000	2.41667	77.437	0.237	194.000	3.23333	77.437	0.237
146.000	2.43333	77.437	0.237	195.000	3.25000	77.437	0.237
147.000	2.45000	77.437	0.237	196.000	3.26667	77.453	0.253
148.000	2.46667	77.437	0.237	197.000	3.28333	77.453	0.253
149.000	2.48333	77.437	0.237	198.000	3.30000	77.437	0.237
150.000	2.50000	77.437	0.237	199.000	3.31667	77.453	0.253
151.000	2.51667	77.437	0.237	200.000	3.33333	77.453	0.253
152.000	2.53333	77.453	0.253	201.000	3.35000	77.453	0.253
153.000	2.55000	77.453	0.253	202.000	3.36667	77.453	0.253
154.000	2.56667	77.453	0.253	203.000	3.38333	77.453	0.253
155.000	2.58333	77.453	0.253	204.000	3.40000	77.453	0.253
156.000	2.60000	77.453	0.253	205.000	3.41667	77.437	0.237
157.000	2.61667	77.453	0.253	206.000	3.43333	77.437	0.237
158.000	2.63333	77.453	0.253	207.000	3.45000	77.437	0.237
159.000	2.65000	77.453	0.253	208.000	3.46667	77.437	0.237
160.000	2.66667	77.453	0.253	209.000	3.48333	77.437	0.237
161.000	2.68333	77.453	0.253	210.000	3.50000	77.437	0.237
162.000	2.70000	77.453	0.253	211.000	3.51667	77.453	0.253
163.000	2.71667	77.453	0.253	212.000	3.53333	77.453	0.253
164.000	2.73333	77.453	0.253	213.000	3.55000	77.453	0.253
165.000	2.75000	77.453	0.253	214.000	3.56667	77.453	0.253
166.000	2.76667	77.453	0.253	215.000	3.58333	77.453	0.253
167.000	2.78333	77.453	0.253	216.000	3.60000	77.453	0.253
168.000	2.80000	77.453	0.253	217.000	3.61667	77.453	0.253
169.000	2.81667	77.453	0.253	218.000	3.63333	77.453	0.253
170.000	2.83333	77.437	0.237	219.000	3.65000	77.453	0.253
171.000	2.85000	77.437	0.237	220.000	3.66667	77.453	0.253
172.000	2.86667	77.437	0.237	221.000	3.68333	77.453	0.253
173.000	2.88333	77.437	0.237	222.000	3.70000	77.453	0.253
174.000	2.90000	77.437	0.237	223.000	3.71667	77.453	0.253
175.000	2.91667	77.437	0.237	224.000	3.73333	77.453	0.253
176.000	2.93333	77.437	0.237	225.000	3.75000	77.453	0.253
177.000	2.95000	77.437	0.237	226.000	3.76667	77.453	0.253
178.000	2.96667	77.437	0.237	227.000	3.78333	77.453	0.253
179.000	2.98333	77.453	0.253	228.000	3.80000	77.453	0.253
180.000	3.00000	77.453	0.253	229.000	3.81667	77.453	0.253
181.000	3.01667	77.453	0.253	230.000	3.83333	77.453	0.253
182.000	3.03333	77.453	0.253	231.000	3.85000	77.437	0.237
183.000	3.05000	77.453	0.253	232.000	3.86667	77.437	0.237
184.000	3.06667	77.453	0.253	233.000	3.88333	77.437	0.237
185.000	3.08333	77.453	0.253	234.000	3.90000	77.453	0.253
186.000	3.10000	77.437	0.237	235.000	3.91667	77.437	0.237
187.000	3.11667	77.437	0.237	236.000	3.93333	77.437	0.237
188.000	3.13333	77.437	0.237	237.000	3.95000	77.437	0.237
189.000	3.15000	77.437	0.237	238.000	3.96667	77.453	0.253

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
239.000	3.98333	77.453	0.253	288.000	4.80000	77.437	0.237
240.000	4.00000	77.437	0.237	289.000	4.81667	77.437	0.237
241.000	4.01667	77.437	0.237	290.000	4.83333	77.437	0.237
242.000	4.03333	77.437	0.237	291.000	4.85000	77.437	0.237
243.000	4.05000	77.437	0.237	292.000	4.86667	77.437	0.237
244.000	4.06667	77.437	0.237	293.000	4.88333	77.437	0.237
245.000	4.08333	77.437	0.237	294.000	4.90000	77.437	0.237
246.000	4.10000	77.437	0.237	295.000	4.91667	77.437	0.237
247.000	4.11667	77.437	0.237	296.000	4.93333	77.437	0.237
248.000	4.13333	77.437	0.237	297.000	4.95000	77.437	0.237
249.000	4.15000	77.437	0.237	298.000	4.96667	77.437	0.237
250.000	4.16667	77.437	0.237	299.000	4.98333	77.437	0.237
251.000	4.18333	77.437	0.237	300.000	5.00000	77.437	0.237
252.000	4.20000	77.437	0.237	301.000	5.01667	77.437	0.237
253.000	4.21667	77.437	0.237	302.000	5.03333	77.453	0.253
254.000	4.23333	77.437	0.237	303.000	5.05000	77.437	0.237
255.000	4.25000	77.437	0.237	304.000	5.06667	77.437	0.237
256.000	4.26667	77.437	0.237	305.000	5.08333	77.437	0.237
257.000	4.28333	77.437	0.237	306.000	5.10000	77.453	0.253
258.000	4.30000	77.437	0.237	307.000	5.11667	77.437	0.237
259.000	4.31667	77.437	0.237	308.000	5.13333	77.453	0.253
260.000	4.33333	77.437	0.237	309.000	5.15000	77.437	0.237
261.000	4.35000	77.437	0.237	310.000	5.16667	77.437	0.237
262.000	4.36667	77.437	0.237	311.000	5.18333	77.453	0.253
263.000	4.38333	77.437	0.237	312.000	5.20000	77.453	0.253
264.000	4.40000	77.437	0.237	313.000	5.21667	77.453	0.253
265.000	4.41667	77.437	0.237	314.000	5.23333	77.453	0.253
266.000	4.43333	77.437	0.237	315.000	5.25000	77.453	0.253
267.000	4.45000	77.437	0.237	316.000	5.26667	77.437	0.237
268.000	4.46667	77.437	0.237	317.000	5.28333	77.453	0.253
269.000	4.48333	77.437	0.237	318.000	5.30000	77.453	0.253
270.000	4.50000	77.437	0.237	319.000	5.31667	77.453	0.253
271.000	4.51667	77.437	0.237	320.000	5.33333	77.453	0.253
272.000	4.53333	77.437	0.237	321.000	5.35000	77.453	0.253
273.000	4.55000	77.437	0.237	322.000	5.36667	77.453	0.253
274.000	4.56667	77.437	0.237	323.000	5.38333	77.453	0.253
275.000	4.58333	77.437	0.237	324.000	5.40000	77.453	0.253
276.000	4.60000	77.437	0.237	325.000	5.41667	77.453	0.253
277.000	4.61667	77.437	0.237	326.000	5.43333	77.453	0.253
278.000	4.63333	77.437	0.237	327.000	5.45000	77.453	0.253
279.000	4.65000	77.453	0.253	328.000	5.46667	77.453	0.253
280.000	4.66667	77.437	0.237	329.000	5.48333	77.453	0.253
281.000	4.68333	77.437	0.237	330.000	5.50000	77.453	0.253
282.000	4.70000	77.437	0.237	331.000	5.51667	77.453	0.253
283.000	4.71667	77.437	0.237	332.000	5.53333	77.453	0.253
284.000	4.73333	77.437	0.237	333.000	5.55000	77.453	0.253
285.000	4.75000	77.437	0.237	334.000	5.56667	77.453	0.253
286.000	4.76667	77.453	0.253	335.000	5.58333	77.453	0.253
287.000	4.78333	77.453	0.253	336.000	5.60000	77.453	0.253

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
337.000	5.61667	77.453	0.253	386.000	6.43333	77.453	0.253
338.000	5.63333	77.453	0.253	387.000	6.45000	77.453	0.253
339.000	5.65000	77.453	0.253	388.000	6.46667	77.453	0.253
340.000	5.66667	77.453	0.253	389.000	6.48333	77.453	0.253
341.000	5.68333	77.453	0.253	390.000	6.50000	77.453	0.253
342.000	5.70000	77.453	0.253	391.000	6.51667	77.453	0.253
343.000	5.71667	77.453	0.253	392.000	6.53333	77.453	0.253
344.000	5.73333	77.453	0.253	393.000	6.55000	77.453	0.253
345.000	5.75000	77.453	0.253	394.000	6.56667	77.453	0.253
346.000	5.76667	77.453	0.253	395.000	6.58333	77.453	0.253
347.000	5.78333	77.453	0.253	396.000	6.60000	77.453	0.253
348.000	5.80000	77.453	0.253	397.000	6.61667	77.453	0.253
349.000	5.81667	77.453	0.253	398.000	6.63333	77.453	0.253
350.000	5.83333	77.453	0.253	399.000	6.65000	77.453	0.253
351.000	5.85000	77.453	0.253	400.000	6.66667	77.453	0.253
352.000	5.86667	77.453	0.253	401.000	6.68333	77.453	0.253
353.000	5.88333	77.453	0.253	402.000	6.70000	77.453	0.253
354.000	5.90000	77.453	0.253	403.000	6.71667	77.453	0.253
355.000	5.91667	77.453	0.253	404.000	6.73333	77.453	0.253
356.000	5.93333	77.453	0.253	405.000	6.75000	77.453	0.253
357.000	5.95000	77.453	0.253	406.000	6.76667	77.453	0.253
358.000	5.96667	77.453	0.253	407.000	6.78333	77.453	0.253
359.000	5.98333	77.453	0.253	408.000	6.80000	77.453	0.253
360.000	6.00000	77.453	0.253	409.000	6.81667	77.453	0.253
361.000	6.01667	77.453	0.253	410.000	6.83333	77.453	0.253
362.000	6.03333	77.453	0.253	411.000	6.85000	77.453	0.253
363.000	6.05000	77.453	0.253	412.000	6.86667	77.453	0.253
364.000	6.06667	77.453	0.253	413.000	6.88333	77.453	0.253
365.000	6.08333	77.453	0.253	414.000	6.90000	77.453	0.253
366.000	6.10000	77.453	0.253	415.000	6.91667	77.453	0.253
367.000	6.11667	77.453	0.253	416.000	6.93333	77.453	0.253
368.000	6.13333	77.453	0.253	417.000	6.95000	77.453	0.253
369.000	6.15000	77.453	0.253	418.000	6.96667	77.453	0.253
370.000	6.16667	77.453	0.253	419.000	6.98333	77.453	0.253
371.000	6.18333	77.453	0.253	420.000	7.00000	77.453	0.253
372.000	6.20000	77.453	0.253	421.000	7.01667	77.453	0.253
373.000	6.21667	77.453	0.253	422.000	7.03333	77.453	0.253
374.000	6.23333	77.453	0.253	423.000	7.05000	77.453	0.253
375.000	6.25000	77.453	0.253	424.000	7.06667	77.453	0.253
376.000	6.26667	77.453	0.253	425.000	7.08333	77.453	0.253
377.000	6.28333	77.453	0.253	426.000	7.10000	77.453	0.253
378.000	6.30000	77.453	0.253	427.000	7.11667	77.453	0.253
379.000	6.31667	77.453	0.253	428.000	7.13333	77.453	0.253
380.000	6.33333	77.453	0.253	429.000	7.15000	77.453	0.253
381.000	6.35000	77.453	0.253	430.000	7.16667	77.453	0.253
382.000	6.36667	77.453	0.253	431.000	7.18333	77.453	0.253
383.000	6.38333	77.453	0.253	432.000	7.20000	77.453	0.253
384.000	6.40000	77.453	0.253	433.000	7.21667	77.453	0.253
385.000	6.41667	77.453	0.253	434.000	7.23333	77.453	0.253

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
435.000	7.25000	77.453	0.253	484.000	8.06667	77.437	0.237
436.000	7.26667	77.453	0.253	485.000	8.08333	77.437	0.237
437.000	7.28333	77.453	0.253	486.000	8.10000	77.437	0.237
438.000	7.30000	77.453	0.253	487.000	8.11667	77.437	0.237
439.000	7.31667	77.453	0.253	488.000	8.13333	77.437	0.237
440.000	7.33333	77.453	0.253	489.000	8.15000	77.437	0.237
441.000	7.35000	77.453	0.253	490.000	8.16667	77.437	0.237
442.000	7.36667	77.453	0.253	491.000	8.18333	77.437	0.237
443.000	7.38333	77.453	0.253	492.000	8.20000	77.437	0.237
444.000	7.40000	77.453	0.253	493.000	8.21667	77.437	0.237
445.000	7.41667	77.453	0.253	494.000	8.23333	77.437	0.237
446.000	7.43333	77.453	0.253	495.000	8.25000	77.437	0.237
447.000	7.45000	77.453	0.253	496.000	8.26667	77.437	0.237
448.000	7.46667	77.453	0.253	497.000	8.28333	77.437	0.237
449.000	7.48333	77.453	0.253	498.000	8.30000	77.437	0.237
450.000	7.50000	77.453	0.253	499.000	8.31667	77.437	0.237
451.000	7.51667	77.453	0.253	500.000	8.33333	77.437	0.237
452.000	7.53333	77.453	0.253	501.000	8.35000	77.437	0.237
453.000	7.55000	77.453	0.253	502.000	8.36667	77.437	0.237
454.000	7.56667	77.453	0.253	503.000	8.38333	77.437	0.237
455.000	7.58333	77.453	0.253	504.000	8.40000	77.437	0.237
456.000	7.60000	77.453	0.253	505.000	8.41667	77.437	0.237
457.000	7.61667	77.453	0.253	506.000	8.43333	77.437	0.237
458.000	7.63333	77.453	0.253	507.000	8.45000	77.437	0.237
459.000	7.65000	77.453	0.253	508.000	8.46667	77.437	0.237
460.000	7.66667	77.453	0.253	509.000	8.48333	77.437	0.237
461.000	7.68333	77.437	0.237	510.000	8.50000	77.437	0.237
462.000	7.70000	77.437	0.237	511.000	8.51667	77.437	0.237
463.000	7.71667	77.437	0.237	512.000	8.53333	77.437	0.237
464.000	7.73333	77.453	0.253	513.000	8.55000	77.437	0.237
465.000	7.75000	77.453	0.253	514.000	8.56667	77.437	0.237
466.000	7.76667	77.453	0.253	515.000	8.58333	77.437	0.237
467.000	7.78333	77.453	0.253	516.000	8.60000	77.437	0.237
468.000	7.80000	77.453	0.253	517.000	8.61667	77.437	0.237
469.000	7.81667	77.453	0.253	518.000	8.63333	77.437	0.237
470.000	7.83333	77.453	0.253	519.000	8.65000	77.437	0.237
471.000	7.85000	77.453	0.253	520.000	8.66667	77.437	0.237
472.000	7.86667	77.437	0.237	521.000	8.68333	77.437	0.237
473.000	7.88333	77.437	0.237	522.000	8.70000	77.437	0.237
474.000	7.90000	77.453	0.253	523.000	8.71667	77.437	0.237
475.000	7.91667	77.437	0.237	524.000	8.73333	77.437	0.237
476.000	7.93333	77.437	0.237	525.000	8.75000	77.437	0.237
477.000	7.95000	77.437	0.237	526.000	8.76667	77.437	0.237
478.000	7.96667	77.437	0.237	527.000	8.78333	77.437	0.237
479.000	7.98333	77.437	0.237	528.000	8.80000	77.437	0.237
480.000	8.00000	77.453	0.253	529.000	8.81667	77.437	0.237
481.000	8.01667	77.437	0.237	530.000	8.83333	77.437	0.237
482.000	8.03333	77.437	0.237	531.000	8.85000	77.437	0.237
483.000	8.05000	77.437	0.237	532.000	8.86667	77.437	0.237

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
533.000	8.88333	77.437	0.237	582.000	9.70000	77.421	0.221
534.000	8.90000	77.437	0.237	583.000	9.71667	77.421	0.221
535.000	8.91667	77.437	0.237	584.000	9.73333	77.421	0.221
536.000	8.93333	77.437	0.237	585.000	9.75000	77.421	0.221
537.000	8.95000	77.437	0.237	586.000	9.76667	77.421	0.221
538.000	8.96667	77.437	0.237	587.000	9.78333	77.421	0.221
539.000	8.98333	77.437	0.237	588.000	9.80000	77.421	0.221
540.000	9.00000	77.437	0.237	589.000	9.81667	77.421	0.221
541.000	9.01667	77.421	0.221	590.000	9.83333	77.421	0.221
542.000	9.03333	77.421	0.221	591.000	9.85000	77.421	0.221
543.000	9.05000	77.437	0.237	592.000	9.86667	77.437	0.237
544.000	9.06667	77.437	0.237	593.000	9.88333	77.421	0.221
545.000	9.08333	77.437	0.237	594.000	9.90000	77.421	0.221
546.000	9.10000	77.421	0.221	595.000	9.91667	77.421	0.221
547.000	9.11667	77.437	0.237	596.000	9.93333	77.437	0.237
548.000	9.13333	77.437	0.237	597.000	9.95000	77.421	0.221
549.000	9.15000	77.437	0.237	598.000	9.96667	77.421	0.221
550.000	9.16667	77.437	0.237	599.000	9.98333	77.421	0.221
551.000	9.18333	77.437	0.237	600.000	10.00000	77.421	0.221
552.000	9.20000	77.437	0.237	601.000	10.01667	77.421	0.221
553.000	9.21667	77.421	0.221	602.000	10.03333	77.421	0.221
554.000	9.23333	77.421	0.221	603.000	10.05000	77.421	0.221
555.000	9.25000	77.437	0.237	604.000	10.06667	77.421	0.221
556.000	9.26667	77.421	0.221	605.000	10.08333	77.421	0.221
557.000	9.28333	77.421	0.221	606.000	10.10000	77.421	0.221
558.000	9.30000	77.421	0.221	607.000	10.11667	77.421	0.221
559.000	9.31667	77.421	0.221	608.000	10.13333	77.421	0.221
560.000	9.33333	77.421	0.221	609.000	10.15000	77.421	0.221
561.000	9.35000	77.421	0.221	610.000	10.16667	77.421	0.221
562.000	9.36667	77.421	0.221	611.000	10.18333	77.421	0.221
563.000	9.38333	77.421	0.221	612.000	10.20000	77.421	0.221
564.000	9.40000	77.421	0.221	613.000	10.21667	77.437	0.237
565.000	9.41667	77.421	0.221	614.000	10.23333	77.421	0.221
566.000	9.43333	77.421	0.221	615.000	10.25000	77.421	0.221
567.000	9.45000	77.421	0.221	616.000	10.26667	77.421	0.221
568.000	9.46667	77.421	0.221	617.000	10.28333	77.421	0.221
569.000	9.48333	77.437	0.237	618.000	10.30000	77.421	0.221
570.000	9.50000	77.437	0.237	619.000	10.31667	77.421	0.221
571.000	9.51667	77.437	0.237	620.000	10.33333	77.421	0.221
572.000	9.53333	77.421	0.221	621.000	10.35000	77.421	0.221
573.000	9.55000	77.421	0.221	622.000	10.36667	77.437	0.237
574.000	9.56667	77.421	0.221	623.000	10.38333	77.421	0.221
575.000	9.58333	77.437	0.237	624.000	10.40000	77.421	0.221
576.000	9.60000	77.437	0.237	625.000	10.41667	77.421	0.221
577.000	9.61667	77.421	0.221	626.000	10.43333	77.437	0.237
578.000	9.63333	77.421	0.221	627.000	10.45000	77.421	0.221
579.000	9.65000	77.421	0.221	628.000	10.46667	77.421	0.221
580.000	9.66667	77.421	0.221	629.000	10.48333	77.421	0.221
581.000	9.68333	77.421	0.221	630.000	10.50000	77.421	0.221

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
631.000	10.51667	77.421	0.221	680.000	11.33333	77.421	0.221
632.000	10.53333	77.421	0.221	681.000	11.35000	77.421	0.221
633.000	10.55000	77.421	0.221	682.000	11.36667	77.421	0.221
634.000	10.56667	77.421	0.221	683.000	11.38333	77.405	0.205
635.000	10.58333	77.421	0.221	684.000	11.40000	77.421	0.221
636.000	10.60000	77.421	0.221	685.000	11.41667	77.421	0.221
637.000	10.61667	77.437	0.237	686.000	11.43333	77.421	0.221
638.000	10.63333	77.437	0.237	687.000	11.45000	77.421	0.221
639.000	10.65000	77.421	0.221	688.000	11.46667	77.421	0.221
640.000	10.66667	77.421	0.221	689.000	11.48333	77.405	0.205
641.000	10.68333	77.421	0.221	690.000	11.50000	77.405	0.205
642.000	10.70000	77.421	0.221	691.000	11.51667	77.405	0.205
643.000	10.71667	77.437	0.237	692.000	11.53333	77.405	0.205
644.000	10.73333	77.437	0.237	693.000	11.55000	77.421	0.221
645.000	10.75000	77.421	0.221	694.000	11.56667	77.421	0.221
646.000	10.76667	77.421	0.221	695.000	11.58333	77.405	0.205
647.000	10.78333	77.421	0.221	696.000	11.60000	77.405	0.205
648.000	10.80000	77.421	0.221	697.000	11.61667	77.421	0.221
649.000	10.81667	77.421	0.221	698.000	11.63333	77.405	0.205
650.000	10.83333	77.421	0.221	699.000	11.65000	77.421	0.221
651.000	10.85000	77.421	0.221	700.000	11.66667	77.405	0.205
652.000	10.86667	77.421	0.221	701.000	11.68333	77.405	0.205
653.000	10.88333	77.421	0.221	702.000	11.70000	77.405	0.205
654.000	10.90000	77.421	0.221	703.000	11.71667	77.405	0.205
655.000	10.91667	77.421	0.221	704.000	11.73333	77.405	0.205
656.000	10.93333	77.421	0.221	705.000	11.75000	77.421	0.221
657.000	10.95000	77.421	0.221	706.000	11.76667	77.405	0.205
658.000	10.96667	77.421	0.221	707.000	11.78333	77.405	0.205
659.000	10.98333	77.421	0.221	708.000	11.80000	77.405	0.205
660.000	11.00000	77.421	0.221	709.000	11.81667	77.405	0.205
661.000	11.01667	77.421	0.221	710.000	11.83333	77.405	0.205
662.000	11.03333	77.421	0.221	711.000	11.85000	77.405	0.205
663.000	11.05000	77.421	0.221	712.000	11.86667	77.405	0.205
664.000	11.06667	77.421	0.221	713.000	11.88333	77.405	0.205
665.000	11.08333	77.421	0.221	714.000	11.90000	77.405	0.205
666.000	11.10000	77.421	0.221	715.000	11.91667	77.405	0.205
667.000	11.11667	77.421	0.221	716.000	11.93333	77.405	0.205
668.000	11.13333	77.421	0.221	717.000	11.95000	77.405	0.205
669.000	11.15000	77.421	0.221	718.000	11.96667	77.405	0.205
670.000	11.16667	77.421	0.221	719.000	11.98333	77.405	0.205
671.000	11.18333	77.421	0.221	720.000	12.00000	77.405	0.205
672.000	11.20000	77.421	0.221	721.000	12.01667	77.405	0.205
673.000	11.21667	77.421	0.221	722.000	12.03333	77.405	0.205
674.000	11.23333	77.421	0.221	723.000	12.05000	77.405	0.205
675.000	11.25000	77.405	0.205	724.000	12.06667	77.405	0.205
676.000	11.26667	77.421	0.221	725.000	12.08333	77.405	0.205
677.000	11.28333	77.421	0.221	726.000	12.10000	77.405	0.205
678.000	11.30000	77.421	0.221	727.000	12.11667	77.405	0.205
679.000	11.31667	77.421	0.221	728.000	12.13333	77.405	0.205

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
729.000	12.15000	77.405	0.205	778.000	12.96667	77.405	0.205
730.000	12.16667	77.405	0.205	779.000	12.98333	77.405	0.205
731.000	12.18333	77.405	0.205	780.000	13.00000	77.405	0.205
732.000	12.20000	77.405	0.205	781.000	13.01667	77.405	0.205
733.000	12.21667	77.405	0.205	782.000	13.03333	77.405	0.205
734.000	12.23333	77.405	0.205	783.000	13.05000	77.405	0.205
735.000	12.25000	77.405	0.205	784.000	13.06667	77.405	0.205
736.000	12.26667	77.421	0.221	785.000	13.08333	77.405	0.205
737.000	12.28333	77.405	0.205	786.000	13.10000	77.405	0.205
738.000	12.30000	77.405	0.205	787.000	13.11667	77.405	0.205
739.000	12.31667	77.405	0.205	788.000	13.13333	77.421	0.221
740.000	12.33333	77.405	0.205	789.000	13.15000	77.405	0.205
741.000	12.35000	77.405	0.205	790.000	13.16667	77.405	0.205
742.000	12.36667	77.405	0.205	791.000	13.18333	77.405	0.205
743.000	12.38333	77.405	0.205	792.000	13.20000	77.405	0.205
744.000	12.40000	77.405	0.205	793.000	13.21667	77.405	0.205
745.000	12.41667	77.405	0.205	794.000	13.23333	77.405	0.205
746.000	12.43333	77.405	0.205	795.000	13.25000	77.405	0.205
747.000	12.45000	77.405	0.205	796.000	13.26667	77.405	0.205
748.000	12.46667	77.405	0.205	797.000	13.28333	77.405	0.205
749.000	12.48333	77.405	0.205	798.000	13.30000	77.405	0.205
750.000	12.50000	77.405	0.205	799.000	13.31667	77.405	0.205
751.000	12.51667	77.405	0.205	800.000	13.33333	77.405	0.205
752.000	12.53333	77.405	0.205	801.000	13.35000	77.405	0.205
753.000	12.55000	77.405	0.205	802.000	13.36667	77.405	0.205
754.000	12.56667	77.405	0.205	803.000	13.38333	77.405	0.205
755.000	12.58333	77.405	0.205	804.000	13.40000	77.405	0.205
756.000	12.60000	77.405	0.205	805.000	13.41667	77.405	0.205
757.000	12.61667	77.405	0.205	806.000	13.43333	77.405	0.205
758.000	12.63333	77.405	0.205	807.000	13.45000	77.405	0.205
759.000	12.65000	77.405	0.205	808.000	13.46667	77.405	0.205
760.000	12.66667	77.421	0.221	809.000	13.48333	77.405	0.205
761.000	12.68333	77.405	0.205	810.000	13.50000	77.405	0.205
762.000	12.70000	77.405	0.205	811.000	13.51667	77.405	0.205
763.000	12.71667	77.405	0.205	812.000	13.53333	77.405	0.205
764.000	12.73333	77.405	0.205	813.000	13.55000	77.405	0.205
765.000	12.75000	77.405	0.205	814.000	13.56667	77.405	0.205
766.000	12.76667	77.405	0.205	815.000	13.58333	77.405	0.205
767.000	12.78333	77.405	0.205	816.000	13.60000	77.405	0.205
768.000	12.80000	77.405	0.205	817.000	13.61667	77.405	0.205
769.000	12.81667	77.405	0.205	818.000	13.63333	77.405	0.205
770.000	12.83333	77.405	0.205	819.000	13.65000	77.405	0.205
771.000	12.85000	77.405	0.205	820.000	13.66667	77.405	0.205
772.000	12.86667	77.405	0.205	821.000	13.68333	77.405	0.205
773.000	12.88333	77.405	0.205	822.000	13.70000	77.405	0.205
774.000	12.90000	77.405	0.205	823.000	13.71667	77.405	0.205
775.000	12.91667	77.405	0.205	824.000	13.73333	77.405	0.205
776.000	12.93333	77.421	0.221	825.000	13.75000	77.405	0.205
777.000	12.95000	77.405	0.205	826.000	13.76667	77.405	0.205

WELL N-81 RECOVERY AFTER DEVELOPMENT (continued)
first pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)
827.000	13.78333	77.405	0.205
828.000	13.80000	77.405	0.205
829.000	13.81667	77.405	0.205
830.000	13.83333	77.405	0.205
831.000	13.85000	77.405	0.205
832.000	13.86667	77.405	0.205
833.000	13.88333	77.405	0.205
834.000	13.90000	77.405	0.205
835.000	13.91667	77.405	0.205
836.000	13.93333	77.405	0.205
837.000	13.95000	77.405	0.205
838.000	13.96667	77.405	0.205
839.000	13.98333	77.405	0.205
840.000	14.00000	77.405	0.205
841.000	14.01667	77.405	0.205
842.000	14.03333	77.405	0.205
843.000	14.05000	77.405	0.205
844.000	14.06667	77.405	0.205
845.000	14.08333	77.421	0.221
846.000	14.10000	77.405	0.205
847.000	14.11667	77.405	0.205
848.000	14.13333	77.421	0.221
849.000	14.15000	77.405	0.205
850.000	14.16667	77.405	0.205
851.000	14.18333	77.405	0.205
852.000	14.20000	77.405	0.205
853.000	14.21667	77.405	0.205
854.000	14.23333	77.405	0.205
855.000	14.25000	77.405	0.205
856.000	14.26667	77.405	0.205
857.000	14.28333	77.405	0.205
858.000	14.30000	77.405	0.205
859.000	14.31667	77.405	0.205
860.000	14.33333	77.405	0.205
861.000	14.35000	77.405	0.205
862.000	14.36667	77.421	0.221
863.000	14.38333	77.405	0.205
864.000	14.40000	77.405	0.205

WELL N-81 DRAWDOWN DURING DEVELOPMENT
 second pumping sequence
 [associated recovery data not available]

SE2000
 Environmental Logger
 04/22 14:52

Unit# 459 Test 3

INPUT 1: Level (F)

Reference 77.070
 SG 1.000
 Linearity 0.000
 Scale factor 50.170
 Offset 0.000
 Delay mSEC 50.000

Step 0 04/21 08:08:48

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.000	0.00000	76.48	0.59	0.250	0.00417	74.09	2.98
0.008	0.00014	77.01	0.06	0.258	0.00431	73.85	3.22
0.017	0.00028	76.83	0.24	0.267	0.00444	73.82	3.25
0.025	0.00042	76.48	0.59	0.275	0.00458	73.90	3.17
0.033	0.00056	76.53	0.54	0.283	0.00472	74.01	3.06
0.042	0.00069	76.33	0.74	0.292	0.00486	74.03	3.04
0.050	0.00083	76.20	0.87	0.300	0.00500	74.08	2.99
0.058	0.00097	76.10	0.97	0.308	0.00514	74.12	2.95
0.067	0.00111	75.95	1.13	0.317	0.00528	74.15	2.92
0.075	0.00125	75.83	1.24	0.325	0.00542	74.22	2.85
0.083	0.00139	75.71	1.36	0.333	0.00556	74.23	2.84
0.092	0.00153	75.60	1.47	0.350	0.00583	74.30	2.77
0.100	0.00167	75.47	1.60	0.367	0.00611	74.36	2.71
0.108	0.00181	75.36	1.71	0.383	0.00639	74.41	2.66
0.117	0.00194	75.25	1.82	0.400	0.00667	74.46	2.61
0.125	0.00208	75.14	1.93	0.417	0.00694	74.47	2.60
0.133	0.00222	75.04	2.03	0.433	0.00722	74.49	2.58
0.142	0.00236	74.90	2.17	0.450	0.00750	74.52	2.55
0.150	0.00250	74.82	2.25	0.467	0.00778	74.55	2.52
0.158	0.00264	74.71	2.36	0.483	0.00806	74.57	2.50
0.167	0.00278	74.58	2.49	0.500	0.00833	74.60	2.47
0.175	0.00292	74.52	2.55	0.517	0.00861	74.63	2.44
0.183	0.00306	74.36	2.71	0.533	0.00889	74.65	2.42
0.192	0.00319	74.30	2.77	0.550	0.00917	74.65	2.42
0.200	0.00333	74.17	2.90	0.567	0.00944	74.66	2.41
0.208	0.00347	74.06	3.01	0.583	0.00972	74.68	2.39
0.217	0.00361	73.98	3.09	0.600	0.01000	74.69	2.38
0.225	0.00375	73.84	3.23	0.617	0.01028	74.71	2.36
0.233	0.00389	73.74	3.33	0.633	0.01056	74.73	2.34
0.242	0.00403	74.19	2.88	0.650	0.01083	74.74	2.33

WELL N-81 DRAWDOWN DURING DEVELOPMENT (continued)
second pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.667	0.01111	74.76	2.31	6.800	0.11333	73.43	3.64
0.683	0.01139	74.77	2.30	7.000	0.11667	73.41	3.66
0.700	0.01167	74.80	2.27	7.200	0.12000	73.36	3.71
0.717	0.01194	74.82	2.25	7.400	0.12333	73.32	3.75
0.733	0.01222	74.84	2.23	7.600	0.12667	73.32	3.75
0.750	0.01250	74.84	2.23	7.800	0.13000	73.28	3.79
0.767	0.01278	74.84	2.23	8.000	0.13333	73.25	3.82
0.783	0.01306	74.85	2.22	8.200	0.13667	73.20	3.87
0.800	0.01333	74.87	2.20	8.400	0.14000	73.17	3.90
0.817	0.01361	74.90	2.17	8.600	0.14333	73.17	3.90
0.833	0.01389	74.92	2.15	8.800	0.14667	73.16	3.91
0.850	0.01417	74.92	2.15	9.000	0.15000	73.11	3.96
0.867	0.01444	74.93	2.14	9.200	0.15333	73.08	3.99
0.883	0.01472	74.96	2.11	9.400	0.15667	73.08	3.99
0.900	0.01500	74.98	2.09	9.600	0.16000	73.03	4.04
0.917	0.01528	74.98	2.09	9.800	0.16333	73.03	4.04
0.933	0.01556	74.98	2.09	10.000	0.16667	73.00	4.07
0.950	0.01583	74.99	2.08	11.000	0.18333	72.87	4.20
0.967	0.01611	75.03	2.04	12.000	0.20000	72.78	4.29
0.983	0.01639	75.03	2.04	13.000	0.21667	72.73	4.34
1.000	0.01667	75.03	2.04	14.000	0.23333	72.67	4.40
1.200	0.02000	75.18	1.89	15.000	0.25000	72.55	4.52
1.400	0.02333	75.31	1.76	16.000	0.26667	72.46	4.61
1.600	0.02667	75.41	1.66	17.000	0.28333	72.41	4.66
1.800	0.03000	75.55	1.52	18.000	0.30000	72.30	4.77
2.000	0.03333	75.64	1.43	19.000	0.31667	72.03	5.04
2.200	0.03667	75.71	1.36	20.000	0.33333	71.68	5.39
2.400	0.04000	75.79	1.28	21.000	0.35000	71.38	5.69
2.600	0.04333	75.88	1.19	22.000	0.36667	71.07	6.00
2.800	0.04667	75.91	1.16	23.000	0.38333	70.84	6.23
3.000	0.05000	75.68	1.39	24.000	0.40000	71.03	6.04
3.200	0.05333	75.23	1.84	25.000	0.41667	71.33	5.74
3.400	0.05667	74.92	2.15	26.000	0.43333	71.52	5.55
3.600	0.06000	74.63	2.44	27.000	0.45000	71.73	5.34
3.800	0.06333	74.44	2.63	28.000	0.46667	71.89	5.18
4.000	0.06667	74.33	2.74	29.000	0.48333	72.05	5.02
4.200	0.07000	74.23	2.84	30.000	0.50000	72.22	4.85
4.400	0.07333	74.14	2.93	31.000	0.51667	72.32	4.75
4.600	0.07667	74.06	3.01	32.000	0.53333	72.44	4.63
4.800	0.08000	74.00	3.07	33.000	0.55000	72.48	4.59
5.000	0.08333	73.90	3.17	34.000	0.56667	72.49	4.58
5.200	0.08667	73.81	3.26	35.000	0.58333	72.49	4.58
5.400	0.09000	73.73	3.34	36.000	0.60000	72.51	4.56
5.600	0.09333	73.66	3.41	37.000	0.61667	72.51	4.56
5.800	0.09667	73.60	3.47	38.000	0.63333	72.51	4.56
6.000	0.10000	73.54	3.53	39.000	0.65000	72.51	4.56
6.200	0.10333	73.54	3.53	40.000	0.66667	72.54	4.53
6.400	0.10667	73.47	3.60	41.000	0.68333	72.54	4.53
6.600	0.11000	73.46	3.61	42.000	0.70000	72.54	4.53

WELL N-81 DRAWDOWN DURING DEVELOPMENT (continued)
second pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
43.000	0.71667	72.55	4.52	92.000	1.53333	72.84	4.23
44.000	0.73333	72.55	4.52	93.000	1.55000	72.86	4.21
45.000	0.75000	72.57	4.50	94.000	1.56667	72.86	4.21
46.000	0.76667	72.57	4.50	95.000	1.58333	72.84	4.23
47.000	0.78333	72.60	4.47	96.000	1.60000	72.86	4.21
48.000	0.80000	72.60	4.47	97.000	1.61667	72.87	4.20
49.000	0.81667	72.63	4.44	98.000	1.63333	72.90	4.17
50.000	0.83333	72.65	4.42	99.000	1.65000	72.89	4.18
51.000	0.85000	72.63	4.44	100.000	1.66667	72.92	4.15
52.000	0.86667	72.65	4.42	101.000	1.68333	72.97	4.10
53.000	0.88333	72.65	4.42	102.000	1.70000	72.98	4.09
54.000	0.90000	72.68	4.39	103.000	1.71667	73.00	4.07
55.000	0.91667	72.68	4.39	104.000	1.73333	73.03	4.04
56.000	0.93333	72.67	4.40	105.000	1.75000	73.05	4.02
57.000	0.95000	72.68	4.39	106.000	1.76667	72.98	4.09
58.000	0.96667	72.70	4.37	107.000	1.78333	72.86	4.21
59.000	0.98333	72.68	4.39	108.000	1.80000	72.73	4.34
60.000	1.00000	72.68	4.39	109.000	1.81667	72.62	4.45
61.000	1.01667	72.68	4.39	110.000	1.83333	72.54	4.53
62.000	1.03333	72.70	4.37	111.000	1.85000	72.46	4.61
63.000	1.05000	72.68	4.39	112.000	1.86667	72.41	4.66
64.000	1.06667	72.70	4.37	113.000	1.88333	72.36	4.71
65.000	1.08333	72.71	4.36	114.000	1.90000	72.25	4.82
66.000	1.10000	72.73	4.34	115.000	1.91667	72.21	4.86
67.000	1.11667	72.74	4.33	116.000	1.93333	72.17	4.90
68.000	1.13333	72.76	4.31	117.000	1.95000	72.13	4.94
69.000	1.15000	72.81	4.26	118.000	1.96667	72.11	4.96
70.000	1.16667	72.76	4.31	119.000	1.98333	72.06	5.01
71.000	1.18333	72.78	4.29	120.000	2.00000	72.03	5.04
72.000	1.20000	72.78	4.29	121.000	2.01667	72.00	5.07
73.000	1.21667	72.78	4.29	122.000	2.03333	72.00	5.07
74.000	1.23333	72.79	4.28	123.000	2.05000	71.98	5.09
75.000	1.25000	72.81	4.26	124.000	2.06667	71.97	5.10
76.000	1.26667	72.81	4.26	125.000	2.08333	71.92	5.15
77.000	1.28333	72.79	4.28	126.000	2.10000	71.92	5.15
78.000	1.30000	72.79	4.28	127.000	2.11667	71.92	5.15
79.000	1.31667	72.82	4.25	128.000	2.13333	71.87	5.20
80.000	1.33333	72.84	4.23	129.000	2.15000	71.89	5.18
81.000	1.35000	72.81	4.26	130.000	2.16667	71.84	5.23
82.000	1.36667	72.79	4.28	131.000	2.18333	71.86	5.21
83.000	1.38333	72.79	4.28	132.000	2.20000	71.84	5.23
84.000	1.40000	72.81	4.26	133.000	2.21667	71.84	5.23
85.000	1.41667	72.79	4.28	134.000	2.23333	71.86	5.21
86.000	1.43333	72.81	4.26	135.000	2.25000	71.84	5.23
87.000	1.45000	72.81	4.26	136.000	2.26667	71.86	5.21
88.000	1.46667	72.82	4.25	137.000	2.28333	71.86	5.21
89.000	1.48333	72.81	4.26	138.000	2.30000	71.84	5.23
90.000	1.50000	72.82	4.25	139.000	2.31667	71.84	5.23
91.000	1.51667	72.84	4.23	140.000	2.33333	71.84	5.23

WELL N-81 DRAWDOWN DURING DEVELOPMENT (continued)
second pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
141.000	2.35000	71.84	5.23	190.000	3.16667	71.94	5.13
142.000	2.36667	71.87	5.20	191.000	3.18333	71.97	5.10
143.000	2.38333	71.87	5.20	192.000	3.20000	71.92	5.15
144.000	2.40000	71.86	5.21	193.000	3.21667	71.95	5.12
145.000	2.41667	71.86	5.21	194.000	3.23333	71.95	5.12
146.000	2.43333	71.86	5.21	195.000	3.25000	71.92	5.15
147.000	2.45000	71.83	5.24	196.000	3.26667	71.94	5.13
148.000	2.46667	71.84	5.23	197.000	3.28333	72.13	4.94
149.000	2.48333	71.83	5.24	198.000	3.30000	72.38	4.69
150.000	2.50000	71.84	5.23	199.000	3.31667	72.63	4.44
151.000	2.51667	71.83	5.24	200.000	3.33333	72.86	4.21
152.000	2.53333	71.87	5.20	201.000	3.35000	73.05	4.02
153.000	2.55000	71.84	5.23	202.000	3.36667	73.20	3.87
154.000	2.56667	71.86	5.21	203.000	3.38333	73.33	3.74
155.000	2.58333	71.87	5.20	204.000	3.40000	73.47	3.60
156.000	2.60000	71.86	5.21	205.000	3.41667	73.58	3.49
157.000	2.61667	71.86	5.21	206.000	3.43333	73.66	3.41
158.000	2.63333	71.84	5.23	207.000	3.45000	73.76	3.31
159.000	2.65000	71.86	5.21	208.000	3.46667	73.82	3.25
160.000	2.66667	71.86	5.21	209.000	3.48333	73.84	3.23
161.000	2.68333	71.84	5.23	210.000	3.50000	73.92	3.15
162.000	2.70000	71.87	5.20	211.000	3.51667	73.93	3.14
163.000	2.71667	71.87	5.20	212.000	3.53333	73.96	3.11
164.000	2.73333	71.87	5.20	213.000	3.55000	73.98	3.09
165.000	2.75000	71.87	5.20	214.000	3.56667	74.03	3.04
166.000	2.76667	71.87	5.20	215.000	3.58333	74.06	3.01
167.000	2.78333	71.87	5.20	216.000	3.60000	74.08	2.99
168.000	2.80000	71.86	5.21	217.000	3.61667	74.08	2.99
169.000	2.81667	71.89	5.18	218.000	3.63333	74.11	2.96
170.000	2.83333	71.92	5.15	219.000	3.65000	74.09	2.98
171.000	2.85000	71.89	5.18	220.000	3.66667	74.11	2.96
172.000	2.86667	71.91	5.16	221.000	3.68333	74.12	2.95
173.000	2.88333	71.89	5.18	222.000	3.70000	74.12	2.95
174.000	2.90000	71.91	5.16	223.000	3.71667	74.15	2.92
175.000	2.91667	71.89	5.18	224.000	3.73333	74.15	2.92
176.000	2.93333	71.91	5.16	225.000	3.75000	74.15	2.92
177.000	2.95000	71.87	5.20	226.000	3.76667	74.15	2.92
178.000	2.96667	71.87	5.20	227.000	3.78333	74.17	2.90
179.000	2.98333	71.91	5.16	228.000	3.80000	74.15	2.92
180.000	3.00000	71.91	5.16	229.000	3.81667	74.17	2.90
181.000	3.01667	71.91	5.16	230.000	3.83333	74.19	2.88
182.000	3.03333	71.92	5.15	231.000	3.85000	74.19	2.88
183.000	3.05000	71.89	5.18	232.000	3.86667	74.17	2.90
184.000	3.06667	71.89	5.18	233.000	3.88333	74.22	2.85
185.000	3.08333	71.91	5.16	234.000	3.90000	74.20	2.87
186.000	3.10000	71.94	5.13	235.000	3.91667	74.22	2.85
187.000	3.11667	71.92	5.15				
188.000	3.13333	71.92	5.15				
189.000	3.15000	71.94	5.13				

WELL N-81 DRAWDOWN DURING DEVELOPMENT (continued)
second pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
236.000	3.93333	74.22	2.85	285.000	4.75000	74.30	2.77
237.000	3.95000	74.20	2.87	286.000	4.76667	74.31	2.76
238.000	3.96667	74.22	2.85	287.000	4.78333	74.30	2.77
239.000	3.98333	74.19	2.88	288.000	4.80000	74.28	2.79
240.000	4.00000	74.19	2.88	289.000	4.81667	74.28	2.79
241.000	4.01667	74.20	2.87	290.000	4.83333	74.31	2.76
242.000	4.03333	74.20	2.87	291.000	4.85000	74.30	2.77
243.000	4.05000	74.22	2.85	292.000	4.86667	74.30	2.77
244.000	4.06667	74.20	2.87	293.000	4.88333	74.28	2.79
245.000	4.08333	74.19	2.88	294.000	4.90000	74.28	2.79
246.000	4.10000	74.22	2.85	295.000	4.91667	74.28	2.79
247.000	4.11667	74.25	2.82	296.000	4.93333	74.27	2.80
248.000	4.13333	74.22	2.85	297.000	4.95000	74.28	2.79
249.000	4.15000	74.22	2.85	298.000	4.96667	74.28	2.79
250.000	4.16667	74.23	2.84	299.000	4.98333	74.31	2.76
251.000	4.18333	74.22	2.85	300.000	5.00000	74.31	2.76
252.000	4.20000	74.23	2.84	301.000	5.01667	74.31	2.76
253.000	4.21667	74.22	2.85	302.000	5.03333	74.31	2.76
254.000	4.23333	74.25	2.82	303.000	5.05000	74.30	2.77
255.000	4.25000	74.22	2.85	304.000	5.06667	74.31	2.76
256.000	4.26667	74.27	2.80	305.000	5.08333	74.31	2.76
257.000	4.28333	74.25	2.82	306.000	5.10000	74.30	2.77
258.000	4.30000	74.25	2.82	307.000	5.11667	74.31	2.76
259.000	4.31667	74.27	2.80	308.000	5.13333	74.33	2.74
260.000	4.33333	74.23	2.84	309.000	5.15000	74.30	2.77
261.000	4.35000	74.25	2.82	310.000	5.16667	74.31	2.76
262.000	4.36667	74.22	2.85	311.000	5.18333	74.31	2.76
263.000	4.38333	74.22	2.85	312.000	5.20000	74.33	2.74
264.000	4.40000	74.25	2.82	313.000	5.21667	74.31	2.76
265.000	4.41667	74.25	2.82	314.000	5.23333	74.34	2.73
266.000	4.43333	74.27	2.80	315.000	5.25000	74.36	2.71
267.000	4.45000	74.28	2.79	316.000	5.26667	74.36	2.71
268.000	4.46667	74.23	2.84	317.000	5.28333	74.34	2.73
269.000	4.48333	74.27	2.80	318.000	5.30000	74.36	2.71
270.000	4.50000	74.30	2.77	319.000	5.31667	74.34	2.73
271.000	4.51667	74.28	2.79	320.000	5.33333	74.38	2.69
272.000	4.53333	74.28	2.79	321.000	5.35000	74.36	2.71
273.000	4.55000	74.25	2.82	322.000	5.36667	74.36	2.71
274.000	4.56667	74.23	2.84	323.000	5.38333	74.34	2.73
275.000	4.58333	74.28	2.79	324.000	5.40000	74.36	2.71
276.000	4.60000	74.28	2.79	325.000	5.41667	74.38	2.69
277.000	4.61667	74.30	2.77	326.000	5.43333	74.36	2.71
278.000	4.63333	74.31	2.76	327.000	5.45000	74.38	2.69
279.000	4.65000	74.27	2.80	328.000	5.46667	74.36	2.71
280.000	4.66667	74.30	2.77	329.000	5.48333	74.34	2.73
281.000	4.68333	74.27	2.80	330.000	5.50000	74.38	2.69
282.000	4.70000	74.28	2.79	331.000	5.51667	74.38	2.69
283.000	4.71667	74.28	2.79	332.000	5.53333	74.36	2.71
284.000	4.73333	74.31	2.76	333.000	5.55000	74.38	2.69

WELL N-81 DRAWDOWN DURING DEVELOPMENT (continued)
second pumping sequence

Time:min	Time:hrs	D-T-W:Ft	s (ft)
334.000	5.56667	74.38	2.69
335.000	5.58333	74.39	2.68
336.000	5.60000	74.38	2.69
337.000	5.61667	74.36	2.71
338.000	5.63333	74.38	2.69
339.000	5.65000	74.39	2.68
340.000	5.66667	74.39	2.68
341.000	5.68333	74.36	2.71
342.000	5.70000	74.39	2.68
343.000	5.71667	74.39	2.68
344.000	5.73333	74.39	2.68

BOREHOLE TEST INFORMATION

page 1 of 1

Borehole 199-N81 Borehole Diameter 4 in. Hanford Coordinates N/A
 Interval Tested 73.33 - 93.33' Depth Interval 73.33'-93.33' Test Type: Instantaneous Slug
 Borehole Depth: 93.33' Instruction Used: WHC-CM-7-7 (EII 10.1)

EQUIPMENT

NAME	DESCRIPTION
Electric Sounder	Solinst s/n: ET-4 Calibration due: 7-27-93
Data Logger	In-Situ Inc. s/n: 2K-459
Pressure Transducer	In-Situ Inc. s/n: 2303 Calibration due: 7-09-93
Slugging Rod	Site Fabricated 6.24'Lx2.5"D 0.194 cu. ft.
Steel Measuring Tape	300' Graduated Steel Tape

MEASUREMENT DATUM

Control Datum: Top of Casing (TOC) 6"
 Elevation: N/A
 Electric Sounder: TOC 6"
 Steel Tape: TOC 6"
 Pressure Transducer: TOC 6"

COMMENTS

WELL HEAD DIAGRAM

Recorded by:

R. S. Edrington
 Sign and Print Name

R S. Edrington

Date: 04/23/93

Page 1 of

Time:	Start	End
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Baseline	<u>1122</u>	<u>1135</u>
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Injection	1135	1215
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Date: 04-22-93

Initial Pressure (Pi): 0.00

Slug Level/Pressure (Pmax) 3.200

Borehole Diameter: 4"

Borehole Diameter: 4"

Recorded by: Robert S. Edrington Robert S. Edrington Date: 04-23-93
Sign and Print Name

WELL N-81 BASELINE FOR SLUG TEST

SE2000
Environmental Logger
04/22 14:50

Unit# 459 Test 4

INPUT 1: Level (F)

Reference 77.070
SG 1.000
Linearity 0.000
Scale factor 50.170
Offset 0.000
Delay mSEC 50.000

Step 0 04/22 11:22:11

Time:min Time:hrs D-T-W:Ft

0	0.00000	77.09
1	0.01667	77.09
2	0.03333	77.09
3	0.05000	77.09
4	0.06667	77.09
5	0.08333	77.07
6	0.10000	77.09
7	0.11667	77.09
8	0.13333	77.07
9	0.15000	77.09
10	0.16667	77.07
11	0.18333	77.09
12	0.20000	77.09
13	0.21667	77.10

WELL N-81 SLUG INJECTION

SE2000
Environmental Logger
04/22 14:47

Unit# 459 Test 5

INPUT 1: Level (F)

Reference 77.070
SG 1.000
Linearity 0.000
Scale factor 50.170
Offset 0.000
Delay mSEC 50.000

Step 0 04/22 11:35:49

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.00	0.00000	77.81	0.74	0.27	0.00444	77.56	0.49
0.01	0.00014	83.85	6.78	0.28	0.00458	77.56	0.49
0.02	0.00028	71.91	-5.16	0.28	0.00472	77.56	0.49
0.03	0.00042	80.30	3.23	0.29	0.00486	77.56	0.49
0.03	0.00056	76.42	-0.65	0.30	0.00500	77.56	0.49
0.04	0.00069	78.26	1.19	0.31	0.00514	77.56	0.49
0.05	0.00083	77.64	0.57	0.32	0.00528	77.56	0.49
0.06	0.00097	77.66	0.59	0.33	0.00542	77.55	0.48
0.07	0.00111	77.78	0.71	0.33	0.00556	77.55	0.48
0.08	0.00125	77.50	0.43	0.35	0.00583	77.55	0.48
0.08	0.00139	77.75	0.68	0.37	0.00611	77.55	0.48
0.09	0.00153	77.66	0.59	0.38	0.00639	77.55	0.48
0.10	0.00167	77.61	0.54	0.40	0.00667	77.55	0.48
0.11	0.00181	77.58	0.51	0.42	0.00694	77.53	0.46
0.12	0.00194	77.66	0.59	0.43	0.00722	77.55	0.48
0.13	0.00208	77.66	0.59	0.45	0.00750	77.53	0.46
0.13	0.00222	77.59	0.52	0.47	0.00778	77.53	0.46
0.14	0.00236	77.61	0.54	0.48	0.00806	77.53	0.46
0.15	0.00250	77.61	0.54	0.50	0.00833	77.53	0.46
0.16	0.00264	77.61	0.54	0.52	0.00861	77.51	0.44
0.17	0.00278	77.61	0.54	0.53	0.00889	77.51	0.44
0.18	0.00292	77.58	0.51	0.55	0.00917	77.51	0.44
0.18	0.00306	77.59	0.52	0.57	0.00944	77.51	0.44
0.19	0.00319	77.59	0.52	0.58	0.00972	77.51	0.44
0.20	0.00333	77.58	0.51	0.60	0.01000	77.51	0.44
0.21	0.00347	77.59	0.52	0.62	0.01028	77.51	0.44
0.22	0.00361	77.58	0.51	0.63	0.01056	77.50	0.43
0.23	0.00375	77.56	0.49	0.65	0.01083	77.50	0.43
0.23	0.00389	77.59	0.52	0.67	0.01111	77.50	0.43
0.24	0.00403	77.56	0.49	0.68	0.01139	77.50	0.43
0.25	0.00417	77.56	0.49	0.70	0.01167	77.48	0.41
0.26	0.00431	77.56	0.49	0.72	0.01194	77.48	0.41

WELL N-81 SLUG INJECTION (continued)

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.73	0.01222	77.48	0.41	7.80	0.13000	77.13	0.06
0.75	0.01250	77.48	0.41	8.00	0.13333	77.13	0.06
0.77	0.01278	77.47	0.40	8.20	0.13667	77.12	0.05
0.78	0.01306	77.48	0.41	8.40	0.14000	77.12	0.05
0.80	0.01333	77.48	0.41	8.60	0.14333	77.12	0.05
0.82	0.01361	77.47	0.40	8.80	0.14667	77.12	0.05
0.83	0.01389	77.47	0.40	9.00	0.15000	77.12	0.05
0.85	0.01417	77.47	0.40	9.20	0.15333	77.12	0.05
0.87	0.01444	77.47	0.40	9.40	0.15667	77.12	0.05
0.88	0.01472	77.45	0.38	9.60	0.16000	77.12	0.05
0.90	0.01500	77.45	0.38	9.80	0.16333	77.12	0.05
0.92	0.01528	77.45	0.38	10.00	0.16667	77.12	0.05
0.93	0.01556	77.45	0.38	11.00	0.18333	77.10	0.03
0.95	0.01583	77.45	0.38	12.00	0.20000	77.10	0.03
0.97	0.01611	77.45	0.38	13.00	0.21667	77.09	0.02
0.98	0.01639	77.45	0.38	14.00	0.23333	77.09	0.02
1.00	0.01667	77.43	0.36	15.00	0.25000	77.10	0.03
1.20	0.02000	77.42	0.35	16.00	0.26667	77.09	0.02
1.40	0.02333	77.39	0.32	17.00	0.28333	77.09	0.02
1.60	0.02667	77.36	0.29	18.00	0.30000	77.10	0.03
1.80	0.03000	77.34	0.27	19.00	0.31667	77.10	0.03
2.00	0.03333	77.32	0.25	20.00	0.33333	77.12	0.05
2.20	0.03667	77.29	0.22	21.00	0.35000	77.12	0.05
2.40	0.04000	77.28	0.21	22.00	0.36667	77.10	0.03
2.60	0.04333	77.26	0.19	23.00	0.38333	77.12	0.05
2.80	0.04667	77.24	0.17	24.00	0.40000	77.10	0.03
3.00	0.05000	77.23	0.16	25.00	0.41667	77.10	0.03
3.20	0.05333	77.20	0.13	26.00	0.43333	77.10	0.03
3.40	0.05667	77.20	0.13	27.00	0.45000	77.10	0.03
3.60	0.06000	77.20	0.13	28.00	0.46667	77.10	0.03
3.80	0.06333	77.18	0.11	29.00	0.48333	77.09	0.02
4.00	0.06667	77.18	0.11	30.00	0.50000	77.09	0.02
4.20	0.07000	77.17	0.10	31.00	0.51667	77.09	0.02
4.40	0.07333	77.17	0.10	32.00	0.53333	77.10	0.03
4.60	0.07667	77.15	0.08	33.00	0.55000	77.10	0.03
4.80	0.08000	77.17	0.10	34.00	0.56667	77.10	0.03
5.00	0.08333	77.15	0.08	35.00	0.58333	77.10	0.03
5.20	0.08667	77.13	0.06	36.00	0.60000	77.13	0.06
5.40	0.09000	77.13	0.06	37.00	0.61667	77.12	0.05
5.60	0.09333	77.13	0.06	38.00	0.63333	77.12	0.05
5.80	0.09667	77.15	0.08	39.00	0.65000	77.10	0.03
6.00	0.10000	77.13	0.06	40.00	0.66667	77.12	0.05
6.20	0.10333	77.13	0.06				
6.40	0.10667	77.13	0.06				
6.60	0.11000	77.13	0.06				
6.80	0.11333	77.15	0.08				
7.00	0.11667	77.13	0.06				
7.20	0.12000	77.13	0.06				
7.40	0.12333	77.13	0.06				
7.60	0.12667	77.13	0.06				

WELL N-81 SLUG WITHDRAWAL

SE2000
Environmental Logger
04/22 14:45

Unit# 459 Test 6

INPUT 1: Level (F)

Reference 77.070
SG 1.000
Linearity 0.000
Scale factor 50.170
Offset 0.000
Delay mSEC 50.000

Step 0 04/22 12:16:55

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.00	0.00000	77.04	0.03	0.28	0.00458	76.29	0.78
0.01	0.00014	78.42	-1.35	0.28	0.00472	76.31	0.76
0.03	0.00042	75.23	1.84	0.29	0.00486	76.31	0.76
0.03	0.00056	76.44	0.63	0.30	0.00500	76.33	0.74
0.04	0.00069	75.79	1.28	0.31	0.00514	76.33	0.74
0.05	0.00083	75.45	1.62	0.32	0.00528	76.34	0.73
0.06	0.00097	75.55	1.52	0.33	0.00542	76.34	0.73
0.07	0.00111	75.71	1.36	0.33	0.00556	76.36	0.71
0.08	0.00125	75.79	1.28	0.35	0.00583	76.36	0.71
0.08	0.00139	75.82	1.25	0.37	0.00611	76.37	0.70
0.09	0.00153	75.83	1.24	0.38	0.00639	76.39	0.68
0.10	0.00167	75.88	1.19	0.40	0.00667	76.40	0.67
0.11	0.00181	75.91	1.16	0.42	0.00694	76.40	0.67
0.12	0.00194	75.96	1.11	0.43	0.00722	76.42	0.65
0.13	0.00208	75.99	1.08	0.45	0.00750	76.44	0.63
0.13	0.00222	76.02	1.05	0.47	0.00778	76.44	0.63
0.14	0.00236	76.06	1.01	0.48	0.00806	76.45	0.62
0.15	0.00250	76.07	1.00	0.50	0.00833	76.47	0.60
0.16	0.00264	76.10	0.97	0.52	0.00861	76.47	0.60
0.17	0.00278	76.14	0.93	0.53	0.00889	76.48	0.59
0.18	0.00292	76.15	0.92	0.55	0.00917	76.50	0.57
0.18	0.00306	76.17	0.90	0.57	0.00944	76.50	0.57
0.19	0.00319	76.20	0.87	0.58	0.00972	76.52	0.55
0.20	0.00333	76.20	0.87	0.60	0.01000	76.52	0.55
0.21	0.00347	76.21	0.86	0.62	0.01028	76.53	0.54
0.22	0.00361	76.23	0.84	0.63	0.01056	76.53	0.54
0.23	0.00375	76.25	0.82	0.65	0.01083	76.55	0.52
0.23	0.00389	76.25	0.82	0.67	0.01111	76.55	0.52
0.24	0.00403	76.26	0.81	0.68	0.01139	76.56	0.51
0.25	0.00417	76.28	0.79	0.70	0.01167	76.56	0.51
0.26	0.00431	76.28	0.79	0.72	0.01194	76.58	0.49
0.27	0.00444	76.28	0.79	0.73	0.01222	76.58	0.49

WELL N-81 SLUG WITHDRAWAL (continued)

Time:min	Time:hrs	D-T-W:Ft	s (ft)	Time:min	Time:hrs	D-T-W:Ft	s (ft)
0.75	0.01250	76.59	0.48	8.00	0.13333	77.12	-0.05
0.77	0.01278	76.59	0.48	8.20	0.13667	77.12	-0.05
0.78	0.01306	76.61	0.46	8.40	0.14000	77.12	-0.05
0.80	0.01333	76.63	0.44	8.60	0.14333	77.12	-0.05
0.82	0.01361	76.63	0.44	8.80	0.14667	77.12	-0.05
0.83	0.01389	76.63	0.44	9.00	0.15000	77.12	-0.05
0.85	0.01417	76.64	0.43	9.20	0.15333	77.12	-0.05
0.87	0.01444	76.64	0.43	9.40	0.15667	77.12	-0.05
0.88	0.01472	76.64	0.43	9.60	0.16000	77.12	-0.05
0.90	0.01500	76.66	0.41	9.80	0.16333	77.12	-0.05
0.92	0.01528	76.66	0.41	10.00	0.16667	77.12	-0.05
0.93	0.01556	76.67	0.40	11.00	0.18333	77.13	-0.06
0.95	0.01583	76.67	0.40	12.00	0.20000	77.12	-0.05
0.97	0.01611	76.67	0.40	13.00	0.21667	77.12	-0.05
0.98	0.01639	76.69	0.38	14.00	0.23333	77.13	-0.06
1.00	0.01667	76.69	0.38	15.00	0.25000	77.12	-0.05
1.20	0.02000	76.75	0.32	16.00	0.26667	77.13	-0.06
1.40	0.02333	76.80	0.27	17.00	0.28333	77.12	-0.05
1.60	0.02667	76.85	0.22				
1.80	0.03000	76.88	0.19				
2.00	0.03333	76.91	0.16				
2.20	0.03667	76.94	0.13				
2.40	0.04000	76.97	0.10				
2.60	0.04333	76.97	0.10				
2.80	0.04667	76.99	0.08				
3.00	0.05000	77.02	0.05				
3.20	0.05333	77.02	0.05				
3.40	0.05667	77.04	0.03				
3.60	0.06000	77.05	0.02				
3.80	0.06333	77.05	0.02				
4.00	0.06667	77.05	0.02				
4.20	0.07000	77.07	0.00				
4.40	0.07333	77.07	0.00				
4.60	0.07667	77.07	0.00				
4.80	0.08000	77.09	-0.02				
5.00	0.08333	77.09	-0.02				
5.20	0.08667	77.09	-0.02				
5.40	0.09000	77.10	-0.03				
5.60	0.09333	77.10	-0.03				
5.80	0.09667	77.10	-0.03				
6.00	0.10000	77.10	-0.03				
6.20	0.10333	77.12	-0.05				
6.40	0.10667	77.10	-0.03				
6.60	0.11000	77.12	-0.05				
6.80	0.11333	77.10	-0.03				
7.00	0.11667	77.10	-0.03				
7.20	0.12000	77.10	-0.03				
7.40	0.12333	77.12	-0.05				
7.60	0.12667	77.12	-0.05				
7.80	0.13000	77.12	-0.05				

DATE

FILMED

7/12/94

END