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SUPPORTING DOCUMENT

1. Total Pages 979

2. Title	3. Number	4. Rev No.
1991 Borehole Completion Data Package for the Low-Level Burial Grounds	WHC-SD-EN-DP-044 Volume 3 of 3	0

5. Key Words

BOREHOLE COMPLETION; MONITORING WELLS; LOW-LEVEL BURIAL GROUNDS; GROUNDWATER MONITORING

APPROVED FOR PUBLIC RELEASE

1-26-93 D. Soler

6. Author

Name: R.B. Mercer

R B Mercer
Signature

Organization/Charge Code 81235 / R4GD1

7. Abstract

Eighteen additional groundwater monitoring wells were installed around the Low-Level Burial Grounds in 1991. This data package contains information on the drilling, construction, development, and aquifer testing of these wells.

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14.0 WELL 299-W6-3

14.1 DRILLING

Construction of this well began on 8 August 1991 and total depth of 441.0 feet was reached on 15 November 1991. The well was drilled using a cable tool rig. Approximately 856 gallons of water were added during drilling activities. Specific well construction information is located in Table 14.1. Well Guard, a non-petroleum based lubricant, was used on the drilling tools. A more detailed description of the drilling is shown in the Well Summary report at the end of this section.

Table 14.1 299-W6-3 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	16"	22.1	ALS
	12"	171.3	ALS
	10"	341.3	ALS
	8"	441.0	ALS
Gross Gamma Logging	6 September	159.5	0
	1 October	341.1	125.0
	15 October	440.0	310.0
Backfill	Hole Plug	441.0	424.8
Permanent Casing	4"	409.6	ALS
Screen	4" 20-Slot	419.2	409.6
Filter Pack	8-12 Silica Sand	424.8	420.2
	10-20 Silica Sand	420.2	406.0
	20-40 Silica Sand	406.0	403.0
	8-12 Silica Sand	403.0	402.1
Annular Seal	Bentonite Slurry	402.1	19.5
	Cement Grout	19.5	0
Concrete Pad	4'x4'x6"	0	ALS

BLS - Below Land Surface
ALS - Above Land Surface

Sediments from the Hanford formation, early "Palouse" soil, Plio-Pleistocene unit, and the Ringold Formation were encountered in this borehole. Hanford deposits extended to 61.5 feet BLS and consisted of sandy gravels. Approximately 26.50 feet (61.5-88 feet BLS) of silty sand represents

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the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (88-441 feet BLS).

The first 20 feet of the borehole were dug with a backhoe. The remainder of the borehole was advanced primarily by the drive barrel however some hard tool drilling was done in more resistant zones and below the water table. Samples were collected at approximately 5 foot intervals for moisture content (above the water table only), radiological screening, carbonate analysis, and lithologic archiving. Grain size analysis was done on samples from the interval to be screened. The borehole log and physical data for this well are located at the end of this section.

Gross gamma logging was conducted as indicated in Table 14.1. Reproductions of these logs are also located at the end of this section.

14.2 WELL COMPLETION

Well completion began on 26 November 1991 and was completed on 21 December 1991. Static water level at the time of completion was 259.0 feet below land surface (BLS). Completion details are presented in Table 14.1. This borehole was completed to monitor the lower portion of the unconfined aquifer. A Nonconformance Report (NCR B05431) was issued following the loss of the eight and ten inch temporary casing shoes. Both shoes were sealed in bentonite above the water level. Approximately 40 gallons of water were removed from the well to settle the filter pack. A 6 inch protective casing with a locking cap, four guard posts, and a brass marker with the well number were also set in the concrete pad. Elevations were determined for the brass marker, the top of the protective casing, and the top of the Hydrostar plate. Lambert and plant (200 West datum) coordinates were established for the centerline of the well. Documentation of well completion activities can be found in the Well Construction Report.

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14.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 27 December 1991 using a 1.5 horsepower Grundfos submersible pump. Approximately 4010 gallons of water were removed to develop the well. A dedicated Hydrostar pump was installed on 27 December with the intake located 417.3 feet below the top of the protective casing.

14.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 26 and 27 December 1991. The data from the well development pumping was collected for analysis as drawdown and recovery tests however the data was not interpretable. Results from these tests are presented in Table 14.2. Slug injection and slug withdrawal data plots are shown in Figures 14.1 and 14.2. Raw data from the aquifer testing at 299-W6-3 are located at the end of this section.

Table 14.2 Hydrologic Testing Results from 299-W6-3				
Formation: Ringold		Lithology: Sand and Gravel	Interval Tested*: 412.2-422.6	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Discharge	26 Dec 91	Not Interpretable	----	----
Recovery	26 Dec 91	Not Interpretable	----	----
Slug Injection	27 Dec 91	Bouwer-Rice (1989)	1	----
Slug Withdrawal	27 Dec 91	Bouwer-Rice (1989)	2	----

* Depth below top of 6" protective casing

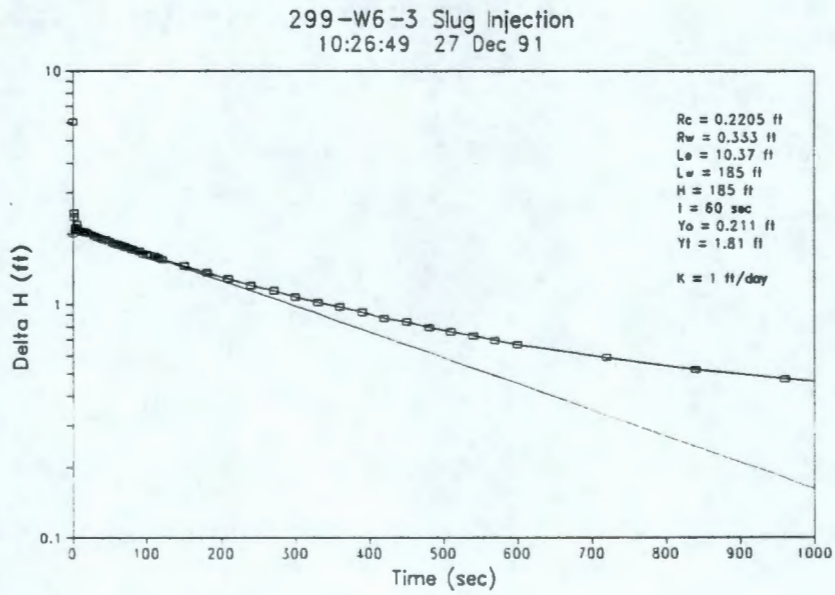

Figure 14.1 299-W6-3 Slug Injection Plot.

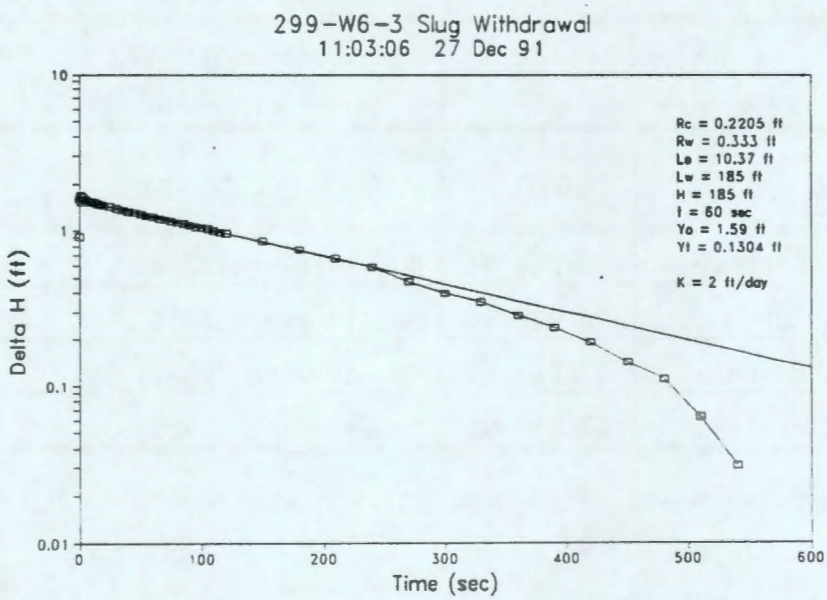

Figure 14.2 299-W6-3 Slug Withdrawal Plot.

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WELL 299-W6-3

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
8-8-91	10-15-91	40	N/A	441.0	9-19-91 229.6' 9-23-91 236.7' 9-25-91 247.1' 9-30-91 249.7' 10-7-91 243.0' 10-10-91 266.4' 10-14-91 260.6'	956 GALLONS 10-15-91 259.0' 10-1-91 249.8'

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
11-26-91	12-21-91	21		441'-BENTONITE 424.8'-SAND	409.5'-419.5'	ADD 150 GALLONS/BAIL 150 GALLONS TO FLUSH FINES REMOVED ~40 GALLONS TO DEVELOP SCREEN PACK.

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	12-26-91 12-27-91	12-26-91 12-27-91	12-27-91	~4010 GALLONS

COMMENTS:

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VALIDATED KDR 3/18/92 SIGNATURE/DATE

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WELL CONSTRUCTION REPORT

Specification No. WHC-S-014 (See comments) Rev No. 5

ECNs 144240, 144241, 127437, 150204 (See comments) 150126, 150128, 164970-2

Project W-017/LLBG

Location 200 West/WMA-S

Drilling Company Jensen Drilling Co

Driller John Johnson/Art Gwin

Other (Companies) Ebasco Environmental (CEED) HART CROWSER

Geologist(s) Mike Havens, Rick Weingart, Chris Wright, Brent Jones, Ed Rafuse, Ken Lane, Robert Winn, J.A. Coats

Well No. 299-W6-3 Temp. Well No. W6-MW2

Coordinates N 137,299.13 E 567,118.18

Casing Elev. 699.85 Ground Elev. 696.49

Drilling Method

Verification Method Visual Observation

Criteria WHC-S-014: 5.2, 5.3, 7.5 EII 6.7, sect 6.2

			Initials	Date
Rotary	Air N/A	Mud N/A	N/A	N/A
Cable Tool	D 0-75 85-145 125-200 145-245 245-305 305-340 340-370	200-225 225-320 165-175 305-340 75-85 230-275	CSW	10/15/91
Drilling Fluid	~~Raw H_2O~~ CSW 12/30/91	856 GAL	MAH	NA ~~8/8/91~~
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Gross Gamma	0.0 - 159.5	9-6-91
Gross Gamma	341.1 - 125.0	10/1/91
Gross Gamma	440.0 - 310.0	10/15/91
	-	
	-	

Completion Data

Drilled Depth 441.0 CSW

Completed Depth 419.92 CSW

Date Started 8/8/91

Date Completed ~~8/8/91~~ ECR 10/3/91

Static Water Level/Date 259.0, 10/15/91

Aquifer Testing

Type Intermittent Slug

Flow Meter I.D. No. -NA-

Cal. Due Date -NA-

Length of Test 1 hr

Volume Pumped -NA-

Drawdown -NA-

Date of Test 12-27-91

Completion Results

Cleaning

Verification Method Visual Inspection

Criteria WHC-S-014: 4.2.2, ~~6.7~~ 7.6, 7.7 WHC-CM-7-7: 5.4 MJH 8-27-91

	Initials	Date
Drilling Tools/Rig	MJH	8-9-91
Backhoe	MJH *	8-12-91
Temporary Materials	MJH DRF	8-9-91 9-10-91
Permanent Materials	CSW	12/4/91

Screen

Type	Length	Slot Size
T-304 Stainless	10.37'	20 Slot

Depth(s) 419.92' - 409.55'

Verification Method Verify w/ Steel Tape

Criteria WHC-S-014: 4.2.1, 4.2.3, 4.2.5, 12.2.1

Initials CSW Date 12/4/91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014: 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	CSW	12/4/91
Material Packing	CSW	12/4/91

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014: 7.2

	Identify	Initials	Date
Additives	Raw Water	MJH	8-27-91
Lubricants	WellGuard	MJH	8-16-91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014: 8.2

Initials RMW Date 10-15-91

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WELL CONSTRUCTION REPORT
(continuation sheet)

299-W6-3

Casing (permanent)

Type	Size	Placement
T-304 Stainless	4"	409.55 - 0
		-
		-
		-

Verification Method: Verify w/ Steel ~~Pipe~~ Tape (MJH 8-13-91)

Criteria: WHC-S-014: 4.2.1, 4.2.4, 4.2.5, 12.2.1

Initials: CSW Date: 12/4/91

Well Protection

Verification Method: Visual Observation

Criteria: WHC-S-014: 4.2.10

	Initials	Date
Protective Posts	KDR	3/18/92
Protective Casing	KDR	3/18/92
Site Restored	KDR	3/18/92
Cap, Hasp and Lock	KDR	3/18/92
Surface Pad	KDR	3/18/92

Annular Seal/Filter Pack

Verification Method: Verify w/ Steel Tape Criteria: WHC-S-014: 4.2.6, 4.2.7, 4.2.8, 4.2.9, 5.3.1, 5.3.2

Type	Interval	Volume	Initials	Date
Hole plug	441.0 - 424.8	6.4 Ft³	CSW	12/30/91
8-12 Sand	424.8' - 420.22'	3.53 Ft³	CSW	12/30/91
10-20 Sand	420.22 - 406'	5.35 Ft³	CSW	12/30/91
20-40 Sand	406' - 403'	1.12 Ft³	CSW	12/30/91
8-12 Sand	403' - 402.09	.50 Ft³	CSW	12/30/91
Bentonite Slurry	402.09 - 14.5	501.6 Ft³ 2283	CSW	12/30/91
Cement Grout	14.5' - 0'	95.09 Ft³ 745 sw	CSW	12/30/91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014: 3.4

	Initials	Date
Measurement Point/Surveyed	KDR	3/18/92
Protective Casing/Brass Cap Surveyed	KDR	3/18/92
Well Number Stenciled	KDR	3/18/92
Brass Cap Labeled	KDR	3/18/92

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014: 4.2.2, 4.2.11

	Initials	Date
Pump Decon/Prep	JAC	12/27/91
Installed	JAC	12/27/91
Pump Tested	JAC	12/27/91

Other (initial if performed)

NA Well Abandonment; NA Downhole TV Inspection; CSW Complete As-Built Diagram, Driller's/Geologist's Logs; 12/27/91 JAC Well Development

Comments/Remarks* D.B. Jones Recieve 6 10'p casing lengths with decon. paperwork (9-10-91).
Rev 6 effective 10/2/91; ECN Nos to Rev 6 are 150132, 164223, 127439

Reviewed By (Sign/Print Name): Kent D Reynolds KDR Date: 3/18/92

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-3

Sheet 1 of 3

Location 200 EU WMA -5

Elevation 694.49

Driller A Gwin

Prepared By [illegible] (Sign/Print Name) Date 8-9-91

Project W017 LLBG

Drilling Contractor Jenson Drilling

Drilling Method and Equipment Backhoe/Cable Tool

Reviewed By Edward C. Rogers (Sign/Print Name) Date 8/30/91

CONSTRUCTION DATA: Description	Diagram	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA: Graphic Log	Lithologic Description
16-in i.d. C.S. temp casing				Silty Sandy GRAVEL
Installed to 22.08' ftbls		10		
CEMENT GROUT 19.5' - 0.0'				
		20		
12-in i.d. C.S. temp casing		30		
Installed to 171.31' ftbls				Sandy GRAVEL
		40		
		50		
10-in i.d. C.S. temp casing				
Installed to 341.34' ftbls		60		
				Very Sandy GRAVEL
				Silty SAND
		70		Very Silty SAND
		80		
BENTONITE GROUT		90		
		UR		Slightly Silty SAND
		100		~~Very Sandy Gravel~~ MEA 8-6-91 Silty SAN
				Very Sandy GRAVEL
		110		
		120		
		130		
				Sandy GRAVEL
		140		Very Sandy GRAVEL
				Sandy GRAVEL
		150		Gravelly Silty SAND
				Sandy GRAVEL
		160		Very Sandy GRAVEL
		14-8		Sandy GRAVEL

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-3

Sheet 2 of 3

Location 200W/WMA-S

Project W-017/LLBG

Elevation 696.49

Drilling Contractor Jensen Drilling Co

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-16-91

Reviewed By Edward C. Rizzo (Sign/Print Name) Date 10/30/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
12"Ø CS CSG @ 171.31'		170		Sandy GRAVEL
		180		
		190		Silty Sandy GRAVEL
10" SHOE BROKE FROM CASING AND LEFT IN HOLE @ 193' BLS		200		
		210		
		220		
10" Ø CS CASING		230		
		240		
BENTONITE GROUT 195'-		250		
10/15/91 SWL @ 259.0		260		
		270		
		280		
		290		
		300		
		310		
		320		
		330		

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-3

Sheet 3 of 3

Location 200 W / WMA-S

Project W017 / LL BG

Elevation 699.49

Drilling Contractor JENSEN DRLG

Driller ART GWIN

Drilling Method and Equipment CABLE TOOL - BUCYRUS ERIE

Prepared By Robert Wind (Sign/Print Name) Date

Reviewed By Edward C. Bryan (Sign/Print Name) Date 12/20/90

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
				SILTY - SANDY W/GRAVEL
10" Ø CS CSG @ 341.34		340		
		350		
8" SHOE CUT OFF @ 440' BLS		360		SANDY - SILTY W/GRAVELS
SHOE FELL OFF @ 367' BLS				
		370		
		380		SANDS & GRAVELS
		390		
Top B-12 Sand 402.05'				
Top 20-40 Sand 403' BLS.		400		
Top 10-20 Sand 406' BLS.				
Top Screen 409.55' BLS.		410		
Bottom Screen ~~420.22'~~ 419.42' BLS				
Top B-12 Sand ~~444.6'~~ 420.22' BLS		420		
Top Hole plug 424.8' BLS				SANDS & GRAVELS - W/TRACE OF SILT
		430		
T.D. 441.0' BLS		440		

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VALIDATION
KDR 3/19/92
SIGNATURE/DATE

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 1 of 23

Location 200 W WMA-5

Project W017 LLBG

Elevation 696.49

Drilling Contractor Jonson Drilling Co.

Driller Art. Gwin

Drilling Method and Equipment Cable Tool/Backhoe

Prepared By P. Wright (Sign/Print Name) Date 8-9-91

Reviewed By R.D. Miller (Sign/Print Name) Date 8/23/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
5'	21.7 lb 1 rad 1 moist	Backhoe		5' silty sandy GRAVEL: 60% gravel 25% silt 15% sand (10YR 6/2) lt brown gr. dry - (10YR 5/2) dark brown wet mod rx to 10% HCl 2% SC 15% UCP 15% CP 10% MP 10% FP 5% VFP 5% CS 5% MS 5% FS 25% fines dry uncemented gravels sub-angular to subrounded sands - angular	
10'	21.7 lb 1 rad 1 moist	Backhoe		10' silty sandy GRAVEL - 70% gravel 15% sand 15% silt - (10YR 6/2) lt br gr (10YR 5/2) gd brown wet 5% SC 15% UCP 20% CP 10% MP 15% VFP 10% FP; 5% CS 5% MS 5% FS 15% fines mod rx to 10% HCl. dry uncemented cobbles subrounded to round gravels sub round to sub angular sand angular to subrounds	
15'	21.7 lb 1 rad 1 moist	Backhoe		15' silty sandy GRAVEL - same as previous (10') wk rx to 10% HCl sand most uncemented	Backhoe to 18'

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 2 of 23

Location 200W/LLBG/WMA-S

Project W-017/LLBG

Elevation 696.49

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 8-16-91

Reviewed By R.D. McCormack (Sign/Print Name) Date 8/29/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
20	2Lith 1Rad 1Moist	DB		Sandy Silty GRAVEL (65% grav, 30% sand, 5% silt) 5% SC, 5% VCP ~~75% CP~~ 10% CP, 15% mp, 15% FP, 15% vfp, 10% CS, 5% ms, 5% fs, 10% vfs, dk gy-wet (10YR 4/1) Lt gy-dry (10YR 7/1) moist, mod sort, subround 40% mafic, 60% felsic, mod HCl react	20 ft sample @ 1323, 8-16-91
25	2Lith 1Rad 1Moist	DB		Silty Sandy GRAVEL (Same as above	25 ft sample @ 1350 8-16-91
30	2Lith 1Rad 1Moist	DB		MTH 8-19-91 ~~Very Sandy Silty GRAVEL~~ Silty Sandy GRAVEL (Same as above)	30 ft sample @ 1318, 8-19-91
35	2Lith 1Rad 1Moist	DB		MTH 8-20-91 ~~Silty Sandy GRAVEL (70% grav~~ Sandy GRAVEL (75% grav, 20% sand, 5% silt) 15% SC, 10% LP, 50% mp, 25% sp, 70% CS, 15% ms, 10% fs, dk gy-wet (10YR/4/1) Lt gy-dry (10YR 6/1) Lt moist, poor sort, subang to subround, 80% mafic, 20% felsic in gravel, 60% mafic, 40% felsic in sand, strong HCl react	35 ft sample @ 0922, 8-20-91

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 3 of 23

Location 200W/LL36/UMA-S

Project W-017/LLBC RBU

Elevation 696.44

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens/[illegible] (Sign/Print Name) Date 8-20-91

Reviewed By R.D. Miller [illegible] (Sign/Print Name) Date 8/20/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
40	2Lith 1Rad 1Moist	DB		Sandy GRAVEL (75% grav, 25% sand) 15% sc 10% lp, 50% mp, 25% sp, 70% cs, 15% ms, 10% fs, Dk gy-wet (10YR 4/1) lt gy-dry (10YR 6/1), lt moist, poor sort (bimodal), subang to subround, 80% mafic, 20% felsic in gravel, 60% Mafic, 40% felsic in sand, strong HCl react	40 ft sample @ 1005 8-20-91
45	2Lith 1Rad 1Moist	DB		Sandy GRAVEL (75% grav, 25% sand) Same as above, some lg cob, moderate HCl react.	45 ft sample @ 1530 8-21-91
50	2Lith 1Rad 1Moist	DB		Sandy GRAVEL (Same as above)	50 ft sample @ 1639 8-21-91
55	2Lith 1Rad 1Moist	DB		55 ft - Sandy GRAVEL (60% grav, 35% sand, 5% silt) Grav: 10% sc, 15% lp 25% mp, 50% sp. Sand: 25% cs 25% ms, 50% fs. Bk gy bm-wet (10YR 4/2) H bm gy-dry (10YR 6/2) lt moist, poor sort (bimodal) subrounded to rounded, 60% mafic 40% felsic in sand, 80% mafic, 20% felsic in gravel, strong HCl react.	55 ft sample @ 1020, 8-22-91

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 4 of 23

Location 200W/LLBG/WMA-S

Project W-017/LLBG

Elevation 696.49

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 8-22-91

Reviewed By R.D. Miller (Sign/Print Name) Date 8/28/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
60	2Lith 1Rad 1Moist	DB		60 ft - Very Sandy GRAVEL (60% grav/40% Sand) Grav: 10% cg, 40% mg, 50% fg	60 ft Sample @ 1333 8-22-91
				Sand: 30% cs 30% ms, 40% fs, Dk gy-brn-wet (10YR 4/2) lt brn gy-dry (10YR 6/2), lt moist, mod sort, subrounded, 60% mafic, 40% felsic in sand, 80% mafic, 20% felsic in grav. Strong HCl react	Sand at 61.5 ft bls
65	2Lith 1Rad 1Moist	DB		65-ft - Silty SAND (80% sand, 20% silt) Sand: 5% cs, 75% ms, 20% fs. Lt brn gy wet (10YR 6/2), lt gy-dry (10YR 7/2) well sort lt moist, rounded, 30% mafic, 70% felsic, Strong HCl react	65 ft sample @ 1410 8-22-91
	2Lith 1Rad 1Moist	DB		Alternating silt and sands	
70				70 ft - Very Silty SAND (60% sand, 40% silt) Sand: 100% fs Lt brn gy-wet (10YR 6/2) lt gy-dry (10YR 7/2) well sort. dry, rounded, 30% mafic, 70% felsic, Strong HCl react	70 ft sample @ 1450 8-22-91
	2Lith 1Rad 1CaCO3	HT		Alternating silts & sands	
75				75 ft - Very Silty Sand (same as above)	75 ft sample @ 0850 8-27-91

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A-6000-382 (04/90)

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 5 of 23

Location 200W - WMA-S

Project W-017 / LLBG

Elevation 691.19

Drilling Contractor

Driller Art Gwin / Jensen

Drilling Method and Equipment Cable Tool

Prepared By M. Havers / [signature] (Sign/Print Name) Date 8-27-91

Reviewed By [signature] (Sign/Print Name) Date 8/31/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
80	2 Lith 1 Rad 1 $CaCO_3$	HT		80 ft - Very Silty SAND (60% sand, 40% Silt) Sand: 100% fs. Lt brn gy - wet (10YR 6/2) Lt gy - dry (10YR 7/2) well sort, dry rounded 30% mafic, 70% felsic, Strong HCl react. Cemented	80 ft sample @ 1025 8-27-91
	2 Lith 1 Rad 1 $CaCO_3$	HT			
85	2 Lith 1 Rad 1 $CaCO_3$ MSH 8-27-91	~~HT~~		85 ft - Very Silty SAND (65% sand, 35% silt) Sand: 60% ms, 40% fs. Lt brn gy - wet (10YR 4/2) Lt gy - dry (10YR 7/2), well sort, dry, rounded. 40% mafic, 60% felsic, strong HCl react. Cemented	85 ft sample @ 1430, 8-27-91
					Out of Paleosol at 88.0 ft.
	2 Lith 1 Rad 1 Moist	DB			
90	2 Lith 1 Rad 1 Moist MSH 8-27-91	~~DB~~		90 ft - Slightly Silty SAND (95% sand, 5% silt) Sand: 100% fs. Gy brn - wet (10YR 5/2), Lt gy - dry (10YR 7/2) lt moist to dry, well sort, rounded 60% felsic, 40% mafic, mica flakes noted, no HCl react. Uncemented	90 ft sample @ 1549, 8-27-91
UR					
	2 Lith 1 Rad 1 Moist	DB			
95				95 ft - Silty SAND (85% sand, 15% silt) Sand: 60% ms, 40% fs Gy brn - wet (10YR 5/2), Lt gy - dry (10YR 7/2) lt moist to dry, well sort, rounded. 60% felsic, 40% mafic, mod HCl react	95 ft sample @ 1646
				14-15	Gravel at 98.5 ft

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 6 of 23

Location 200W/LLBG/WMA-S

Project W-017/LLBG

Elevation 496.44

Drilling Contractor Jerson

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 8-28-91

Reviewed By R.D. Miller (Sign/Print Name) Date 8/31/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
100	2Lith 1Rad 1Moist	DB		100 ft - Very Sandy GRAVEL (65% grav, 35% sand) Grav: 20% lc, 20% sc, 30% lp, 15% mp, 15% sp. Sand: 30% cs, 55% ms, 15% fs Grey-wet (10YR 5/1), ltgy-dry (10YR 7/1), dry, well sort, rounded to subrounded, 60% felsic 40% mafic in sand, gravel. Strong HCl react.	100 ft sample @ 0930, 8-28-91
105	2Lith 1Rad 1Moist	DB		105 ft - Very Sandy GRAVEL (Same as above) Slight HCl react.	105 ft sample @ 1415, 8-28-91
110	2Lith 1Rad 1Moist	DB		110 ft - V. Sandy GRAVEL (Same as above)	110 ft sample @ 1512 8-28-91
115	2Lith 1Rad 1Moist	DB		115 ft - V. Sandy GRAVEL (Same as above)	115 ft sample @ 1730, 8-28-91

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 7 of 23

Location 200W/WMA-S

Project W-017/LLBG

Elevation 696.49

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 8-28-91

Reviewed By R.D. Miller (Sign/Print Name) Date 9/2/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
120	2Lith 1Rad 1Moist	DB		120 ft - Very Sandy GRAVEL (65% gravel, 35% sand) Grav: 20% lc, 20% sc, 30% lp, 15% mp, 15% sp. Sand: 30% cs, 55% ms, 15% fs. Grey-wet (10YR 5/1) lt gy-dry (10YR 7/1), lt moist to dry, well sort, rounded to subrounded, 60% felsic, 40% mafic in sand & gravel, slight HCl react.	120 ft sample @ 0845 8-29-91
	2Lith 1Rad 1Moist	DB			
125	2Lith 1Rad 1Moist	DB		125 ft - Sandy GRAVEL (70% gravel, 30% sand) Grav: 10% lc, 50% sc, 5% lp, 15% mp, 20% sp. Sand: 30% cs, 55% ms, 15% fs Grey-wet (10YR 5/1), lt gy-dry (10YR 7/1) lt moist to dry, med sort, rounded to subrounded, secondary fractures noted, 65% felsic, 35% mafic in sand & gravel, slight HCl react.	125 ft sample @ 1031 8-29-91 Becoming wet at 126 ftb/s
130	2Lith 1Rad 1Moist	DB		128 ft - Silty Sandy GRAVEL (25% sand, 25% silt, 50% Grav) Grav: 10% lc, 50% sc, 5% lp, 15% mp, 20% sp, Sand: 30% cs, 55% ms, 15% fs Dk gy-wet (10YR 4/1), lt gy dry (10YR 7/1) Saturated rounded, 65% felsic 35% mafic, slight HCl react.	128 ft sample @ 1510 8-29-91 MK 8-29-91 Dry at ±2 130 ftb/s 130 ft sample @ 1525 8-29-91
135	2Lith 1Rad 1Moist	DB		130 ft - Sandy GRAVEL (70% Gravel, 30% sand) Grav: 10% lc, 50% sc, 5% lp, 15% mp, 20% sp - Sand: 30% cs, 55% ms, 15% fs Grey-wet (10YR 5/1), lt gy-dry (10YR 7/1), lt moist to dry, med sort, rounded, 65% felsic, 35% mafic, Very Slight HCl react. 135 ft - Sandy GRAVEL (60% Gravel 40% Sand) Grav: 10% lc, 50% sc, 5% lp, 15% mp, 20% sp. Sand: 30% cs, 55% ms, 15% fs. Grey-wet (10YR 5/1), lt gy-dry (10YR 7/1). Moist, poss due to drill water, med sort, rounded, 65% felsic, 35% mafic, no HCl react.	135 ft sample @ 0957, 9-3-91

9313018.162

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 8 of 23

Location 200W/WMA-S

Project U-017/LLBG

Elevation 696.49

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-3-91

Reviewed By R.D. Miller (Sign/Print Name) Date 9/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
140	2Lith 1Rad 1Moist	DB		140 ft - Sandy GRAVEL (70% gravel, 30% sand) Grav: 10% lc, 50% sc, 5% lp, 15% mp, 20% sp. Sand: 30% cs, 55% ms, 15% fs. Grey-wet (10YR5/1), lt gy-dry (10YR7/1) lt moist to dry, med sort, rounded, 60% felsic, 40% mafic, mod HCl react	140 ft sample @ 1359 9-3-91
	2Lith 1Rad 1Moist	DB			Sand zone 143.5 to 146.0 ftbls
145				145 ft - Gravelly Silty SAND (50% sand, 15% silt, 35% grav) Sand: 70% ms, 30% fs. Grav: 10% sc, 25% lp, 30% mp, 35% sp. dk gy brn-wet (10YR5/2) V. pale brn-dry (10YR7/3) med sort, subrnd, dry, 65% felsic, 35% mafic, slight HCl react, noncemented, flowing sand.	145 ft sample @ 0806, 9-4-91
	2Lith 1Rad 1~~Moist~~ Moist 9-4-91	DB			
150				150 ft - Sandy GRAVEL (65% gravel, 35% sand) Grav: 10% lc, 5% sc, 5% lp, 15% mp, 20% sp. Sand: 30% cs, 55% ms, 15% fs Grey-wet (10YR5/1), lt gy-dry (10YR7/1) lt moist to dry (drilling water added to sample) med sort, subrounded, 60% felsic, 40% mafic. Secondary fractures from drilling. mod HCl react	150 ft sample @ 1321 9-4-91
	2Lith 1Rad 1~~Moist~~ ~~Coff~~ Moist	DB			
155				155 ft - V. Sandy GRAVEL (60% grav, 40% sand) Grav: 5% sc, 25% lp, 30% mp, 20% sp. Sand: 65% ms, 35% fs. Grey-wet (10YR5/1), lt gy-dry (10YR7/1), dry, med sort, rounded, 75% felsic, 25% mafic, mod HCl react.	155 ft sample at 1612, 9-4-91

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 9 of 23

Location 200 W/WMA-S

Project W-017/LLBG

Elevation 696.44

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-4-91

Reviewed By R.D. Miller (Sign/Print Name) Date 9/10/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
160	2 Lith 1 Rad 1 Moist CaCO3	DB		160 ft - Sandy GRAVEL (70% ~~gravel~~ gravel, 30% sand) Gravel: 5% SC, 25% TP, 50% mp, 20% sp, Sand: 65% ms, 35% fs. Gray-wet (10YR5/1) Ido y-dry (10YR7/1) dry (drill water has saturated sample) mod sord, rounded, 75% felsic, 25% mafic, mod HCl react	160 ft sample @ 1318, 9-5-91
	2 Lith 1 Rad 1 CaCO3	HT			Hard Tooling from 163.0 ft to 172.5 ftbls
165				165 ft - Sandy GRAVEL (Same as above)	165 ft sample @ 1325 9-6-91
	2 Lith 1 Rad 1 CaCO3	HT			
170			9-11-91	(170 Ft) - SANDY GRAVEL (SAME AS ABOVE; poor sample quality; running water during drilling operations	170 Ft Sample taken @ 1620
					Switch to core barrel at 172.5 to 198.5' bls
	2 Lith 1 Rad 1 CaCO3	DB			
175			9-11-91	175 ft - Sandy GRAVEL (Same as above)	175 ft Sample @ 1031, 9-11-91
					Cobbles becoming larger from 177 ftbls

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 10 of 23

Location 200W/WMA-S

Project W-017/LLBG

Elevation 691.44

Drilling Contractor Jensen

Driller Art Gunn

Drilling Method and Equipment Cable Tool

Prepared By M. Havens / [signature] (Sign/Print Name) Date 9-11-91

Reviewed By R.A. [signature] (Sign/Print Name) Date 9/18/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
180	2 Lith 1 Rad 1 CaCO3	DB		180 ft - Sandy GRAVEL (70% grav, 30% sand) Grav: 15% lc, 70% sc, 25% lp, 25% mp, 25% sp Sand: 25% fs, 40% ms, 35% fs Gray-wet (10YR 5/1), lt gy-dry (10YR 7/1) dry (Drill water has saturated sample) well sort rounded, 75% felsic, 25% mafic, no HCl react	180 ft sample @ 1511, 9-11-91
	2 Lith 1 Rad 1 CaCO3	DB			
185				185 ft - Silty Sandy Gravel (65% grav, 25% Sand, 10% silt) Grav: 15% lc, 10% sc, 10% lp, 30% mp, 35% fp. Sand: 40% ms, 60% fs Dkgy brn - wet (10YR 4/2), Lt gy-dry (10YR 7/2), dry (Saturated w/ drill water) mod sort, rounded (Secondary fractures from drilling) 75% felsic, 25% mafic, No HCl react.	185 ft sample @ 1007, 9-12-91
	2 Lith 1 Rad 1 CaCO3	DB			
190				190 ft - Silty Sandy GRAVEL (Same as above)	190 ft sample @ 1605, 9-12-91
	2 Lith 1 Rad 1 CaCO3	DB			
195				195 ft - Silty Sandy GRAVEL (Same as above)	195 ft sample @ 1345, 9-16-91
					Switch to Hard tools at 198.5' bls

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 11 of 23

Location 200W/WMA-S

Project W-017/LLBG

Elevation 691.49

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-17-91

Reviewed By L.D. Miller (Sign/Print Name) Date 9/21/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
200.0	2 Lith 1 Rad 1 $CaCO_3$	~~BG~~ HT		200 ft - Silty Sandy GRAVEL (65% grav, 25% sand, 10% silt) Grav: 15% lc, 10% sc, 10% lp, 30% mp, 35% fp Sand: 40% ms, 60% fs Dk gy brn - wet (10YR 4/2), Lt gy - dry (10YR 7/2), dry (saturated from drilling), med sort, rounded (Pulverized from drilling) 75% felsic 25% mafic, no HCl react.	200 ft sample @ 0755, 9-17-91
205	2 Lith 1 Rad 1 $CaCO_3$	HT		205 ft - Silty Sandy GRAVEL (Same as above)	205 ft sample @ 1108, 9-17-91
210	2 Lith 1 Rad 1 $CaCO_3$	HT		210 ft - Silty Sandy Gravel (Same as above)	210 ft sample @ 1626, 9-17-91
215	2 Lith 1 Rad 1 $CaCO_3$	HT		215 ft - Silty Sandy GRAVEL (Same as above)	215 ft sample @ 1720 9-17-91

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 12 of 23

Location 200W/WMA-S

Project W-017/LLBG

Elevation 696.49

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 7-18-91

Reviewed By R.A. Mc Ginn (Sign/Print Name) Date 9/21/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
220	2Lith 1Rad 1CaCO3	DB		220 ft - Silty Sandy GRAVEL (75% grav, 20% sand, 5% silt) 5% lc, 10% sc, 15% lp, 30% mp, 40% fp. sand: 20% cs 50% ms, 30% fs. Dark brn-wet (10YR4/2) lt gy-dry (10YR7/2), dry (saturated from drilling), med sort, rounded, 75% felsic, 25% mafic, slight HCl react	220 ft sample @ 0925, 9-18-91 Core barrel used for 220 ft sample only
	2Lith 1Rad 1CaCO3	HT			
225				225 ft - Silty Sandy GRAVEL (Same as above)	225 ft sample @ 1326 9-18-91
	2Lith 1Rad 1CaCO3	HT			
230				230 ft - Silty Sandy GRAVEL (Same as above)	230 ft sample @ 1503 9-18-91
	2Lith 1Rad 1CaCO3	HT			
235				235 ft - Silty Sandy GRAVEL (Same as above)	235 ft sample @ 1724 9-18-91

9313018.1627

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 13 of 23

Location 200W/WMA-S

Project W-017/LLBG

Elevation 694.49

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-19-91

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
240	2 Lith 1 Rad 1 $CaCO_3$	HT		240 ft - Silty Sandy GRAVEL ~~(70% grav, 25% sand MTH 9-19-91~~ (70% grav, 25% sand, 5% silt) Grav: 5% lc, 10% sc, 15% lp, 30% mp, 40% fp. Sand: 20% cs 50% ms, 30% fs. Dk dy brn-wet (10YR 4/2), lt gy-dry (10YR 7/2), dry (Saturated from drilling), med sort, rounded, 75% felsic, 25% mafic, slight HCl react.	240 ft Sample @ 1284 9-19-91 Carbon Tetrachloride in borehole, 1.5 ppm on PID. Identification by Draeger Tube
245	2 Lith 1 Rad 1 $CaCO_3$	HT		245 ft - Silty Sandy GRAVEL (Same as above)	245 ft sample @ 1547, 9-19-91 PID = 1.0 ppm in borehole
250	2 Lith 1 Rad 1 $CaCO_3$	HT		250 ft - Silty Sandy GRAVEL (Same as above)	250 ft sample @ 1701 9-19-91
		ST 394/1.2 No Recovery			250.5 - 251.7 ft sample @ 0901, 9-23-91. No Recovery
255	2 LITH 1 RAD 1 $CaCO_3$	HT		255 FT SILTY SANDY GRAVEL 75% GRAVEL, 20% SAND, 5% SILT GRAVEL · SHATTER by HT. SAND: 20% CS 40% MS, 40% FS ~~ALEUE~~ WET COLOR OLIVE 5Y 4/2 DRY COLOR N/A SATURATED MEDIUM SORTED SUB ROUNDED 60% FELSIC 40% BASALT	255 FT. SAMPLE TAKEN @ 0824 SEPT 24, 91 HAND TOOL / BAILED SLURRY

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 14 of 23

Location 200W / WMA-5

Project W-017-LLBG

Elevation 696.49

Drilling Contractor Jensen

Driller ART

Drilling Method and Equipment Cable / B.E 60L

Prepared By Ken Lane / Ken Lane (Sign/Print Name) Date 9/24/91

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet BLS)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
260.	2 LETH 1 RAD 1 $CaCO_3$	HT		260' Silty Sandy GRAVEL 75% GRAVEL, 20%, 5% SILT GRAVEL: SHATTERED by HT SAND: 40% MS, 60% FS WET COLOR: OLIVE 5Y4/2 DRY COLOR N/A SATURATED, MEDIUM SORTED, SUB ROUNDED 60% FELSIC, 40% MAFIC SLIGHT REACTION TO HCl	260 FT SAMPLE TAKEN ~1005 9/24/91 HAND TOOL / BAILER SLURRY
265	2 LETH 1 RAD 1 $CaCO_3$	HT		265' SILTY SANDY GRAVEL 75% GRAVEL, 20% SAND, 5% SILT GRAVEL SHATTERED by HT SAND 20% CS 40% MS 40% FS WET COLOR: OLIVE 5Y4/2 DRY COLOR N/A SATURATED, MEDIUM SORTED, SUBANGULAR 60% FELSIC, 40% MAFIC SLIGHT REACTION TO HCl	265 FT SAMPLE TAKEN 1237 @ 9/24/91 HAND TOOL / BAILER SLURRY
270	2 LETH 1 RAD 1 $CaCO_3$	HT		270 FT SILTY SANDY GRAVEL 75% GRAVEL, 20% SAND, 5% SILT GRAVEL SHATTERED by HT SAND 20% CS 40% MS, 40% FS WET COLOR OLIVE 5Y4/2 DRY N/A SATURATED, MEDIUM SORT. SUB ANGULAR 60% FELSIC 40% MAFIC SLIGHT REACTION TO HCl	270' SAMPLE 1405 ON 9/24/91 HAND TOOL
275	2 LETH 1 RAD 1 $CaCO_3$	HT		275' SILTY SANDY GRAVEL 75% GRAVEL, 20% SAND, 5% SILT GRAVEL SHATTERED BY HT SAND: 20% CS 40% MS 40% FS WET COLOR: OLIVE 5Y4/2 DRY N/A SLIGHT REACTION TO HCl	275 FT SAMPLED @ 1649 ON 9/24/91 H.T. / BAILER.

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BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 15 of 23

Location 200W - WMA-5

Project W-017-LLBG

Elevation 691.46

Drilling Contractor Jensen

Driller ART GWIN

Drilling Method and Equipment Cable / B.E. COL

Prepared By K. Lane (Sign/Print Name) Date 9/25/91

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
280	ST	46/100/175		~~SELTY~~ 280' SELTY SANDY GRAVEL	formation taken
				65% GRAVEL, 25% SAND 10% SILT	out of the spoon
		2 LETH		GRAVEL 10% LC 20% SC 40% CP	sleeves looked fairly
		1 $CaCO_3$		20% MP 10% FP SAND: 30% CS	intact and very tight
		1 RAD		40% MS, 30% FS olive brown wet	
				2.5Y 4/3 DRY COLOR: LIGHT GRAY	
				2.5Y 7/2 V. MOIST "NOT SATURATED"	
				Poorly sorted, sub angular	
				55% felsic 45% mafic slight	
				reaction to HCl	
285	HT	2 LETH			
		1 $CaCO_3$		285' SELTY SANDY GRAVEL	
		1 RAD		GRAVEL 65% SHATTERED SAND: 30% CS	
				40% MS, 30% FS, olive brown wet	
				color 2.5Y 4/3 DRY N/A	
				saturated Poorly sorted, sub angular	
				55% felsic, 45% mafic, slight	
				reaction to HCl	
				290' SELTY SANDY GRAVEL	
290	HT	2 LETH		GRAVEL 55% SAND 35% 10% SILT	
		1 RAD		GRAVEL: SHATTERED SAND: 20% CS, 40%	290.5' DRILLER
		1 $CaCO_3$		MS, 40% FS, wet, color olive brown	BELIEVES WERE
				2.5Y 4/3 DRY N/A, saturated,	INTO SAND.
				Poorly sorted, sub angular	
				55% felsic, 45% mafic, slight reaction	290.5 - 296.5
				to HCl	
				295' SELTY SANDY GRAVEL	BAILED HOLE
295	HT	2 LETH		GRAVEL 45% SAND 45% 10% SILT	TO BOTTOM OF
		1 RAD		GRAVEL SHATTERED BY H.T	HOLE, SWITCHED
		1 $CaCO_3$		SAND: 40% CS, 40% MS, 40% FS	TO CLOSE BARREL
				wet color: olive brown 2.5Y 4/4	for SAMPLE 295'.
				DRY: N/A saturated Poorly sorted	298'
				sub angular 55% felsic 45% mafic	
				slight reaction to HCl	

9313018.1625

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 16 of 23

Location 200W / WMA-5 | Project ~~O~~ W-017-LLBG

Elevation 1:96.49 | Drilling Contractor JENSEN

Driller ART GWIN | Drilling Method and Equipment CABLE / B.E. 60L

Prepared By K. LANE (Sign/Print Name) Date 9/25/91 | Reviewed By KReynolds KDR (Sign/Print Name) Date 3/18/92

Depth	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
295-298	2 LETH. 1 RAD 1 CaCO3	CORE BARREL		295'-298' SANDY GRAVEL	
				GRAVEL: 80%, SAND 20%	CORE BARREL
				SILT < 1-2% GRAVEL: 10% SB 20% LC	RETRIEVAL 50660
				30% SC 20% CP 10% MP 10% FP	WELL SORTED SAND ~ 295'
				SAND 60% CS 30% MS 10% FS	WELL SORTED FINE - MED
				SAND COLOR WET: GRAYISH BROWN	PEBBLES 296-297
				2.5Y 5/2 SATURATED, POORLY SORTED	AND POORLY SORTED
				(OCCASIONAL) SUB-ANGULAR TO ROUNDED	SANDY GRAVEL 297-298
				COBBLES: 80% FELSIC 20% MAFIC	—
				SAND: 60% FELSIC 40% MAFIC	(DAY ITEM) —
300	2 LETH 1 RAD 1 CaCO3	CORE BARREL		NO REACTION TO HCl	—
					DRILLED W/ MOVE
				300' SANDY GRAVEL GRAVEL 80%	BARREL ~ 295'-299
				SAND 19-20% SILT 1% / GRAVEL: 20% LC	—
				30% SC, 20% CP, 20% MP, 10% FP SAND:	—
				50% CS, 30% MS, 20% FS, SAND COLOR WET	—
				GRAYISH BROWN 2.5Y 5/2 SATURATED, POORLY	
				SORTED SUB ANGULAR-ROUNDED, COBBLES	
				45% FELSIC 5% MAFIC SAND: 50% FELSIC 50% MAFIC	
				20% K.L. 9/26/91	
305	2 LETH 1 RAD 1 CaCO3			305' SANDY GRAVEL, GRAVEL ~~80%~~	1644 / 9/26/91
				SAND 19-20% SILT 1% GRAVEL WAS	
				SHATTERED BY H.T SAND: 50% CS 30% MS	
				20% FS SILTY SAND COLOR DARK GRAYISH	
				BROWN 2.5Y 4/2, SATURATED POORLY	
				SORTED, SUB ANGULAR 60% FELSIC	
				40% MAFIC NO REACTION HCl	
				310' SILTY SANDY GRAVEL, GRAVEL: 75%	9/30/91 0857
310	2 LETH 1 RAD 1 CaCO3			SAND 20%, SILT 5%, GRAVEL WAS SHATTERED	HT ~ 3.5'/hr SINCE
				by HT SAND 40% CS, 40% MS, 20% FS.	08:00
				COLOR: WET DARK GRAYISH BROWN 2.5Y 4/2	
				SATURATED, POORLY SORTED, SUB ANGULAR	
				60% FELSIC 40% MAFIC, NO REACTION	
				TO HCl	

9313018.1631

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 17 of 23

Location 200W / WMA-5

Project W-017-LLBG

Elevation 646.49

Drilling Contractor JENSEN

Driller ART GWIN

Drilling Method and Equipment CABLE / B.E.-60L

Prepared By K LANE / Ken Lane (Sign/Print Name) Date 9/25/91

Reviewed By KReynolds KDR (Sign/Print Name) Date 3/18/92

Depth	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
315	~~HT~~ 2 LITH 1 RAD 1 $CaCO_3$	HT		~~SILTY~~ 315' SILTY SANDY GRAVEL GRAVEL 75%, SAND 20%, 5% SILT, GRAVEL WAS SHATTERED by HT SAND 40% CS, 40% MS, 20% FS Color: WET, DARK GRAYISH BROWN 2.5Y 4/2 SATURATED Poorly Sorted Sub ANGULAR, 60% felsic, 40% mafic No REACTION HCl	
320	2 LITH 1 RAD 1 $CaCO_3$	HT		320' SILTY SANDY GRAVEL GRAVEL 75% SAND 20% SILT 5% GRAVEL WAS SHATTERED by HT SAND 40% CS, 40% MS, 20% FS Color: WET, DARK GRAYISH BROWN 2.5Y 4/2 SATURATED Poorly Sorted Sub ANGULAR 60% felsic, 40% mafic, NO REACTION HCl	
325	2 LITH 1 RAD 1 $CaCO_3$	HT		325' SILTY SANDY GRAVEL GRAVEL 75% SAND 20% SILT 5% GRAVEL WAS SHATTERED by HT SAND 40% CS, 40% MS, 20% FS, Color: WET, DARK GRAYISH BROWN 2.5Y 4/2 SATURATED, POORLY SORTED, Sub ANGULAR 60% felsic, 40% mafic, NO REACTION TO HCl	
330'	2 LITH 1 RAD 1 $CaCO_3$	HT		330' SILTY SANDY GRAVEL GRAVEL 65% SAND 30% SILT 5% GRAVEL WAS SHATTERED by HT SAND 30% CS, 40% MS, 30% FS Color: WET, DARK GRAYISH BROWN 2.5Y 4/2 SATURATED, Poorly SORTED Sub ANGULAR - Sub ROUNDED GRAVEL: 60% felsic, 40% mafic SAND: 80% felsic, 20% mafic NO REACTION TO 10% HCl	

9313018.1622

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 19 of 23

Location 200W / WMA-5 | Project W-017-LLBG

Elevation 646.49 | Drilling Contractor JENSEN

Driller ART GWIN | Drilling Method and Equipment CABLE

Prepared By Ken Lane (Sign/Print Name) Date 10/1/91 | Reviewed By Edward C. Rafuse (Sign/Print Name) Date 11/29/91

Depth	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description (Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.)	Comments (Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level)
335	~~1~~ 2 LETH 1 RAD 1 $CaCO_3$	HT		335' SILTY SANDY GRAVEL. GRAVEL 75%, SAND 20% SILT 5% GRAVEL WAS SHATTERED by HT. SAND 40% CS 40% MS 20% FS COLOR: WET DARK GRAYISH BROWN 2.5Y4/2, SATURATED, POORLY SORTED, SUB ANGULAR - SUB ROUNDED 60% FELSIC 40% MAFIC NO REACT HCl	
340	2 LETH 1 RAD 1 $CaCO_3$	HT		340' SILTY SANDY GRAVEL GRAVEL 75% SAND 20% SILT 5% GRAVEL WAS SHATTERED by HT SAND: 40% CS 40% MS 20% FS COLOR: WET DARK GRAYISH BROWN 2.5Y4/2, SATURATED, POORLY SORTED, SUB ANGULAR, SUB ROUNDED 60% FELSIC, 40% MAFIC. NO REACTION TO HCl	POSSIBLE SAND LENS / STRAIN @ 337 FROM GAMMA 10/02/91 K.L.
341-344	2 LETH 1 RAD 1 $CaCO_3$	DB		341-344 SILTY SAND GRAVEL 0% SAND 95% 5% SILT SAND: 15% CS 65% MS 20% FS COLOR WET: OLIVE 5Y5/3 SATURATED VERY WELL SORTED, SUB-ANGULAR / SAND MINERALOGY: 40% QTZ 15% MAFIC 5% LITHIC NO REACTION TO HCl	DRIVE BRASS DRIVE. VERY EASILY ELUDIATING LOOSE FORMATION, SAMPLE WAS TAKEN ~2 hr AFTER WELL HAD BEEN BAILED DOWN ~44 ft of head. K.L.
345-347	2 LETH 1 RAD 1 $CaCO_3$	DB		~~345~~ GRAVELY SILTY SAND GRAVEL 5% SAND 95% SILT 7% CLAY 3% GRAVEL 50% MF, 50% FP SAND: 10% CS 60% MS 30% FS COLOR WET: OLIVE 5Y5/3 SATURATED, MODERATELY SORTED SUB ANGULAR / SAND MINERALOGY 70% QTZ, 15% MAFIC, 10% MICA 5% LITHIC	

9313018.1633

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 19 of 23

Location 200W / WMA-5

Project W-017-LLBG

Elevation 696.49

Drilling Contractor JENSEN

Driller ART GWIN

Drilling Method and Equipment CABLE

Prepared By Ken Lane / Ken Lane (Sign/Print Name) Date 10/8/91

Reviewed By Edward C. Rafuse / Edward C. Rafuse (Sign/Print Name) Date 11/29/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
348.352 (350')	2 LETH 1 RAD 1 $CaCO_3$	DB		350' GRAVELLY SILTY ~~SAND~~ SAND	SAMPLE WAS NOT SATURATED;
				GRAVEL 10% SAND 80% SILT 10%	Probably due to excessive
				GRAVEL WAS SHATTERED (ANGULAR PIECES)	PACKING OF DRIVE BARREL
				SAND 10% CS, 60% MS, 30% FS	Portions of drive barrel
				COLOR WET: OLIVE 5Y5/3 V. MOIST	SAMPLE APPEARED SLIGHTLY
				MODERATELY TO WELL SORTED SUB ANGULAR	CEMENTED but showed
				SAND MINERALOGY: 70% QTZ. 15% MAFIC	V. SLIGHT REACTION TO 10% HCl
				15% MICA ~~NO~~ SLIGHT REACTION TO HCl	
355'	2 LETH 1 RAD 1 $CaCO_3$	DB		355' SILTY SAND	
				GRAVEL 0% SAND 97% SILT 3%	
				SAND 10% CS 70% MS 20% FS	
				COLOR WET: GRAYISH BROWN 2.5Y 5/2	
				~~SATURATED~~ V. MOIST, WELL SORTED,	
				SUB ANGULAR, 70% QTZ 15% MAFIC, 15%	
				MICA NO REACTION TO HCl	
360	2 LETH 1 RAD 1 $CaCO_3$	DB		~~SILTY G~~ 360' SILTY GRAVELLY SAND	
				GRAVEL 35% SAND 60% SILT 5%	
				GRAVEL 30% CP, 50% MP, 20% FP	
				SAND 20% CS 60% MS 20% FS	
				COLOR WET: LIGHT OLIVE BROWN	
				2.5Y 5/4, V. MOIST, MODERATELY SORTED	
				SUB ANGULAR, GRAVEL: 80% FELSIC	
				20% MAFIC SAND 70% QTZ 20% MAFIC	
				10% MICA NO REACTION TO HCl	
365	2 LETH 1 RAD 1 $CaCO_3$	DB		365' SILTY SANDY GRAVEL.	SAMPLE from drive
				GRAVEL ~70% / SAND ~20% / SILT ~8% / CLAY ~	barrel was very
				2% GRAVEL: 50% CP, 30% MP, 20% FP	compacted & tight,
				SAND: 20% CS 50% MS, 30% FS	Gravel appeared matrix
				COLOR WET (SAND & SILT) 2.5Y 5/4	supported. Probably very
				LIGHT OLIVE BROWN, // COLOR DRY:	Low "K"
				5Y 7/2, LIGHT GRAY / V. MOIST	
				POORLY SORTED GRAVEL: 55% FELSIC	
				~~40% MAFIC~~ 5% LITHIC / SAND: 65% QTZ	
				35% MAFIC NO REACTION TO HCl	

9313018.1623

1058

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 20 of 23

Location 200W / WMA-5

Project W-017-LLBG

Elevation 694.49

Drilling Contractor JENSEN

Driller ART GWEN

Drilling Method and Equipment CABLE

Prepared By [illegible] / Ken Lane (Sign/Print Name) Date 10/1/91

Reviewed By Edward C. Rafuse / Edward C. Rafuse (Sign/Print Name) Date 11/29/91

Depth	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
370'	2 LETH 1 RAD 1 $CaCO_3$	HT		370' SILTY SANDY GRAVEL	
				GRAVEL 70% SAND 20% to SILT 10%	
				GRAVEL WAS SHATTERED by HT. COLOR	
				of SLURRY WET: OLIVE, 5Y 5/3, SATURATED	
				POORLY SORTED SUB ANGULAR 50% felsic	
				50% mafic NO REACTION TO HCl	
				375' SILTY SANDY GRAVEL	LOGGED 10/09/91 K.L.
375'	2 LETH 1 $CaCO_3$ 1 RAD	HT		GRAVEL 70% SAND 25% SILT 5%	
				GRAVEL WAS SHATTERED by HT	
				COLOR of SLURRY WET: OLIVE, 5Y 5/3, SATURATED	
				POORLY SORTED, SUB ANGULAR 50% felsic	
				50% mafic, NO REACTION TO HCl	
				380' SILTY SANDY GRAVEL	
380	2 LETH 1 $CaCO_3$ 1 RAD	HT		GRAVEL: 70% SAND 25% SILT 5%	
				GRAVEL WAS SHATTERED by HT	
				SAND: 20% CS 50% MS 30% FS	
				COLOR WET: OLIVE 5Y 5/3, SATURATED	
				POORLY SORTED SUB ANGULAR	
				50% felsic, 50% mafic NO REACTION	
				TO 10% HCl	
				385' SILTY SANDY GRAVEL	
385	2 LETH 1 $CaCO_3$ 1 RAD	HT		AS ABOVE	

9313018.1635

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 21 of 23

Location 200W / WMA-5

Project W-017-LLBG

Elevation 696.49

Drilling Contractor JENSEN

Driller ART GWIN

Drilling Method and Equipment CABLE

Prepared By K. LANE / K. LANE (Sign/Print Name) Date 10/9/91

Reviewed By EDWARD C. ROSEN / EDWARD C. ROSEN (Sign/Print Name) Date 11/29/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
390	2 LETH 1 AMD 1 $CaCO_3$	HT		390' SILTY SANDY GRAVEL	
				GRAVEL ~ 70% SAND 25% SILT 5%	
				GRAVEL WAS SHATTERED by HT	
				SAND: 20% CS, 50% MS, 30% FS	
				COLOR WET: OLIVE BROWN 2.5Y 4/4	COLOR DRY: LIGHT BROWISH GRAY
				SATURATED, POORLY SORTED SUB ANGULAR	2.5Y 6/2
				50% FELSIC 50% MAFIC, NO REACTION TO HCl	
				395' SILTY SANDY GRAVEL	
395'	2 LETH 1 AMD 1 $CaCO_3$	HT		GRAVEL 70% SAND 25% SILT 5%	
				GRAVEL WAS SHATTERED by HT	
				SAND: 20% CS, 50% MS, 30% FS	
				COLOR WET: OLIVE BROWN 2.5Y 4/4	
				SATURATED, POORLY SORTED, SUB ANGULAR	
				50% FELSIC, 50% MAFIC, NO REACTION HCl	
				400' SILTY SANDY GRAVEL	
400'	2 LETH 1 AMD 1 $CaCO_3$	HT		GRAVEL 70% SAND 25% SILT 5%	
				GRAVEL WAS SHATTERED by HT	
				SAND: 20% CS 50% MS 30% FS	
				COLOR WET: OLIVE BROWN 2.5Y 4/4	
				SATURATED, POORLY SORTED SUB ANGULAR	
				50% FELSIC, 50% MAFIC (GRAVEL ALTS)	
				NO REACTION TO HCl	
				405' SILTY SANDY ~~GRAVEL~~ GRAVEL	
405'	2 LETH 1 AMD 1 $CaCO_3$	HT		GRAVEL 70% SAND 25% SILT 5%	
				GRAVEL WAS SHATTERED by HT	
				SAND: 20% CS 50% MS 30% FS	
				COLOR WET: OLIVE BROWN 2.5Y 4/4	
				SATURATED, POORLY SORTED, SUB ANGULAR	
				50% FELSIC 50% MAFIC, NO REACTION	
				TO HCl	

9313018.1639

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 22 of 23

Location 200W / WMA-5

Project W017 - LLBG

Elevation 696.44

Drilling Contractor JENSEN

Driller ART GWIN

Drilling Method and Equipment CABLE TOOL, BUCYRUS ERIE

Prepared By ROBERT WIN (Sign/Print Name) Date 10/10/91

Reviewed By EDWARD C. RAFUSE (Sign/Print Name) Date 11/20/91

Depth (FEET)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
410'		HT		410' SAND — VF-F SANDS, ~80% QTZ, 20% ± BASALT; WATER SATURATED, LIGHT OLIVE BROWN -- WET; TAN WHEN DRY; ANGULAR TO SUB-ROUNDED, DRILLING TOOLS DO MOST OF THE BREAKING (FRACTURING) OF THE "ROCKS" TO FINER PIECES i.e. VF-F-M SANDS	8" Ø CSG
	2-LITH 1-RAD 1-$CaCO_3$				
415'		HT		415' SAND - SILTY SAND, SIZES & COLORS AS ABOVE	
	2-LITH 1-RAD 1-$CaCO_3$				
420'		HT		420' SANDS, SILTS, TRACE CLAY: CONSTITUENTS, SIZES, COLORS AS ABOVE	5' SAMPLE 10" CSG @ 341.34'
	2-LITH 1-RAD 1-$CaCO_3$				
425'		HT		425' SANDS, SILTS, GRAVELS, PEBBLES, ST 425-427, FULL RECOVERY; SPL MATERIAL IS ANGULAR TO SUB-ROUNDED, CRUSHED BY DRILLING TOOLS ~50/50 MAFIC-FELSIC COMPOSITION, SIZED PARTICLES INCREASE W/DEPTH, COLORS AS ABOVE	5' SAMPLE 425-427; 427-430 ST — 100% RECOVERY, LARGE PEBBLES - VERY FINE MATERIAL — BLOWS: 8 - 1ST SET 7 - 2nd ✓ 78 - 3rd ✓ 221 - 4th ✓
	2-LITH 1-RAD 1-$CaCO_3$			DRILLING W/ SLURRY DEVELOPED BY TOOL ACTION	

A-6000-382 (04/90)

9313018.1637

BOREHOLE LOG

Boring or Well No. 299-W6-3

Sheet 23 of 23

Location 200 W / WMA-5

Project W017 - LLBG

Elevation 646.44

Drilling Contractor JENSEN

Driller ART GWINN

Drilling Method and Equipment CABLE TOOL, BUCYRUS ERIE

Prepared By Robert Winn (Sign/Print Name) ROBERT WINN Date 10/14/91

Reviewed By Edward C. Rafes (Sign/Print Name) Date 11/29/91

Depth (FEET)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
430'				430' — SANDS, SILTS VF BASALT W/ QTZ XTALS, SUB-ROUNDED TO ROUNDED, SLIGHT REACTION TO 10% HCl, BASALT VOL INCREASES; GRAVELS --- BOTH BASALT AND QTZ BECOME MORE PROMENANT, COLOR OF SAMPLES (DRY MATERIAL) BECOMING MORE OLIVE TO BLACK IN WET CONDITIONS -- OK TAN WHEN DRY, PEBBLES OF BOTH BASALT + QTZ BECOMING LARGER	
	2-LITH 1-RAD 1-$CaCO_3$				
435'		HT		435' — AS ABOVE, GRAIN SIZE OF BASALT + QTZ LARGE SANDS + GRAVELS GETTING LARGER. CLAY RICH SEDIMENTS ACT AS MATRIX MATERIAL HOLDING EVERYTHING TOGETHER	
	2-LITH 1-RAD 1-$CaCO_3$	ST 73 213 50			ST @ 439-441' REC 1.5' LOGGED WELL TD: 441.
440'					
445	2-LITH 1-RAD 1-$CaCO_3$				
	2-LITH 1-RAD 1-$CaCO_3$				

A-6000-382 (04/90)

9313018.1633

EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

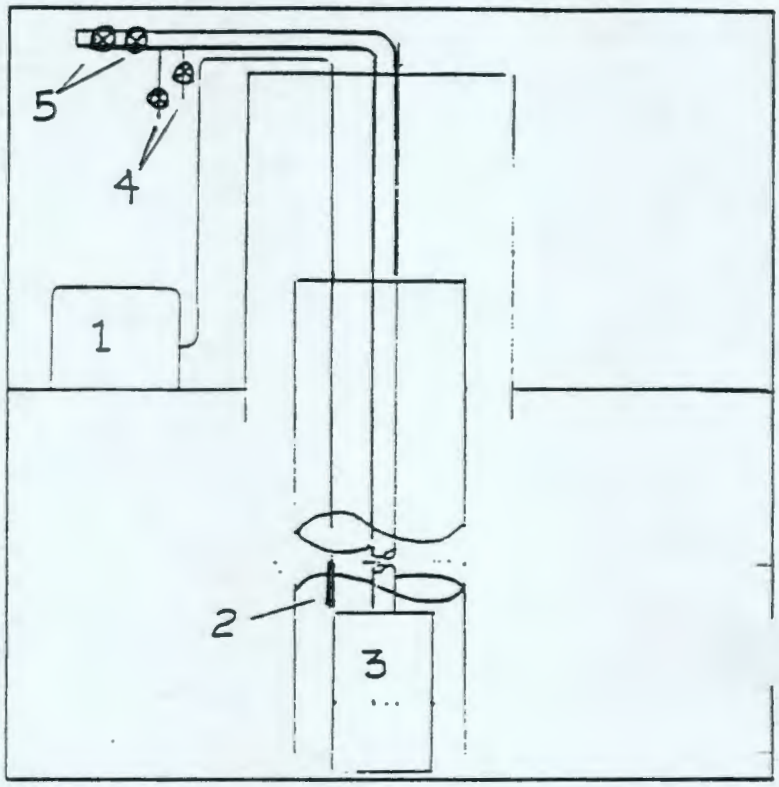
Well Designation 299-W16-3 Depth 422.56' BTOC

VALIDATED KDR 3/18/92 SIGNATURE/DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K192
2	TRANSDUCER SN-2303
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

Diagram

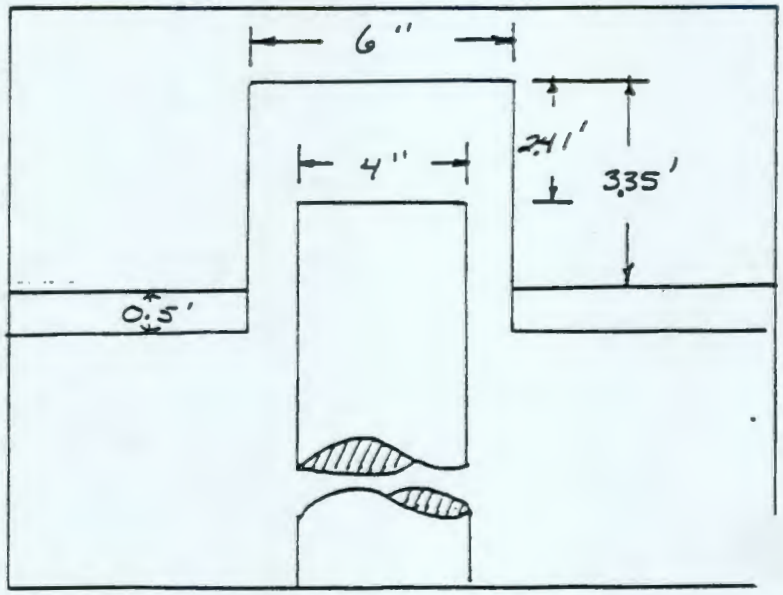


Well Head

Comments

Reference pt: Top of 6" casing (TOC)
BTOC - below Top of Casing

Diagram



Signature of Recorder BA WILLIAMS Date 2/10/92

A-6000-417 (08/89)

9313018.1639

WELL DEVELOPMENT FORM

Well Designation 299-W6-3 Well Depth 422.56' BTOC

Screened Interval 419.92' to 409.55' BGS (422.56 - 412.19 BTOC) Date Well Development is Performed 12-26-91, 12-27-91

BAILING

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

Type of Surge Block _____ Dimension of Surge Block _____

TD BEFORE	STROKE LENGTH	STROKE FREQUENCY	SURGE INTERVAL	SURGE TIME	TD AFTER	TD DIFFERENCE

AIRLIFT

Depth of Eductor Pipe _____ Airlift Start Time _____

Flow Rate _____ Accumulated Flow _____ Airlift Stop Time _____

Turbidity _____, _____, _____, _____, _____, _____, _____, _____

_____, _____, _____, _____, _____, _____, _____, _____

MECHANICAL PUMPING

Pumping Technique CONSTANT DISCHARGE Pump Depth 420.84' BTOC Pump Start Time 12-26-91 1049 | 12-26-91 1255

Flow Rate 1049-1102 10.7 GPM | 1255-0830 2.4 GPM Accumulated Flow 3000 GAL * Pump Stop Time 12-26-91 1102 | 12-27-91 0830

Turbidity 12-26-91 81-NTU to 22 NTU, 12-27-91 ~~49~~ 59 NTU, 44 NTU, 40 NTU, 33 NTU, 18 NTU, 20 NTU, 9.1 NTU, 14 NTU, 14 NTU, 35 NTU, 23 NTU, 21 NTU, 11 NTU, 22 NTU, 8.7 NTU, 23 NTU, 2.8 NTU

Comments * Total purge water volume recalculated @ 3000 GAL (Field Activity Report states 4000 GAL)

Signature of Recorder BA WILLIAMS JAMES A. COATES Date 2/10/92

Sign and Print Name 14-35

9313018.1645

DRAWDOWN/RECOVERY

Well Designation 299-W6-3 Date 12-26-91/ 12-27/91

Well Depth 422.56' BTOC Screened Interval 422.56' - 412.19' BTOC

Pumping Method CONSTANT DISCHARGE

Equipment Used to Measure Water Level E.TAPE/TRANSDUCER S.N. ET-1/2303 Calibation Due 1-24-92/7-19-92

Equipment Used to Measure Flow —NA— S.N. —NA— Calibation Due —NA—

Measuring Point TOP OF CASING 6" (T.O.C. 6") Pump Start Time 1049, 1255-12/26/92 Pump Stop Time 1102-12/26/92 0850-12/27/92

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD.
				~~28~~ BW 5 GAL/28.02 SEC = 10.7 GPM
				5 GAL/122.54 SEC = 2.44 GPM
		SEE		
		ATTACHED		

Signature of Recorder ~~James A. Coates BW~~ Date 2/10/92

Sign and Print Name BA WILLIAMS

A-6000-402 (03/90)

9313018.1641

SE2000
Environmental Logger
12/30 14:02

Unit# 192 Test 0

INPUT 1: Level (F) TOC

Reference	242.710
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/26 10:38:48

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.000	0.000	242.710	-242.710
1.000	0.017	242.694	-242.694
2.000	0.033	242.694	-242.694
3.000	0.050	242.678	-242.678
4.000	0.067	242.710	-242.710
5.000	0.083	242.694	-242.694
6.000	0.100	242.710	-242.710
7.000	0.117	242.694	-242.694
8.000	0.133	242.694	-242.694
9.000	0.150	242.710	-242.710
10.000	0.167	242.710	-242.710

9313018.1615

299-W6-3 DRAWDOWN PAGE 3 OF 6

SE2000
Environmental Logger
12/30 14:01

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	242.710
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/26 10:51:31

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	251.710	-251.710
0.0083	0.0001	242.915	-242.915
0.0166	0.0003	243.327	-243.327
0.0250	0.0004	243.201	-243.201
0.0333	0.0006	243.549	-243.549
0.0416	0.0007	243.660	-243.660
0.0500	0.0008	243.787	-243.787
0.0583	0.0010	243.993	-243.993
0.0666	0.0011	244.246	-244.246
0.0750	0.0013	244.500	-244.500
0.0833	0.0014	244.452	-244.452
0.1000	0.0017	244.849	-244.849
0.1166	0.0019	245.229	-245.229
0.1333	0.0022	245.498	-245.498
0.1500	0.0025	245.910	-245.910
0.1666	0.0028	246.164	-246.164
0.1833	0.0031	246.433	-246.433
0.2000	0.0033	246.782	-246.782
0.2166	0.0036	247.210	-247.210
0.2333	0.0039	247.431	-247.431
0.2500	0.0042	247.780	-247.780
0.2666	0.0044	248.160	-248.160
0.2833	0.0047	248.414	-248.414
0.3000	0.0050	248.778	-248.778
0.3166	0.0053	249.063	-249.063
0.3333	0.0056	249.333	-249.333
0.4166	0.0069	250.711	-250.711
0.5000	0.0083	252.248	-252.248
0.5833	0.0097	253.770	-253.770
0.6666	0.0111	255.164	-255.164

9313018.1643

299-W6-3 DRAWDOWN

0.7500	0.0125	256.479	-256.479
0.8333	0.0139	257.667	-257.667
0.9166	0.0153	258.951	-258.951
1.0000	0.0167	260.076	-260.076
1.0833	0.0181	261.185	-261.185
1.1666	0.0194	262.342	-262.342
1.2500	0.0208	263.483	-263.483
1.3333	0.0222	264.576	-264.576
1.4166	0.0236	265.701	-265.701
1.5000	0.0250	266.842	-266.842
1.5833	0.0264	267.919	-267.919
1.6666	0.0278	269.044	-269.044
1.7500	0.0292	270.090	-270.090
1.8333	0.0306	271.168	-271.168
1.9166	0.0319	272.309	-272.309
2.0000	0.0333	273.402	-273.402
2.5000	0.0417	280.104	-280.104
3.0000	0.0500	286.347	-286.347
3.5000	0.0583	292.606	-292.606
4.0000	0.0667	298.437	-298.437
4.5000	0.0750	304.142	-304.142
5.0000	0.0833	309.545	-309.545
5.5000	0.0917	314.917	-314.917
6.0000	0.1000	319.971	-319.971
6.5000	0.1083	324.757	-324.757
7.0000	0.1167	329.463	-329.463
7.5000	0.1250	333.994	-333.994
8.0000	0.1333	338.273	-338.273
8.5000	0.1417	342.361	-342.361
9.0000	0.1500	345.989	-345.989
9.5000	0.1583	349.808	-349.808
10.0000	0.1667	353.310	-353.310

9313018.1451

7 of 8

299-W6-3 RECOVERY

SE2000
Environmental Logger
12/30 13:59

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	242.710
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/26 11:03:46

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	360.694	-360.694
0.0083	0.0001	360.694	-360.694
0.0166	0.0003	360.725	-360.725
0.0250	0.0004	360.710	-360.710
0.0333	0.0006	360.710	-360.710
0.0416	0.0007	360.710	-360.710
0.0500	0.0008	360.710	-360.710
0.0583	0.0010	360.710	-360.710
0.0666	0.0011	360.710	-360.710
0.0750	0.0013	360.710	-360.710
0.0833	0.0014	360.710	-360.710
0.1000	0.0017	360.710	-360.710
0.1166	0.0019	360.710	-360.710
0.1333	0.0022	360.710	-360.710
0.1500	0.0025	360.710	-360.710
0.1666	0.0028	360.710	-360.710
0.1833	0.0031	360.710	-360.710
0.2000	0.0033	360.710	-360.710
0.2166	0.0036	360.710	-360.710
0.2333	0.0039	360.710	-360.710
0.2500	0.0042	360.710	-360.710
0.2666	0.0044	360.710	-360.710
0.2833	0.0047	360.710	-360.710
0.3000	0.0050	360.710	-360.710
0.3166	0.0053	360.710	-360.710
0.3333	0.0056	360.694	-360.694
0.4166	0.0069	359.363	-359.363
0.5000	0.0083	357.952	-357.952
0.5833	0.0097	356.558	-356.558
0.6666	0.0111	355.179	-355.179

9313018.1645

0.7500	0.0125	353.833	-353.833
0.8333	0.0139	352.533	-352.533
0.9166	0.0153	351.202	-351.202
1.0000	0.0167	349.966	-349.966
1.0833	0.0181	348.762	-348.762
1.1666	0.0194	347.590	-347.590
1.2500	0.0208	346.433	-346.433
1.3333	0.0222	345.324	-345.324
1.4166	0.0236	344.246	-344.246
1.5000	0.0250	343.121	-343.121
1.5833	0.0264	342.123	-342.123
1.6666	0.0278	341.141	-341.141
1.7500	0.0292	340.174	-340.174
1.8333	0.0306	339.239	-339.239
1.9166	0.0319	338.336	-338.336
2.0000	0.0333	337.449	-337.449
2.5000	0.0417	332.632	-332.632
3.0000	0.0500	329.019	-329.019
3.5000	0.0583	326.389	-326.389
4.0000	0.0667	323.837	-323.837
4.5000	0.0750	321.350	-321.350
5.0000	0.0833	318.910	-318.910
5.5000	0.0917	316.485	-316.485
6.0000	0.1000	314.108	-314.108
6.5000	0.1083	311.684	-311.684
7.0000	0.1167	309.355	-309.355
7.5000	0.1250	307.057	-307.057
8.0000	0.1333	304.855	-304.855
8.5000	0.1417	302.700	-302.700
9.0000	0.1500	300.608	-300.608
9.5000	0.1583	298.580	-298.580
10.0000	0.1667	296.631	-296.631
12.0000	0.2000	289.168	-289.168
14.0000	0.2333	282.735	-282.735
16.0000	0.2667	277.094	-277.094
18.0000	0.3000	272.134	-272.134
20.0000	0.3333	267.951	-267.951
22.0000	0.3667	264.227	-264.227
24.0000	0.4000	261.074	-261.074
26.0000	0.4333	258.285	-258.285
28.0000	0.4667	255.909	-255.909
30.0000	0.5000	253.849	-253.849
32.0000	0.5333	252.042	-252.042
34.0000	0.5667	250.553	-250.553
36.0000	0.6000	249.238	-249.238
38.0000	0.6333	248.160	-248.160

9313018.16

SAMPLING PUMP INSTALLATION FORM

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

Project: W-0174 / RCRA

Well Number 299-W6-3

Pump Type HS8001

Pump Model: 8001

Date Installed: 12/27/91

Installed by: (KEH)

Depth to water: 242.71

Depth to bottom 422.5

Reported Depth to water:

Screened Interval: (10.37)

Pump/Riser Pipe Description:

pipe: 3/4" DISPARBE PIPE S.S

pump length: (4.3) 4.43

pump screen length (1.9) 2.0

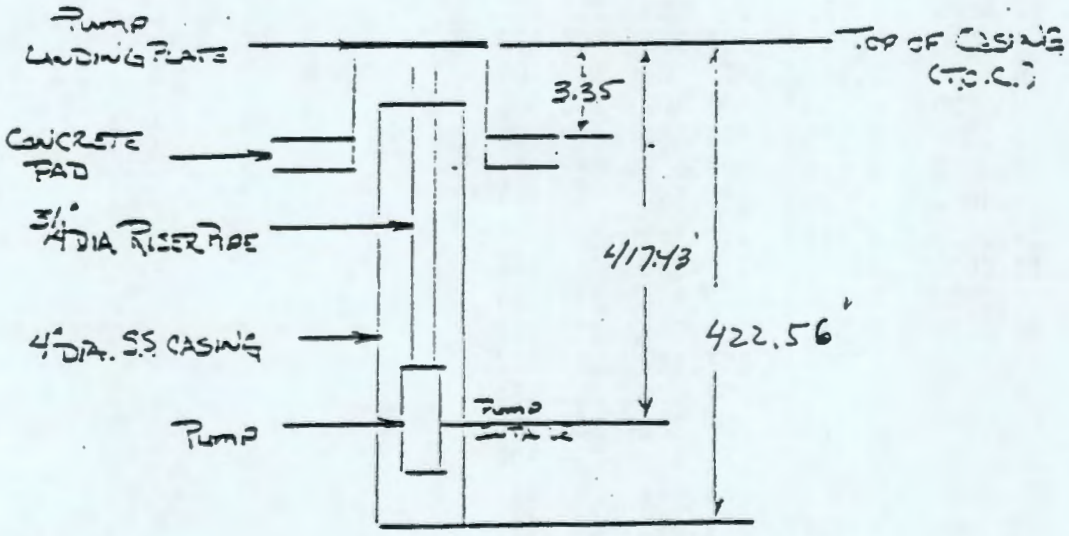
material cleaning: m1

Comments:

PUMP INSTALLATION SKETCH

Total material length 419.43

Loc. of pump intake: 415.81



Completed By: D. Williams

Date: 12/27/91

9313018.1647

BOREHOLE TEST INFORMATION

VALIDATED KDR 3/18/92 SIGNATURE/DATE

Borehole 299-W6-3 Borehole Diameter 4" Hanford Coordinates —NA—

Interval Tested 422.56' - 412.19' BTOC Depth Interval 422.56' - 412.19' BTOC

Test Type Instantaneous Slug Test Injection / Withdrawal Borehole Depth 422.56' BTOC

Instruction Used WHC-CM-7-7-EII 10.1

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOUNST SN-ET-1
DATA LOGGER.	IN-SITU INC. SN.- ~~2303BW~~ 2K192
PRESSURE TRANSDUCER	IN-SITU INC. S.N.- 2303
SLUGGING ROD	2.0' x 6.0', 0.13 ft³
STEEL MEASURING TAPE	500' GRADUATED STEEL TAPE

MEASUREMENT DATUM

Control Datum TOP OF CASING 6" (T.O.C. 6")

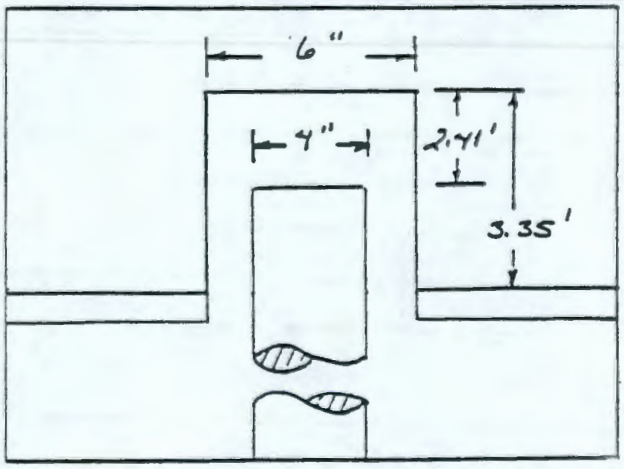
Elevation NA

Electric Sounder T.O.C. 6"

Steel Tape T.O.C. 6"

Pressure Transducer T.O.C. 6"

WELL HEAD DIAGRAM



COMMENTS

BTOC - below top of casing

BWL - Below water level

Recorded by: RA WILLIAMS ~~JAMES A. COATES~~ BW
Sign and Print Name

2/10/92
Date

BD-6000-295 (05/89)

9313018.1645

INSTANTANEOUS SLUG TEST DATA SHEET

INJECTION

Page ~~1~~ 7 of ~~7~~

Borehole 299-W6-3

Interval Tested 422.56' - 412.19' BTOC

Depth to Water 242.71' BTOC

Date 12-27-91

Measured by ~~JAMES A. COATES~~ BW

Slug Volume .13ft³ Barometer Reading (Beginning) - NA - (End) - NA -

Time Injection Baseline - ~~1034~~ 1021, Injection - 1034

Transducer Measurement Units FEET

Depth to Transducer 118.388' BWL

Initial Pressure (P_i) 242.71'

Slug Level or Pressure (P_{max}) 236.672'

Borehole Diameter 4"

Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement
		SEE ATTACHED			SEE ATTACHED			

Recorded by BA SILLIANS / ~~JAMES A. COATES~~ BW (Sign and Print Name) 14-44

2/10/92 (Date)

9313018.1649

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299-W6-3 INJECTION BASELINE PAGE 2 OF 1

SE2000
Environmental Logger
12/30 13:57

Unit# 192 Test 3

INPUT 1: Level (F) TOC

Reference	242.710
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/27 10:12:58

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	242.614	-242.614
1.0000	0.0167	242.551	-242.551
2.0000	0.0333	242.504	-242.504
3.0000	0.0500	242.472	-242.472
4.0000	0.0667	242.456	-242.456
5.0000	0.0833	242.424	-242.424
6.0000	0.1000	242.424	-242.424
7.0000	0.1167	242.408	-242.408
8.0000	0.1333	242.393	-242.393
9.0000	0.1500	242.393	-242.393
10.0000	0.1667	242.377	-242.377
11.0000	0.1833	242.377	-242.377
12.0000	0.2000	242.393	-242.393

9313018.1655

SE2000
Environmental Logger
12/30 13:55

Unit# 192 Test 4

INPUT 1: Level (F) TOC

Reference	242.710
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/27 10:26:49

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	236.672	-236.672
0.0083	0.0001	245.070	-245.070
0.0166	0.0003	240.713	-240.713
0.0250	0.0004	240.269	-240.269
0.0333	0.0006	240.349	-240.349
0.0416	0.0007	240.570	-240.570
0.0500	0.0008	240.586	-240.586
0.0583	0.0010	240.586	-240.586
0.0666	0.0011	240.634	-240.634
0.0750	0.0013	240.602	-240.602
0.0833	0.0014	240.507	-240.507
0.1000	0.0017	240.650	-240.650
0.1166	0.0019	240.586	-240.586
0.1333	0.0022	240.634	-240.634
0.1500	0.0025	240.650	-240.650
0.1666	0.0028	240.634	-240.634
0.1833	0.0031	240.665	-240.665
0.2000	0.0033	240.650	-240.650
0.2166	0.0036	240.665	-240.665
0.2333	0.0039	240.665	-240.665
0.2500	0.0042	240.665	-240.665
0.2666	0.0044	240.681	-240.681
0.2833	0.0047	240.681	-240.681
0.3000	0.0050	240.681	-240.681
0.3166	0.0053	240.697	-240.697
0.3333	0.0056	240.697	-240.697
0.4166	0.0069	240.729	-240.729
0.5000	0.0083	240.761	-240.761
0.5833	0.0097	240.776	-240.776
0.6666	0.0111	240.808	-240.808

9313018.1651

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299-W6-3 INJECTION PAGE 4 OF 4

0.7500	0.0125	240.824	-240.824
0.8333	0.0139	240.856	-240.856
0.9166	0.0153	240.887	-240.887
1.0000	0.0167	240.903	-240.903
1.0833	0.0181	240.919	-240.919
1.1666	0.0194	240.951	-240.951
1.2500	0.0208	240.967	-240.967
1.3333	0.0222	240.998	-240.998
1.4166	0.0236	241.014	-241.014
1.5000	0.0250	241.030	-241.030
1.5833	0.0264	241.062	-241.062
1.6666	0.0278	241.077	-241.077
1.7500	0.0292	241.093	-241.093
1.8333	0.0306	241.109	-241.109
1.9166	0.0319	241.141	-241.141
2.0000	0.0333	241.157	-241.157
2.5000	0.0417	241.252	-241.252
3.0000	0.0500	241.347	-241.347
3.5000	0.0583	241.426	-241.426
4.0000	0.0667	241.505	-241.505
4.5000	0.0750	241.569	-241.569
5.0000	0.0833	241.632	-241.632
5.5000	0.0917	241.695	-241.695
6.0000	0.1000	241.743	-241.743
6.5000	0.1083	241.790	-241.790
7.0000	0.1167	241.838	-241.838
7.5000	0.1250	241.870	-241.870
8.0000	0.1333	241.917	-241.917
8.5000	0.1417	241.949	-241.949
9.0000	0.1500	241.981	-241.981
9.5000	0.1583	242.012	-242.012
10.0000	0.1667	242.044	-242.044
12.0000	0.2000	242.123	-242.123
14.0000	0.2333	242.187	-242.187
16.0000	0.2667	242.234	-242.234
18.0000	0.3000	242.266	-242.266
20.0000	0.3333	242.298	-242.298
22.0000	0.3667	242.313	-242.313
24.0000	0.4000	242.329	-242.329
26.0000	0.4333	242.329	-242.329
28.0000	0.4667	242.345	-242.345
30.0000	0.5000	242.345	-242.345
32.0000	0.5333	242.361	-242.361
34.0000	0.5667	242.361	-242.361

9313018.1652

6 of 8

INSTANTANEOUS SLUG TEST DATA SHEET

WITHDRAWAL

Borehole 299-W6-3

Interval Tested 422.56' - 412.19' BTOC

Depth to Water 242.71' BTOC

Date 12-27-91

Measured by ~~JAMES A. COATES BW~~

Slug Volume .13ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time 1110

Transducer Measurement Units FEET

Depth to Transducer 118.388' BWL

Initial Pressure (P_i) 242.71'

Slug Level or Pressure (P_{max}) 244.405'

Borehole Diameter 4"

Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement
		SEE ATTACHED			SEE ATTACHED			

Recorded by BA WILLIAMS

~~JAMES A. COATES, BW~~ (Sign and Print Name) 14-48

2/10/92 (Date)

9313018.1653

788

299-W6-3 WITHDRAWAL PAGE 2 OF 3

SE2000
Environmental Logger
12/30 13:53

Unit# 192 Test 5

INPUT 1: Level (F) TOC

Reference	242.710
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/27 11:03:06

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	243.629	-243.629
0.0083	0.0001	244.310	-244.310
0.0166	0.0003	244.405	-244.405
0.0250	0.0004	244.326	-244.326
0.0333	0.0006	244.231	-244.231
0.0416	0.0007	244.373	-244.373
0.0500	0.0008	244.326	-244.326
0.0583	0.0010	244.326	-244.326
0.0666	0.0011	244.294	-244.294
0.0750	0.0013	244.294	-244.294
0.0833	0.0014	244.310	-244.310
0.1000	0.0017	244.278	-244.278
0.1166	0.0019	244.278	-244.278
0.1333	0.0022	244.262	-244.262
0.1500	0.0025	244.246	-244.246
0.1666	0.0028	244.246	-244.246
0.1833	0.0031	244.231	-244.231
0.2000	0.0033	244.231	-244.231
0.2166	0.0036	244.215	-244.215
0.2333	0.0039	244.215	-244.215
0.2500	0.0042	244.199	-244.199
0.2666	0.0044	244.199	-244.199
0.2833	0.0047	244.183	-244.183
0.3000	0.0050	244.183	-244.183
0.3166	0.0053	244.167	-244.167
0.3333	0.0056	244.167	-244.167
0.4166	0.0069	244.136	-244.136
0.5000	0.0083	244.104	-244.104
0.5833	0.0097	244.072	-244.072
0.6666	0.0111	244.041	-244.041

9313018.1651

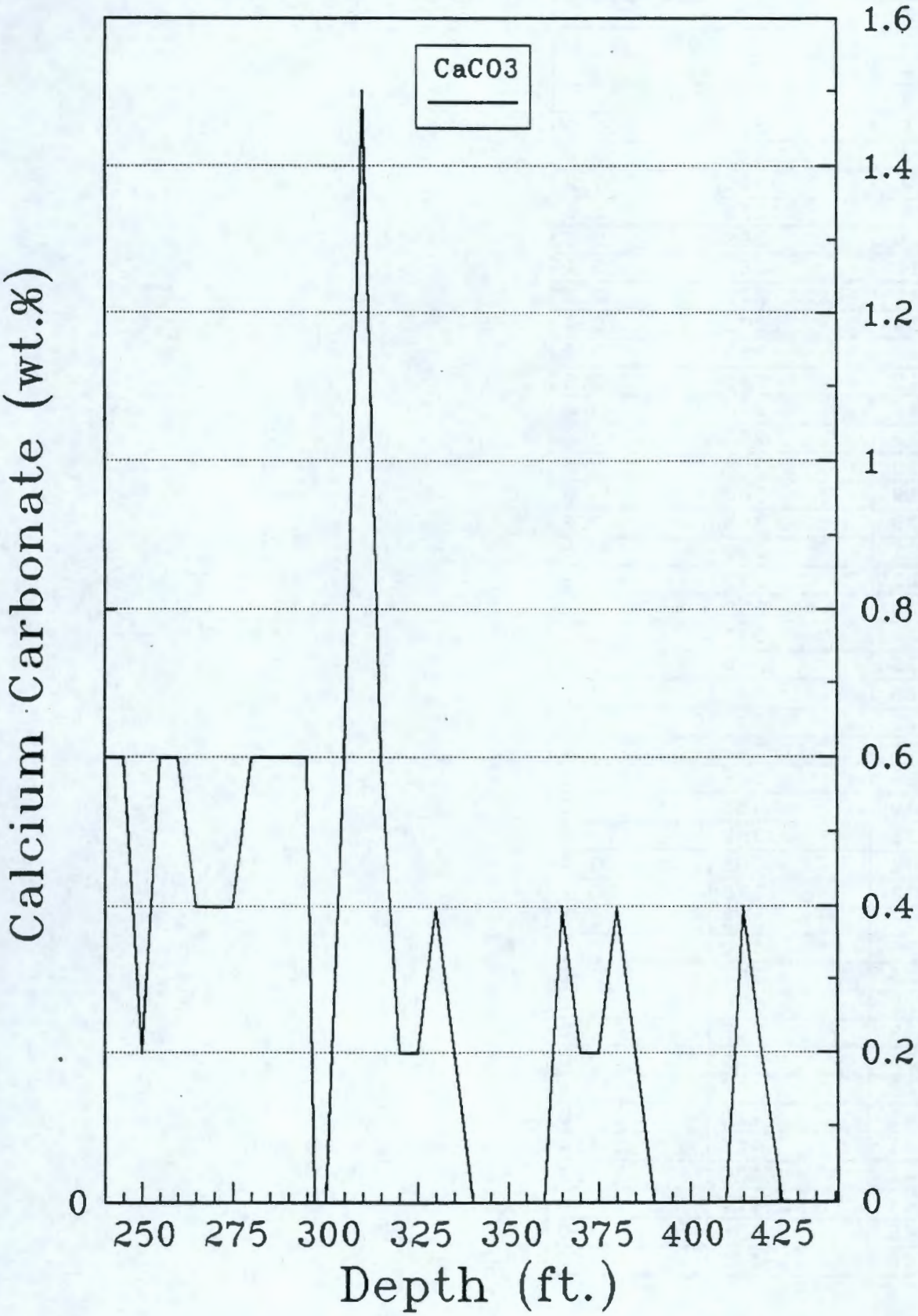
299-W6-3 WITHDRAWAL

0.7500	0.0125	244.025	-244.025
0.8333	0.0139	243.993	-243.993
0.9166	0.0153	243.961	-243.961
1.0000	0.0167	243.945	-243.945
1.0833	0.0181	243.914	-243.914
1.1666	0.0194	243.898	-243.898
1.2500	0.0208	243.866	-243.866
1.3333	0.0222	243.835	-243.835
1.4166	0.0236	243.819	-243.819
1.5000	0.0250	243.787	-243.787
1.5833	0.0264	243.771	-243.771
1.6666	0.0278	243.755	-243.755
1.7500	0.0292	243.739	-243.739
1.8333	0.0306	243.708	-243.708
1.9166	0.0319	243.692	-243.692
2.0000	0.0333	243.676	-243.676
2.5000	0.0417	243.565	-243.565
3.0000	0.0500	243.470	-243.470
3.5000	0.0583	243.375	-243.375
4.0000	0.0667	243.296	-243.296
4.5000	0.0750	243.185	-243.185
5.0000	0.0833	243.106	-243.106
5.5000	0.0917	243.058	-243.058
6.0000	0.1000	242.995	-242.995
6.5000	0.1083	242.947	-242.947
7.0000	0.1167	242.900	-242.900
7.5000	0.1250	242.852	-242.852
8.0000	0.1333	242.820	-242.820
8.5000	0.1417	242.773	-242.773
9.0000	0.1500	242.741	-242.741
9.5000	0.1583	242.710	-242.710
10.0000	0.1667	242.678	-242.678
12.0000	0.2000	242.583	-242.583
14.0000	0.2333	242.519	-242.519
16.0000	0.2667	242.456	-242.456
18.0000	0.3000	242.424	-242.424

9313018.1955

VALIDATED
KDR 3/18/92
SIGNATURE DATE

WELL 299-W6-3



9313018.1667

2 of 2

	A	B
1	WELL 299-W6-3	
2		
3	Depth	CaCO3
4	ft.	Wt. %
5		
6	240	0.6
7	245	0.6
8	250	0.2
9	255	0.6
10	260	0.6
11	265	0.4
12	270	0.4
13	275	0.4
14	280	0.6
15	285	0.6
16	290	0.6
17	295	0.6
18	295-298	0
19	300	0
20	305	0.6
21	310	1.5
22	315	0.6
23	320	0.2
24	325	0.2
25	330	0.4
26	335	0.2
27	340	0
28	341-344	0
29	345	0
30	355	0
31	360	0
32	365	0.4
33	370	0.2
34	375	0.2
35	380	0.4
36	385	0.2
37	390	0
38	395	0
39	400	0
40	405	0
41	410	0
42	415	0.4
43	420	0.2
44	425-427	0
45	435	0
46	439.5-441	0

9313018.1657

RDK
10/23/91
20 sk+
10-20 sml

TEST REQUEST

SAMPLE/SPECIMEN NO. 2-0217 COST CODE/WORK ORDER NO. R331H

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 10-22-91

TEST REQUESTED	NO. OF SAMPLES	TEST LAB INFORMATION (PROCEDURE USED)
SIEVE ANALYSIS	1	GEL-07

REMARKS 299-W6-3
425-427'

RECEIVED BY: R.G. ALEXANDER DATE 10-22-91

APPROVED BY: R.G. ALEXANDER DATE 10-22-91

9313018.165

RADIATION RELEASE

Bldg. 299-W6-3 Expiration Date 10/22/91

Released By [signature]
Health Physics

Remarks 425-427

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299-W6-3 Expiration Date 10/22/91

Released By [signature]
Health Physics

Remarks 425-427

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 2-0217 Page 1 of 1

Tested By: R.G. ALEXANDER Date 10-22-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0015 Calibration Due Date 9-16-92
N/A : ETAL- N/A Calibration Due Date N/A
: ETAL- Calibration Due Date
: ETAL- Calibration Due Date
: ETAL- Calibration Due Date

Sample Description SANDY GRAVEL Sieve Time 10 (min)

Reduced by ( ) Splitting ( ) Quartering (✓) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2"	1093.1	Ø	Ø	100
1½		Ø	Ø	100
1		69.5	6.4	93.6
¾		69.5	6.4	93.6
½		104.8	9.6	90.4
3/8		138.4	12.7	87.3
#4		193.6	17.7	82.3
#10	1240	13.0	10.5	73.7
#40		65.4	52.7	38.9
#60		94.6	76.3	19.5
#100		109.0	87.9	10.0
#200		115.2	92.9	5.8

Finess Modules (FM) N/A (See ASTM C 136-85, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASH GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; [signature] Date 10-23-91

A-6400-204(2-87)

9313018.1659

9313018.1607

GRAIN SIZE ANALYSIS PLOT

Sample No. 2-0217

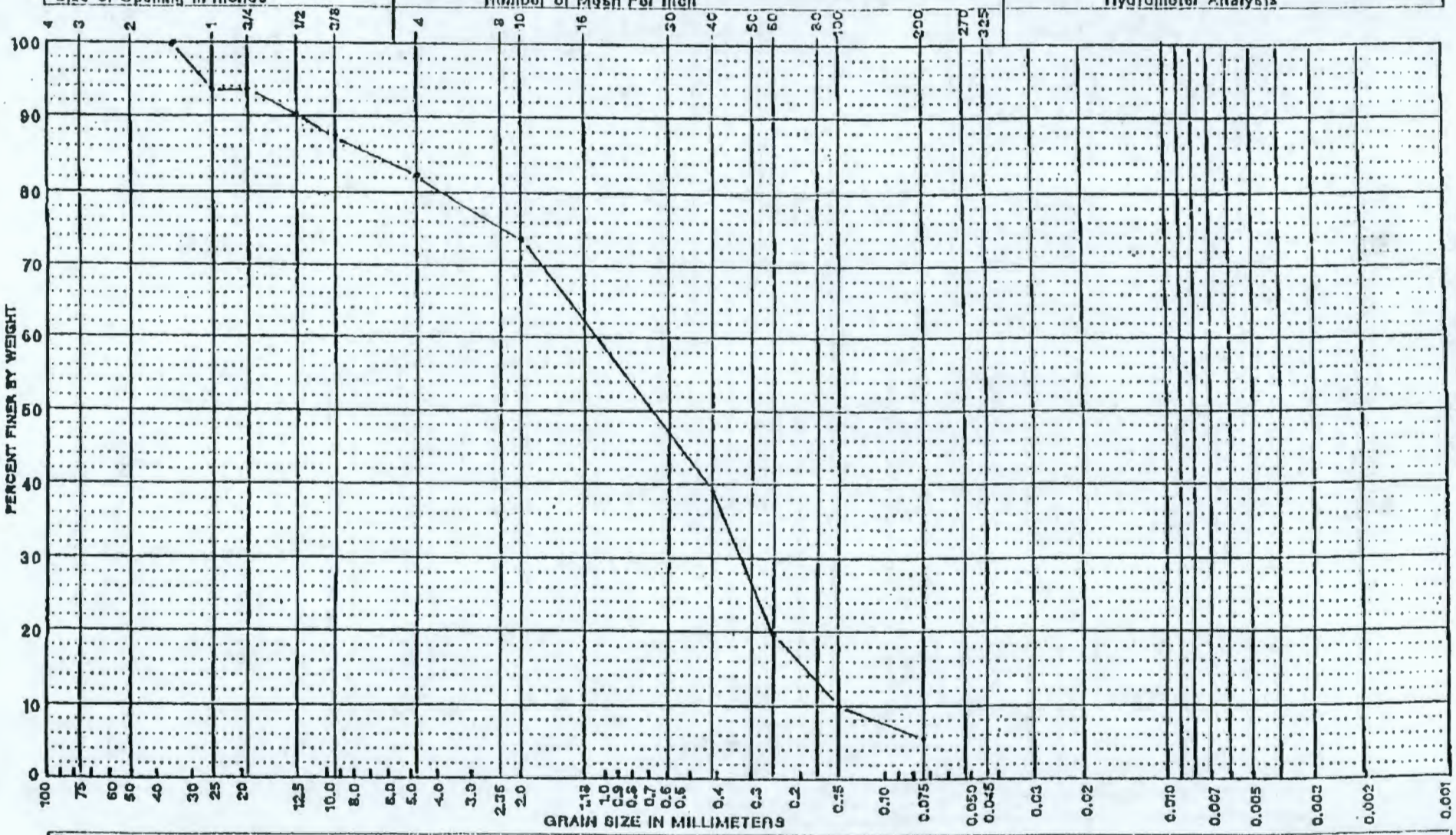
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Plotted By R.G. ALEXANDER

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 10-23-91



Remarks 299-W6-3 425-427'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: Cindy Russell Date 10-23-91

14-55

WHC-SD-EN-DP-044, Rev. 0

SIEVE ANALYSIS DATA SHEET

Sample No. 2-0217 Page 1 of 1

Tested By: R.G. ALEXANDER Date 10-22-91
Procedure No: GEZ-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0015 Calibration Due Date 9-16-92
N/A : ETAL- N/A Calibration Due Date N/A
: ETAL- Calibration Due Date
: ETAL- Calibration Due Date
: ETAL- Calibration Due Date

Sample Description SAND Sieve Time ____ (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
#4	124.0	Ø	Ø	100
#10		13.0	10.5	89.5
#40		65.4	52.7	47.3
#60		94.6	76.3	23.7
#100		109.0	87.9	12.1
#200		115.2	92.9	7.1

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	
E = Dry Weight of Sample After Washing/Sieve	N/A g	WASH GRADING
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By: [signature] Date 10-22-91

A-6400-204(2-87)

9313018.1961

013 TECH TRNG 10/23/91 12:03 509 373 5052

GRAIN SIZE ANALYSIS PLOT

Sample No. 2-0217

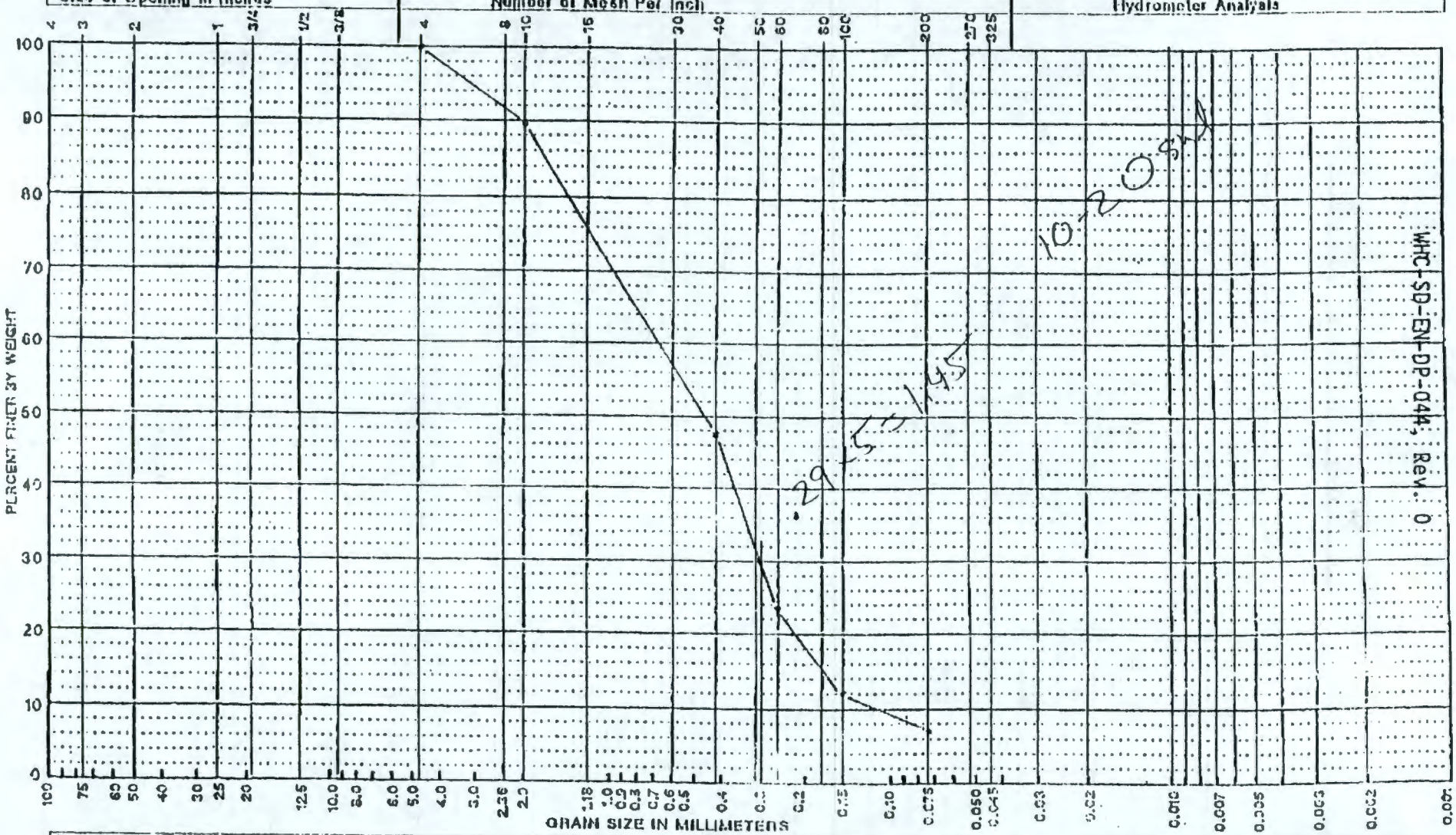
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Plotted By RG ALEXANDER

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 10-23-91



Remarks 299-W6-3 425-427

SAND

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By Cindi Connell Date 10-23-91

WHC-SD-EN-DP-044, Rev. 0

VALIDATED KDR 3/18/92 SIGNATURE/DATE

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Requested by:	Phone No.	Well No.	Date:
		299-W6-3	1/6/93

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5'		SOIL	8.14.91	1859.91	7.4	0.5
10'				1860.91	13.6	0.6
15'				1861.91	7.9	0.6
20'	8.19.91		8.20.91	1921.91	1.7	0.4
25'				1913.91	25.2	<D
30'	8.20.91		8.21.91	1929.91	7.4	<D
35'				1939.91	16.5	<D
40'				1933.91	10.9	0.8
45'						
50						
55			9.3.91	0334.91B	22.95	0.71
60				0336-91B	<D	1.4
65'				0332-91B	34.80	0.47
70'			9.3.91	0339.91B	14.81	1.43
75'	8.27.91		9.4.91	0352.91B	19.11	0.
80'	8.27.91			0353.91B	19.53	0.87
85'				0354.91B	19.25	0.47
90'				0364 91B	36.38	0.43
95'				0365.91B	41.14	0.26
100'	9.3.91		9.5.91	0390.91B	41.23	2.22
105'	8.28.91		9.5.91	0407.91B	30.28	1.8
110'	8.28.91			0403.91B	39.24	2.15
115'				0414.91B	50.60	1.80
120'	8.29.91		9.6.91	0421 91B	25.18	0.24
125'				0425.91B	16.16	0.40
128'	9.3.91		9.3.91	0341 91B	25.90	<D
130'				0342.91B	6.18	<D
135'			9.9.91	0467.91B	1.19	1.47
140'			9.6.91	0447.91B	20.16	0.71
145'	9.4.91			0442.91B	6.84	1.17
150'			9.12.91	0518.91B	36.46	2.16
155'			9.9.91	0470.91B	24.13	1.

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/9

9313018.1663

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

2 of 3

Requested by:	Phone No.	Well No.	Date:
		299 W6 3	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
160	9.5.91	Soil	9.16.91	0557.91B	4.94	<D
165	9.6.91		9.16.91	0552.91B	1.03	<D
170	9.11.91			0715.91B	9.89	0.25
175	9.13.91		9.26.91	0734.91B	28.06	<D
180	9.11.91		9.23.91	0584.91B	3.01	0.96
185	9.12.91			0590.91B	5.21	1.11
190	9.16.91		9 27 91	0800.91B	18.26	0.59
195	9.17.91			0820.91B	27.58	0.8
200				0819.91B	22.57	1.6
205			9.25.91	0624.91B	16.72	0.80
210				0617.91B	22.57	1.68
215	9.17.91			0616.91B	17.78	0.65
220	9.17.91			0615.91B	26.33	<D
225	9.17.91		9.27.91	0745.91B	1.16	0.24
230			9.26.91	0768.91B	9.03	0.8
235	9.23.91		10.1.91	0867.91B	8.27	<D
240				0868.91B	9.03	0.8
245			9.30.91	0854.91B	4.69	0.89
250				0855.91B	25.08	0.53
255	9.24.91		10.4.91	0908.91B	12.13	0.14
260				0904.91B	10.49	0.45
265				0910.91B	7.63	<D
270			10.7.91	0911.91B	11.99	<D
275	9.30.91		10.8.91	0972.91B	23.98	<D
280-281.5	9.30.91		10.7.91	0955.91B	14.86	<D
285	10.2.91		10.9.91	0980.91B	20.51	<D
290	9.30.91			0989.91B	7.63	<D
295				0987.91B	16.79	0.48
295-295			10.10.91	0993.91B	16.61	0.45
300			10.9.91	0988.91B	<D	<D
305	9.26.91		10.17.91	1099.91B	<D	0.78
310				1097.91B	23.81	<D

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1611

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Requested by:	Phone No.	Well No. 299 W6-3 (3 of 3)	Date:

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
315'	9.26.91	SOIL	10.17.91	1098.91B	<D	0.93
320'	9.30.91		10.29.91	1356.91B	19.73	<D
325'	↓		↓	1345.91B	9.45	<D
330'	10.1.91		10.15.91	1036.91B	34.34	0.97
335'	↓		10.15.91	1034.91B	22.89	0.48
340'	↓		↓	1033.91B	64.10	1.21
345'	10.7.91		10.22.91	1192.91B	28.11	0.77
341'-344'	10.1.91		10.15.91	1016.91B	21.52	0.66
348'-352'	10.7.91		10.22.91	1206.91B	32.39	0.71
355'	10.7.91		10.22.91	1194.91B	<D	0.83
360'	10.7.91		10.22.91	1196.91B	18.81	0.19
365'	10.8.91		10.23.91	1240.91B	9.09	0.44
370	↓		↓	1232.91B	14.09	0.73
375'	↓		↓	1233.91B	10.00	0.87
380'	10.7.91		10.22.91	1217.91B	27.06	<1
385'	10.8.91		10.23.91	1226.91B	3.92	0.71
390'	10.7.91		10.22.91	1218.91B	42.17	1.39
395	10.7.91		↓	1215.91B	29.14	0.39
400	↓		↓	1216.91B	17.0	<D
405'	10.9.91		10.29.91	1340.91B	26.44	<D
410'	10.10.91		10.29.91	1293.91B	20.13	0.92
415	↓		10.29.91	1296.91B	13.94	0.60
420'	9.30.91		10.29.91	1356.91B	19.73	<D
425'	10.14.91		10.21.91	1258.91B	<D	<D
425'-427'	↓		10.29.91	1396.91B	11.94	<D
427'-430'	↓		↓	1397.91B	8.95	0.55
435'	10.15.91		↓	1414.91B	16.96	<D
439'-441'	10.15.91		10.29.91	1386.91B	16.46	<D

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1665

Westinghouse Hanford Company	LOG HEADER	Page 1 of 2

Well No. 299-W6-3 Area 200 West Date 9/6/91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD 29* Elevation 696.49' Brass Cap

Survey Coordinates 137299.13 N 567118.18 E

Log Measured From Ground Surface

Location Description NW of T-Plant

Ground Surface Elevation 696.49' Brass Cap

Surface Temperature 27.0°C Weather Clear - Hot

BOREHOLE INFORMATION

Driller Art Gwin (Jensen Drilling)

Drill Rig Type Cable Tool | Bit Type/Diameter 12" / Hard Tool

Borehole Diameter(s)/Depth 16"/22.1 12"/164.75'

Depth Driller 164.75' | Depth Logger 159.5' (See Notes)

Liquid Level NA | Liquid Density NA

Temperature NA

CASING RECORD

Type 16" Carbon Steel Sch. 40	Interval +1.0' - 22.08'
Type 12" Carbon Steel Sch. 40	Interval +9.2' - 161.75'
Type	Interval
Type	Interval

Well Screen Interval NA

Comments: Return Error = +0.17' high
Centralizer used.
Thick drill cuttings at bottom of borehole / No fluid.
*Survey data from Kaiser 12/15/92 RDM

11-61/62

14-61/62

A-6000-520 (05/90)

9313018.1666

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No.: CG27A97

Base Calibration Date: 5/91 | Calibration Reference:

Calibration/Probe Factor: 8.84x10^-3 eU p/m/c/s | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μ sec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 159.5' | To: 0.0'

Rerun(s): 159.5' to 130.0' 100.0' to 60.0' 25.0' to 10.0'

Pre Survey Verification: Position 1: 306.7 eU | Position 2: 65.9 eU | Background: 55 c/s

Base Calibration Difference: Position 1: 9.3 eU | Position 2: 1.6 eU

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 0920 | Completion Time: 1120

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC-1

Post Survey Verification: Position 1: 295.3 eU | Position 2: 64.1 eU | Background: 60 c/s

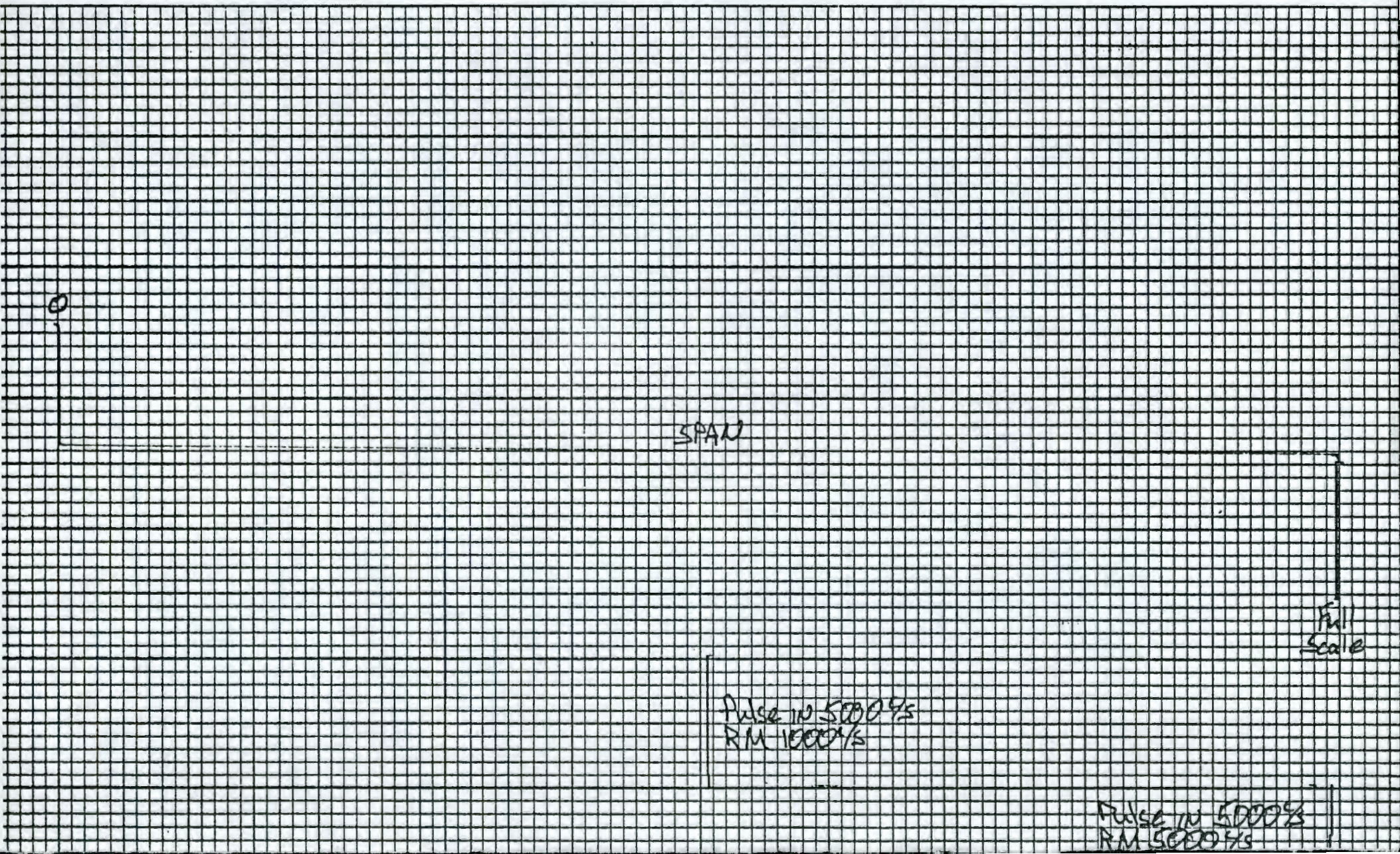
Percent Change: Position 1: 3.7% | Position 2: 2.7%

Comments: Return Error = +0.17' high

Centralizer used

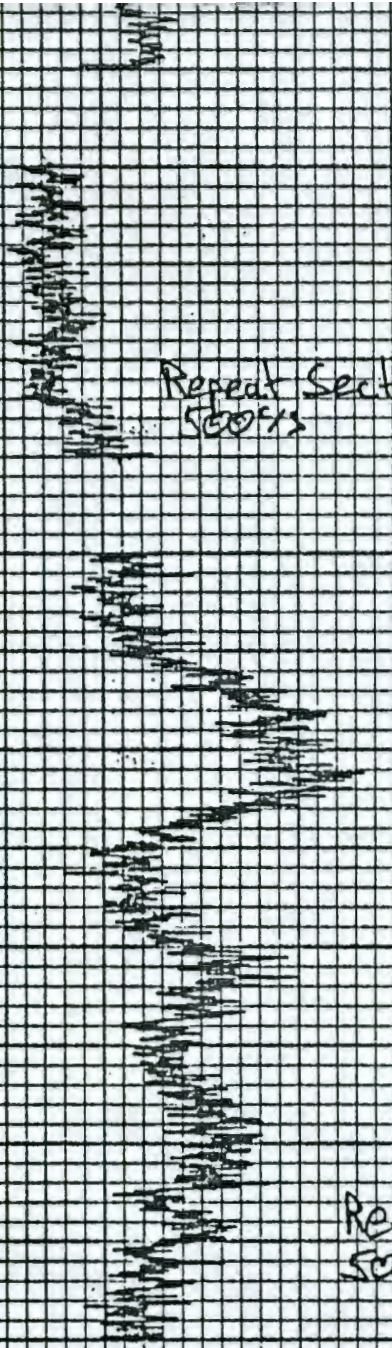
Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 9/6/91

A-6000-520 (05/90)



Pos. 2
1000 ys
Pos. 1
500 ys
Background
500 ys

Post Survey Calibration



10

20

60

70

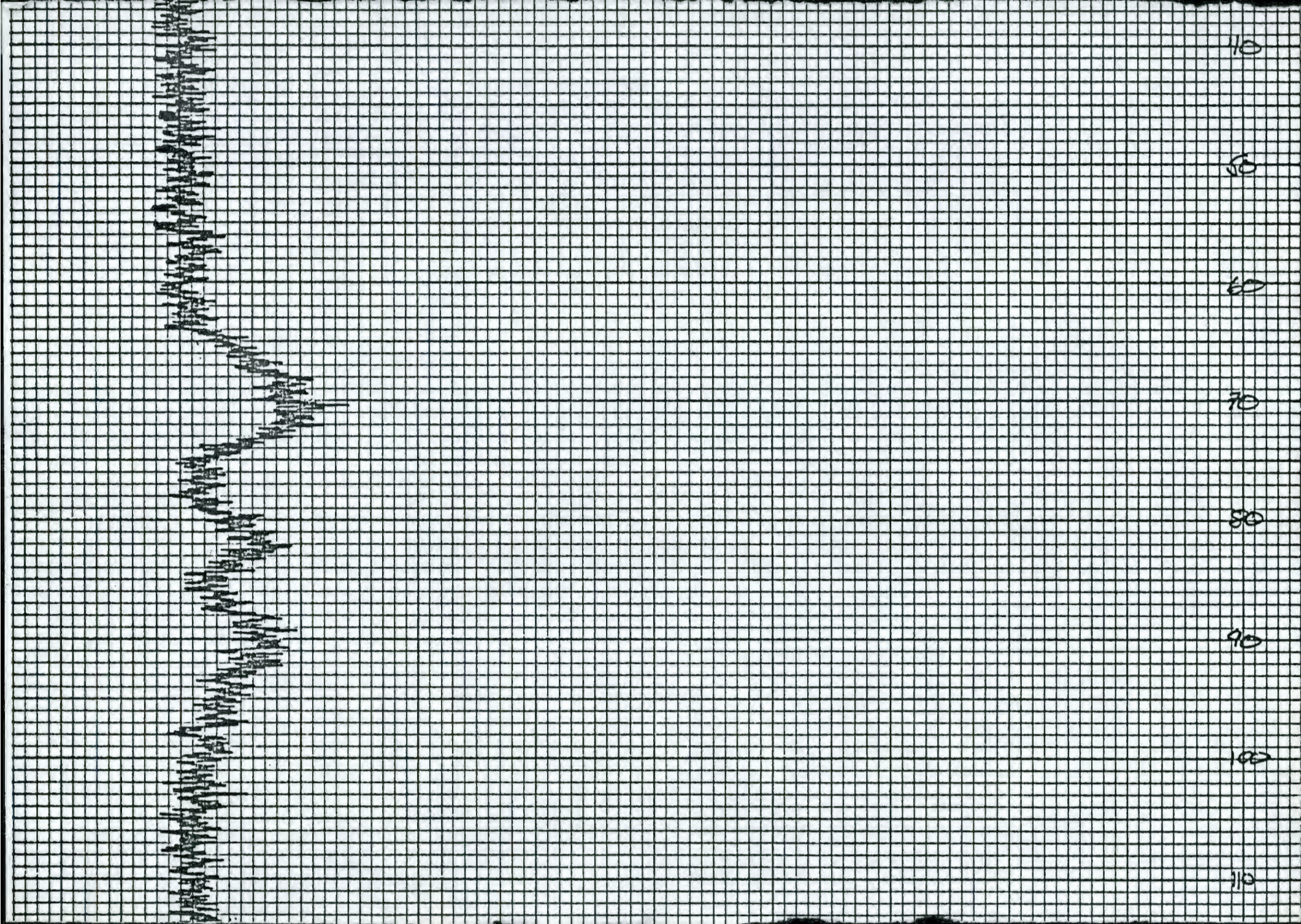
80

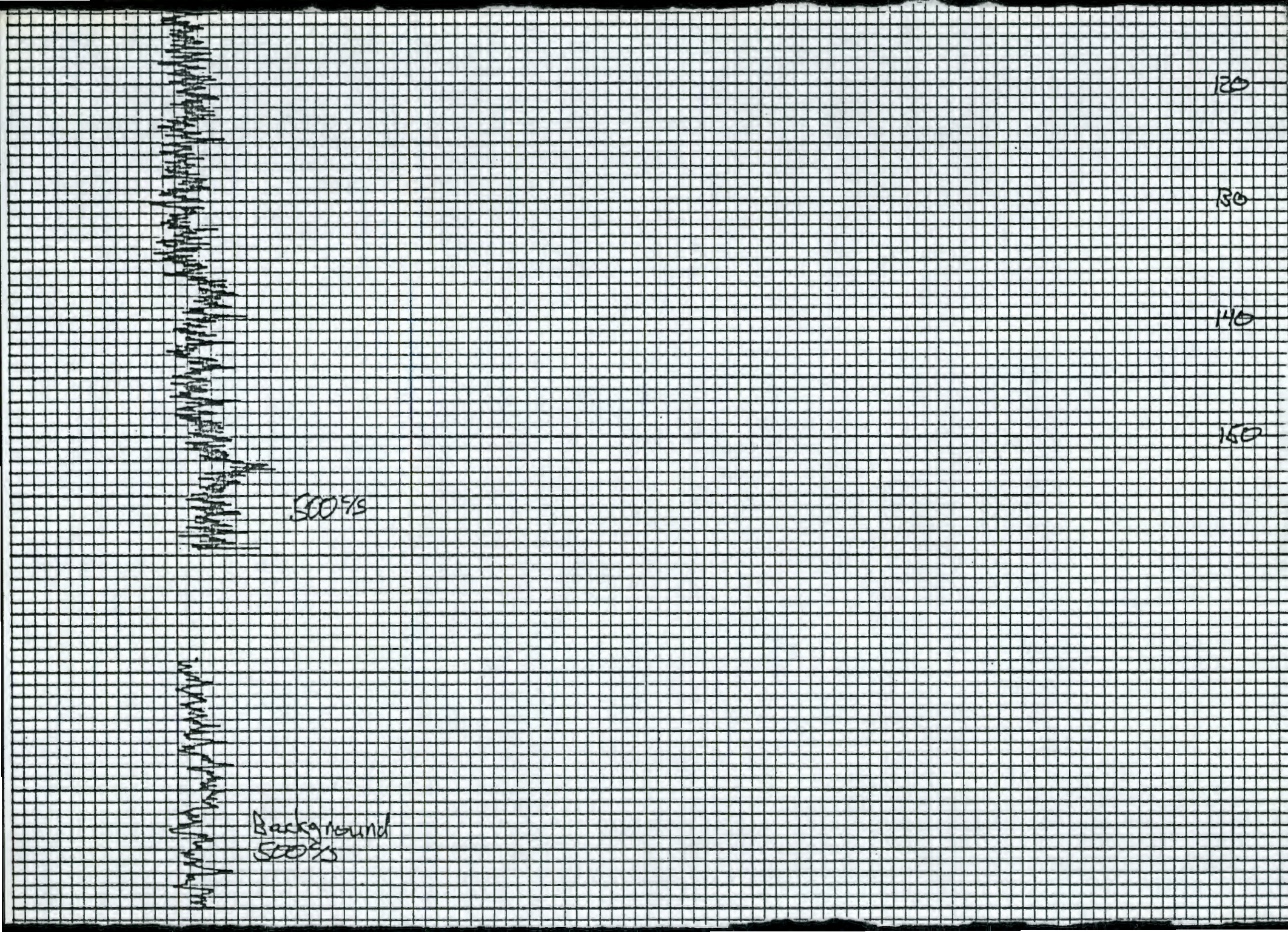
90

100

Repeat Section
500 c's

Pen Quit Working See Repeat Section


40
50
60
70
80
90
100
110


120
130
140
150
500 c/s
Background
500 c/s

Pos. 2
1000%
Pos. 1
500%
Pulse in 5000%
RM 1000%
Pulse in 5000%
RM 5000%
0
SPAN
Pre Survey Calibration
Full Scale
299-W6-3 #1

Westinghouse Hanford Company	WHC-SD-EN-DP-044, Rev. 0 LOG HEADER	Page 1 of 2

Well No. 299-W6-3 Area 200 West Date 10-1-91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD29 * Elevation 696.49' Brass Cap

Survey Coordinates 137299.13 N 567118.18

Log Measured From Ground Surface

Location Description 200 West Area / West of T-Plant

Ground Surface Elevation 696.49' Brass Cap

Surface Temperature 27.8°C Weather Partly Cloudy - Warm

BOREHOLE INFORMATION

Driller Art Gwin

Drill Rig Type Cable Tool Bit Type/Diameter Hand Tool / 10"

Borehole Diameter(s)/Depth 16"/22.1 12"/171.3 10"/341.0'

Depth Driller 341.0' Depth Logger 341.1'

Liquid Level 249.8' Recharging while Logging Liquid Density NA

Temperature NA Sample Not Taken

CASING RECORD

Type 16" Carbon Steel Sch.40 Interval +0.1' - 22.1'

Type 12" Carbon Steel Sch.40 Interval +0.3' - 171.31'

Type 10" Carbon Steel Sch.40 Interval +0.7' - 341.34'

Type Interval

Well Screen Interval NA

Comments: Return Error = +0.17' high

Centralizer used.

*Survey data from Kaiser 12/15/92

14-63/64

14-63/64

14-59/60

A-6000-520

9313018.1667

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No. C627A97

Base Calibration Date: 5/91 | Calibration Reference: PNL-7735 UC-606

Calibration/Probe Factor: 8.84×10^{-3} eU p/m/c/s | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μsec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 341.1' | To: 125.0'

Rerun(s): 210.0' to 170.0'

Pre Survey Verification: Position 1: 297.9 eU | Position 2: 63.6 eU | Background: 55 c/s

Base Calibration Difference: Position 1: 0.5 eU | Position 2: 0.7 eU

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 1420 | Completion Time: 1650

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC-1

Post Survey Verification: Position 1: 297.9 eU | Position 2: 63.6 eU | Background: 55 c/s

Position 1: [illegible] | Position 2: [illegible]

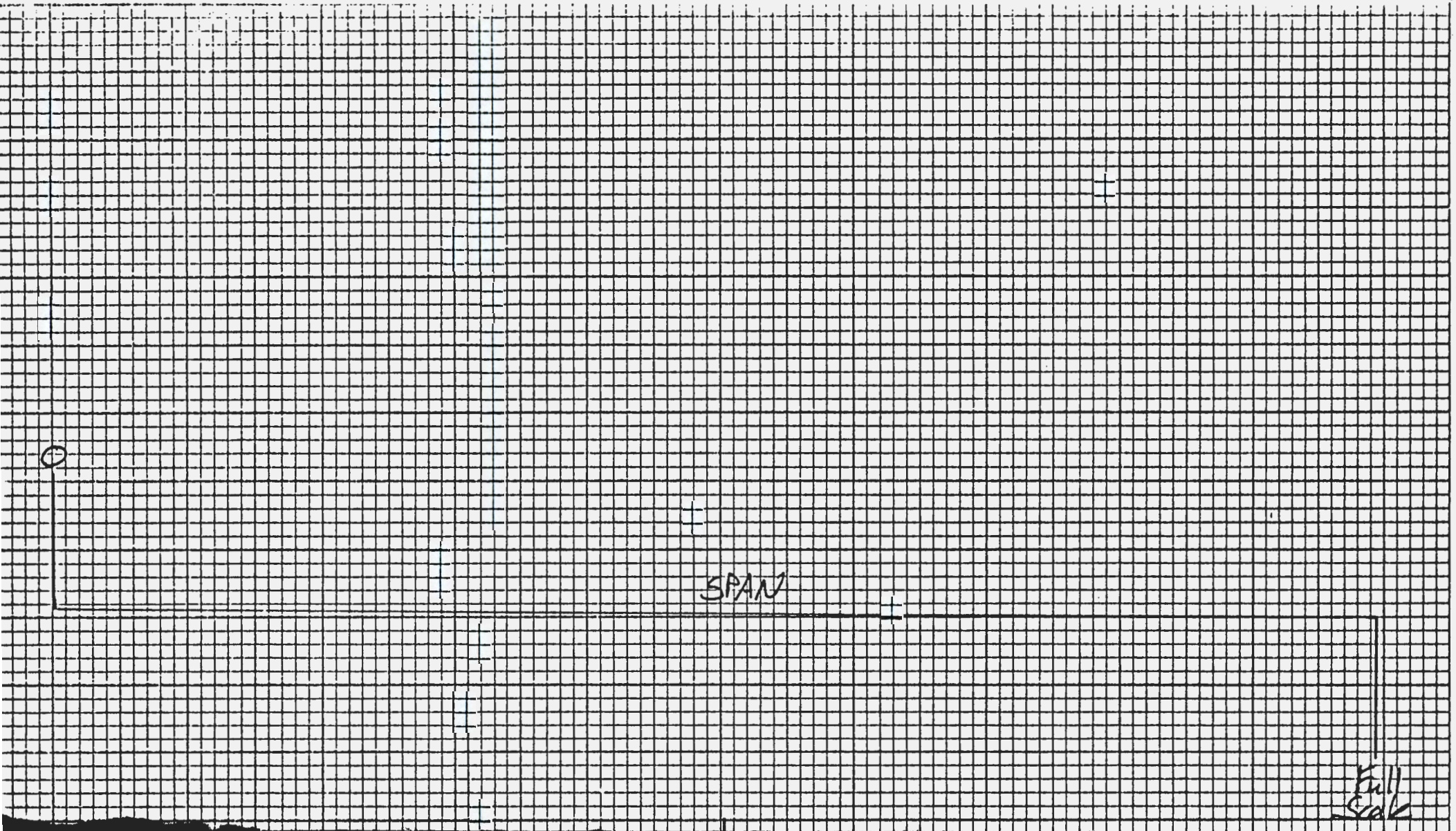
Percent Change: Position 1 0.0% Position 2 0.0

Comments Return Error = +0.17 high

Centralizer used.

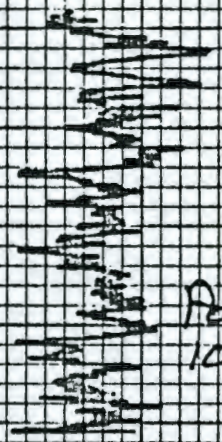
Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 10/1/91

A-6000-520 (05/90)



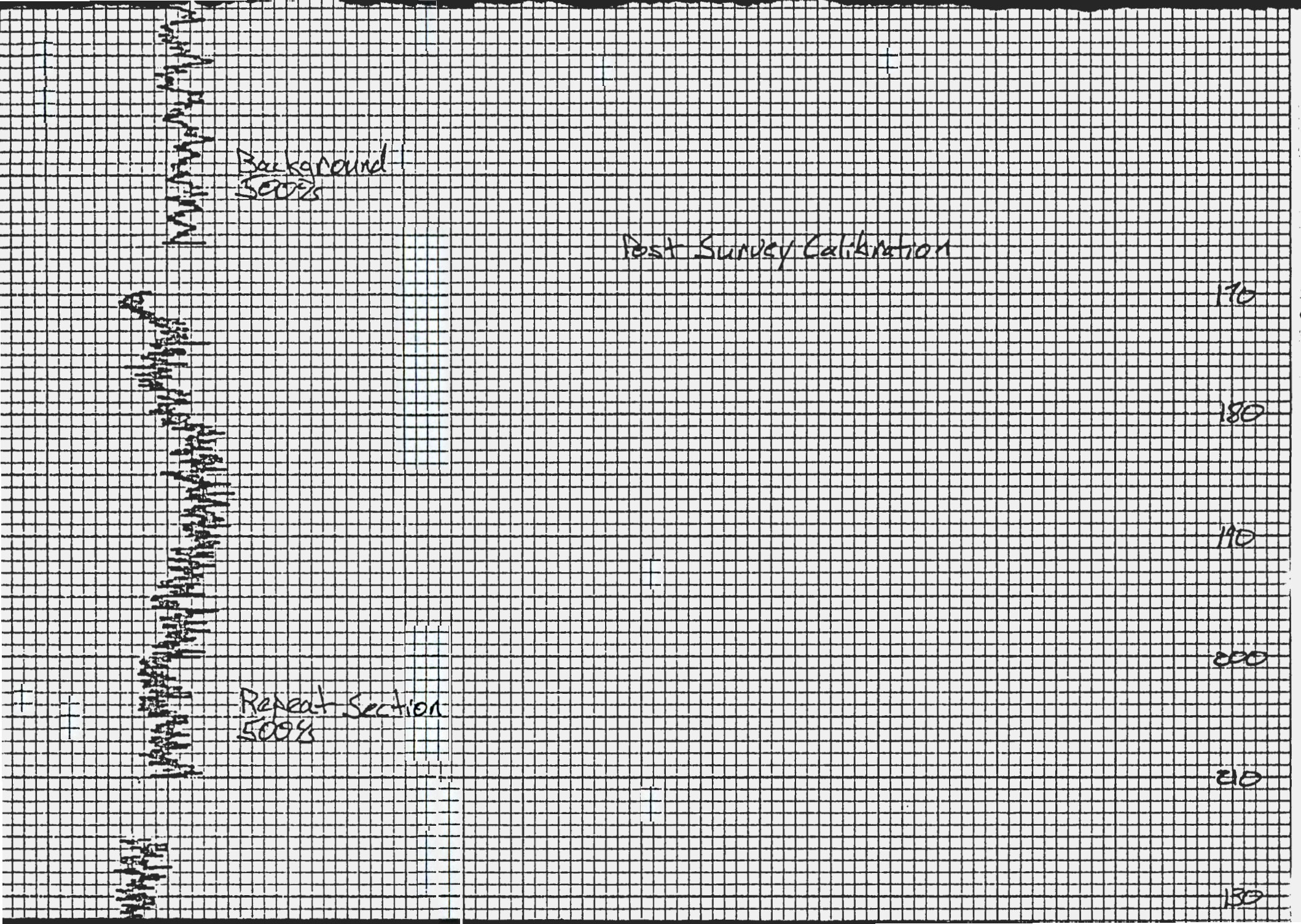
Pulse in 500%
RM 6000%

Pulse in 500%
RM 5000%



Pos 2
1000%

Pos 1
5000%


Background
500ft
Post Survey Calibration
170
180
190
200
210
220
Repeat Section
500ft

140
150
160
170
180
190
200

210

220

230

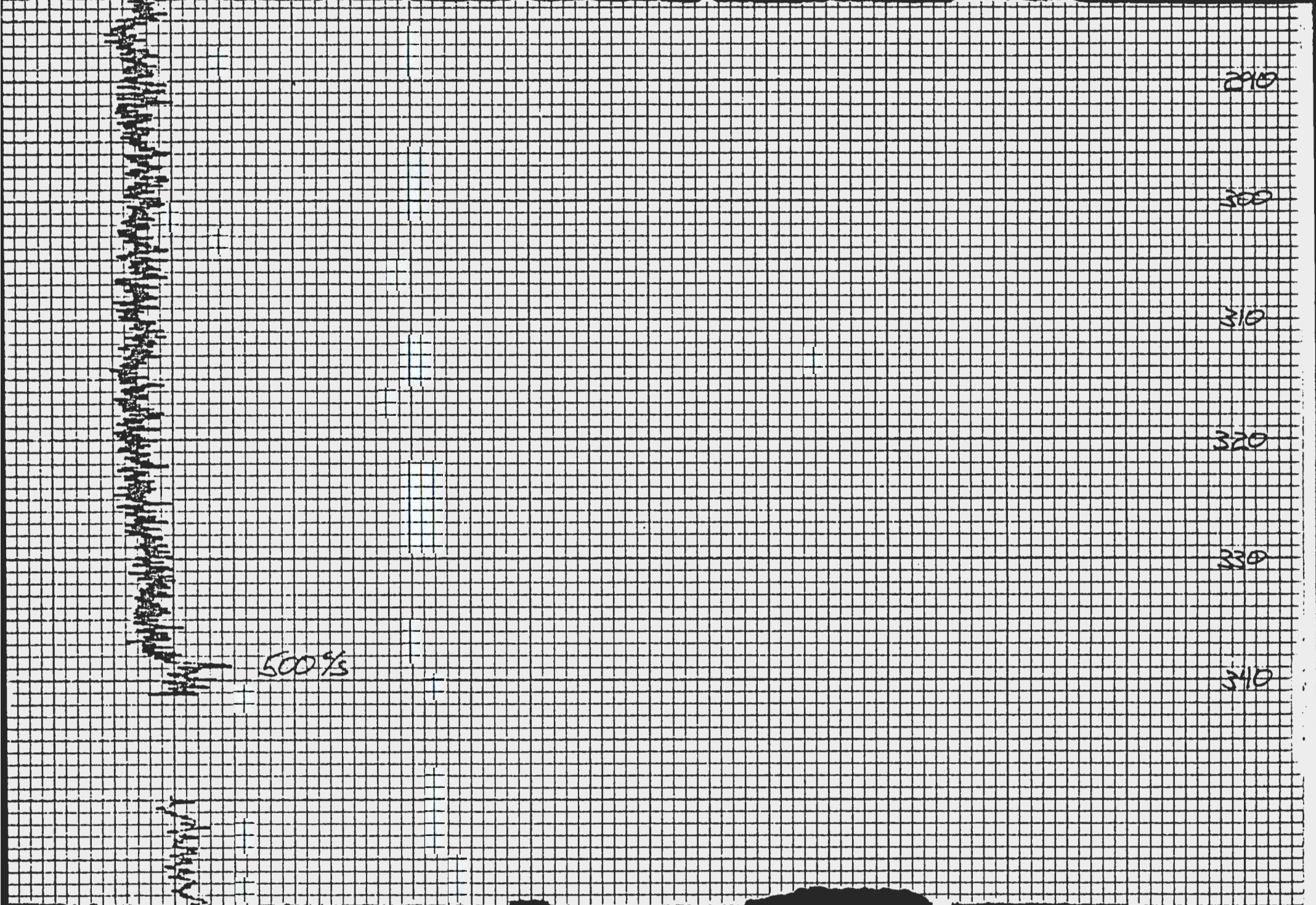
240

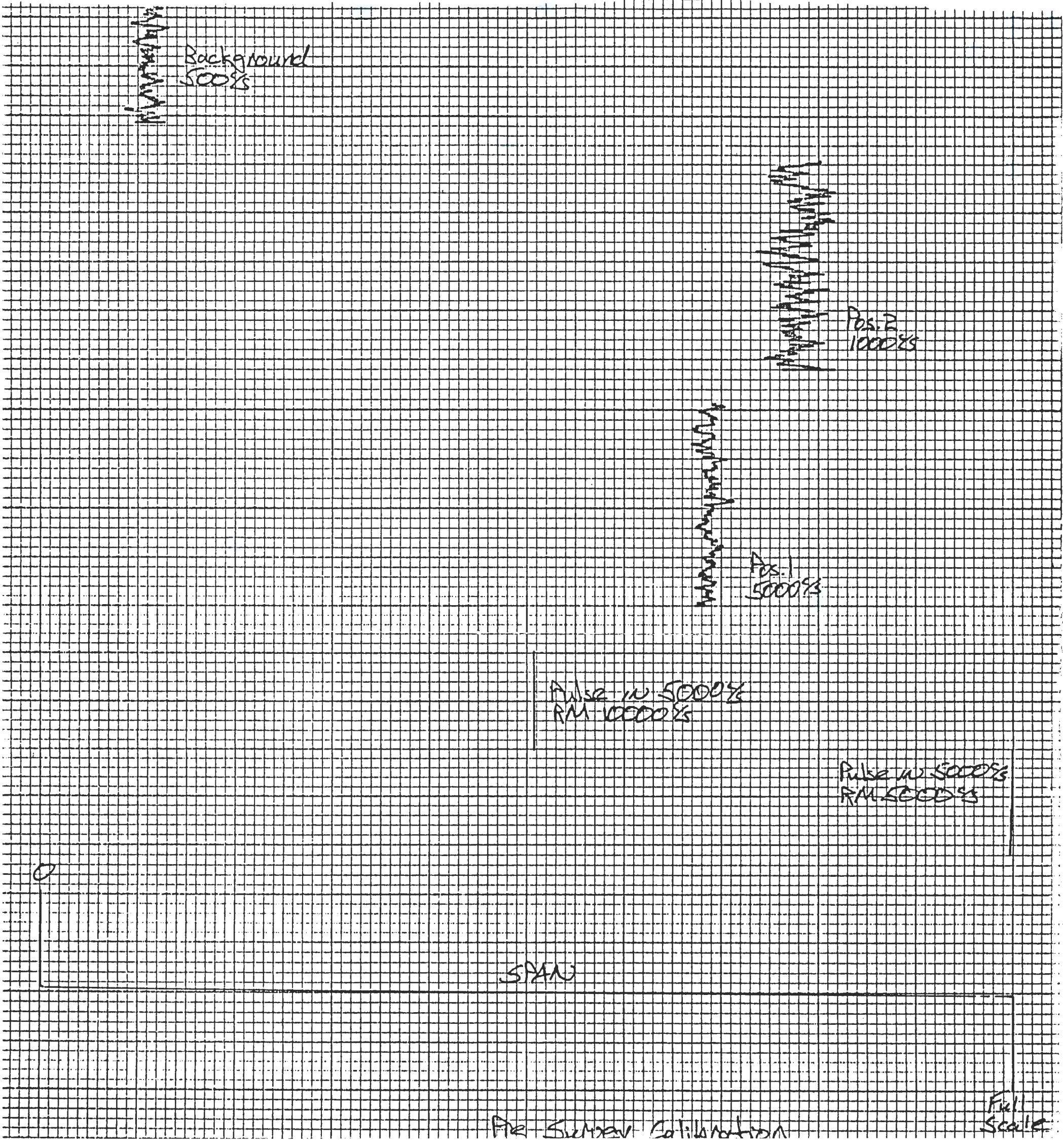
250

260

270

280


290
300
310
320
330
340
500 %


Background
500%
Pos. 2
1000%
Pos. 1
5000%
Pulse w 5000%
RM 10000%
Pulse w 5000%
RM 5000%
0
SPAN
Full
Scale
Pre Survey Calibration

Westinghouse Hanford Company	WHC-SD-EN-DP-044, Rev. 0 LOG HEADER	Page 1 of 2

Well No. 299-W6-3 Area 200 West Date 10/15/91

Log Run #3 Log Type Gross Gamma

Elevation Datum NGVD29 * Elevation 696.49' Brass Cap

Survey Coordinates 137299.13 N 567118.13 E

Log Measured From Ground Surface

Location Description 696.49' Brass Cap

Ground Surface Elevation

Surface Temperature 21.5°C Weather Clear-Warm

BOREHOLE INFORMATION

Driller Art Gwin (Jensen Drilling)

Drill Rig Type Cable Tool | Bit Type/Diameter Hand Tool/ 8"

Borehole Diameter(s)/Depth 16"/20.1' 12"/171.3' 10"/341.3' 8"/441.0'

Depth Driller 441.0' | Depth Logger 439.9'

Liquid Level 287.8' | Liquid Density Muddy

Temperature 18.3°C

CASING RECORD

Type 16" Carbon Steel Sch.40 | Interval +0.2' -20.08'

Type 12" Carbon Steel Sch.40 | Interval +0.5' - 171.31'

Type 10" Carbon Steel Sch.40 | Interval +1.0' - 341.34'

Type 8" Carbon Steel Sch.40 | Interval +2.8' - 437.70'

Well Screen Interval NA

Comments: Return Error = +0.22' high

Centralizer used.

* Survey data from Kaiser 12/15/92 RDT

14-65/66

9313018.1668

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS

Equipment Type: Analog

Tool Type: Gamma Ray

Serial No.: CG27A97

Base Calibration Date: 5/91

Calibration Reference: PNL-7725 UC-606

Calibration/Probe Factor: 8.84×10^{-3} eU/m/c/s

Base Calibration Datum (eU): Position 1: 297.4 eU

Position 2: 64.3 eU

Dead Time: 11.8 μsec

Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 439.9'

To: 310.0'

Rerun(s): 439.7' to 400.0'

Pre Survey Verification: Position 1: 299.9 eU Position 2: 64.8 eU Background: 57 c/s

Base Calibration Difference: Position 1: 2.5 eU Position 2: 0.5 eU

Logging Speed: 5 ft./min.

Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 1145

Completion Time: 1445

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in.

Time Constant(s): TC-1

Post Survey Verification: Position 1: 297.9 eU Position 2: 65.4 eU Background: 55 c/s

Percent Change: Position 1: 0.7% Position 2: 0.9%

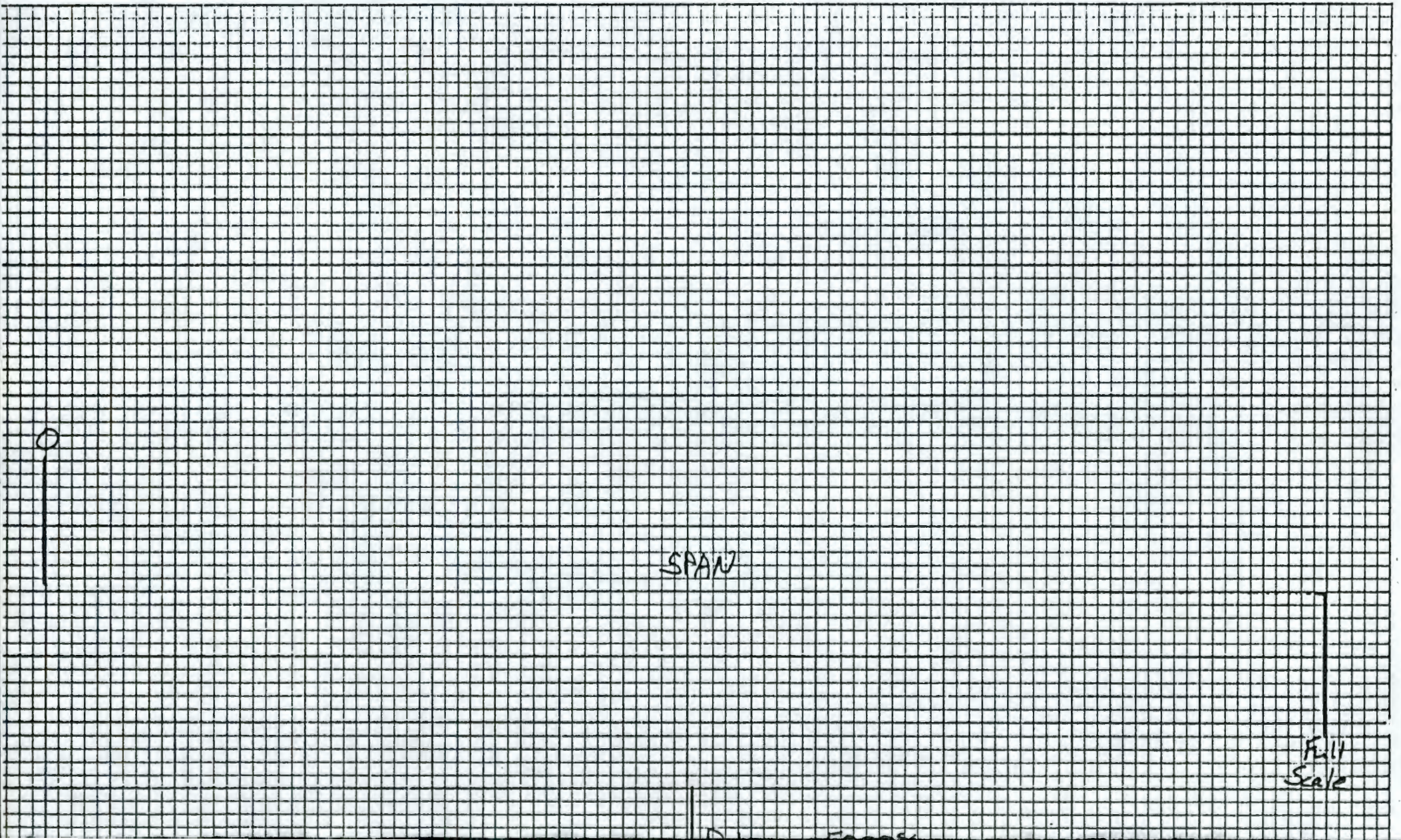
[illegible] +0.22' [illegible]

Comments Return error = 0.22 high

Centralizer used.

Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 10/15/91

A-6000-520 (05/90)

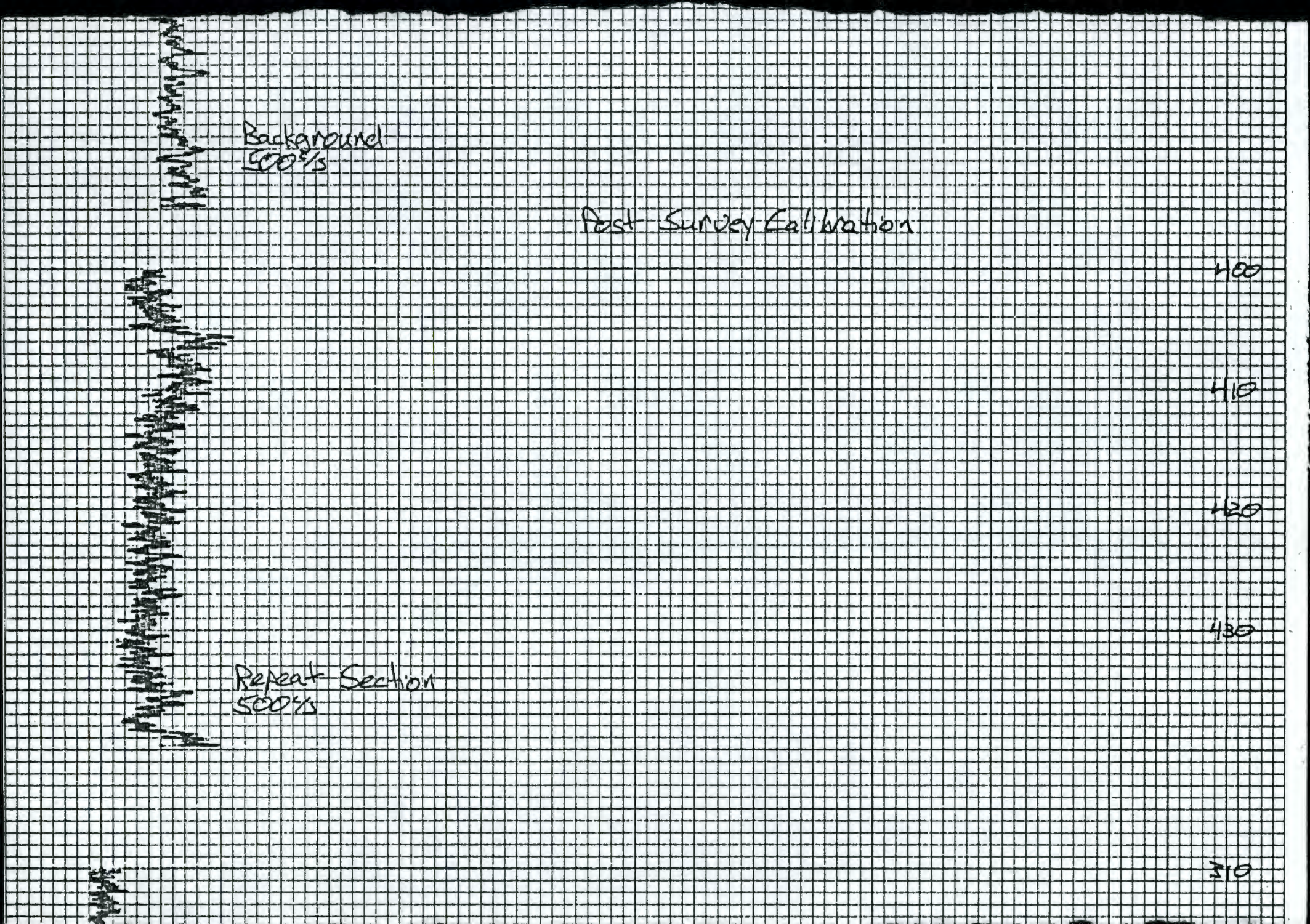


Pulse w 10000%
RM 10000%

Pulse w 5000%
RM 5000%

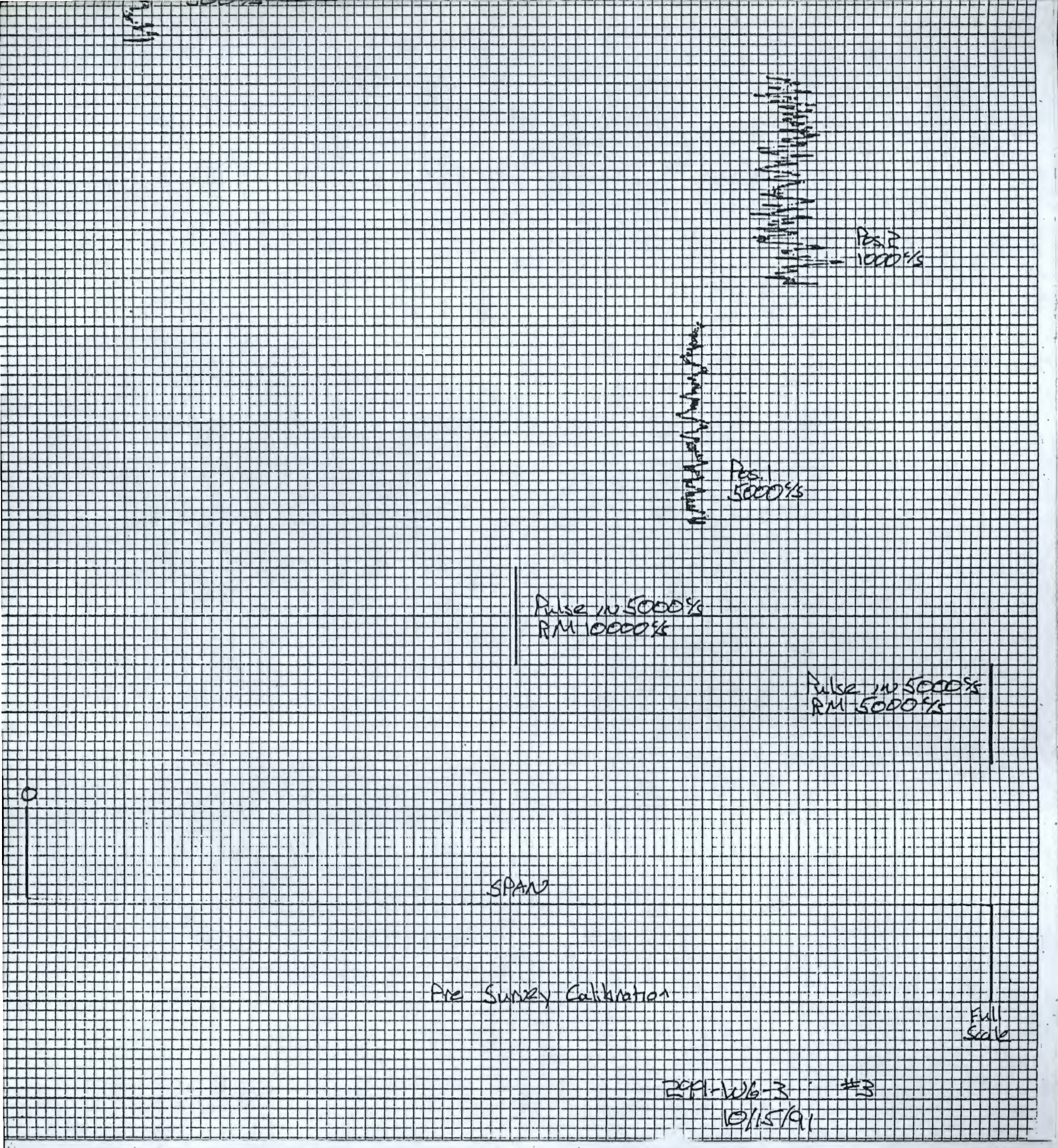
Pos 2
1000%

Pos 1
5000%


Background
500°/s
Post Survey Calibration
400
410
420
430
Repeat Section
500°/s
310

320
330
340
350
360
370
380

590
400
410
420
430
500%
Background
500%


Pos 2
1000 °/s
Pos 1
5000 °/s
Pulse in 5000 °/s
RM 10000 °/s
Pulse in 5000 °/s
RM 5000 °/s
0
SPAN
Pre Survey Calibration
Full Scale
ZPA-W6-3 #3
10/15/91

Westinghouse Hanford Company	WHC-SD-EN-DP-044, Rev. 0 LOG HEADER	Page 1 of 2

Well No. 299-W6-3 Area 200 West Date 12/31/91

Log Run #~~3~~ 4 Log Type Gross Gamma

Elevation Datum NGVD29 * Elevation 696.49' Brass Cap

Survey Coordinates 137299.13 N 567118.18 E

Log Measured From Ground Surface

Location Description ~600 ft South of the North Perimeter of West Area

Ground Surface Elevation 696.49' Brass Cap

Surface Temperature 2.0°C Weather Foggy - Cool

BOREHOLE INFORMATION

Driller Art Gwin

Drill Rig Type Cable Tool | Bit Type/Diameter Hard Tool / 8"

Borehole Diameter(s)/Depth 4" / 419.9'

Depth Driller 419.9' | Depth Logger 419.0~~0~~

Liquid Level 259.0 | Liquid Density NA

Temperature NA

CASING RECORD

Type 4" Stainless Steel Sch. 40 | Interval +3.7' - 409.55'

Type | Interval

Type | Interval

Type | Interval

Well Screen Interval 419.92' - 409.55'

Comments: Return Error = +0.17' high

Centralizer used.

Did not sample water because bailer was not deconed properly

* Survey data from Kaiser 12/15/92 RDM

14-67/68

14-67/68

9313018.1669

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS

Equipment Type: Analog

Tool Type: Gamma Ray

Serial No.: CG27A97

Base Calibration Date: 5/91

Calibration Reference: PNL-7785 UC-606

Calibration/Probe Factor: 8.84×10^{-3} eU/cps/ft

Base Calibration Datum (eU): Position 1: 297.4 eU

Position 2: 64.3 eU

Dead Time: 11.8 μsec

Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 419.0'

To: 1.4'

Rerun(s): 40.0' to 1.4'

Pre Survey Verification: Position 1: 309.0 eU Position 2: 67.2 eU Background: 55 c/s

Base Calibration Difference: Position 1: 11.6 eU Position 2: 2.9 eU

Logging Speed: 5 ft./min.

Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 0830

Completion Time: 1145

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in.

Time Constant(s): TC-1

Post Survey Verification: Position 1: 304.5 eU Position 2: 64.5 eU Background: 55 c/s

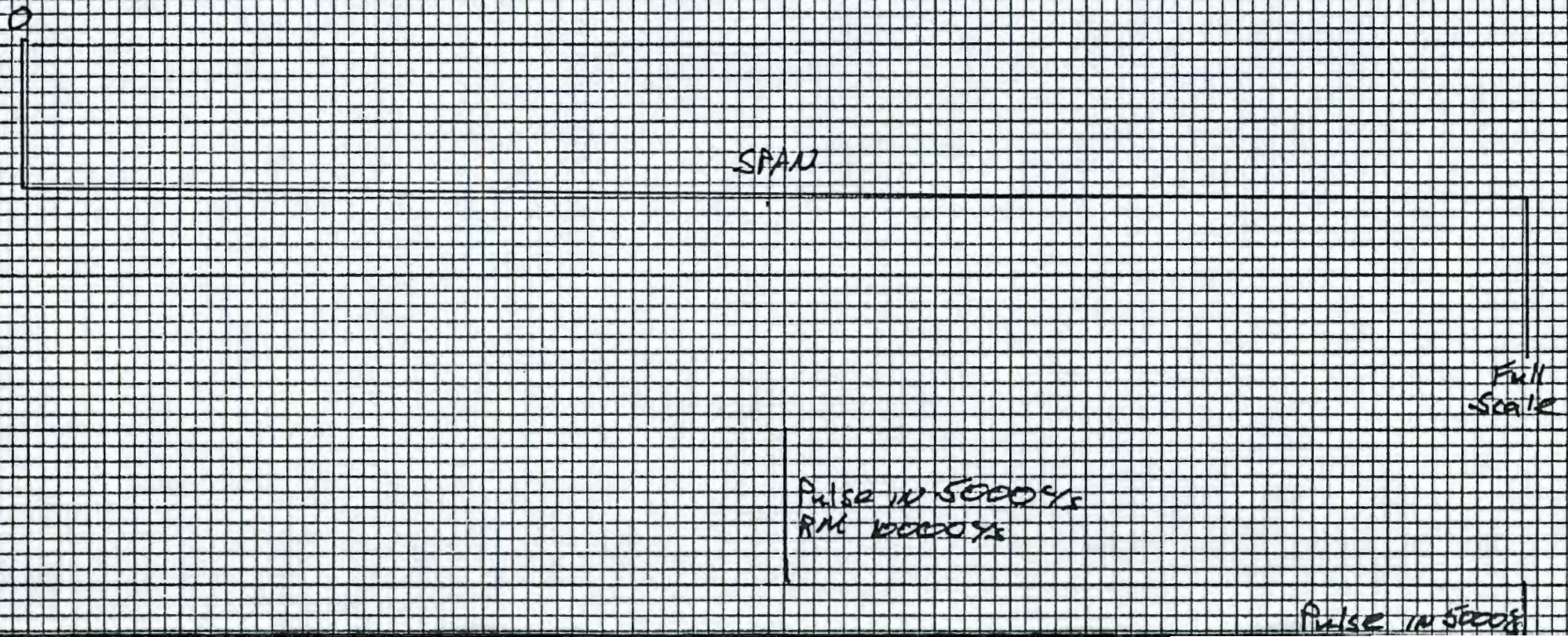
Percent Change: Position 1: 1.5% Position 2: 4.0%

Comments Return Error = +0.17' high

Centralizer used.

Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 12/31/91

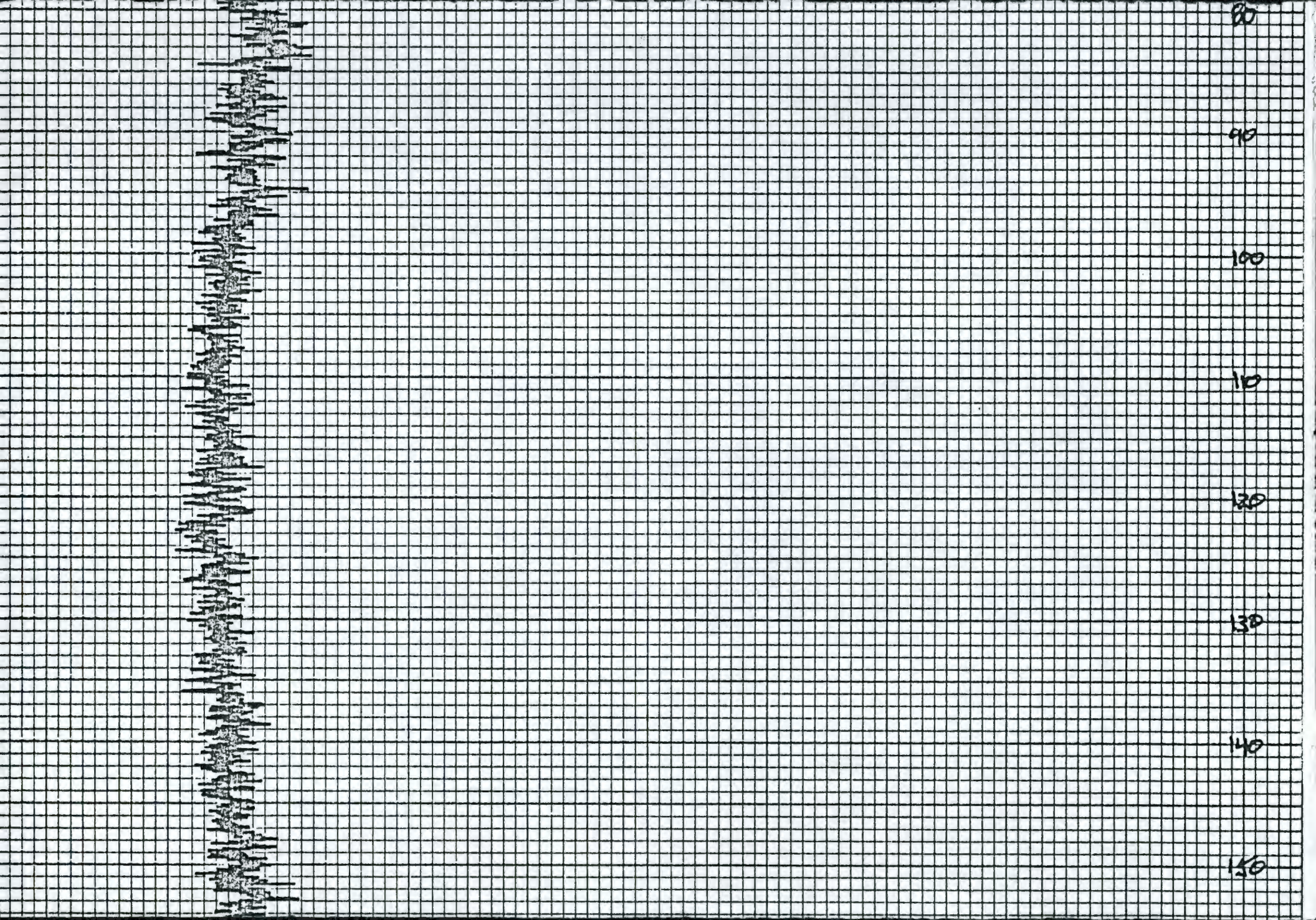
A-6000-520 (05/90)



RK 5000%
Pos.2
1000%
Pos 1
5000%

Background
500 c/s
Post Survey Calibration
10
20
30
Repeat Section
500 c/s
40

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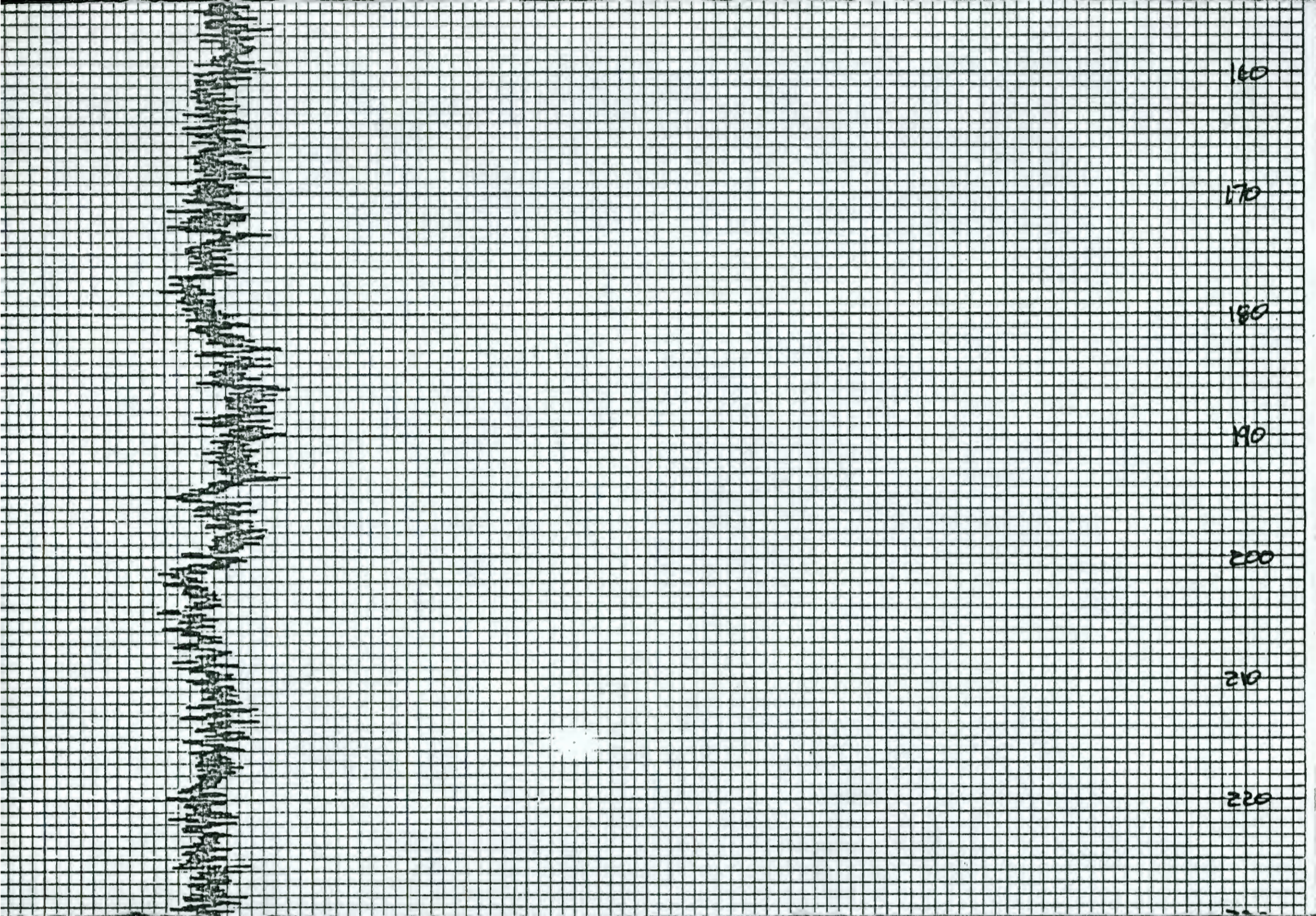
90
100
110
120
130
140
150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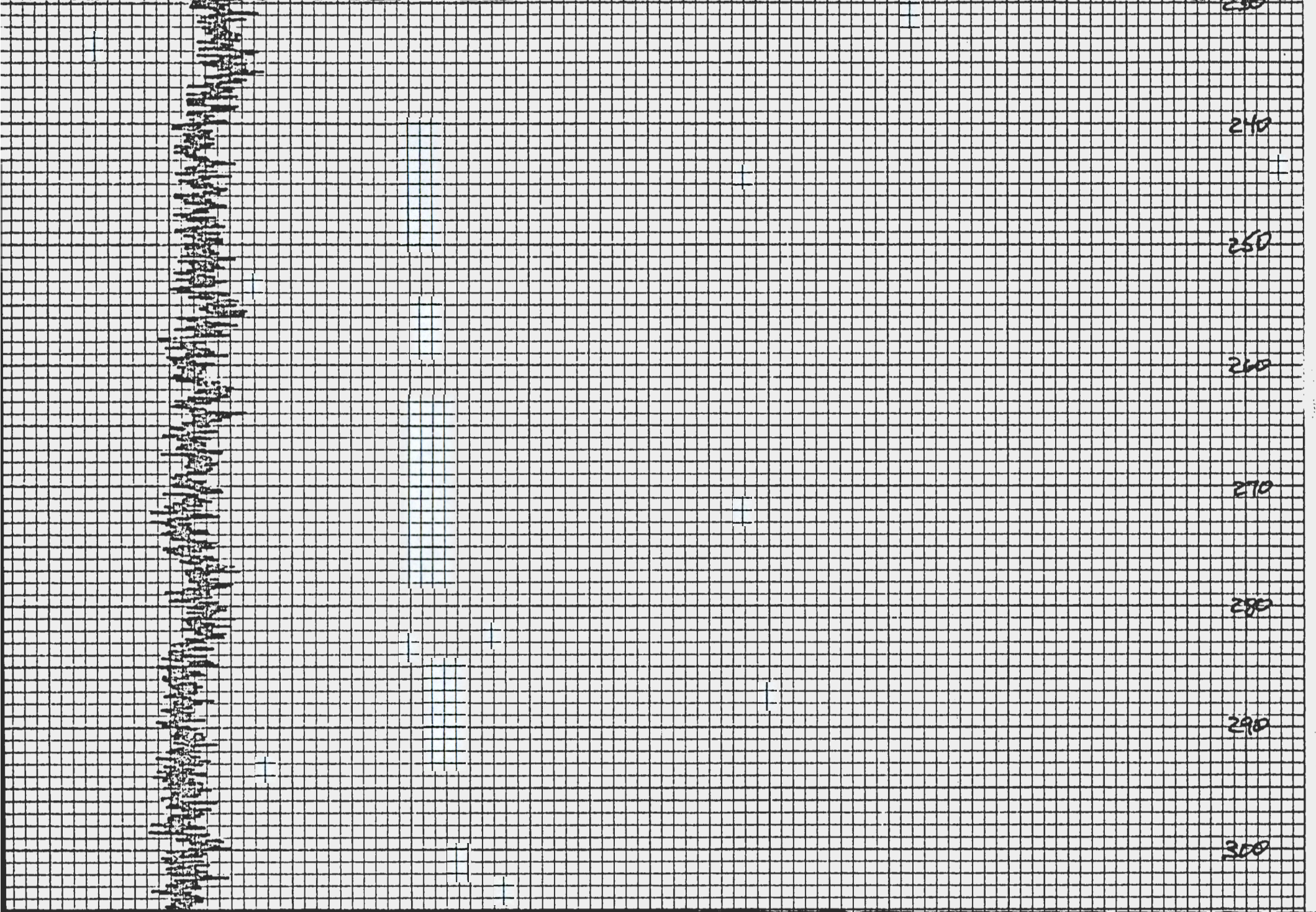
170
180
190
200
210
220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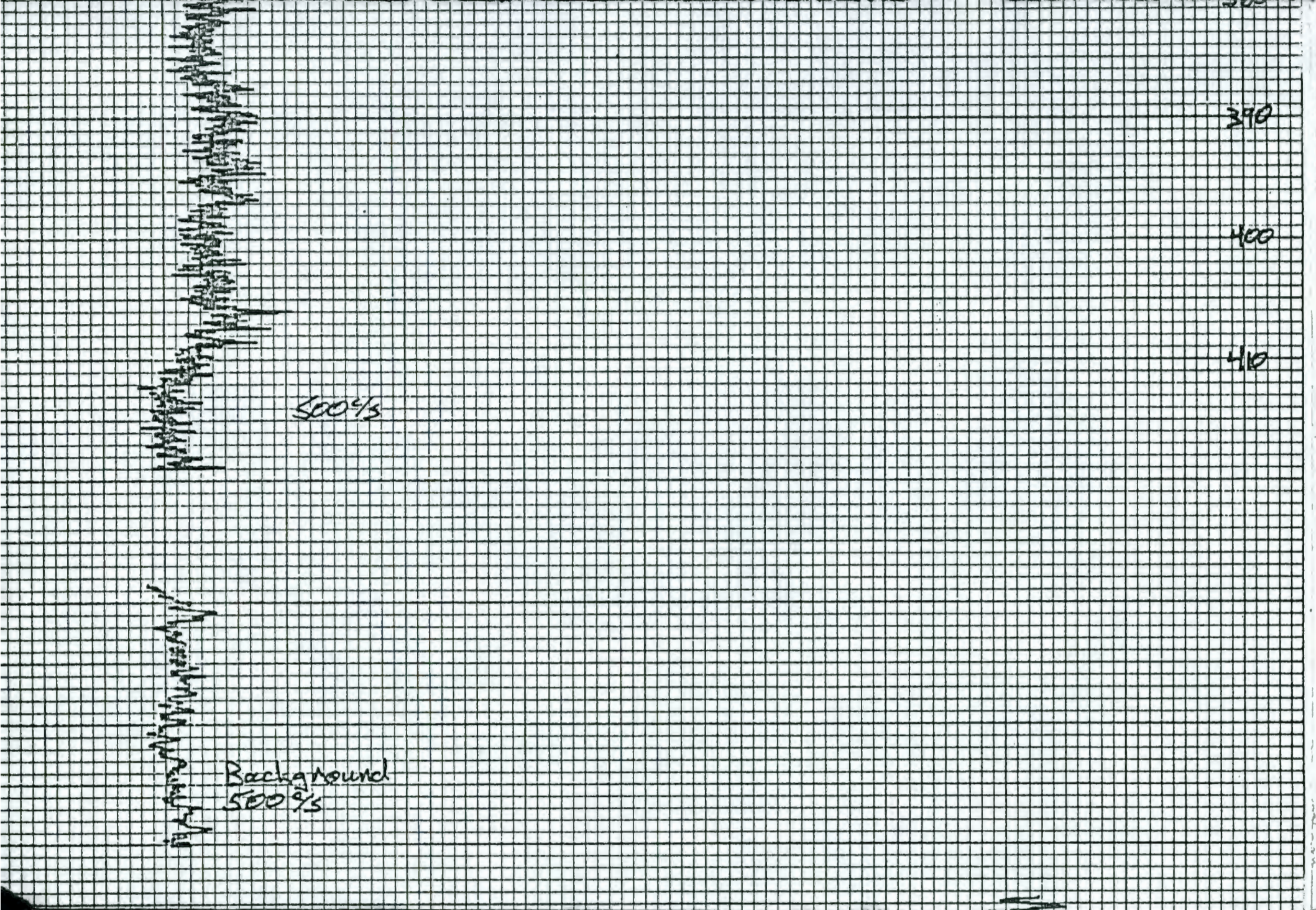
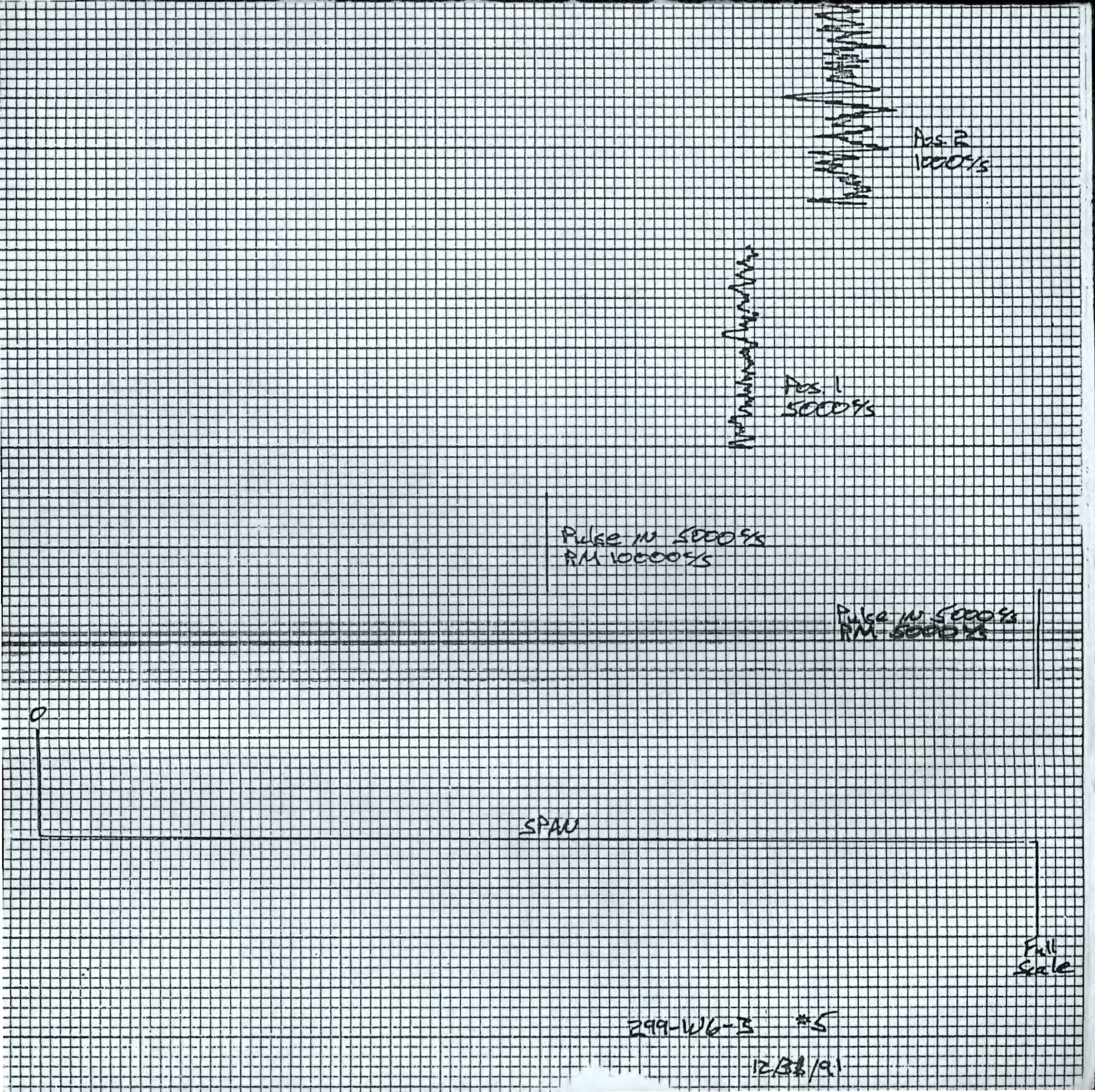
240
250
260
270
280
290
300

350
320
330
340
350
360
370
380


390
400
410
500°/s
Background
500°/s


Pos. 2
10000 s/s
Pos. 1
5000 s/s
Pulse IN 5000 s/s
RM 10000 s/s
Pulse IN 5000 s/s
RM 5000 s/s
0
SPAN
Full Scale
299-W6-3 #5
12/31/91

15.0 WELL 299-W6-4

15.1 DRILLING

Construction of this well began on 12 August 1991 and total depth of 258.3 feet was reached on 26 September 1991. The well was drilled using a cable tool rig. Approximately 595 gallons of water were added during drilling activities. Specific well construction information is located in Table 15.1. Well Guard, a non-petroleum based lubricant, was used on the drilling tools. A more detailed description of the drilling is shown in the Well Summary report at the end of this section.

Table 15.1 299-W6-4 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	19.4	ALS
	10"	169.9	ALS
	8"	257.0	ALS
Gross Gamma Logging	9 September	162.1	0
	2 October	257.7	125.0
	2 December	255.1	0.0
Permanent Casing	4"	234.9	ALS
Screen	4" 10-Slot	256.0	234.9
Filter Pack	20-40 Silica Sand	258.2	231.4
Annular Seal	Bentonite Pellets	231.4	227.2
	Bentonite Crumbles	227.2	168.9
	Bentonite Slurry	168.9	19
	Cement Grout	19	2
Concrete Pad	4'x4'x6"	2	ALS

BLS - Below Land Surface
ALS - Above Land Surface

Sediments from the Hanford formation, early "Palouse" soil, Plio-Pleistocene unit, and the Ringold Formation were encountered in this borehole. Hanford deposits extended to 70 feet BLS and were primarily sandy gravel and silty sandy gravel. Approximately 20 feet (70-90 feet BLS) of silty sand represents the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (90-258 feet BLS).

9313018.167

The first 25 feet of the borehole were dug with a backhoe. The remainder of the borehole was advanced primarily by the drive barrel however some hard tool drilling was done in more resistant zones. Samples were collected at approximately 5 foot intervals for moisture content (above the water table only), radiological screening, carbonate analysis, and lithologic archiving. Grain size analysis was done on samples from the interval to be screened. The borehole log and physical data for this well are located at the end of this section.

Gross gamma logging was conducted as indicated in Table 15.1. Reproductions of these logs are also located at the end of this section.

15.2 WELL COMPLETION

Well completion began on 3 October 1991 and was completed on 26 November 1991. Static water level at the time of completion was 238.0 feet below land surface (BLS). Completion details are presented in Table 15.1. A Nonconformance Report (NCR B05432) was issued during the completion of this well detailing the loss of approximately 48 feet of eight inch temporary carbon steel casing left in the well. The casing parted while backpulling at about 143.5 feet below ground surface. Variance request 91586430 was submitted to the Department of Ecology. Approximately 30 gallons of water were removed from the well to settle the filter pack. A 6 inch protective casing with a locking cap, four guard posts, and a brass marker with the well number were also set in the concrete pad. Elevations were determined for the brass marker, the top of the protective casing, and the top of the Hydrostar plate. Lambert and plant (200 West datum) coordinates were established for the centerline of the well. Documentation of well completion activities can be found in the Well Construction Report.

9313018.1671

15.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 9 December 1991 using a 1.5 horsepower Grundfos submersible pump. Approximately 1182 gallons of water were removed to develop the well. A dedicated Hydrostar pump was installed on 9 December with the intake located 252.3 feet below the top of the protective casing.

15.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 7 and 9 December 1991. The data from the well development pumping was collected for analysis as drawdown and recovery tests however the drawdown data was not interpretable. Results from the testing are presented in Table 15.2. The value for transmissivity calculated from the recovery test may not be representative of the actual formation because of the lack of a check valve in the development pump and partial well penetration. Recovery and slug withdrawal data plots are shown in Figures 15.1 and 15.2. Raw data from the aquifer testing at 299-W6-4 are located at the end of this section.

Table 15.2 Hydrologic Testing Results from 299-W6-4				
Formation: Ringold		Lithology: Silty Sandy Gravel	Interval Tested*: 242.1-259.9	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Discharge	9 Dec 91	Not Interpretable	----	----
Recovery	9 Dec 91	Cooper-Jacob (1946)	----	37†
Slug Injection	9 Dec 91	Not Interpretable	----	----
Slug Withdrawal	9 Dec 91	Bouwer-Rice (1989)	11	----

* Depth below top of 6" protective casing
† Values are suspect

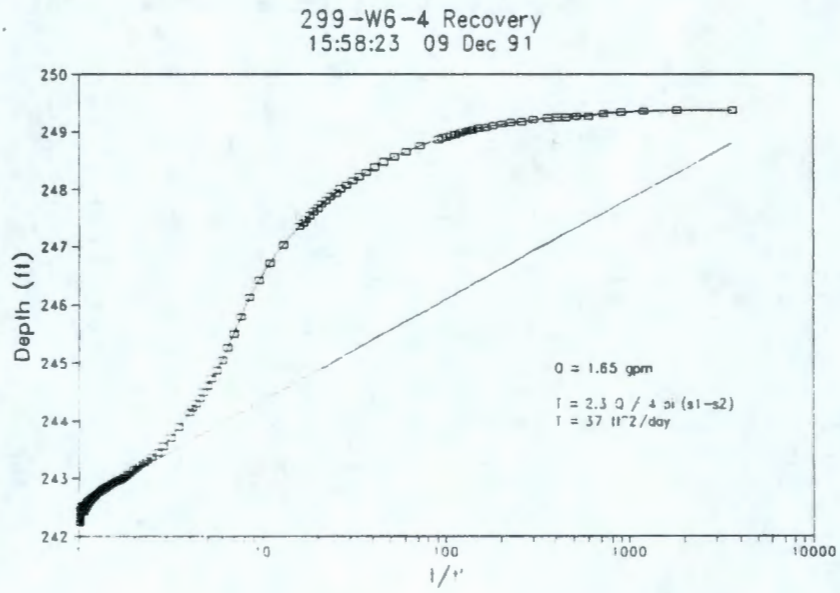


Figure 15.1 299-W6-4 Recovery Plot.

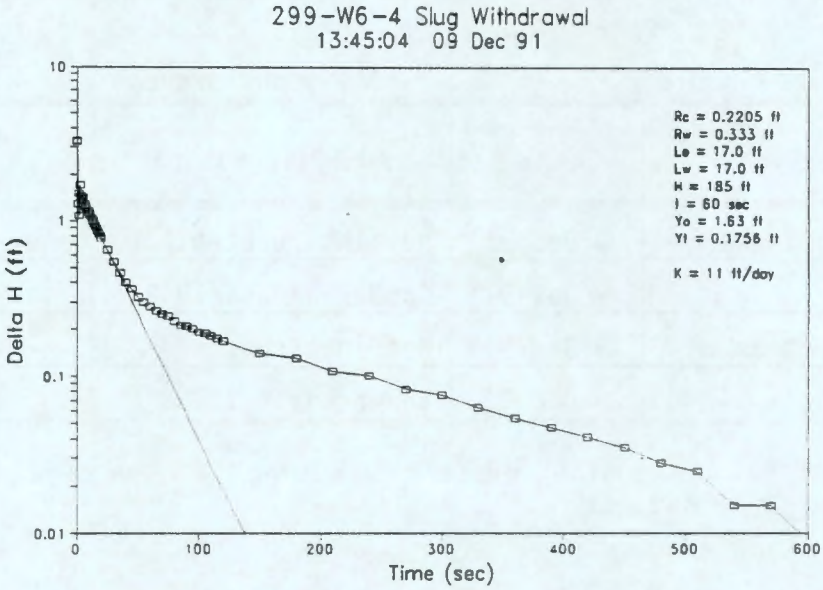


Figure 15.2 299-W6-4 Slug Withdrawal Plot.

9313018.1973

LLBG

WELL 299-W6-4

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
8-12-91	9-26-91	25	N/A	258.3	9-24-91 238.0 9-25-91 241.4 10-2-91 237.9	595

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
10-3-91	11-26-91	23	10-3-91 238.1 10-7-91 238.0	258.2	234.9 - 256.0	~30 GALLONS REMOVED TO DEVELOP FILTER PACK 15 GALLONS ADDED ON TOP OF BENTONITE SLURRY TO AVOID DESSICATION (

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	12-7-91 12-9-91	12-7-91 12-9-91	12-9-91	1182 GALLONS

COMMENTS:

DOWNHOLE CAMERA LOG WAS RUN DURING COMPLETION ON 11-12-91

WELL CONSTRUCTION REPORT

VALIDATED KDR 3/19/92 SIGNATURE/DATE

Page 1 of 2

Specification No. WHC-S-014 (SEE COMMENT) Rev No. 5

ECNs 144240, 144241, 127437, 150204, 150126, 150128, 164970-L (SEE COMMENT)

Project W-017/LLBG

Location 200West/WMA-S

Drilling Company Jensen Drilling Co

Driller John Johnson

Other (Companies) Ebasco Environmental (EED)

Geologist(s) Mike Havens, Nancy Ballantyne, Chris Wright, Brent Jones, Ed Rafuse, Ken Lane, Stacey Callison, R. Deinhart, B. Walz, J.A. Comes

Well No. Z99-W6-4 Temp. Well No. W6-MW3

Coordinates N: 137,290.49; E: 567,132.25 LAMBERT

Casing Elev. 701.25' Ground Elev. 697.76' BRASS CAP

Drilling Method

Verification Method Visual Observation

Criteria WHC-S-014: 5.2, 5.3, 7.5 EII 6.7, Sect 6.2

			Initials	Date
Rotary	Air N/A	Mud N/A	N/A	N/A
Cable Tool	Ø 0-20.0 (BACKHOE)	H 200-169.5 (DB)	169.5-186.3 (HT)	186.3-197.5 (DB)
Drilling Fluid	197.5-258.3 (HT)	RAW WATER: 1681 GAL.		N.A.
Other	NA			

Geophysical Logging

Sondes	Interval	Date
* Gross-Gamma	0 - 162.1	9-9-91
Gross-Gamma	257.7 - 125.0	10/02/91
Magnetic	200± - 100±	11/15/91
Gross Gamma	255.1 - 0.0	12/2/91
	-	

Completion Data

Drilled Depth 258.25' bls

Completed Depth 258.2' bls

Date Started 10/3/91

Date Completed 11/26/91

Static Water Level/Date 237.9' bls 10/2/91

Aquifer Testing

Type Instantaneous Slug Test

Flow Meter I.D. No. -NA-

Cal. Due Date -NA-

Length of Test 1 hr

Volume Pumped -NA-

Drawdown -NA-

Date of Test 12-9-91

Completion Results

Cleaning

Verification Method Visual Inspection

Criteria WHC-S-014: 4.2.2, ~~6.7, 7.1~~ 7.6, 7.7 (MJH 8-27-91) WHC-CM-7-7: 5.4

	Initials	Date
Drilling Tools/Rig Rackhoe	MJH	8-16-91
Temporary Materials	~~MJH~~ ** ~~DOJ~~	~~8-12-91~~ 9-9-91
Permanent Materials	SWC	10/3/91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014: 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	SWC	10/3/91
Material Packing	SWC	10/3/91

Screen

Type	Length	Slot Size
4" Stainless steel T-304 wire wrap	21.0'	0.010 10 slot

Depth(s) 255.47 - 234.43

Verification Method Verify w/ Steel Tape

Criteria WHC-S-014: 4.2.1, 4.2.3, 4.2.5, 12.2.1

Initials SWC Date 10/3/91

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014: 7.2

	Identify	Initials	Date
Additives	~~Well Guard~~ MJH 8-19-91 Raw Water	~~MJH~~ MJH	~~8-19-91~~ 8-29-91
Lubricants	Well Guard	MJH	8-19-91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014: 8.2 ECN 150204

Initials K.D. Date 9/25/91

A-6000-436 (09/90)

9313018.1675

page 298

WELL CONSTRUCTION REPORT
(continuation sheet)

299-W6-4

Casing (permanent)

Type	Size	Placement
4" stainless steel T-304	4"	234.93 - 0
		-
		-
		-

Verification Method: Verify w/ Steel Tape

Criteria: WHC-S-014: 4.2.1, 4.2.4, 4.2.5, 12.2.1

Initials: SWC Date: 10/4/91

Well Protection

Verification Method: Visual Observation

Criteria: WHC-S-014: 4.2.10

	Initials	Date
Protective Posts	KDR	3/18/92
Protective Casing	KDR	3/18/92
Site Restored	KDR	3/18/92
Cap, Hasp and Lock	KDR	3/18/92
Surface Pad	KDR	3/18/92

Annular Seal/Filter Pack

Verification Method: Verify w/ Steel Tape Criteria: WHC-S-014: 4.2.6, 4.2.7, 4.2.8, 4.2.9, 5.3.1, 5.3.2

Type	Interval	Volume	Initials	Date
20-40 silica sand	258.2 - 231.4	20.16 ft³	BGW	10/9/91
3/4" Pellets	231.4 - 227.2	1.86 ft³	BGW	10/9/91
Crumbles	227.2 - 168.43	26.98 ft³	CSW	11/20/91
Bentonite Slurry	168.43 - 14'	201.6 ft³	CSW	11/26/91
Portland Cement Grout	14' - 0'21	30.55	CSW	11/26/91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014: 3.21

	Initials	Date
Measurement Point/Surveyed	KDR	3/18/92
Protective Casing/Brass Cap Surveyed	KDR	3/18/92
Well Number Stenciled	KDR	3/18/92
Brass Cap Labeled	KDR	3/18/92

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014: 4.2.2, 4.2.11

	Initials	Date
Pump Decon/Prep	NB	12-9-91
Installed	NB	12-9-91
Pump Tested	NB	12-9-91

Other (initial if performed)

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

NB 12-9-91 Well Development

Comments/Remarks: * D.B. Jones witness gross gamma logging on 9-9-91 and
** D.B. Jones Recieve 8" casing w/ Decon. paperwork at site 9-9-91
Rev 6 in effect 10/2/91
Cert. No's for Rev 6, 150132, 154223, 127439
49'of 8" Casing Left in Borehole 191.5'BLS – 142.5'BLS

Reviewed By (Sign/Print Name): Edward C. Rafuse / Edward C. Rafuse Date: 12/28/91

A-6000-436 (09/90)

9313018.1675

WELL SUMMARY SHEET

Boring or Well No. 299-W6-4

Sheet 1 of 1

Location 200W / WMA-S

Project W-017 / LLBG

Elevation 698' ground elevation

Drilling Contractor Jensen Drilling Co

Driller John Johnson

Drilling Method and Equipment Backhoe / Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9/16/91

Reviewed By Edward C. Rafuse (Sign/Print Name) Date 12/28/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
12-in i.d. c.s. temp casing set to 19.36 ft				Silty Sandy GRAVEL
19' BLS Top Sludge		10		
		20		
10-in i.d. c.s. temp casing set to 169.87 ft		30		
		40		Sandy GRAVEL
		50		
8-in i.d. c.s. temp casing set to 257.00 ft		60		
				Very Sandy GRAVEL
		70		Silty Gravelly SAND
				Very Silty SAND
		80		
		90		
				Slightly Silty SAND
		100		Silty SAND
				Very Sandy GRAVEL
		110		
		120		
		130		Sandy GRAVEL
143.5' cw 9/11/91 ~~140'~~ Top Broken 8" casing.		140		Very Sandy GRAVEL
				Gravelly Silty SAND (140-141.5)
		150		Sandy GRAVEL
168.53' cw 9/11/91 ~~168.48~~ BLS Top Cumbia.		160		

A-6000-384 (04/90)

9313018.1677

WELL SUMMARY SHEET

Boring or Well No. 299-W6-4

Sheet 2 of 2

Location 200W/WMA-S

Project W-017/LLBG

Elevation 698' ground elevation

Drilling Contractor Jensen Drilling Company

Driller John Johnson

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-16-91

Reviewed By Edward C. Rafuse / Edward C. Rafuse (Sign/Print Name) Date 9/28/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
		170		Sandy GRAVEL
		180		
185'8' BLS - Chipping Hammer				
CW 9/2/91		190		Silty Sandy GRAVEL
~~190.5~~' BLS - Bottom Bottom 8" casing.				
191.5' BLS		200		
		210		
Top PELLETS 227.2 ± BLS		220		
Top SAND 231.4± BLS				
		230		
Top SCREEN at 234.43' BLS				
SWL 237.4 BLS 10/2/91		240		
243.3± 11/26/91				
		250		
Bottom SCREEN at 255.47' BLS				
TD at 258.25 ft bls		260		
		270		
		280		
		290		
		300		
		310		
		320		
		330		

15-9

A-6000-384 (04/90)

9313018.1677

BOREHOLE LOG

VALIDATED KDR 3/18/92 SIGNATURE/DATE

Boring or Well No. 299-W6-4

Sheet 1 of 13

Location 200 W / WMA-S

Project W-017 / LLBG

Elevation 647.76 = Bins Cap

Drilling Contractor Jensen Drilling CO

Driller John Johnson

Drilling Method and Equipment Backhoe / Cable tool

Prepared By M. Havens / [signature] (Sign/Print Name) Date 8-12-91

Reviewed By [signature] (Sign/Print Name) Date 9/23/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
	2 Lith 1 Rad 1 Moist 8-12-91			Silty Sandy GRAVEL (70% grav, 20% sand, 10% silt) Gy brn-wet (10YR5/2) lt gy brn-dry (10YR6/2) 15% VCP, 15% CP, 15% MP, 15% VFP, 10% FP, 5% VCS, 5% CS, 5% MS, 5% FS, dry, mod sort, rounded, 60% felsic, 40% mafic, mod react to HCl	Use backhoe to set surface casing to 20 ft.
5	2 Lith 1 Rad 1 Moist	BH		Silty Sandy GRAVEL (70% Grav, 20% sand, 10% silt) Gray brn-wet (10YR5/2) lt gy brn-dry (10YR6/2) 15% VCP, 15% CP, 15% MP, 15% VFP, 10% FP, 5% VCS, 5% CS, 5% MS, 5% FS dry, mod sort, rounded 60% felsic, 40% mafic, mod react to HCl	5 ft sample @ 0810 8-12-91
10	2 Lith 1 Rad 1 Moist	BH		Silty Sandy GRAVEL, same as above, moist	10 ft sample @ 0819 8-12-91
15	2 Lith 1 Rad 1 Moist	BH		Silty Sandy Gravel, same as above	15 ft sample @ 0826 8-12-91

A-6000-382 (04/90)

9313018.1679

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 2 of 13

Location 200W/WMA-S

Project W-017/LLBG

Elevation 697.76 = Brass Cap

Drilling Contractor Jensen

Driller John Johnson/

Drilling Method and Equipment Backhoe/Cabletool

Prepared By [signature] /Mike Hawes (Sign/Print Name) Date 8-12-91

Reviewed By [signature] (Sign/Print Name) Date 8/23/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
20	2 Lith 1 Rad ~~Moist~~ MM 8-21-91	BH		Silty Sandy GRAVEL (70% grav, 20% sand, 10% silt) Gy brn-wet (10YR 5/2) Lt gy-brn-dry (10YR 6/2) 15% UCP, 15% CP, 15% mP, 15% UCP, 10% FP, 5% UCS, 5% CS, 5% ms 5% fs, dry mod sort rounded, 60% ~~static~~ felsic 40% mafic, mod react to HCl	20 ft sample @ 0844 8-12-91
25	2 Lith 1 Rad	DB	8-21-91	25' see Above	1140 8/20/91
30	2 Lith 1 Rad	DB		Silty Sandy GRAVEL (Same as above)	30 ft sample @ 1527 8-21-91
35	2 Lith 1 Rad	DB		Sandy GRAVEL (75% grav, 20% sand, 5% silt) 15% sc, 10% lp, 50% mP, 25% SP, 70% cs, 15% ms, 10% fs. Dk gy-wet (10YR 4/1) lt gy-dry (10YR 6/1) lt moist, poor sort, sub ang to subround, 80% mafic, 20% felsic in gravel, 60% mafic 40% felsic in sand, strong HCl react	35 ft sample @ 1625 8-21-91

A-6000-382 (04/90)

9313018.1605

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 3 of 13

Location 200W/WMA-S

Project W-017/LLBG

Elevation 647.76 = Brass Cap

Drilling Contractor Jensen

Driller John Johnson

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 8-21-91

Reviewed By R.D. Miller (Sign/Print Name) Date 8/28/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
40	2Lith 1Rad	DB		40ft - Sandy GRAVEL (75% grav, 25% sand) 15% sc, 10% lp, 50% mp, 25% sp, 70% cs, 15% ms, 10% fs. Dk gy-wet (10YR4/1) ltgy-dry (10YR6/1), lt moist, poor sort (bimodal), subang to subround w/ some round, 80% mafic, 20% felsic in gravel, 60% mafic 40% felsic in sand, strong HCl react	40 ft sample @ 1719 8-21-91
	2Lith 1Rad	DB			
45				45ft - Sandy GRAVEL (Same as above)	45 ft sample @ 1036 8-22-91
	2Lith 1Rad	DB			
50				50ft - Sandy GRAVEL (Same as above)	50 ft sample @ 1120 8-26-91
	2Lith 1Rad	DB			
55				55-ft - Sandy GRAVEL (60% grav, 35% sand, 5% silt) Grav: 10% sc, 15% lp, 25% mp, 50% sp. Sand: 25% cs, 25% ms, 50% fs. Dk gy brn-wet (10YR4/2) lt brn gy-dry (10YR6/2) lt moist, poor sort (bimodal) subrounded to rounded, 60% mafic 40% felsic in sand, 80% mafic, 20% felsic in gravel. Strong HCl react.	55 ft sample @ 1324 8-26-91

A-6000-382 (04/90)

9313018.1681

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 4 of 13

Location 200W / WMA-S

Project W-017/LLBG

Elevation 697.76 = Bloss Cap.

Drilling Contractor Jensen

Driller John Johnson

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 8-26-91

Reviewed By R D Miller (Sign/Print Name) Date 9/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
60	2 Lith 1 Rad	DB		60ft - Very Sandy GRAVEL (60% grav, 40% sand) Grav: 10% cg, 40% mg, 50% fg. Sand: 30% cs, 30% ms, 40% fs. Dk gy brn-wet (10YR4/2), Lt brn gy-dry (10YR6/2) lt moist, mod sort, subround, sand is 60% mafic 40% felsic ~~MK 8-26-91~~ ~~10 Sand~~ Gravel is 80% mafic, 20% felsic, strong HCl react	60 ft sample @ 1259, 8-26-91
65	2 Lith 1 Rad	DB		~~65ft - Gravelly SAND (30% grav 70% Sand) Sand fract: 20% m~~ MK 8-27-91 ~~Sand fract~~ MK 8-27-91	65 ft sample @ 0756, 8-27-91
				65ft - Silty Gravelly SAND (30% grav 50% Sand, 20% silt) Sand: 10% cs, 30% ms 60% fs. Grav: 20% mg, 80% sg Brn-wet (10YR5/3), V. pale brn-dry (10YR7/3) dry, poor sort (bimodal) subround. 65% felsic, 35% mafic, strong HCl react	
70	2 Lith 1 Rad	DB		70ft - Very Silty SAND (60% sand, 40% silt) Sand: 100% fs. Lt brn gy-wet (10YR6/2) lt gy-dry (10YR7/2) well sort, dry, rounded, 30% mafic, 70% felsic, strong HCl react.	70 ft sample @ 0850, 8-27-91
75	1 st liner 2 Lith 1 Rad ~~Moist~~ MK 8-29-91				
		ST 199/1.8		76.3→78.1 ft - Very Silty ~~SAND~~ (Same as above)	76.3→78.1 ft sample @ 1610 8-29-91

EP 7

PP

9313018.1605

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 5 of 13

Location 200W/WMA-S

Project W-017/LLRG

Elevation 697.76 = Brass Cap

Drilling Contractor Jensen

Driller John Johnson

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 8-27-91

Reviewed By R.D. Miller (Sign/Print Name) Date 9/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
80	2Lith 1Rad	DB		80ft - Very Silty SAND (60% sand, 40% silt) Sand: 100% fs. Lt brn gy-wet (10YR 6/2), lt gy-dry (10YR 7/2) well sort, dry (wet from hard tool) rounded 30% mafic, 70% felsic, Strong HCl react, cemented.	80 ft sample @ 0753 9-3-91
	2Lith 1Rad	DB			
85				85ft - Very silty SAND (65% sand, 35% silt) Sand: 60% ms, 40% fs. Lt brn gy-wet (10YR 6/2) lt gy-dry (10YR 7/2), well sort, dry, rounded, 40% mafic, 60% felsic, strong HCl react, cemented	85ft sample @ 1133 9-3-91
	2Lith 1Rad	DB			
90				90ft - Slightly Silty SAND (95% sand, 5% silt) Sand: 20% CS, 60% ms, 20% fs. Gy brn-wet (10YR 5/2) lt gy-dry (10YR 7/2) lt moist to dry, well sort, rounded, 60% felsic, 40% mafic, mica flakes noted, mod HCl react, noncemented	90 ft sample at 1254, 9-3-91
	2Lith 1Rad	DB			
95				95ft - Silty SAND (85% sand, 15% silt) Sand: 60% ms, 40% fs. Gy brn-wet (10YR 5/2) lt gy-dry (10YR 7/2) lt moist to dry, well sort, rounded, 60% felsic, 40% mafic, mod HCl react	95 ft sample @ 1502 9-3-91

9313018.1683

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 6 of 13

Location 200W / WMA-S

Project W-017/LLBG

Elevation 697.7 = Brass Cap

Drilling Contractor Jensen

Driller John Johnson

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-3-91

Reviewed By R.D. Mill (Sign/Print Name) Date 9/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
100	2Lith 1Rad	DB		100 ft - Silty SAND (85% sand, 15% silt) Sand: 10% cs, 50% ms, 40% fs. Gy brn-wet (10YR5/2) lt gy-dry (10YR7/2), Dry, med sort, rounded, 60% felsic, 40% mafic, mod-strong HCl react. Gravel noted in bottom of sample.	100 ft sample @ 1617, 9-3-91
					Turns to gravel @ 101.0 ft
105	2Lith 1Rad	DB		105 ft ~~Sample~~ 9-4-91 - Very sandy GRAVEL (65% grav, 35% sand) Grav: 20% lc, 20% sc, 30% lp, 15% mp, 15% sp. Sand: 30% cs, 55% ms, 15% fs. Grey-wet (10YR5/1), lt gy-dry (10YR7/1), dry, well sort, rounded to subrounded, 60% felsic, 40% mafic in sand & gravel. Mod HCl react.	105 ft sample @ 1133, 9-4-91
110	2Lith 1Rad	DB		110 ft - V. Sandy GRAVEL (Same as above) slight HCl react	110 ft sample @ 1525, 9-4-91
115	2Lith 1Rad	DB		115 ft - V. Sandy GRAVEL (Same as above)	115 ft sample @ 0846, 9-5-91

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 7 of 13

Location 200W/LLBG/WMA-S

Project W-017/LLBG

Elevation 697.76 = Brass Cap

Drilling Contractor Jensen Drilling

Driller John Johnson

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-5-91

Reviewed By R. D. Miller (Sign/Print Name) Date 9/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
120	2Lith 1Rad	DB		120 ft - Very Sandy GRAVEL (65% gravel, 35% sand) Grav: 20% lc, 20% sc, 30% lp, 15% mp, 15% sp. Sand: 30% cs, 55% ms, 15% fs. Gray - Wet (10YR5/1) lt gy - dry (10YR 7/1) lt moist to dry (Water added during drilling to wet sample) Well sort, rounded to subrounded, 60% felsic, 40% mafic, slight HCl react.	120 ft sample @ 1044, 9-5-91
	2Lith 1Rad	DB			~~125~~ MSH 9-5-91
125				125 ft sample - Sandy GRAVEL (70% gravel, 30% sand) Grav: 10% lc, 50% sc, 5% lp, 15% mp, 20% sp. Sand: 30% cs, 55% ms, 15% fs Gray - Wet (10YR5/1), lt gy - dry (10YR7/1) lt moist to dry, med sort, rounded to subrounded, 65% felsic, 35% mafic, slight HCl react.	125 ft sample @ 1153, 9-5-91
	2Lith 1Rad	DB			
130				130 ft - Sandy GRAVEL (Same as above) No HCl react.	130 ft sample @ 1439, 9-5-91
	2Lith 1Rad	DB			
135				MSH 9-5-91 135 ft - Vi Sandy ~~Gravel~~ GRAVEL (60% gravel, 40% sand) Grav: 10% lc, 50% sc, 5% lp, 15% mp, 20% sp. Sand: 30% cs, 55% ms, 15% fs. Gray - wet (10YR5/1) lt gy - dry (10YR7/1), dry (Moist due to drill water), med/sort, rounded 65% felsic, 35% mafic, no HCl react.	135 ft sample @ 1551, 9-5-91

9313018.1685

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 8 of 13

Location 200W/LLBG/WMA-S

Project W-017/LLBG

Elevation 647.76 = Brass Cap

Drilling Contractor Jensen

Driller John Johnson

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-5-91

Reviewed By R.D. Miller (Sign/Print Name) Date 9/7/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
140	2 Lith 1 Rad	DB		140 ft - Gravelly Silty SAND (10% silt, 15% gravel, 75% sand) Grav: 60% sc, 20% lp, 10% mp, 10% sp. Sand: 70% ms, 30% fs. Dk gy brn-wet (10YR 5/2), v. pale brn-dry (10YR 7/3) med sort, rounded, lt moist to dry, 65% felsic, 35% mafic, slight HCl react.	140 ft sample at 0828, 9-6-91
					Sand from 140.0 to 141.5 ftbls
	2 Lith 1 Rad	DB			
145				145 ft - Sandy GRAVEL (65% grav, 35% sand) Grav: 10% lc, 5% sc, 5% lp, 15% mp, 20% sp. Sand: 30% cs, 55% ms, 15% fs. Grey-wet (10YR 5/1) lt gy-dry (10YR 7/1), lt moist to dry (Wet from drill water), med sort, subrounded, 60% felsic, 40% mafic, mod HCl react	145 ft sample @ 1046, 9-6-91
	2 Lith 1 Rad	DB			
150				150 ft - Sandy GRAVEL (Same as above)	150 ft sample @ 1422, 9-6-91
	2 Lith 1 RAD	DB			
155				155 ft - SANDY GRAVEL (65% gravel, 35% sand) GRAVEL: 5% sc, 25% lp, 55% mp, 20% sp. SAND: 65% ms, 35% fs. GREY (10YR 5/1) lt gy-dry, WET (10YR 3/1) dk gy, MOD SORT, SUBROUNDED to SUBANGULAR, 75% FELSIC, 25% MAFIC, SLIGHTLY MOD HCL REACT.	155 ft. sample @ 1530 9-6-91

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BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 9 of 13

Location 200 W/ GLBG / GWMA-S

Project W-017 / GLBG

Elevation 697.76 = Brass Cap

Drilling Contractor JENSEN

Driller JOHN JOHNSON

Drilling Method and Equipment CABLE TOOL

Prepared By (Sign/Print Name)

Date

Reviewed By R.D. Miller (Sign/Print Name)

Date 9/10/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
160	2 Lith 1 Rad	DB		160 ft SANDY GRAVEL (60% QUARTZ 40% SAND) GRANITE 10% K, 10% MC, 30% MP, 50% SP. SAND: 10% CS, 10% MS, 10% FS, 10% VFS, WET 2.5Y 6/4 light yellow brown, DRY (7.5YR 6/4, LT. BROWN) poorly SORTED SUBANGULAR - ANGULAR 30% MAFIC, 70% FELSIC NO HCL REACTION, MICA FLAKES, SOME CLAY IN FILL	160 Sample @ 1630 9-6-91
165	2 Lithology 1 Rad.	DB 50%	9-12-91	(165') SANDY GRAVEL (SAME AS ABOVE).	165' Sample taken 1550 9-9-91
170	2 Lith 1 Rad	HT			Switch to Hard Tools at 169.5 ft bls to 186.3
			9-12-91	170 ft - Sandy GRAVEL (Same as above)	170 ft sample @ 0924, 9-12-91
175	2 Lith 1 Rad	HT			
				175 ft - Sandy GRAVEL (Same as above)	175 ft sample @ 1155, 9-12-91

A-6000-382 (04/90)

9313018.1687

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 10 of 13

Location 200W / WMA-S

Project W-017/LLBG

Elevation 692.76 = Brass Cap

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens / [signature] (Sign/Print Name) Date 9-12-91

Reviewed By [signature] (Sign/Print Name) Date 9/18/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
180	2Lith 1Rad	HT		180 ft - Sandy GRAVEL (70% grav, 30% sand) Grav: 15% lc, 10% sc, 25% lp, 25% mp, 25% so Sand: 25% fs, 40% ms, 35% fs, G, wet (10YR5/1), lt gy - dry (10YR7/1) dry (Drill water has saturated sample) well sort, rounded, 75% felsic, 25% mafic, no HCl react.	180 ft sample @ 1552, 9-12-91
	2Lith 1Rad	HT/DB			
185				185 ft - Silty Sandy GRAVEL (65% grav, 25% sand, 8% silt) Grav: 15% lc, 10% sc, 10% lp, 30% mp, 35% fp. Sand: 40% ms, 60% fs. Dk gy, brn - wet (10YR4/2) lt gy - dry (10YR7/2) dry (wet from drill water) med sort, rounded (Secondary fractures from drilling) 75% felsic, 25% mafic, no HCl react.	185 ft sample @ 0817 9-16-91 Switch to Core barrel 186.3 – 197.5'
	2Lith 1Rad	DB			
190				190 ft - Silty Sandy GRAVEL (Same as above)	190 ft sample @ 1028, 9-16-91
	2Lith 1Rad	DB			
195				195 ft - Silty sandy GRAVEL (Same as above)	195 ft sample @ 1438, 9-16-91
					Switch to hard tools, 197.5'

9313018.1691

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 11 of 13

Location 200W/WMA-S

Project W-017/LLBG

Elevation 697.76 ± Brass Cap

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date 9-17-91

Reviewed By R. D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
200	2Lith 1Rad	HT		200 ft - Silty Sandy GRAVEL (65% grav, 25% sand, 10% silt) Grav: 45% lc, 10% sc, 10% lp, 30% mp, 35% fp, Sand: 40% ms, 60% fs, Dk gy brn-wet (10YR4/2), lt gy-dry (10YR7/2), dry (saturated from drilling) med sort, rounded (Pulverized from drilling). 75% felsic, 25% mafic, no HCl react.	200 ft sample @ 1102, 9-17-91
	2Lith 1Rad	HT			
205				205 ft - Silty Sandy GRAVEL (Same as above)	205 ft sample @ 1510, 9-17-91
	2Lith 1Rad	HT			
210				210 ft - Silty sandy GRAVEL (Same as above)	210 ft sample @ 1715, 9-17-91
	2Lith 1Rad	HT			
215				215 ft - Silty Sandy GRAVEL (Same as above)	215 ft sample @ 1146 9-18-91

A-6000-382 (04/90)

9313018.1689

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 12 of 13

Location 200W/WMA-S

Project W-017/LLBG

Elevation 697.76 = Brass Cap

Drilling Contractor Jensen

Driller Art Gwin

Drilling Method and Equipment Cable Tool

Prepared By M. Havens (Sign/Print Name) Date

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
220	2 Lith 1 Rad	HT		220 ft - Silty Sandy GRAVEL (65% gravel, 25% sand, 10% silt) Gravel: 15% lc, 10% sc, 10% lp, 30% mp, 35% fp, Sand: 40% ms, 60% fs. Dkgy.brn -wet (10YR4/2) Ltgy-dry (10YR7/2), dry (saturated from drilling), med sort, rounded (pulverized from drilling) 75% felsic, 25% mafic, no HCl react)	220 ft sample @ 1050, 9-23-91
	2 Lith 1 Rad	HT		225 WH 9-23-91	
225				~~220~~ ft - Silty Sandy GRAVEL - (Same as above)	225 ft sample @ 1250, 9-23-91
	2 Lith 1 Rad	HT			
230				230 ft - Silty Sandy GRAVEL (65% g, 25% s, 10% silt) GRAVEL: 15% LC, 10% SC, 10% LP, 30% MP, 35% FP SAND: 40% MS, 60% FS WET COLOR: DARK GRAY BROWN 10YR 4.2 SATURATED FROM DRILLING PROCESS MEDIUM SORTED, ROUNDED 75% FELSIC, 25% MAFIC, ~~NO HCL RAT~~ 9-23 KL HELD REACTION TO HCL	230 ft sample @ 1553, 9-23-91
	2 Lith 1 Rad	HT			235 ft sample @ 0933 9/24/91
235				235 ft: SILTY SANDY GRAVEL 55% GRAVEL, 35% SAND, 10% SILT GRAVEL SHATTERED by TOOL, SAND 40% MS 60% FS WET COLOR: OLIVE 5Y 4/2, DRY N/A 75% FELSIC, 25% BASALT,	

9313018.1655

BOREHOLE LOG

Boring or Well No. 299-W6-4

Sheet 13 of 13

Location 200W WMA-5

Project W-017-LLBG

Elevation 692.76 : Brass Cap

Drilling Contractor Jensen

Driller John Johnson

Drilling Method and Equipment Cable / DANDO-800

Prepared By K. Lane (Sign/Print Name) Date 9/24/91

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
240	ST	150/6" 200/6"		~~SPL~~ 240 FT SILTY SANDY GRAVEL	
				GRAVEL 75% SAND 20% SILT 5%	
				GRAVEL: 30% LC 20% SC 30% CP	
				20% MP 10% FP SAND: 40% CS	
				40% MS 20% FS WET COLOR: OLIVE	
				5Y 4/2 SATURATED, POORLY SORTED	
				SUB ANGULAR 65% FELSIC 35% MAFIC	
245	HT	2 LITH 1 $CaCO_3$ 1 RAD		245' SILTY SANDY GRAVEL	
				GRAVEL 75% SAND 20% SILT 5%	
				GRAVEL WAS SHATTERED BY HT.	
				SAND: 40% CS, 40% MS, 20% FS	
				WET COLOR: OLIVE, 5Y 4/2, SATURATED	
				POORLY SORTED SUB ANGULAR	
				65% FELSIC, 35% MAFIC	
250	HT	2 LITH 1 RAD 1 $CaCO_3$		250' SILTY SANDY GRAVEL	
				GRAVEL 60% SAND 30% SILT 10%	
				GRAVEL WAS SHATTERED BY HT	
				SAND 40% CS, 30% MS, 30% FS	
				WET COLOR: OLIVE BROWN 2.5Y 4/3 DRY N/A	
				SATURATED, POORLY SORTED SUB ANGULAR	
				60% FELSIC, 40% MAFIC	
255	HT	2 LITH 1 RAD 1 $CaCO_3$		255' SILTY SANDY GRAVEL	
				GRAVEL 60% SAND 30% SILT 10%	
				GRAVEL WAS SHATTERED BY HT	
				SAND 40% CS 30% MS 30% FS	
				WET COLOR: OLIVE BROWN 2.5Y 4/3	
				DRY: N/A SATURATED POORLY SORTED	
				SUB ANGULAR 60% FELSIC 40% MAFIC	
258		2 LITH 1 RAD 1 $CaCO_3$		258' SILTY SANDY GRAVEL	258' SAMPLE BOTTOM OF HOLE
				AS ABOVE	

A-6000-382 (04/90)

9313018.1691

1062

EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

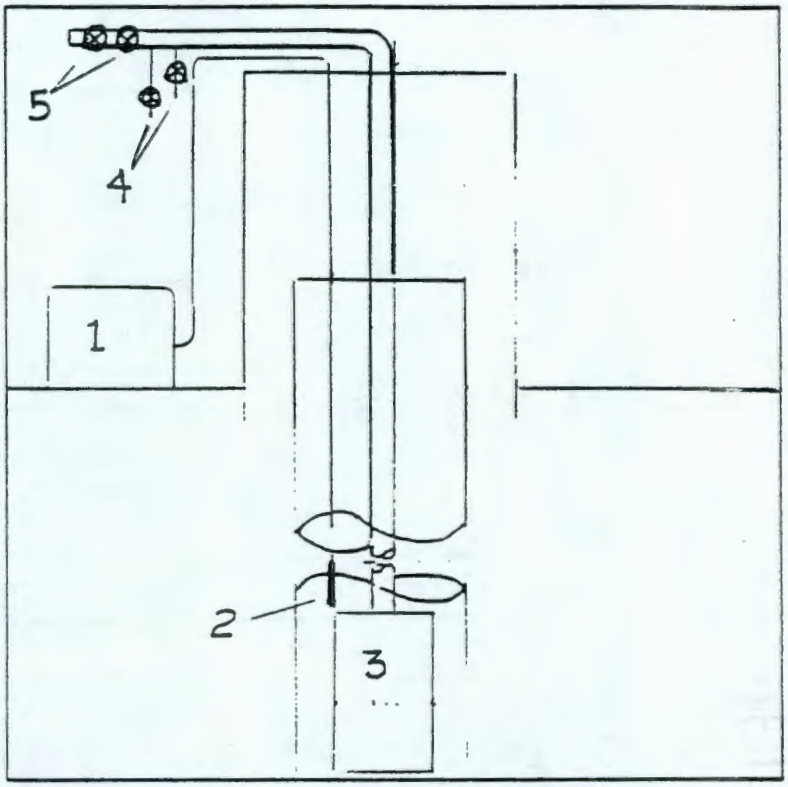
Well Designation 299-W6-1 Depth 259.94' BTOC

VALIDATED KDR 3/18/92 SIGNATURE/DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K192
2	TRANSDUCER SN-2324
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

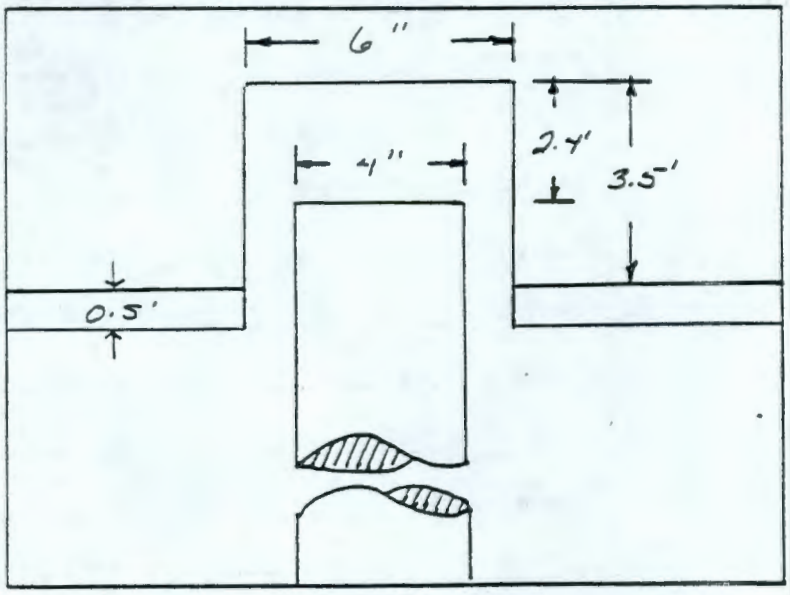
Diagram



Well Head

Comments

Diagram



Signature of Recorder Nancy Ballantyne Nancy Ballantyne Date 12-9-91

A-6000-417 (08/89)

9313018.1622

2 of 2

WELL DEVELOPMENT FORM

Well Designation 299-W6-4 Well Depth 259.94' BTOC

Screened Interval 259.94'-238.9' BTOC Date Well Development is Performed 12-7-91 / 12-9-91

BAILING

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

Type of Surge Block _____ Dimension of Surge Block _____

TD BEFORE	STROKE LENGTH	STROKE FREQUENCY	SURGE INTERVAL	SURGE TIME	TD AFTER	TD DIFFERENCE

AIRLIFT

Depth of Eductor Pipe _____ Airlift Start Time _____

Flow Rate _____ Accumulated Flow _____ Airlift Stop Time _____

Turbidity _____, _____, _____, _____, _____, _____, _____, _____

_____, _____, _____, _____, _____, _____, _____, _____

MECHANICAL PUMPING

Pumping Technique Constant Discharge Pump Depth 258.72' BTOC Pump Start Time 12-7-91: 0825, 0927 | 12-9-91: 0810, 0840

Flow Rate 12-7-91: 1.85 gpm | 12-9-91: 1.9, 1.7, 1.6 Accumulated Flow 1182 Pump Stop Time 0855, 1000 | 0850, 1200

Turbidity 12-7-91: 25 NTU, 21 NTU, 14 NTU, 17 NTU, 12 NTU, 11 NTU, 10 NTU, 10 NTU

12-9-91: 9.5 NTU, 8.5 NTU, 10 NTU, 70 NTU, 100 NTU, 10 NTU, 8.9 NTU, 16 NTU, 4.3 NTU

Comments _____

Signature of Recorder Nancy Ballantyne Nancy Ballantyne (Ebasco) Date 12-10-91

Sign and Print Name

A-6000-393 (03/90)

9313018.1693

DRAWDOWN/RECOVERY
WHC-SD-EN-DP-044, Rev. 0

Well Designation 299-W6-4 Date 12-9-91

Well Depth 259.94' BTOC Screened Interval 259.94'-238.90' BTOC

Pumping Method Constant Discharge

Equipment Used to Measure Water Level E. Tape/Transducer S.N ET-1/2324 Calibration Due 1-24-92/7-19-92

Equipment Used to Measure Flow -NA- S.N. -NA- Calibration Due -NA-

Measuring Point Top of Casing 6" (TOC) Pump Start Time 0825, 0930-12/9 Pump Stop Time 0850, 1600-12/9 0830, 1200-12/9

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				Bucket Method:
				5gal/2min 42sec = 1.85 GPM (12/9/91)
				5gal/2min 37sec = 1.9 GPM (12/9/91)
				5gal/3min 1sec = 1.76 GPM (12/9/91)
				5gal/3min 42sec = 1.6 GPM (12/9/91)
		SEE ATTACHED		

Signature of Recorder Nancy Ballantyne Nancy Ballantyne Date 12-11-91
Sign and Print Name Ebasco

A-6000-402 (03/90)

9313018.1651

WELL NO. 299-W6-4 DRAWDOWN PAGE 9 OF 10

0.9166	0.0153	243.544	-243.544
1.0000	0.0167	243.627	-243.627
1.0833	0.0181	243.720	-243.720
1.1666	0.0194	243.809	-243.809
1.2500	0.0208	243.889	-243.889
1.3333	0.0222	243.987	-243.987
1.4166	0.0236	244.077	-244.077
1.5000	0.0250	244.166	-244.166
1.5833	0.0264	244.258	-244.258
1.6666	0.0278	244.351	-244.351
1.7500	0.0292	244.449	-244.449
1.8333	0.0306	244.542	-244.542
1.9166	0.0319	244.622	-244.622
2.0000	0.0333	244.695	-244.695
2.5000	0.0417	245.087	-245.087
3.0000	0.0500	245.456	-245.456
3.5000	0.0583	245.778	-245.778
4.0000	0.0667	246.116	-246.116
4.5000	0.0750	246.346	-246.346
5.0000	0.0833	246.623	-246.623
5.5000	0.0917	246.910	-246.910
6.0000	0.1000	247.225	-247.225
6.5000	0.1083	247.553	-247.553
7.0000	0.1167	247.901	-247.901
7.5000	0.1250	248.229	-248.229
8.0000	0.1333	248.516	-248.516
8.5000	0.1417	248.780	-248.780
9.0000	0.1500	249.016	-249.016
9.5000	0.1583	249.520	-249.520
10.0000	0.1667	249.462	-249.462
12.0000	0.2000	249.599	-249.599
14.0000	0.2333	250.128	-250.128
16.0000	0.2667	250.657	-250.657
18.0000	0.3000	251.218	-251.218
20.0000	0.3333	251.744	-251.744
22.0000	0.3667	252.286	-252.286
24.0000	0.4000	252.907	-252.907

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SE2000
Environmental Logger
12/09 16:21

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	242.610
SG	1.000
Linearity	0.000
Scale factor	10.090
Offset	0.000
Delay mSEC	50.000

Step 0 12/07 15:58:23

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	249.388	-249.388
0.0083	0.0001	249.372	-249.372
0.0166	0.0003	249.362	-249.362
0.0250	0.0004	249.346	-249.346
0.0333	0.0006	249.330	-249.330
0.0416	0.0007	249.314	-249.314
0.0500	0.0008	249.267	-249.267
0.0583	0.0010	249.270	-249.270
0.0666	0.0011	249.254	-249.254
0.0750	0.0013	249.248	-249.248
0.0833	0.0014	249.235	-249.235
0.1000	0.0017	249.206	-249.206
0.1166	0.0019	249.177	-249.177
0.1333	0.0022	249.152	-249.152
0.1500	0.0025	249.126	-249.126
0.1666	0.0028	249.101	-249.101
0.1833	0.0031	249.075	-249.075
0.2000	0.0033	249.050	-249.050
0.2166	0.0036	249.024	-249.024
0.2333	0.0039	249.002	-249.002
0.2500	0.0042	248.977	-248.977
0.2666	0.0044	248.951	-248.951
0.2833	0.0047	248.929	-248.929
0.3000	0.0050	248.907	-248.907
0.3166	0.0053	248.884	-248.884
0.3333	0.0056	248.862	-248.862
0.4166	0.0069	248.760	-248.760
0.5000	0.0083	248.658	-248.658
0.5833	0.0097	248.562	-248.562
0.6666	0.0111	248.467	-248.467
0.7500	0.0125	248.381	-248.381
0.8333	0.0139	248.295	-248.295

WELL NO. 299-W6-4 RECOVERY PAGE 6 OF 10

0.9166	0.0153	248.218	-248.218
1.0000	0.0167	248.142	-248.142
1.0833	0.0181	248.072	-248.072
1.1666	0.0194	248.005	-248.005
1.2500	0.0208	247.938	-247.938
1.3333	0.0222	247.871	-247.871
1.4166	0.0236	247.804	-247.804
1.5000	0.0250	247.740	-247.740
1.5833	0.0264	247.673	-247.673
1.6666	0.0278	247.606	-247.606
1.7500	0.0292	247.546	-247.546
1.8333	0.0306	247.482	-247.482
1.9166	0.0319	247.418	-247.418
2.0000	0.0333	247.358	-247.358
2.5000	0.0417	247.026	-247.026
3.0000	0.0500	246.720	-246.720
3.5000	0.0583	246.424	-246.424
4.0000	0.0667	246.115	-246.115
4.5000	0.0750	245.793	-245.793
5.0000	0.0833	245.494	-245.494
5.5000	0.0917	245.248	-245.248
6.0000	0.1000	245.044	-245.044
6.5000	0.1083	244.875	-244.875
7.0000	0.1167	244.729	-244.729
7.5000	0.1250	244.601	-244.601
8.0000	0.1333	244.490	-244.490
8.5000	0.1417	244.394	-244.394
9.0000	0.1500	244.305	-244.305
9.5000	0.1583	244.228	-244.228
10.0000	0.1667	244.155	-244.155
12.0000	0.2000	243.900	-243.900
14.0000	0.2333	243.709	-243.709
16.0000	0.2667	243.575	-243.575
18.0000	0.3000	243.467	-243.467
20.0000	0.3333	243.381	-243.381
22.0000	0.3667	243.320	-243.320
24.0000	0.4000	243.269	-243.269
26.0000	0.4333	243.225	-243.225
28.0000	0.4667	243.186	-243.186
30.0000	0.5000	243.154	-243.154
32.0000	0.5333	243.123	-243.123
34.0000	0.5667	243.094	-243.094
36.0000	0.6000	243.068	-243.068
38.0000	0.6333	243.046	-243.046
40.0000	0.6667	243.027	-243.027
42.0000	0.7000	243.011	-243.011
44.0000	0.7333	242.995	-242.995
46.0000	0.7667	242.982	-242.982
48.0000	0.8000	242.970	-242.970
50.0000	0.8333	242.960	-242.960
52.0000	0.8667	242.950	-242.950
54.0000	0.9000	242.941	-242.941

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9,012

WELL NO. 299-W6-4 RECOVERY PAGE 7 OF 10

56.0000	0.9333	242.928	-242.928
58.0000	0.9667	242.919	-242.919
60.0000	1.0000	242.909	-242.909
62.0000	1.0333	242.900	-242.900
64.0000	1.0667	242.890	-242.890
66.0000	1.1000	242.884	-242.884
68.0000	1.1333	242.877	-242.877
70.0000	1.1667	242.868	-242.868
72.0000	1.2000	242.861	-242.861
74.0000	1.2333	242.852	-242.852
76.0000	1.2667	242.845	-242.845
78.0000	1.3000	242.839	-242.839
80.0000	1.3333	242.833	-242.833
82.0000	1.3667	242.826	-242.826
84.0000	1.4000	242.820	-242.820
86.0000	1.4333	242.817	-242.817
88.0000	1.4667	242.810	-242.810
90.0000	1.5000	242.804	-242.804
92.0000	1.5333	242.801	-242.801
94.0000	1.5667	242.794	-242.794
96.0000	1.6000	242.788	-242.788
98.0000	1.6333	242.782	-242.782
100.0000	1.6667	242.778	-242.778
105.0000	1.7500	242.766	-242.766
110.0000	1.8333	242.756	-242.756
115.0000	1.9167	242.743	-242.743
120.0000	2.0000	242.734	-242.734
125.0000	2.0833	242.721	-242.721
130.0000	2.1667	242.711	-242.711
135.0000	2.2500	242.699	-242.699
140.0000	2.3333	242.696	-242.696
145.0000	2.4167	242.686	-242.686
150.0000	2.5000	242.680	-242.680
155.0000	2.5833	242.673	-242.673
160.0000	2.6667	242.670	-242.670
165.0000	2.7500	242.664	-242.664
170.0000	2.8333	242.657	-242.657
175.0000	2.9167	242.651	-242.651
180.0000	3.0000	242.645	-242.645
185.0000	3.0833	242.638	-242.638
190.0000	3.1667	242.635	-242.635
195.0000	3.2500	242.632	-242.632
200.0000	3.3333	242.625	-242.625
205.0000	3.4167	242.619	-242.619
210.0000	3.5000	242.613	-242.613
215.0000	3.5833	242.610	-242.610
220.0000	3.6667	242.606	-242.606
225.0000	3.7500	242.603	-242.603
230.0000	3.8333	242.600	-242.600
235.0000	3.9167	242.594	-242.594
240.0000	4.0000	242.590	-242.590

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100612

245.0000	4.0833	242.584	-242.584

WELL NO. 299-W6-4 RECOVERY PAGE 8 OF 10

250.0000	4.1667	242.581	-242.581
255.0000	4.2500	242.574	-242.574
260.0000	4.3333	242.568	-242.568
265.0000	4.4167	242.565	-242.565
270.0000	4.5000	242.562	-242.562
275.0000	4.5833	242.555	-242.555
280.0000	4.6667	242.555	-242.555
285.0000	4.7500	242.552	-242.552
290.0000	4.8333	242.552	-242.552
295.0000	4.9167	242.546	-242.546
300.0000	5.0000	242.543	-242.543
305.0000	5.0833	242.536	-242.536
310.0000	5.1667	242.530	-242.530
315.0000	5.2500	242.527	-242.527
320.0000	5.3333	242.523	-242.523
325.0000	5.4167	242.517	-242.517
330.0000	5.5000	242.514	-242.514
335.0000	5.5833	242.511	-242.511
340.0000	5.6667	242.508	-242.508
345.0000	5.7500	242.501	-242.501
350.0000	5.8333	242.495	-242.495
355.0000	5.9167	242.501	-242.501
360.0000	6.0000	242.495	-242.495
365.0000	6.0833	242.495	-242.495
370.0000	6.1667	242.495	-242.495
375.0000	6.2500	242.498	-242.498
380.0000	6.3333	242.492	-242.492
385.0000	6.4167	242.492	-242.492
390.0000	6.5000	242.488	-242.488
395.0000	6.5833	242.488	-242.488
400.0000	6.6667	242.488	-242.488
405.0000	6.7500	242.485	-242.485
410.0000	6.8333	242.482	-242.482
415.0000	6.9167	242.479	-242.479
420.0000	7.0000	242.476	-242.476
425.0000	7.0833	242.472	-242.472
430.0000	7.1667	242.472	-242.472
435.0000	7.2500	242.472	-242.472
440.0000	7.3333	242.463	-242.463
445.0000	7.4167	242.463	-242.463
450.0000	7.5000	242.460	-242.460
455.0000	7.5833	242.457	-242.457
460.0000	7.6667	242.457	-242.457
465.0000	7.7500	242.453	-242.453
470.0000	7.8333	242.450	-242.450
475.0000	7.9167	242.444	-242.444
480.0000	8.0000	242.453	-242.453
485.0000	8.0833	242.437	-242.437
490.0000	8.1667	242.437	-242.437

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495.0000	8.2500	242.441	-242.441
500.0000	8.3333	242.434	-242.434
505.0000	8.4167	242.428	-242.428

WELL NO. 299-W6-4 RECOVERY PAGE 9 OF 10

510.0000	8.5000	242.431	-242.431
515.0000	8.5833	242.431	-242.431
520.0000	8.6667	242.418	-242.418
525.0000	8.7500	242.421	-242.421
530.0000	8.8333	242.425	-242.425
535.0000	8.9167	242.425	-242.425
540.0000	9.0000	242.421	-242.421
545.0000	9.0833	242.421	-242.421
550.0000	9.1667	242.421	-242.421
555.0000	9.2500	242.421	-242.421
560.0000	9.3333	242.421	-242.421
565.0000	9.4167	242.421	-242.421
570.0000	9.5000	242.418	-242.418
575.0000	9.5833	242.421	-242.421
580.0000	9.6667	242.418	-242.418
585.0000	9.7500	242.418	-242.418
590.0000	9.8333	242.421	-242.421
595.0000	9.9167	242.421	-242.421
600.0000	10.0000	242.425	-242.425
605.0000	10.0833	242.425	-242.425
610.0000	10.1667	242.425	-242.425
615.0000	10.2500	242.425	-242.425
620.0000	10.3333	242.421	-242.421
625.0000	10.4167	242.421	-242.421
630.0000	10.5000	242.425	-242.425
635.0000	10.5833	242.428	-242.428
640.0000	10.6667	242.428	-242.428
645.0000	10.7500	242.431	-242.431
650.0000	10.8333	242.428	-242.428
655.0000	10.9167	242.428	-242.428
660.0000	11.0000	242.428	-242.428
665.0000	11.0833	242.425	-242.425
670.0000	11.1667	242.418	-242.418
675.0000	11.2500	242.418	-242.418
680.0000	11.3333	242.421	-242.421
685.0000	11.4167	242.428	-242.428
690.0000	11.5000	242.428	-242.428
695.0000	11.5833	242.431	-242.431
700.0000	11.6667	242.434	-242.434
705.0000	11.7500	242.434	-242.434
710.0000	11.8333	242.434	-242.434
715.0000	11.9167	242.431	-242.431
720.0000	12.0000	242.431	-242.431
725.0000	12.0833	242.431	-242.431
730.0000	12.1667	242.431	-242.431
735.0000	12.2500	242.425	-242.425
740.0000	12.3333	242.421	-242.421

745.0000	12.4167	242.431	-242.431
750.0000	12.5000	242.431	-242.431
755.0000	12.5833	242.431	-242.431
760.0000	12.6667	242.434	-242.434
765.0000	12.7500	242.431	-242.431

WELL NO. 299-W6-4 RECOVERY PAGE 10 OF 10

770.0000	12.8333	242.437	-242.437
775.0000	12.9167	242.434	-242.434
780.0000	13.0000	242.444	-242.444
785.0000	13.0833	242.441	-242.441
790.0000	13.1667	242.437	-242.437
795.0000	13.2500	242.437	-242.437
800.0000	13.3333	242.441	-242.441
805.0000	13.4167	242.441	-242.441
810.0000	13.5000	242.441	-242.441
815.0000	13.5833	242.441	-242.441
820.0000	13.6667	242.441	-242.441
825.0000	13.7500	242.444	-242.444
830.0000	13.8333	242.447	-242.447
835.0000	13.9167	242.447	-242.447
840.0000	14.0000	242.444	-242.444
845.0000	14.0833	242.450	-242.450
850.0000	14.1667	242.447	-242.447
855.0000	14.2500	242.453	-242.453
860.0000	14.3333	242.457	-242.457
865.0000	14.4167	242.460	-242.460
870.0000	14.5000	242.463	-242.463
875.0000	14.5833	242.466	-242.466
880.0000	14.6667	242.466	-242.466
885.0000	14.7500	242.466	-242.466
890.0000	14.8333	242.469	-242.469
895.0000	14.9167	242.472	-242.472
900.0000	15.0000	242.469	-242.469
905.0000	15.0833	242.476	-242.476
910.0000	15.1667	242.476	-242.476
915.0000	15.2500	242.476	-242.476
920.0000	15.3333	242.479	-242.479
925.0000	15.4167	242.476	-242.476
930.0000	15.5000	242.479	-242.479
935.0000	15.5833	242.479	-242.479
940.0000	15.6667	242.482	-242.482
945.0000	15.7500	242.482	-242.482
950.0000	15.8333	242.479	-242.479
955.0000	15.9167	242.479	-242.479
960.0000	16.0000	242.479	-242.479
965.0000	16.0833	242.479	-242.479
970.0000	16.1667	242.482	-242.482
975.0000	16.2500	242.482	-242.482
980.0000	16.3333	242.479	-242.479
985.0000	16.4167	242.482	-242.482
990.0000	16.5000	242.479	-242.479

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1041

SAMPLING PUMP INSTALLATION FORM

VALIDATED
KDR 7/18/92
SIGN TURNGATE

Project: W017/LLBG

Well Number: 299-W6-4

Pump Type: Hydrostar

Pump Model: 8001

Date Installed: 12/9/91

Installed by: R. Strode/M. Munson

Depth to water: 242.13' BTOC

Depth to bottom: 259.94' BTOC

Reported Depth to water: -

Screened Interval: 259.94'-238.90' BTOC

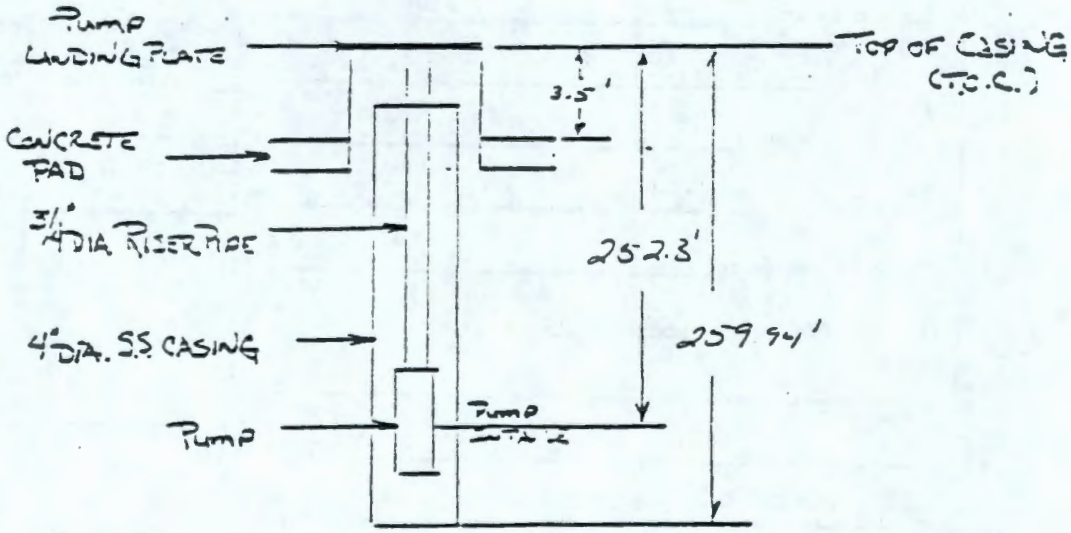
Pump/Riser Pipe Description:

pipe: 3/4" SS. Discharge
pump length: 4.2'
pump screen length: 1.9'
material cleaning: manufacturer

Comments:

PUMP INSTALLATION SKETCH

Total material length 254.2'
Loc. of pump intake: 252.3'



Completed By: Nancy Ballantyne

Date: 12/9/91

WHC-SD-EN-DP-044, Rev. 0

BOREHOLE TEST INFORMATION

VALIDATED KDR 3/18/9

Borehole 299-W4-6 Borehole Diameter 4" Hanford Coordinates -NA-

Interval Tested 259.94'-238.90' BTOC Depth Interval 259.94' 238.90' BTOC

Test Type Instantaneous Slug Test Injection/Withdrawal Borehole Depth 259.94' BTOC

Instruction Used WHC-CM-7-7.EII 10.1

EQUIPMENT

NAME	DESCRIPTION
Electris Sounder	Solinst SN-ET-1
Data Logger	In-Situ Inc. SN-2K192
Pressure Transducer	In-Situ Inc S.N. - 2324
Slugging Rod	2.0'x6.0', 0.13ft³
Steel Measuring Tape	500' Graduated Steel Tape

MEASUREMENT DATUM

Control Datum Top of 6" Casing (TOC)

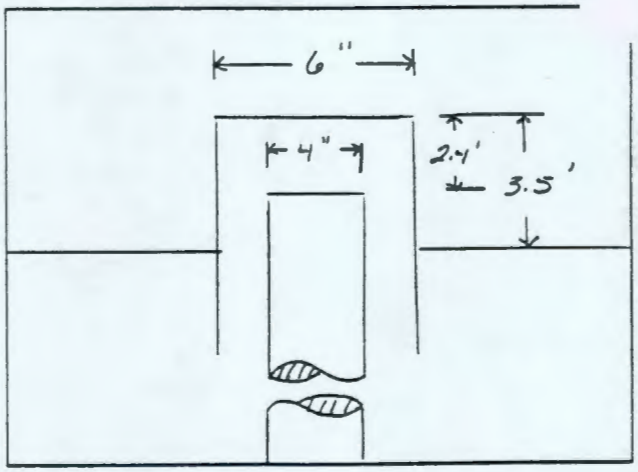
Elevation NA

Electric Sounder TOC

Steel Tape TOC

Pressure Transducer TOC

WELL HEAD DIAGRAM



COMMENTS

Recorded by: Nancy Ballantyne (Ebasco) 12-11-91

Sign and Print Name Date

BD-6000-295 (05/89)

9313018.1703

WHC-SD-EN-DP-044, Rev. 0

INSTANTANEOUS SLUG TEST DATA SHEET

INJECTION

Borehole 299-W6-4

Interval Tested 259.94'-238.90' BTOC

Depth to Water 242.61' BTOC

Date 12/9/91

Measured by Nancy Ballantyne

Slug Volume .13Ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time 1300-inj. baseline, 1315-injection

Transducer Measurement Units Feet

Depth to Transducer 14.02' BWL

Initial Pressure (P_i) 242.61'

Slug Level or Pressure (P_{max}) 231.854'

Borehole Diameter 4"

Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement
		see attached			see attached			

Recorded by Nancy Ballantyne Nancy Ballantyne (Ebasco) (Sign and Print Name) 12-11-91 (Date)

BD-6000-293 (07/90)

9313018.1711

SE2000
Environmental Logger
12/09 16:28

Unit# 192 Test 3

INPUT 1: Level (F) TOC

Reference	242.610
SG	1.000
Linearity	0.000
Scale factor	10.090
Offset	0.000
Delay mSEC	50.000

Step 0 12/09 12:59:17

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.000	0.000	242.594	-242.594
1.000	0.017	242.587	-242.587
2.000	0.033	242.584	-242.584
3.000	0.050	242.584	-242.584
4.000	0.067	242.578	-242.578
5.000	0.083	242.574	-242.574
6.000	0.100	242.571	-242.571
7.000	0.117	242.568	-242.568
8.000	0.133	242.568	-242.568
9.000	0.150	242.565	-242.565
10.000	0.167	242.565	-242.565
11.000	0.183	242.559	-242.559

9313018.1705

SE2000
Environmental Logger
12/09 16:29

Unit# 192 Test 4

INPUT 1: Level (F) TOC

Reference	242.610
SG	1.000
Linearity	0.000
Scale factor	10.090
Offset	0.000
Delay mSEC	50.000

Step 0 12/09 13:14:52

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	231.854	-231.854
0.0083	0.0001	240.102	-240.102
0.0166	0.0003	246.784	-246.784
0.0250	0.0004	239.015	-239.015
0.0333	0.0006	243.154	-243.154
0.0416	0.0007	241.344	-241.344
0.0500	0.0008	241.934	-241.934
0.0583	0.0010	242.555	-242.555
0.0666	0.0011	241.322	-241.322
0.0750	0.0013	242.638	-242.638
0.0833	0.0014	241.647	-241.647
0.1000	0.0017	242.010	-242.010
0.1166	0.0019	242.173	-242.173
0.1333	0.0022	242.195	-242.195
0.1500	0.0025	242.205	-242.205
0.1666	0.0028	242.227	-242.227
0.1833	0.0031	242.243	-242.243
0.2000	0.0033	242.256	-242.256
0.2166	0.0036	242.262	-242.262
0.2333	0.0039	242.269	-242.269
0.2500	0.0042	242.275	-242.275
0.2666	0.0044	242.281	-242.281
0.2833	0.0047	242.278	-242.278
0.3000	0.0050	242.284	-242.284
0.3166	0.0053	242.294	-242.294
0.3333	0.0056	242.294	-242.294
0.4166	0.0069	242.297	-242.297
0.5000	0.0083	242.307	-242.307
0.5833	0.0097	242.313	-242.313
0.6666	0.0111	242.316	-242.316
0.7500	0.0125	242.320	-242.320
0.8333	0.0139	242.323	-242.323

WELL NO. 299-W6-4 INJECTION PAGE 4 OF 4

0.9166	0.0153	242.329	-242.329
1.0000	0.0167	242.339	-242.339
1.0833	0.0181	242.339	-242.339
1.1666	0.0194	242.345	-242.345
1.2500	0.0208	242.355	-242.355
1.3333	0.0222	242.351	-242.351
1.4166	0.0236	242.358	-242.358
1.5000	0.0250	242.367	-242.367
1.5833	0.0264	242.383	-242.383
1.6666	0.0278	242.380	-242.380
1.7500	0.0292	242.386	-242.386
1.8333	0.0306	242.386	-242.386
1.9166	0.0319	242.390	-242.390
2.0000	0.0333	242.390	-242.390
2.5000	0.0417	242.421	-242.421
3.0000	0.0500	242.437	-242.437
3.5000	0.0583	242.450	-242.450
4.0000	0.0667	242.466	-242.466
4.5000	0.0750	242.482	-242.482
5.0000	0.0833	242.488	-242.488
5.5000	0.0917	242.504	-242.504
6.0000	0.1000	242.511	-242.511
6.5000	0.1083	242.527	-242.527
7.0000	0.1167	242.523	-242.523
7.5000	0.1250	242.533	-242.533
8.0000	0.1333	242.536	-242.536
8.5000	0.1417	242.552	-242.552
9.0000	0.1500	242.539	-242.539
9.5000	0.1583	242.549	-242.549
10.0000	0.1667	242.559	-242.559
12.0000	0.2000	242.568	-242.568
14.0000	0.2333	242.574	-242.574
16.0000	0.2667	242.584	-242.584
18.0000	0.3000	242.584	-242.584
20.0000	0.3333	242.590	-242.590
22.0000	0.3667	242.597	-242.597
24.0000	0.4000	242.603	-242.603
26.0000	0.4333	242.597	-242.597
28.0000	0.4667	242.597	-242.597

9313018.1707

6 of 8

WHC-SD-EN-DP-044, Rev. 0

INSTANTANEOUS SLUG TEST DATA SHEET

WITHDRAWAL

Borehole 299-W6-4

Time 1345

Interval Tested 259.44'-238.90' BTOC

Transducer Measurement Units Feet

Depth to Water 242.61' BTOC

Depth to Transducer 14.02' BWL

Date 12/9/91

Initial Pressure (P_i) 242.61'

Measured by Nancy Ballantyne

Slug Level or Pressure (P_{max}) 245.911'

Slug Volume .1343 Barometer Reading (Beginning) -NA- (End) -NA-

Borehole Diameter 4"

Time		Pressure Trans. Measurement	Time		Pressure Trans. Measurement	Time		Pressure Trans. Measurement
Observed	Elapsed		Observed	Elapsed		Observed	Elapsed	
		see attached			see attached			

Recorded by Nancy Ballantyne (Sign and Print Name) Nancy Ballantyne (Ebasco) 12-11-91 (Date)

BD-6000-293 (07/90)

9313018.1755

7 of 8

WELL NO. 299-W6-4 WITHDRAWAL PAGE 2 OF 3

SE2000
Environmental Logger
12/09 16:31

Unit# 192 Test 5

INPUT 1: Level (F) TOC

Reference	242.610
SG	1.000
Linearity	0.000
Scale factor	10.090
Offset	0.000
Delay mSEC	50.000

Step 0 12/09 13:45:04

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	245.882	-245.882
0.0083	0.0001	245.911	-245.911
0.0166	0.0003	243.897	-243.897
0.0250	0.0004	243.696	-243.696
0.0333	0.0006	244.126	-244.126
0.0416	0.0007	244.314	-244.314
0.0500	0.0008	244.063	-244.063
0.0583	0.0010	244.021	-244.021
0.0666	0.0011	243.986	-243.986
0.0750	0.0013	244.024	-244.024
0.0833	0.0014	243.958	-243.958
0.1000	0.0017	243.903	-243.903
0.1166	0.0019	243.862	-243.862
0.1333	0.0022	243.820	-243.820
0.1500	0.0025	243.776	-243.776
0.1666	0.0028	243.734	-243.734
0.1833	0.0031	243.693	-243.693
0.2000	0.0033	243.652	-243.652
0.2166	0.0036	243.613	-243.613
0.2333	0.0039	243.575	-243.575
0.2500	0.0042	243.537	-243.537
0.2666	0.0044	243.502	-243.502
0.2833	0.0047	243.470	-243.470
0.3000	0.0050	243.438	-243.438
0.3166	0.0053	243.406	-243.406
0.3333	0.0056	243.378	-243.378
0.4166	0.0069	243.263	-243.263
0.5000	0.0083	243.151	-243.151
0.5833	0.0097	243.072	-243.072
0.6666	0.0111	243.011	-243.011
0.7500	0.0125	242.970	-242.970
0.8333	0.0139	242.931	-242.931

9313018.1709

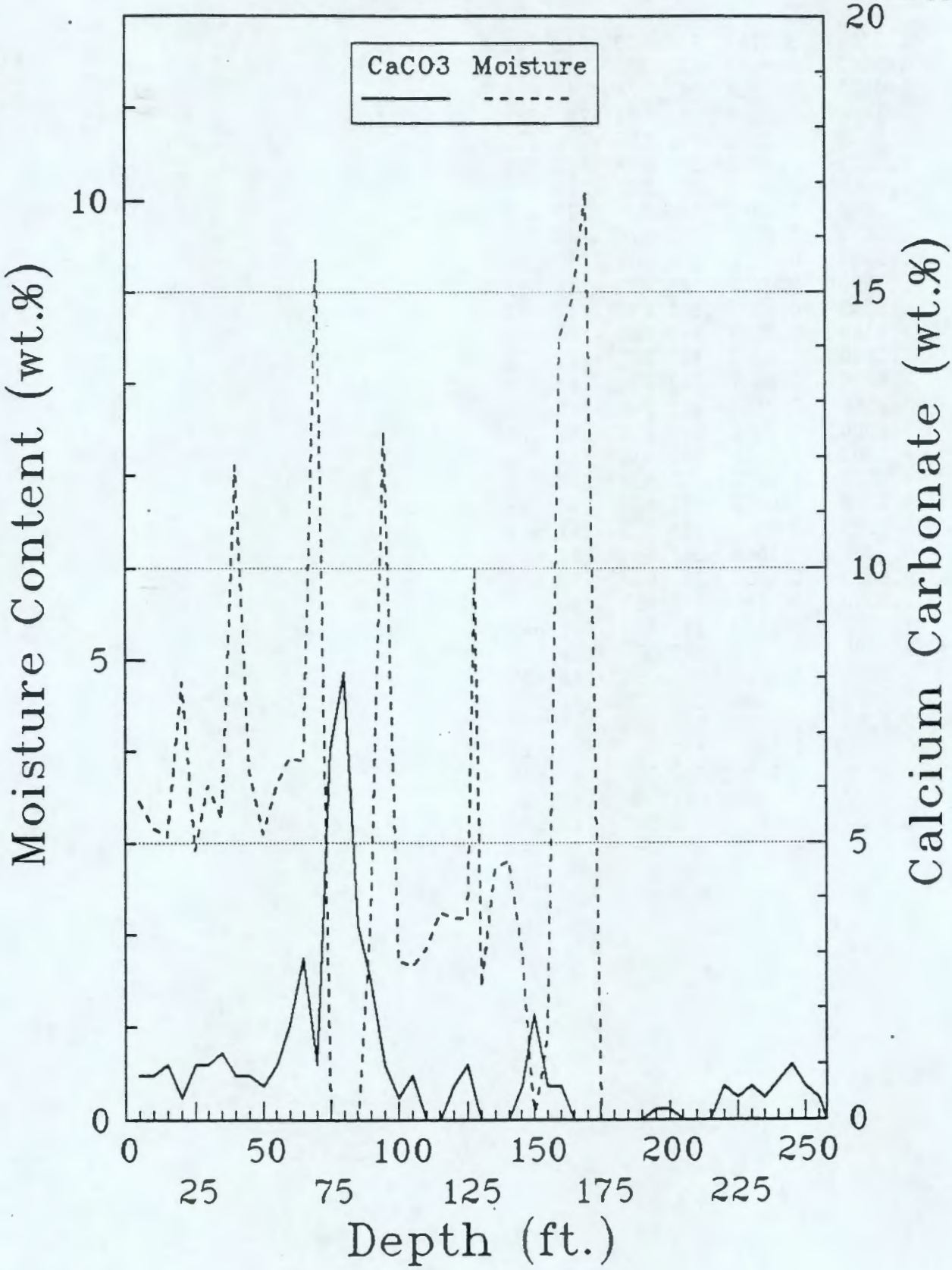
WELL NO. 299-W6-4 WITHDRAWAL PAGE 3 OF 3

0.9166	0.0153	242.909	-242.909
1.0000	0.0167	242.890	-242.890
1.0833	0.0181	242.874	-242.874
1.1666	0.0194	242.861	-242.861
1.2500	0.0208	242.855	-242.855
1.3333	0.0222	242.836	-242.836
1.4166	0.0236	242.823	-242.823
1.5000	0.0250	242.820	-242.820
1.5833	0.0264	242.810	-242.810
1.6666	0.0278	242.801	-242.801
1.7500	0.0292	242.798	-242.798
1.8333	0.0306	242.791	-242.791
1.9166	0.0319	242.785	-242.785
2.0000	0.0333	242.778	-242.778
2.5000	0.0417	242.750	-242.750
3.0000	0.0500	242.740	-242.740
3.5000	0.0583	242.718	-242.718
4.0000	0.0667	242.711	-242.711
4.5000	0.0750	242.692	-242.692
5.0000	0.0833	242.686	-242.686
5.5000	0.0917	242.673	-242.673
6.0000	0.1000	242.664	-242.664
6.5000	0.1083	242.657	-242.657
7.0000	0.1167	242.651	-242.651
7.5000	0.1250	242.645	-242.645
8.0000	0.1333	242.638	-242.638
8.5000	0.1417	242.635	-242.635
9.0000	0.1500	242.625	-242.625
9.5000	0.1583	242.625	-242.625
10.0000	0.1667	242.619	-242.619
12.0000	0.2000	242.606	-242.606
14.0000	0.2333	242.594	-242.594
16.0000	0.2667	242.587	-242.587

9308.17P

VALIDATED
KDR3
ORIGINAL UPDATE

WELL 299-W6-4



9313018.1711

293

	A	B	C
1	WELL 299-W6-4		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	0.8	3.45
7	10	0.8	3.17
8	15	1	3.07
9	20	0.4	4.76
10	25	1	2.92
11	30	1	3.62
12	35	1.2	3.27
13	40	0.8	7.11
14	45	0.8	3.78
15	50	0.6	3.10
16	55	1	3.64
17	60	1.7	3.93
18	65	2.9	3.89
19	70	1	9.35
20	75	6.7	
21	80	8.1	
22	85	3.5	
23	90	2.5	2.20
24	95	1	7.48
25	100	0.4	1.72
26	105	0.8	1.65
27	110	0	1.85
28	115	0	2.24
29	120	0.6	2.18
30	125	1	2.18
31	128	0.4	6.03
32	130	0	1.44
33	135	0	2.72
34	140	0	2.80
35	145	0.6	1.82
36	150	1.9	
37	155	0.6	0.90
38	160	0.6	8.50
39	165	0	8.92
40	170	0	10.10
41	175	0	
42	180	0	
43	185	0	
44	190	0	
45	195	0.2	
46	200	0.2	
47	205	0	

9313018.1712

3 8 3

	A	B	C
48	210	0	
49	215	0	
50	220	0.6	
51	225	0.4	
52	230	0.6	
53	235	0.4	
54	245	1	
55	250	0.6	
56	255	0.4	
57	258	0	

9313018.1713

10 slot
20-40 Swell
10/2/91
KR

WESTINGHOUSE HANFORD COMPANY
P.O. BOX 1970
RICHLAND, WA 99352

WHC We're making sure

FAX NO. (509) 373-5052 VERIFY NO. (509)373-1957

DATE: 9-26-91 PHONE: 6-3416

TO: ~~Bob Williams~~ Kent FAX NO: 6-6476

400 Hills PHONE: 6-3416

S. ENGLAND MSIN: SO-11

THIS IS OF 7 PAGES, INCLUDING COVER SHEET

MESSAGE:

DO YOU WANT YOUR ORIGINAL? ☐ YES ☐ NO

9313018.17

SIEVE ANALYSIS DATA SHEET

Sample No. 1-2243 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 9-26-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-5-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0006 Calibration Due Date 4-1-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SAND Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	106.7	0	0	100
10		14.1	13.3	86.7
40		52.7	49.9	50.1
60		63.4	60.0	40.0
100		70.5	66.7	33.3
200		77.9	73.7	26.3
N/A	N/A	N/A	N/A	N/A

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	
E = Dry Weight of Sample After Washing/Sieve	N/A g	WASHED GRADING
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; M. A. Bachler Date 9-26-91

A-6400-204(2-87)

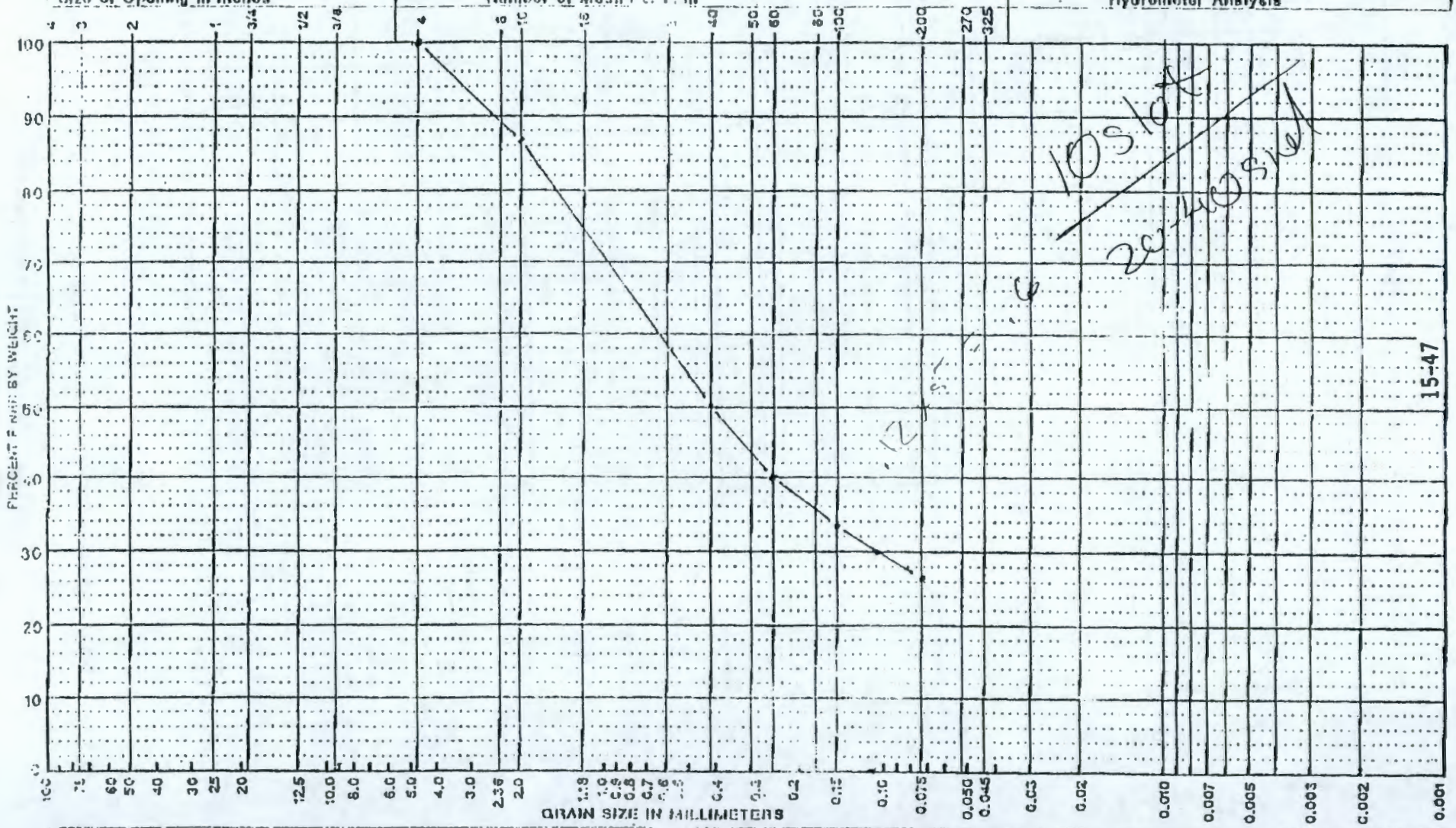
9313018.1215

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-2243 Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-16-89 Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A Date 9-26-91



Remarks SAND

299-W6-4 240-241'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: M. G. Barchus Date 9-26-91

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-2243

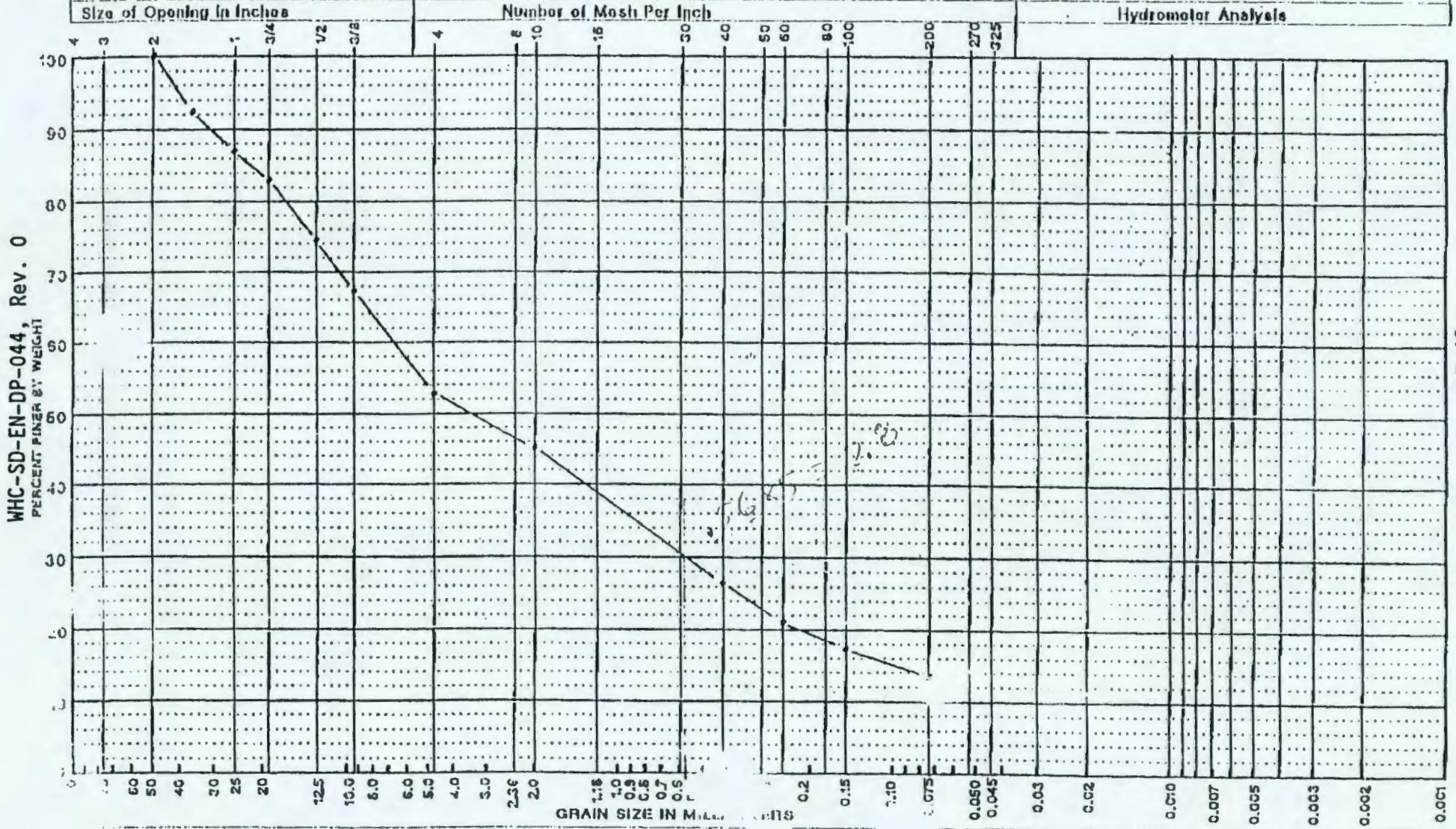
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 9-26-91



Remarks SANDY GRAVEL

299-W6-4 240-241'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: W. G. Bachler Date 9-26-91

WHC-SD-EN-DP-044, Rev. 0

15-48

9313018.1717

SIEVE ANALYSIS DATA SHEET

Sample No. 1-2243 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 9-26-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0006 Calibration Due Date 4-1-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SANDY GRAVEL Sieve Time 10 (min)

Reduced by ( ) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2	1559.1	0	0	100
1 1/2	↓	121.5	7.8	92.2
1		201.5	12.9	87.1
3/4		260.7	16.7	83.2
1/2		396.1	25.4	74.6
3/8		504.4	32.4	67.6
4	↓	737.9	47.3	52.7
10	105.7	14.1	13.3	45.7
40	↓	52.7	49.9	26.4
60		63.4	60.0	21.1
100		70.5	66.7	17.5
200	↓	77.9	73.7	13.9

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED FINE GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; M.C. Boucher Date 9-26-91

A-6400-204(2-87)

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-2243 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON R. MILLER DATE 9-25-91

TEST REQUESTED	NO. OF SAMPLES	TEST LAB INFORMATION (PROCEDURE USED)
SIEVE ANALYSIS	1	GEL-07

RECEIVED BY: R.G. ALEXANDER DATE 9-25-

APPROVED BY: R.G. ALEXANDER DATE 9-25-91

RADIATION RELEASE

Bldg. 279-225-4 Expiration Date 9-25-91

Released By [illegible] Health Physics

Remarks [illegible]

[illegible] (01/89)

RADIATION [illegible]

Bldg. [illegible] 25-91

Released [illegible]

Re[illegible]

[illegible] (01/89)

9313018.1719

RICH, F.Y. FILES
PUEBE FILE
SEVERTED
20-40 MESH SL
& 10 SLT STD SC
10/1/91

TEST REQUEST

SAMPLE/SPECIMEN NO. 1-2243 COST CODE/WORK ORDER NO. WJ3V1

REQUESTED BY: ORG. 81231 PERSON R. MILLER DATE 9-25-91

TEST REQUESTED	NO. OF SAMPLES	TEST LAB INFORMATION (PROCEDURE USED)
SIEVE ANALYSIS	1	GEL-07

REMARKS 299-W6-4 240'-241

RECEIVED BY: R.G. ALEXANDER DATE 9-25-91

APPROVED BY: R.G. ALEXANDER DATE 9-25

RADIATION RELEASE

Bldg. 299-W6-4 Expiration Date 9-25-91

Released By [signature] Health Physics

Remarks 240'-241

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299-W6-4 Expiration Date 9-25-91

Released By [signature] Health Physics

Remarks 240'-241

54-3000-022 (01/89)

9313018.1725

SIEVE ANALYSIS DATA SHEET

Sample No. 1-2243 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 9-26-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 2210 Calibration Due Date 12-25-91
Thermometer: ETAL- 0006 Calibration Due Date 4-1-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SANDY GRAVEL Sieve Time 10 (min)

Reduced by ( ) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2	1559.1	0	0	100
1 1/2		121.8	7.8	92.2
1		201.5	12.9	87.1
3/4		260.7	16.7	83.2
1/2		396.1	25.4	74.6
3/8		504.4	32.4	67.6
4		737.9	47.3	52.7
10	105.7	14.1	13.3	45.7
40		52.7	49.9	26.4
60		63.4	60.0	21.1
100		70.5	66.7	17.5
200		77.9	73.7	13.9

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED FINE GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; M.A. Bachler Date 9-26-91

A-6400-204(2-87)

9313018.1721

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-2243

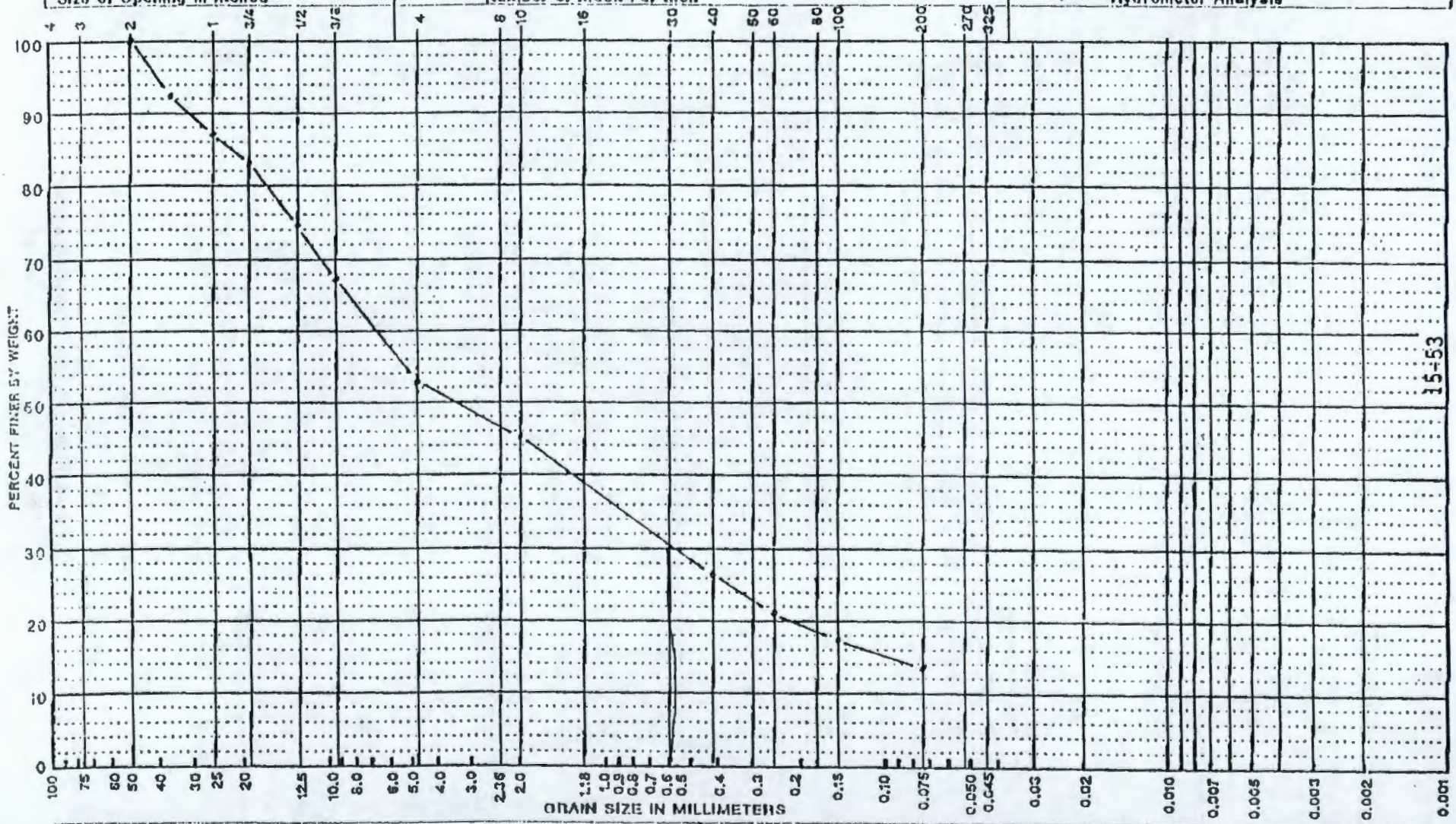
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 9-26-91



Remarks SANDY GRAVEL

299-W6-4 240-241'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: W. G. Bachler Date 9-26-91

SIEVE ANALYSIS DATA SHEET

Sample No. 1-2243 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 9-26-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0006 Calibration Due Date 4-1-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SAND Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	106.7	0	0	100
10		14.1	18.3	86.7
40		52.7	49.9	50.1
60		63.4	60.0	40.0
100		70.5	66.7	33.3
200		77.9	73.7	26.3
N/A	N/A	N/A	N/A	N/A

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	
E = Dry Weight of Sample After Washing/Sieve	N/A g	WASHED GRADING
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained ~~and~~ used calibrated instruments.
Checked By; M. A. Bachler Date 9-26-91

A-6400-204(2-87)

9313018.1723

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-2243

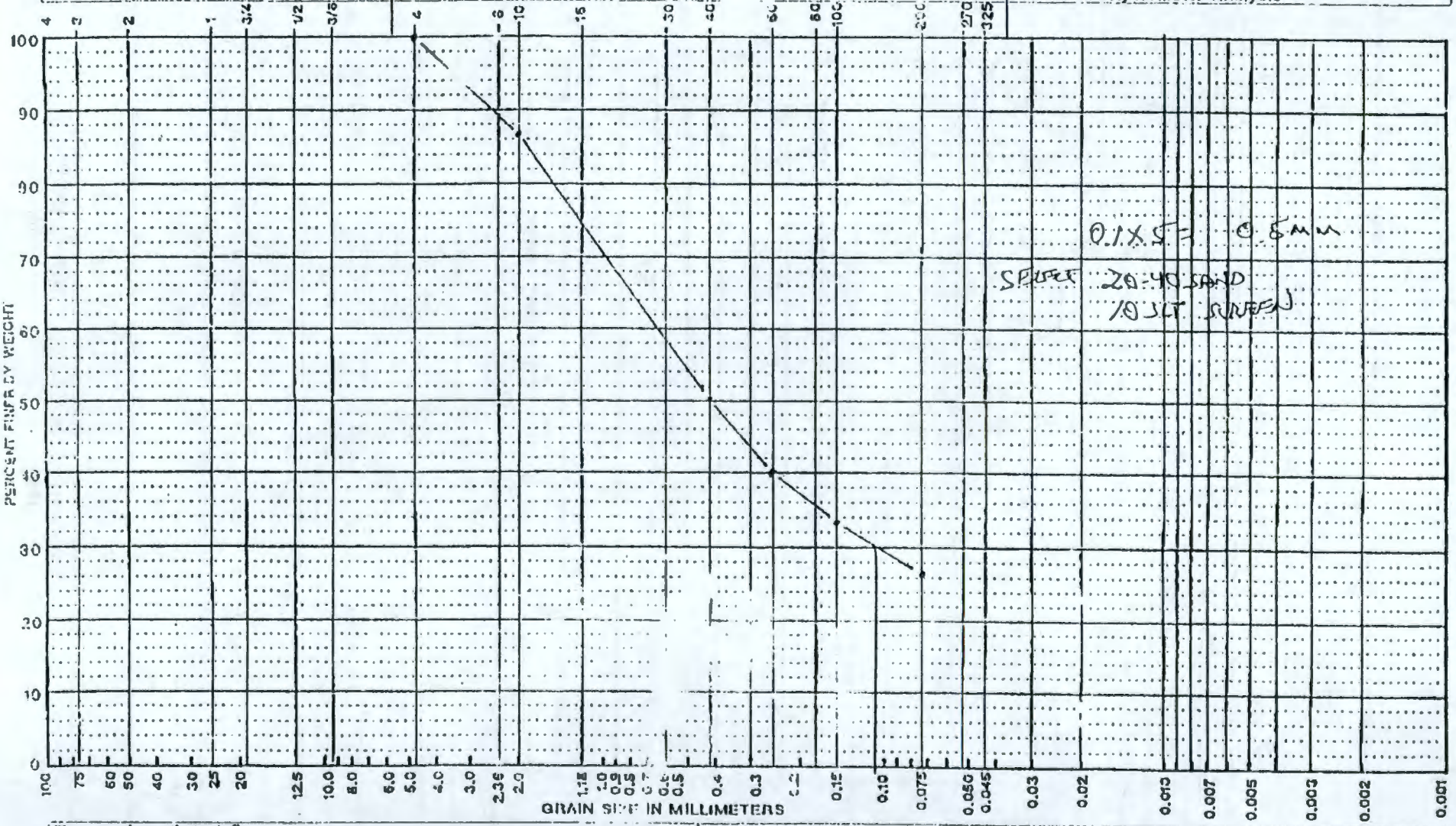
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-16-89

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued

Date 9-26-91



Remarks SAND

299-W6-4

240

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: M. G. Bachler Date 9-26-91

WHC-SD-EN-DP-044, Rev. 0

15-55

SIEVE ANALYSIS DATA SHEET

Sample No. 1-2243 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 9-26-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0006 Calibration Due Date 4-1-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SAND Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	106.7	0	0	100
10	↓	14.1	13.3	86.7
40	↓	52.7	49.9	50.1
60	↓	63.4	60.0	40.0
100	↓	70.5	66.7	33.3
200	↓	77.9	73.7	26.3
N/A	N/A	N/A	N/A	N/A
↓	↓	↓	↓	↓
↓	↓	↓	↓	↓

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percemtage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	
E = Dry Weight of Sample After Washing/Sieve	N/A g	WASHED GRADING
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; M. G. Baechler Date 9-26-91

A-6400-204(2-87)

9313018.1725

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-2243

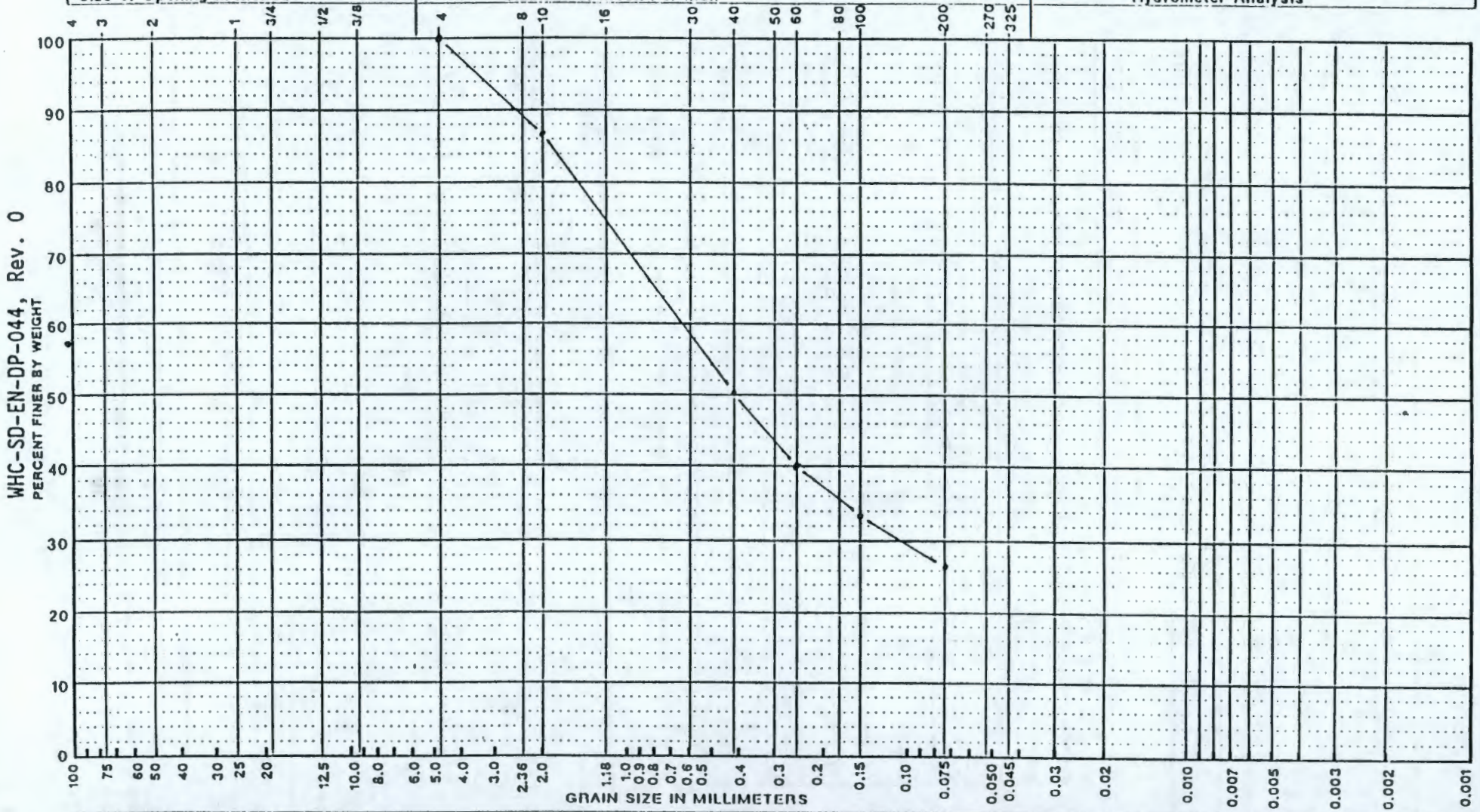
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Test Plan No. N/A Rev. N/A Date Issued N/A

Plotted By JERRY L. ENGLAND

Date 9-26-91



Remarks SAND

299-W6-4 240-241'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: M. G. Barchus Date 9-26-91

WHC-SD-EN-DP-044, Rev. 0

15-57

9313018.1730

SIEVE ANALYSIS DATA SHEET

Sample No. 1-2243 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 9-26-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0006 Calibration Due Date 4-1-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SANDY GRAVEL Sieve Time 10 (min)

Reduced by ( ) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2	1559.1	0	0	100
1 1/2		121.8	7.8	92.2
1		201.5	12.9	87.1
3/4		260.7	16.7	83.2
1/2		396.1	25.4	74.6
3/8		504.4	32.4	67.6
4		737.9	47.3	52.7
10	105.7	14.1	13.3	45.7
40		52.7	49.9	26.4
60		63.4	60.0	21.1
100		70.5	66.7	17.5
200		77.9	73.7	13.9

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percemtage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED FINE GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; M.A. Buchler Date 9-26-91

A-6400-204(2-87)

9313018.1727

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-2243

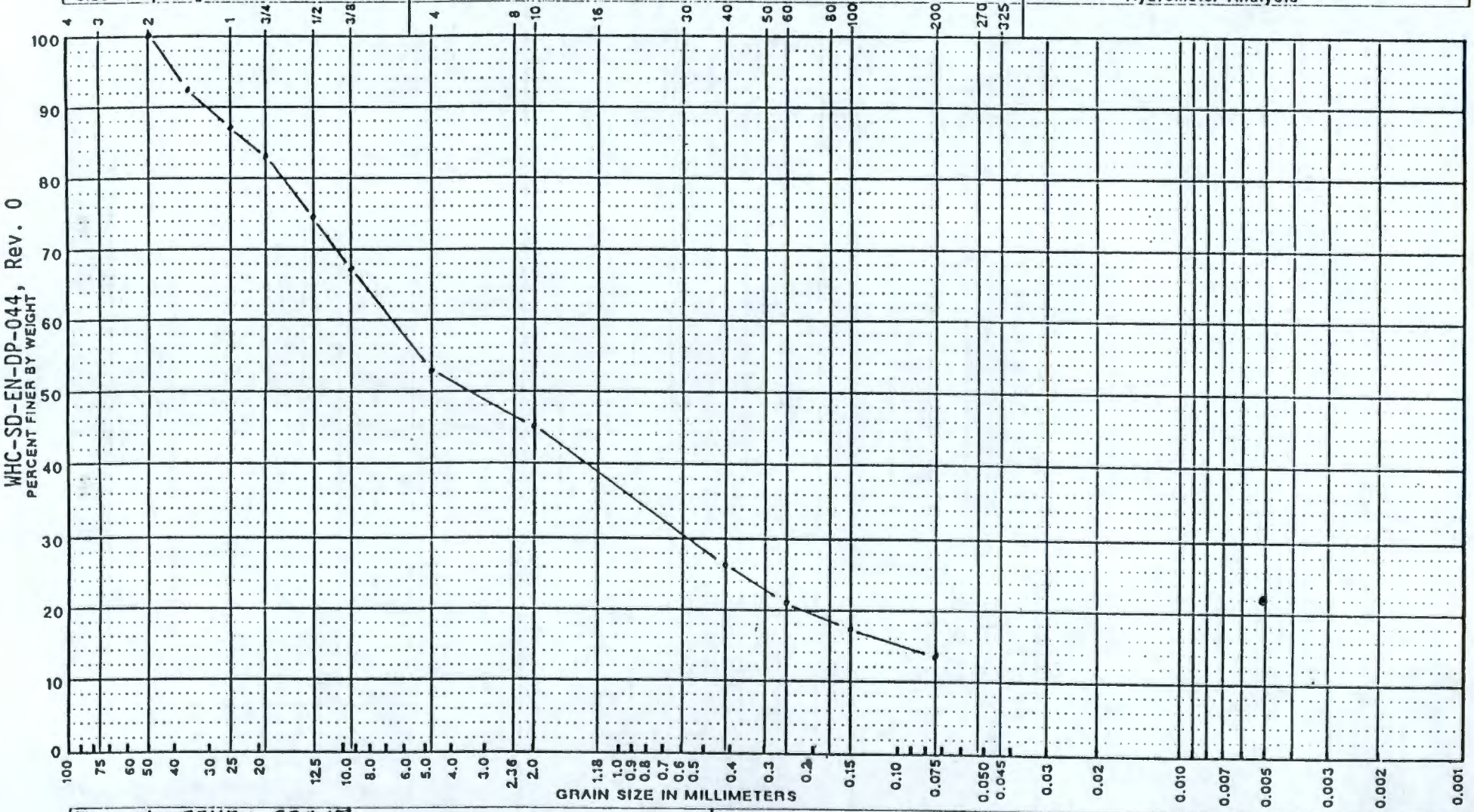
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-16-89

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 9-26-91



Remarks SANDY GRAVEL

299-W6-4 240-241'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: M. G. Bachler Date 9-26-91

WHC-SD-EN-DP-044, Rev. 0

15-59

9313018.1770

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 1 of 2

Requested by:

Phone No.

Well No. 299-W6-4

Date:

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5'		SOIL	8.14.91	1862.91	11.8	0.6
10'				1863.91	39.7	1.3
15'				1864.91	15.9	0.2
20'				1877.91	14.0	0.1
25'	8.21.91			1962.91	11.2	1.1
30'						
35'						
40'						
45'	9.3.91		9.3.91	B333.91	42.78	2.39
50'	8.26.91		9.5.91	0383.91B	55.24	2.83
55'				0387.91B	39.07	1.09
60'				0381.91B	43.79	2.18
65'	8.27.91		9.4.91	0357.91B	16.17	0.65
70'				0363.91B	31.26	<D
76.1-78.1'			9.6.91	0427.91B	10.37	2.1
80'	9.3.91		9.6.91	0424.91B	22.22	<D
85'				0465.91B	<D	0.87
90'				0468.91B	20.68	<D
95'	9.4.91			0445.91B	7.75	1.19
100'				0466.91B	2.36	<D
105'			9.13.91	0516.91B	26.81	1.47
110'	9.4.91		9.6.91	0419.91B	32.58	1.92
115'	9.5.91			0471.91B	16.03	0.79
120				0426.91B	45.17	1.44
125'				0477.91B	12.3	0.2
130'				0547.91B	12.61	0.60
135'			9.13.91	0530.91B	36.46	1.20
140'	9.6.91		9.16.91	0549.91B	10.74	0.37
145				0546.91B	11.64	0.15
150'				0544.91B	14.22	<D
155'			0	0555.91B	10.58	1.0
160'	9.11.91		9.26.91	0717.91B	20.06	0.1

Performed By:

Date:

Page: of

A-6000-829 (10/91)

9313018.1729

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

page 2 of 2

Requested by:	Phone No.	Well No.	Date:
		299-W6-4	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
165'	9.11.91	SOIL	9.25.91	0712.91B	2.31	0.92
170'	9.12.91		9.23.91	0591.91B	29.34	1.68
175'				0592.91B	<D	0.24
180'	9.16.91		9.26.91	0801.91B	30.1	0.48
185'			9.27.91	0802.91B	8.21	0.87
190'	9.17.91			0821.91B	12.32	<D
195'				0825.91B	10.27	1.09
200'			9.25.91	0623.91B	37.61	<D
205'				0613.91B	34.60	0.24
210'				0618.91B	29.10	0.48
215'			9.26.91	0769.91B	11.81	<D
220'	9.24.91		.91	0912.91B	<D	<D
225'				0913.91B	<D	<D
230'				0914.91B	<D	12.58
235'				0915.91B	17.06	<D
245'	9.30.91		10.8.91	0971.91B	24.16	<D
250'			10.7.91	0956.91B	4.24	<D
255'				0958.91B	20.35	<D
258'			10.10.91	0994.91B	22.89	0.24
260'						
265'						
270'						
280'						
285'	9.30.91		10.7.91	0956.91B	4.24	<D

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1720

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Westinghouse Hanford Company	WHC-SD-EN-DP-044, Rev. 0 LOG HEADER	Page 1 of 2

Well No. 299-W6-4 Area 200 West Date 9/9/91

Log Run #1 Log Type Gross Gamma Run 1 of 3

Elevation Datum NGVD29* Elevation 697.76' BRASS CAP

Survey Coordinates 137290.49 N 567132.25 E

SIGNATURE/DATE

Log Measured From Ground Surface

Location Description NW of T-Plant

Ground Surface Elevation 697.76' Brass Cap

Surface Temperature 23.9°C Weather Clear - Warm

BOREHOLE INFORMATION

Driller John Johnson

Drill Rig Type Cable Tool Bit Type/Diameter Drive Barrel / 10"

Borehole Diameter(s)/Depth 12"/18.9' 10"/164.0'

Depth Driller 164.0' Depth Logger 162.1'

Liquid Level NA Liquid Density NA

Temperature NA

CASING RECORD

Type 12" Carbon Steel Sch.40 Interval +0.8' - 18.91'

Type 10" Carbon Steel Sch.40 Interval +7.3' - 164.07

Type Interval

Type Interval

Well Screen Interval NA

Comments: Return Error = +0.17' high

Centralizer used.

* Survey Data from Kaiser 12/15/92 KDT

15-63/64

15-63/61

A-6000-520 (05/9

9313018.1731

LOG HEADER	Page 2 of 2

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS — Equipment Type: Analog

Tool Type: Gamma Ray — Serial No.: CG27A97

Base Calibration Date: 5/91 — Calibration Reference:

Calibration/Probe Factor: 8.84×10^{-3} eU p/m/c/s — Base Calibration Datum (eU): Position 1: 297.4 eU — Position 2: 64.3 eU

Dead Time: 11.8 μsec — Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 162.1' — To: 0.0'

Rerun(s): 100.0 to 60.0'

Pre Survey Verification: Position 1: 302.3 eU — Position 2: 66.7 eU — Background: 55 c/s

Base Calibration Difference: Position 1: 4.9 eU — Position 2: 2.4 eU

Logging Speed: 5 ft./min. — Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 1200 — Completion Time: 1400

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. — Time Constant(s): TC-1

Post Survey Verification: Position 1: 300.1 eU — Position 2: 65.0 eU — Background: 55 c/s

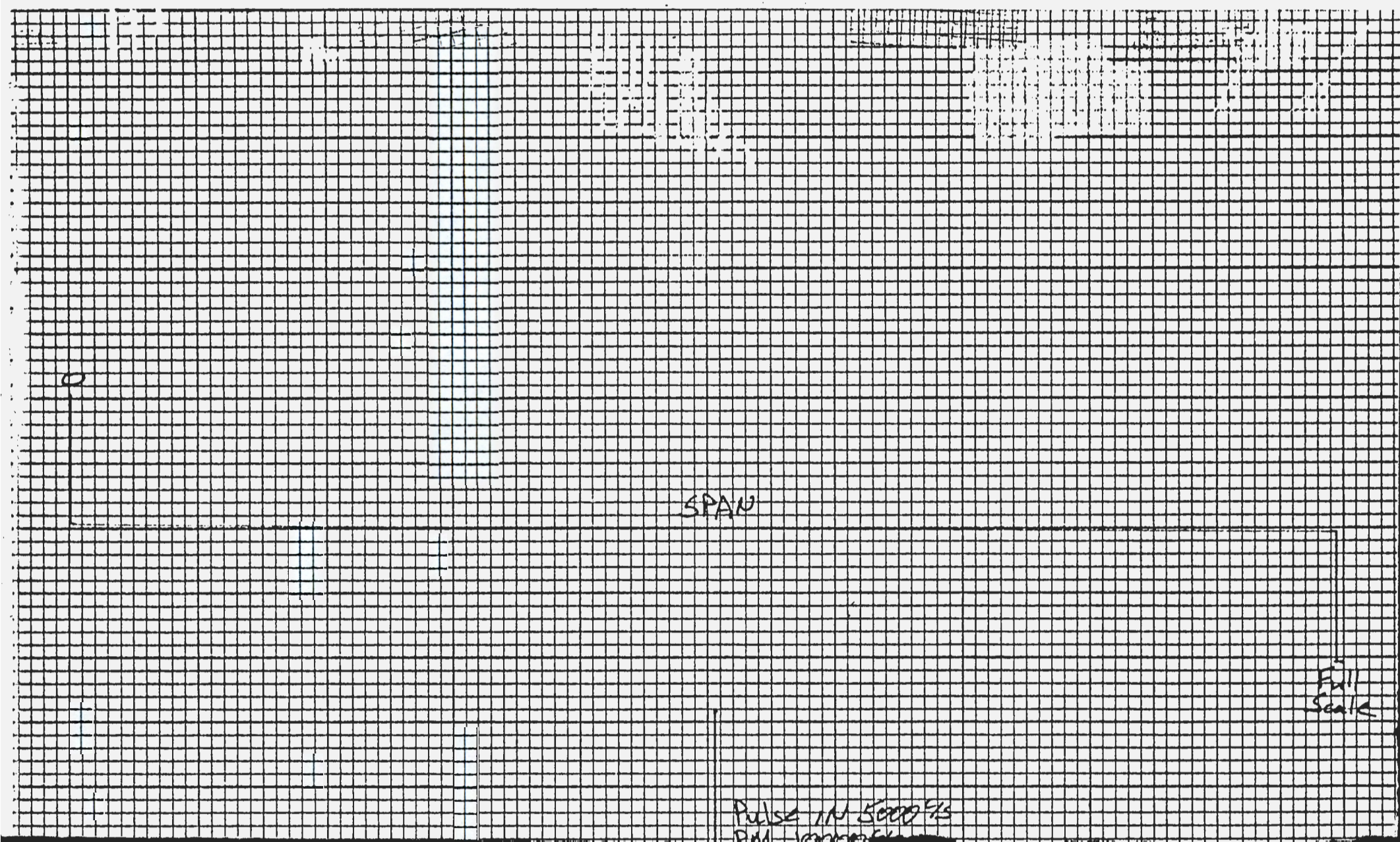
Percent Change: Position 1: 0.7% — Position 2: 2.5%

Comments: Return Error = +0.17 high

Centralizer used

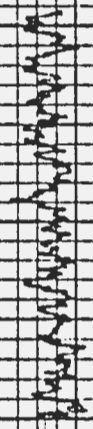
Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 9/9/91

A-6000-520 (05/90)

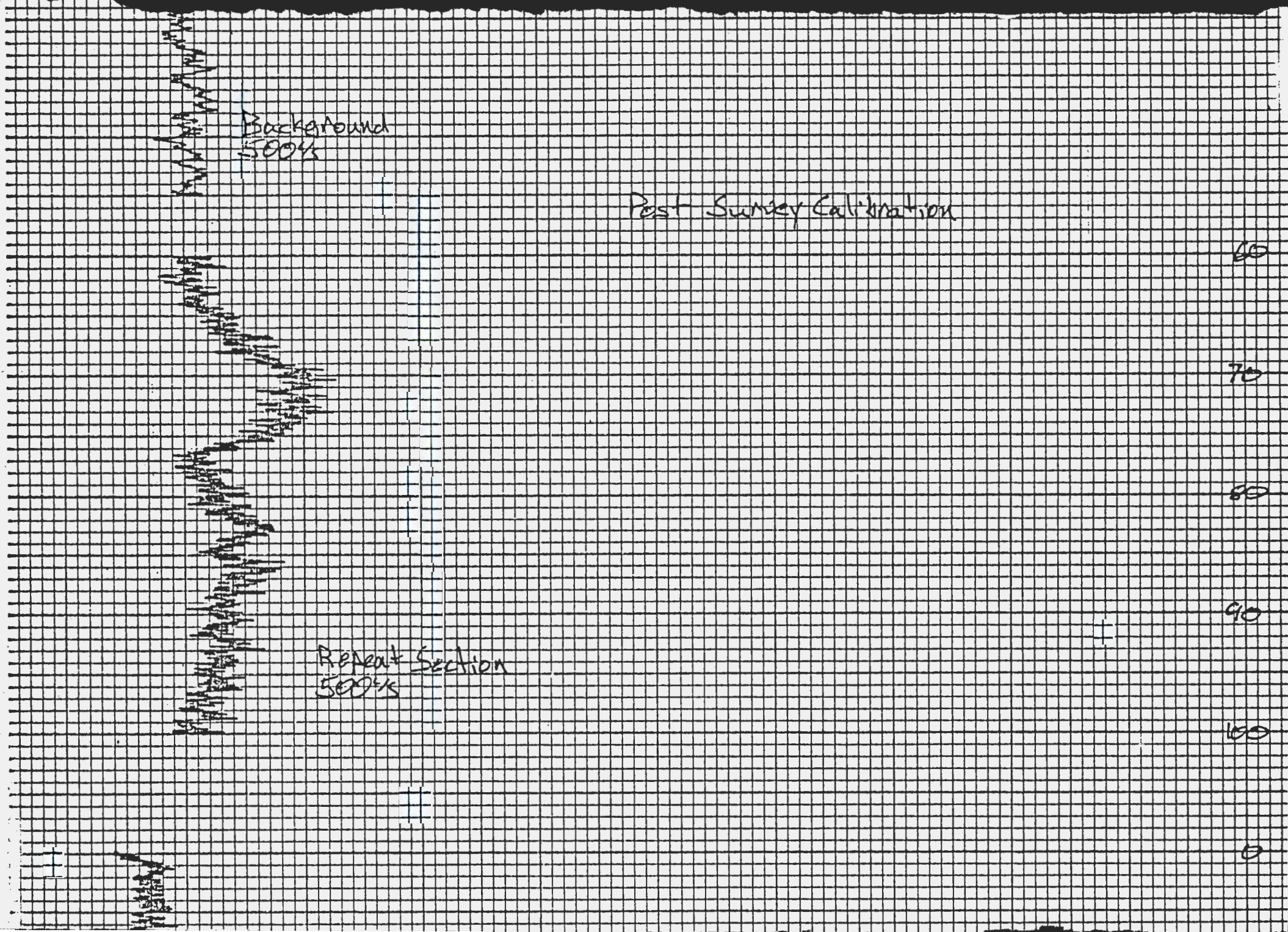


Pulse IN 5000%
RM 5000%

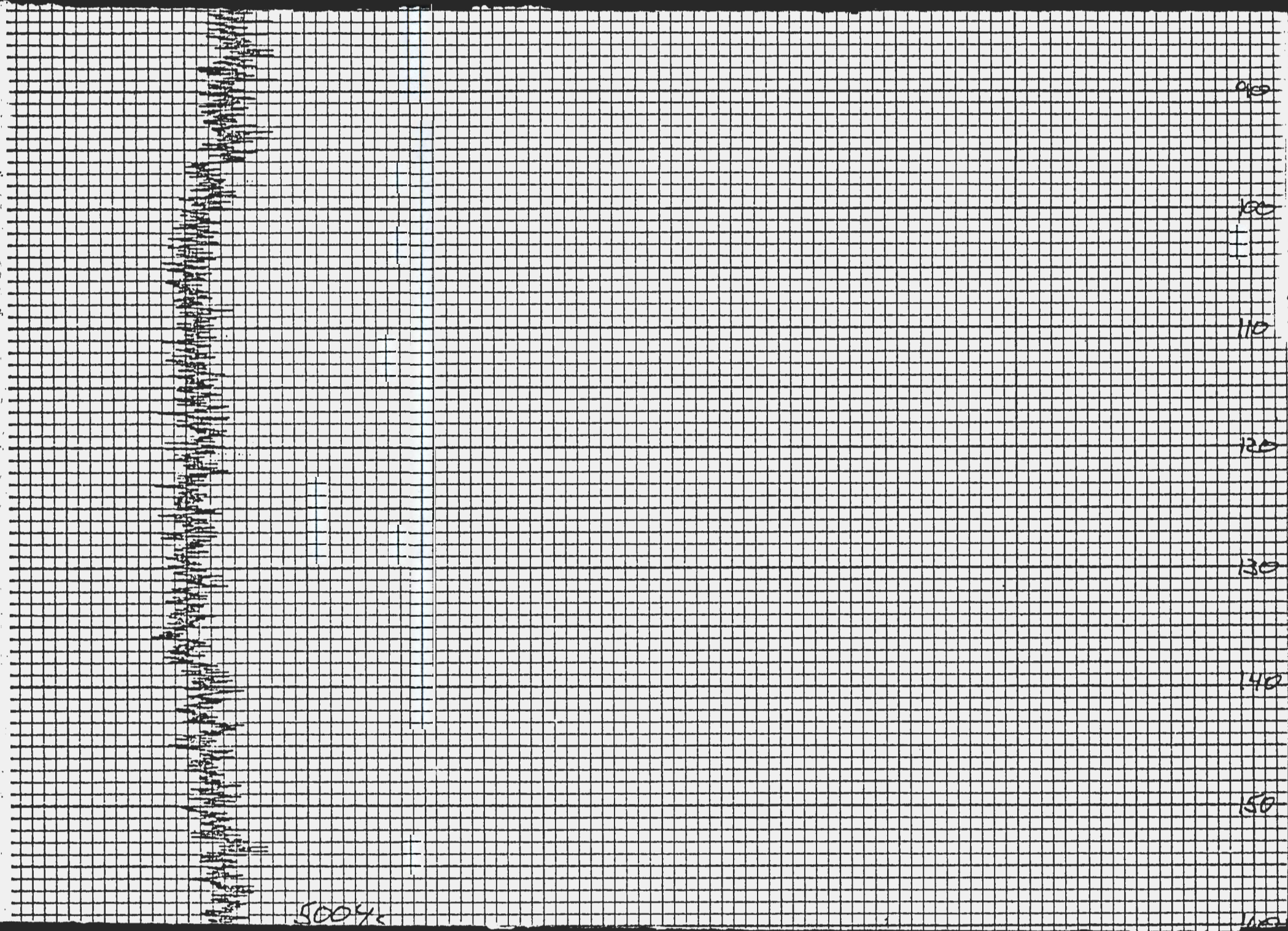
Pos 2
1000%



Pos 1
5000%


Background
500ks
Post Survey Calibration
60
70
80
90
100
0
Repeat Section
500ks

10
20
30
40
50
60
70
80


90
100
110
120
130
140
150
500%

Background
500%

Pos. 2
1000%

Pos. 1
5000%

Pulse IN 5000%
RM 10000%

Pulse IN 5000%
RM 5000%

0

SPAN

Pre Survey Calibration

Full Scale

299-W6-1 #1

Westinghouse Hanford Company	WHC-SD-EN-DP-044, Rev. 0 LOG HEADER	Page 1 of 2

Well No. 299-W6-4 Area 200 West Date 10/2/91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD29 * Elevation 697.76' Brass Cap

Survey Coordinates 137290.49 N 567132.25 E

Log Measured From Ground Surface

Location Description 200 West Area, West of T-Plant

Ground Surface Elevation 697.76' Brass Cap

Surface Temperature 21.3°C Weather Clear - Warm

BOREHOLE INFORMATION

Driller John Johnson

Drill Rig Type Cable Tool Bit Type/Diameter Hard Tool / 8"

Borehole Diameter(s)/Depth 12"/19.4' 10"/169.9' 8"/258.3'

Depth Driller 258.3' Depth Logger 257.7'

Liquid Level 237.9' Liquid Density NA

Temperature NA (did not sample)

CASING RECORD

Type 12" Carbon Steel Sch. 40 Interval +0.2' - 19.36'

Type 10" Carbon Steel Sch. 40 Interval +0.8' - 169.87'

Type 8" Carbon Steel Sch. 40 Interval +3.3' - 257.0'

Type Interval

Well Screen Interval NA

Comments: Return Error = +0.35' high

Centralizer used.

* Survey data from Kaiser 12/15/92 RDM

15-65/66

A-6000-520 (05/90)

9313018.1732

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson & Brad Gilmore

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No.: CG27A97

Base Calibration Date: 5/91 | Calibration Reference: PNL-7785 UC-606

Calibration/Probe Factor: 8.84×10^{-3} eU p/m/c/s | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μsec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 257.7' | To: 125.0'

Rerun(s): 240.0' to ~~200.0'~~ 205.0'

Pre Survey Verification: Position 1: 293.5 eU | Position 2: 65.0 eU | Background: 55 c/s

Base Calibration Difference: Position 1: 3.9 eU | Position 2: 0.7 eU

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 1000 | Completion Time: 1215

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC-1

Post Survey Verification: Position 1: 297.9 eU | Position 2: 65.4 eU | Background: 55 c/s

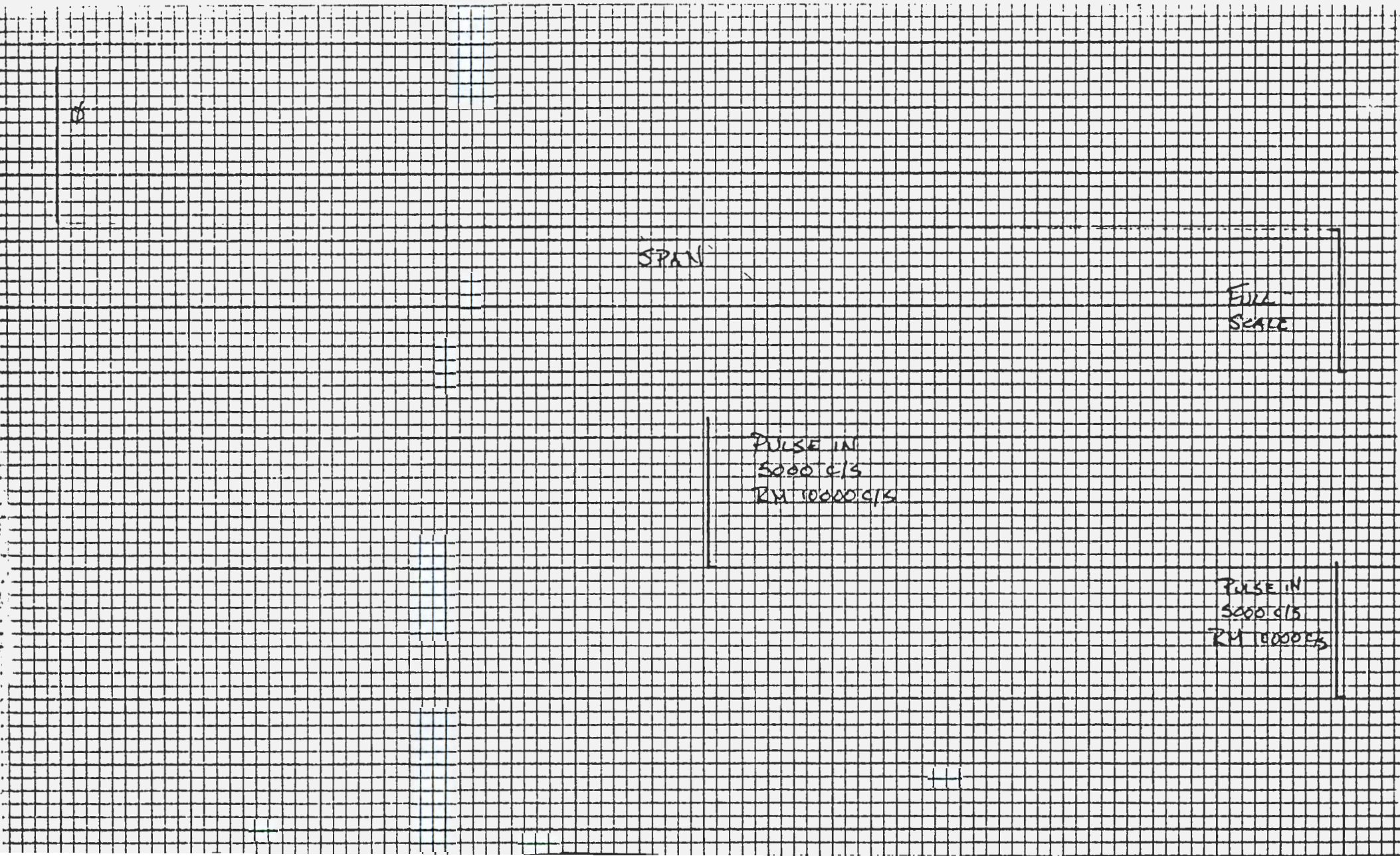
Percent Change: Position 1: 1.5% | Position 2: 0.6%

Comments: Rotam Error = +0.35' high

Centralizer used.

Witnessed and Verified by: (sign and print name) Alan Pearson / Alan Pearson Date: 10/2/91

A-6000-520 (05/90)



Pos. 2
1000 cl/s

Pos. 1
5000 cl/s

Backgound
500 c/s

POST SURVEY CALIBRATION

REPEAT SECTION 500%

200

210

220

230

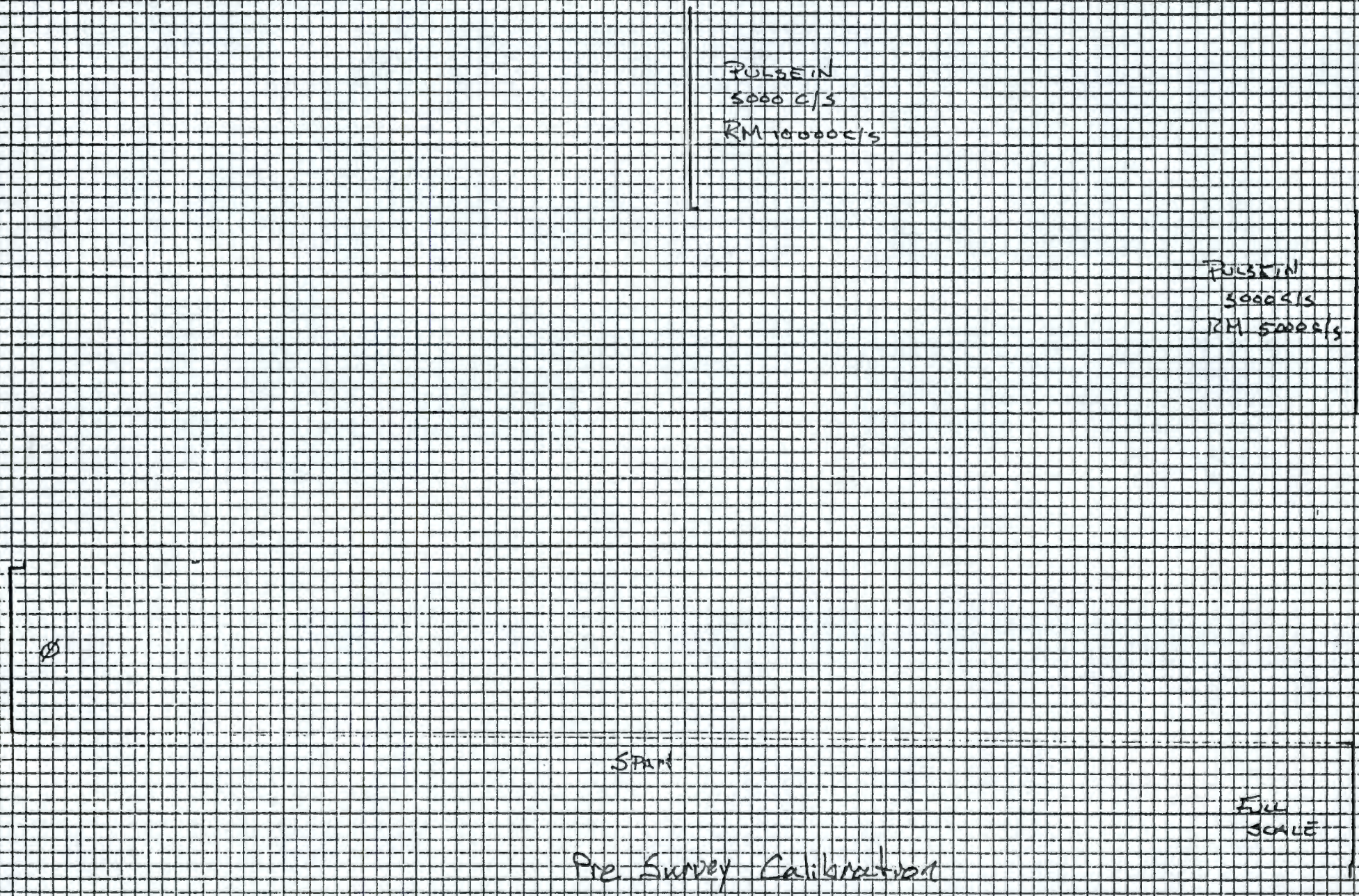
240

5.05

Fig: 1
5000 c/s

Fig: 2
1000 c/s

500 c/s



Pre Survey Calibration

299 W64 #2
10-2-91

Westinghouse Hanford Company	LOG HEADER	Page 1 of 2

Well No. 299-W6-~~3~~4 299-W6-4 Area 200 West Date 12/2/91

Log Run #3 Log Type Gross Gamma

Elevation Datum NGVD29 * Elevation 697.76' Brass Cap

Survey Coordinates 137290.49 N 567132.25 E

Log Measured From Ground Surface

Location Description NW of T-Plant

Ground Surface Elevation 697.76' Brass Cap

Surface Temperature 6.7°C Weather Cloudy-Cool

BOREHOLE INFORMATION

Driller John Johnson

Drill Rig Type Cable Tool Bit Type/Diameter Hard Tool /8"

Borehole Diameter(s)/Depth 4"/257.0'

Depth Driller 257.0' Depth Logger 255.1'

Liquid Level 237.9' Liquid Density Did not Sample

Temperature Did not Sample

CASING RECORD

Type 4" Stainless Steel Interval +5.1' - 257.0'

Type Interval

Type Interval

Type Interval

Well Screen Interval 236.0' - 257.0'

Comments: Return Error = 0.05' low

Centralizer used.

Completed Well

* Survey Data from Kaiser 12/15/92 KDM

15-67/68

A-6000-520 (05/9

9313018.1733

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No.: CG27A97

Base Calibration Date: 5/91 | Calibration Reference: PNL-7785 UC-606

Calibration/Probe Factor: 8.84×10^{-3} eU/CPS | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μsec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 255.1' | To: 0.0'

Rerun(s): 240.0' to 210.0'

Pre Survey Verification: Position 1: 304.5 eU | Position 2: 66.3 eU | Background: 55 c/s

Base Calibration Difference: Position 1: 7.1 eU | Position 2: 2.0 eU

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 0730 | Completion Time: 1030

Chart Speed(s), f/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC-1

Post Survey Verification: Position 1: 302.3 eU | Position 2: 65.4 eU | Background: 55 c/s

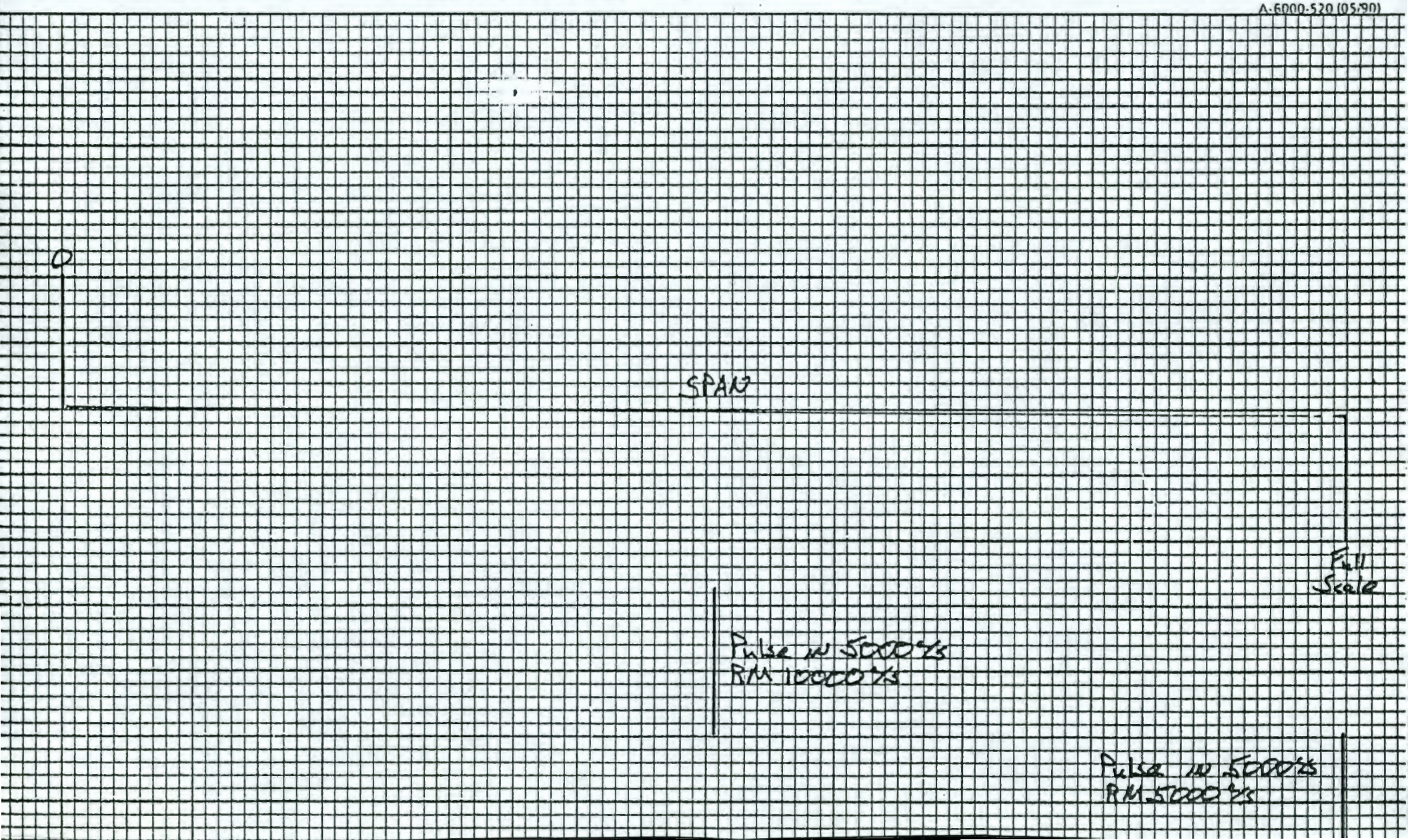
Percent Change: Position 1: 0.7% | Position 2: 1.4%

Comments: Return Error = 0.05' low

Centralizer used

Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 12/2/91

A-6000-520 (05/90)



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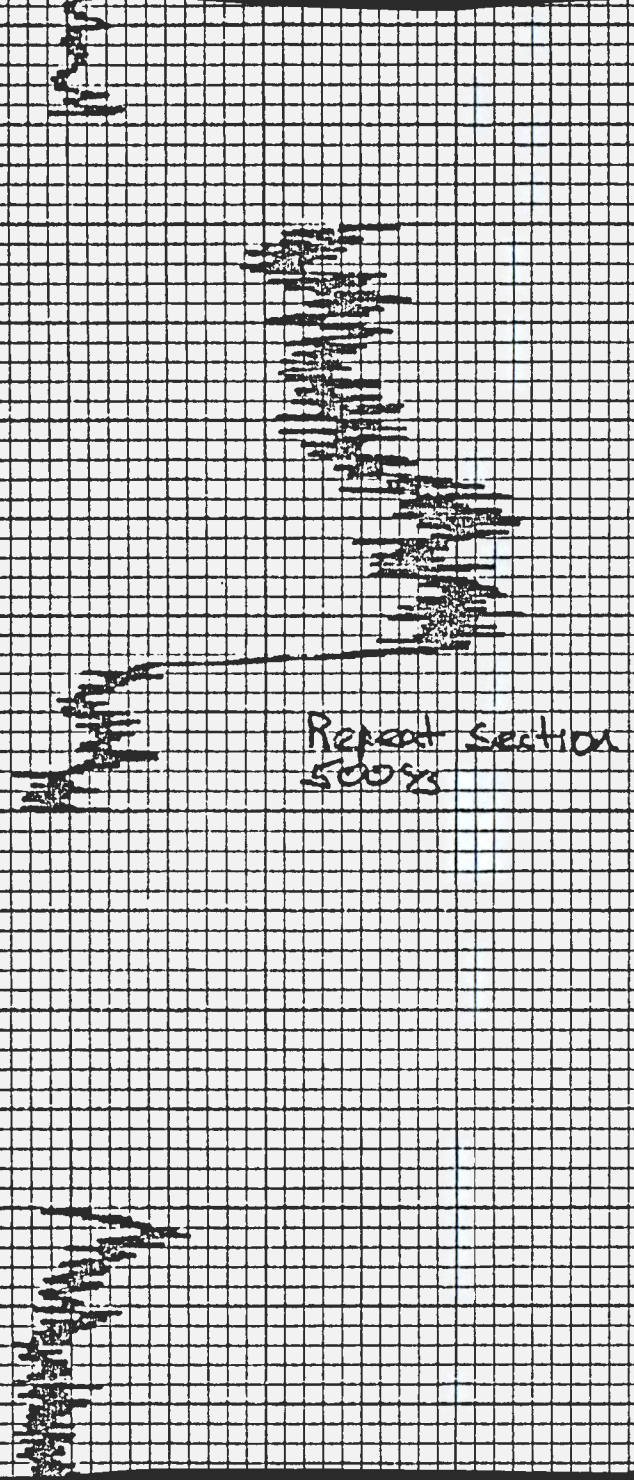
Post Survey Calibration



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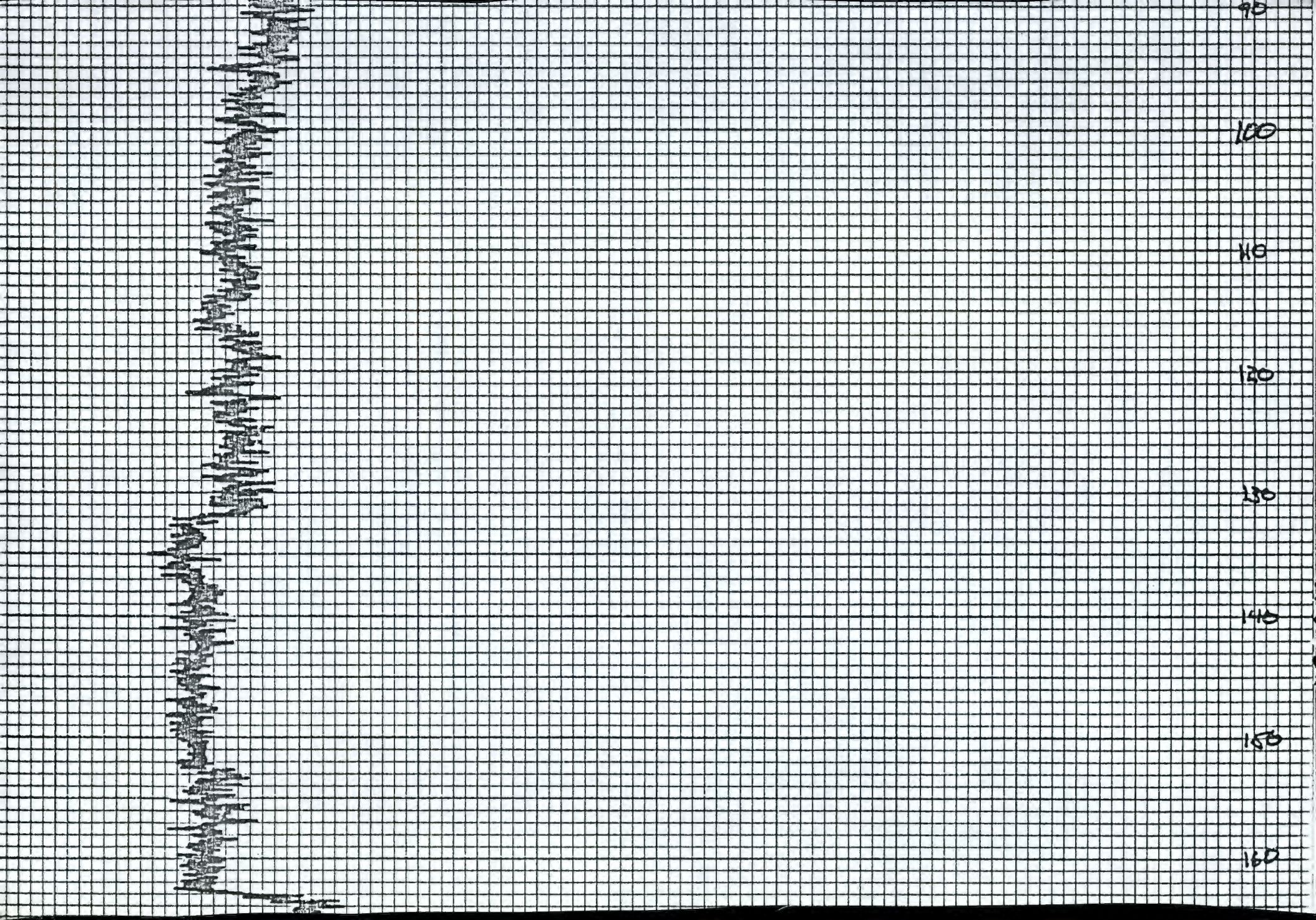
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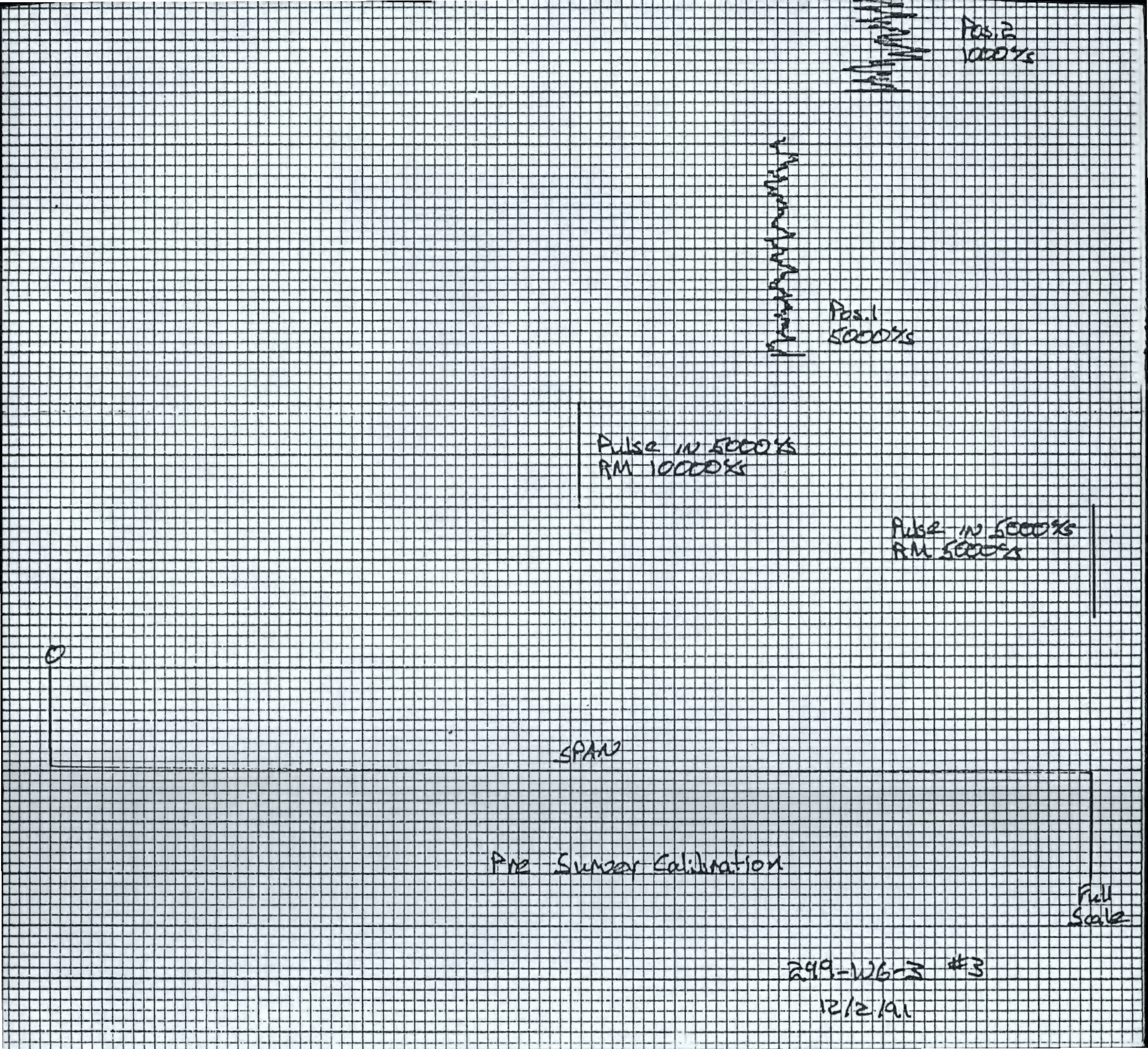
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Full
Scale
299-W6-3 #3
12/2/91

16.0 WELL 299-W6-5

16.1 DRILLING

Construction of this well began on 12 August 1991 and total depth of 286.8 feet was reached on 31 October 1991. The well was drilled using a cable tool rig. Approximately 931 gallons of water were added during drilling activities. Specific well construction information is located in Table 16.1. Well Guard, a non-petroleum based lubricant, was used on the drilling tools. A more detailed description of the drilling is shown in the Well Summary report at the end of this section.

Table 16.1 299-W6-5 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	19.0	ALS
	10"	160.9	ALS
	8"	285.0	ALS
Gross Gamma Logging	24 September	158.1	3.9
	4 November	285.3	130.0
Permanent Casing	4"	264.0	ALS
Screen	4" 20-Slot	284.7	264.0
Filter Pack	10-20 Silica Sand	286.6	253.2
Annular Seal	Bentonite Pellets	253.2	249.5
	Bentonite Crumbles	249.5	169
	Bentonite Slurry	169	20
	Cement Grout	20	1.5
Concrete Pad	4'x4'x6"	1.5	ALS

BLS - Below Land Surface
ALS - Above Land Surface

Sediments from the Hanford formation, early "Palouse" soil, Plio-Pleistocene unit, and the Ringold Formation were encountered in this borehole. Hanford deposits extended to 23 feet BLS and were primarily gravelly sand and sandy gravel with some silt. Approximately 22 feet (23-45 feet BLS) of sand and gravelly sand with numerous caliche zones represent the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (45-286.6 feet BLS).

The first 25 feet of the borehole were dug with a backhoe. The remainder of the borehole was advanced primarily by the drive barrel however some hard

9313018.1721

tool drilling was done in more resistant zones. Samples were collected at approximately 5 foot intervals for moisture content (above the water table only), radiological screening, carbonate analysis, and lithologic archiving. Grain size analysis was done on samples from the interval to be screened. The borehole log and physical data for this well are located at the end of this section.

Gross gamma logging was conducted as indicated in Table 16.1. Reproductions of these logs are also located at the end of this section.

16.2 WELL COMPLETION

Well completion began on 12 November 1991 and was completed on 16 December 1991. Static water level at the time of completion was 256.2 feet below land surface (BLS). Completion details are presented in Table 16.1. A Nonconformance Report (NCR B05432) was issued during the completion because approximately 173 feet of eight inch temporary carbon steel casing was left in the well (1.5 to 174.5 feet below ground surface). Approximately 30 gallons of water were removed from the well to settle the filter pack. A 6 inch protective casing with a locking cap, four guard posts, and a brass marker with the well number were also set in the concrete pad. Elevations were determined for the brass marker, the top of the protective casing, and the top of the Hydrostar plate. Lambert and plant (200 West datum) coordinates were established for the centerline of the well. Minor damage to the permanent 4 inch stainless steel casing occurred during well completion however a downhole camera survey revealed no breach in the casing. This occurrence was also documented in NCR B05432. Documentation of well completion activities can be found in the Well Construction Report.

16.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 18 December 1991 using a HydroStar pump. Approximately 4743 gallons of water were removed to develop the well. The intake of the dedicated Hydrostar pump was located 282.4 feet below the top of the protective casing.

16.4 AQUIFER TESTING

Aquifer testing was not conducted at this well because the damage to the permanent casing prevented installation of a transducer and Grundfos pump.

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91-017-LLBG

WELL 299-W6-5

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
8-12-91	10-31-91	28	N/A	256.8	10-29-91 255.1' 10-30-91 257.0' 10-31-91 256.2'	931 GALLONS

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
11-12-91	12-16-91	25	12-16-91 256.2'	235.0'	264.0-284.7	30 GALLONS REMOVED TO DEVELOP FILTER PACK

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
*	12-19-91 12-18-91	12-19-91 12-18-91	12-18-91	4743'

COMMENTS:

* DOWNHOLE CAMERA RUN: ASSOCIATED WITH SWENGING 4" STAINLESS STEEL CASING 12-9-91 TO 12-13-91

WELL CONSTRUCTION REPORT

VALIDATED KDR 3/18/92 SIGNATURE/DATE

Page 1 of 5

Page 1 of 2

Specification No. WHC-S-014 (see comment) Rev No. S**

ECNs 144240, 144241, 127437, 150204, 150126, 150128, 154970-C (see comment)

Project W-017/LLBG

Location 200 West / WMA-S

Drilling Company Jensen Drilling Co

Driller ~~John Johnson~~ Glen White SEE NOTE 1

Other (Companies) Ebasco Environmental (EED) HART CROWSER

Geologist(s) Mike Havens, Robert S. Edrington, E.C. Rogue, C. Wright HC, D. Anderson, Susan Havens, R. Weingart, Stacey Allison, BRENT JONES, D. Seauge, C. Wolfe, J.A. Coates

Well No. 299-W6-5 Temp. Well No. W6-MW6

Coordinates N: 137,638.63 ; E: 567,493.33 LAM

Casing Elev. 698.55' Ground Elev. 695.42 BRASS CAP

Drilling Method

Verification Method Visual Observation

Criteria WHC-S-014: 5.2, 5.3, 7.5 EII 6.7, Sect 6.2

			Initials	Date
Rotary	Air N/A	Mud N/A	N/A	N/A
Cable Tool	D 0-175	H 175-190 (ST-190-194, 265-267)	DS	10/31/91
Drilling Fluid	Raw Water	(192-265, 267-286) 931 GAL.	DS	10/31/91
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Gross Gamma	158.1 - 3.5	11/24/91
Gross Gamma	285.3 - 130	11/4/91
	-	
	-	
	-	

Completion Data

Drilled Depth 286.8

Completed Depth 285.04 CSW 11/13/91

Date Started 8/12/91

Date Completed 10/31/91

Static Water Level/Date 256.3 10/31/91

Aquifer Testing

Type (NOT PERFORMED - DUPLICATE 4'SS) *A

Flow Meter I.D. No. -NA-

Cal. Due Date -NA-

Length of Test

Volume Pumped

Drawdown

Date of Test

Completion Results

Cleaning

Verification Method Visual Inspection

Criteria WHC-S-014: 4.2.2, 7.6, 7.7 WHC-CM-7-7:54

	Initials	Date
Drilling Tools/Rig	CW	9/10/91
Backhoe	MTH	8-12-91
Temporary Materials *	MTH ~~BK~~	8-13-91
	~~DBA~~	~~9-26-91~~
Permanent Materials	CSW	11/12/91

Screen

Type	Length	Slot Size
T304 Wire Wrapped	20.71	20 Slot.

Depth(s) 284.73' BLS - 264.02' BLS

Verification Method Verify w/ steel tape

Criteria WHC-S-014: 4.2.3, 4.2.5, 4.2.1, 12.2.1

Initials CSW Date 11/13/91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014: 4.1.2, 7.3

	Initials	Date
Mtl. Handling/Storage	CSW	11/12/91
Material Packing	CSW	11/12/91

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014: 7.2

	Identify	Initials	Date
Additives	Raw Water	SWC	9/17/91
Lubricants	Well Guard	CW	9/10/91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014: 8.2

Initials DS /10/31/91 Date 10-31-91

A-6000-436 (09/90)

WELL CONSTRUCTION REPORT
(continuation sheet)

299-W6-5

Casing (permanent)

Type	Size	Placement
T-304 Stainless	4"	264.62 - 0
		-
		-
		-

Verification Method: Verify w/ steel tape

Criteria: WHC-S-014: 4.2.1, 4.2.4, 4.2.5, 12.2.1

Initials: CSW Date: 11/13/91

Well Protection

Verification Method: Visual Observation

Criteria: WHC-S-014: 4.2.10

	Initials	Date
Protective Posts	KDR	3/18/92
Protective Casing	KDR	3/18/92
Site Restored	KDR	3/18/92
Cap, Hasp and Lock	KDR	3/18/92
Surface Pad	KDR	3/18/92

Annular Seal/Filter Pack

Verification Method: Verify w/ steel tape Criteria: WHC-S-014: 4.2.6, 4.2.7, 4.2.8, 4.2.9, 5.3.1, ~~5.3.2~~

Type	Interval	Volume	Initials	Date
10-20 Sand	286.6' - 252.16'	28.89 Ft3	CSW	11/13/91
Bentonite Pellets	253.16' - 249.5	2.48 Ft3	CSW	11/13/91
8-20 Chumber	249.5' - 169'	38.34 Ft3	CSW	12/16/91
Bentonite Slurry	169' - 20'	118.8 Ft3	CSW	12/16/91
portland Cement	20' - 1.5'	60.39 Ft3	CSW	12/16/91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014: 3.4

	Initials	Date
Measurement Point/Surveyed	KDR	3/18/92
Protective Casing/Brass Cap Surveyed	KDR	3/18/92
Well Number Stenciled	KDR	3/18/92
Brass Cap Labeled	KDR	3/18/92

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014: 4.2.2, 4.2.11

	Initials	Date
Pump Decon/Prep	JAC	12-18-91
Installed	JAC	12-19-91
Pump Tested	JAC	12-19-91

Other (initial if performed)

NA Well Abandonment — X Downhole TV Inspection — CSW 12/10/91 Complete As-Built Diagram, Driller's/Geologist's Logs

JAC 12-19-91 Well Development

Comments/Remarks: * 6" DRIVE BARREL delivered to site 9-26-91.

** REV 6 IN EFFECT 10/2/91

** ECN No: 150132 164223 127439

NOTE 1: DRILLERS - A. GWIN, D. PERKINS, S. MACKINNON, T. MEREDITH

173.2' of 8" CASING LEFT IN HOLE

*A) No AQUIFER TEST - 55.4' PROBABLE CASING DAMAGE - WILL NOT ALLOW SLUG ROD TO PASS

Reviewed By (Sign/Print Name): Kent D Reynolds Date: 3/18/92

A-6000-436 (09/90)

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-5

Sheet 1 of 2

Location 200W/WMA-5

Project W017/LLBL

Elevation ~~Land SURFACE~~ 695.42' BRASS CAP

Drilling Contractor Jensen.

Driller ALLT Gwin/Glen White

Drilling Method and Equipment Cable Tool Rezzu

Prepared By G Wright/[illegible] (Sign/Print Name) Date 9/1/91

Reviewed By KDReynolds KDR (Sign/Print Name) Date 3/18/92

CONSTRUCTION DATA: Description	Diagram	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA: Graphic Log	Lithologic Description
Top 8" Casing 1.5' BLS.				
Total 8" left in Hole 173.2'		10		Sandy Silty Gravel
Top Slurry at 17'± in 10"-8" Annular Space				Sandy Gravel
12" Casing set at 14' BLS.		20		Gravelly Silty Sand.
Top Bentonite Slurry in 8" Casing				Slightly Gravelly Sand.
20' BLS		30		Sand.
12" Removed prior to completion.				Gravelly Sandy Caliche.
		40		Sand.
				"
		50		"
				"
		60		Slightly Gravelly Sand.
				"
		70		Sand
				"
		80		"
				"
		90		"
				"
		100		"
				"
		110		"
				Sandy Gravel
		120		"
				Slightly Silty Sandy Gravel
		130		Sandy Gravel
				"
		140		Slightly Silty Sandy Gravel
		150		Gravelly Sand
Slurry pumped in 10"-8" Space at 155.8'				"
10" Casing Set at 160.4' BLS		160		Silty Sandy Gravel
		16-6		"

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-5

Sheet 2 of 2

Location 200 W/WMA-5

Project W017/LLBG

Elevation Land Surface

Drilling Contractor Jensen

Driller Art Gavin/Glen White

Drilling Method and Equipment Cable Tool BE22m

Prepared By L Wright / [illegible] (Sign/Print Name) Date 9/11/91

Reviewed By KD Reynolds KDR (Sign/Print Name) Date 3/18/92

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
Top Cemented at 169.0' BLS		170		Silty Sandy Gravel
Bottom of 8" casing at				Gravelly Silty Sand
174.7' BLS		180		Sand
Cement for Stainless at 174' BLS				"
		190		"
				Slightly Silty Slightly Gravelly Sand
		200		" Slightly Silty Slightly Sandy Gravel
				"
		210		"
				"
		220		"
				"
		230		"
				" Sandy Gravel
		240		~~Silty~~ Sandy Gravel
				Silty Sandy Gravel
Top Pellets at 249.5' BLS		250		"
Top 10-20 Sand 253.16				"
SWL 256.23' BLS @ 10/31/91		260		"
Top Screen at 264.02' BLS				"
		270		"
				"
Stainless set at 285.04' BLS		280		Sandy Gravel
9" Casing set at 285.94' BLS				"
T.D. = 286.6' BLS				"

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NOTE: For Reference only - This information is from Adjacent well #299-W6-4

BOREHOLE LOG

KDR 3/18/92

Boring or Well No. 299-W6-5

Sheet 1 of 15

Location 200W/WMA-S

Project W-017/LLBG

Elevation ~~697.16~~ = Brass Cap 695.42

Drilling Contractor Jensen Drilling CO

Driller John Johnson

Drilling Method and Equipment Backhoe/Cable tool

Prepared By M. Havens/[illegible] (Sign/Print Name) Date 8-12-91

Reviewed By [illegible] (Sign/Print Name) Date 9/23/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
	2 Lith 1 Rad 1 Moist with 8-12-91			Silty Sandy GRAVEL (70% grav, 20% sand, 10% silt) Gy brn-wet (10YR5/2) lt gy brn-dry (10YR 6/2) 15% VCP, 15% CP, 15% MP, 15% UCP, 10% FP, 5% VCS, 5% CS, 5% MS, 5% FS, dry, mod sort, rounded, 60% felsic, 40% mafic, mod react to HCl	Use backhoe to set surface casing to 20 ft.
5	2 Lith 1 Rad 1 Moist	BH		Silty Sandy GRAVEL (70% Grav, 20% sand, 10% silt) Gray brn-wet (10YR5/2) lt gy brn-dry (10YR 6/2) 15% UCP 15% CP, 15% MP 15% UFP 10% FP, 5% VCS, 5% CS, 5% MS, 5% FS dry, mod sort, rounded 60% felsic, 40% mafic, mod react to HCl	5 ft sample @ 0810 8-12-91
10	2 Lith 1 Rad 1 Moist	BH		Silty Sandy GRAVEL, same as above, moist	10 ft sample @ 0819 8-12-91
15	2 Lith 1 Rad 1 Moist	BH		Silty Sandy Gravel, same as above	15 ft sample @ 0826 8-12-91

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BOREHOLE LOG

KDR 3/18/92

Boring or Well No. 299-W6-5

Sheet 2 of 15

Location 200 W / WMA-S

Project W-017 / LLBG

Elevation 695.42 BRASS CAP

Drilling Contractor JDC

Driller John Johnson / Glen White

Drilling Method and Equipment Backhoe / Cable Tool

Prepared By Mike Havens / Mike M (Sign/Print Name) Date 8-13-91 Swanson Havens / SJ Havens 9/11/91

Reviewed By R.D. Miller (Sign/Print Name) Date 9/15/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
20	2 Lith 1 Rec 1 Moist	(Backhoe)		Slightly Gravelly SAND (10% gravel, 90% sand) 10% vcs, 10% cs, 50% ms, 10% fs, 10% vfs Dk gy brn - wet (10YR 4/2) Lt brn gy - dry (10YR 6/2), moist, mod sort subangular, 65% felsic 35% mafic, Mod HCl React	20 ft sample @ 0749 8-13-91
25	2 Lith 1 Rec 1 Moist / CaCO3	DB		25' SAND 15% cs, 20% ms, 30% fs, 35% vfs to silt (10YR 6/2) dry lt brnish gray, (10YR 5/2) wet grayish brown, sample moist, mod sorted, subang, 75% felsic, 25% mafic strong rx to 10% HCl	9/11/91 1410 PID < det SJH
				28' SAND interbedded w/ gravelly CALICHE layers	9/12/91
					hard drilling DB keeps getting stuck in bore hole
30	2 Lith 1 Rec 1 Moist / CaCO3	DB		30' Gravelly Sandy Caliche (15% Gravel, 85% Sand) 3% cg, 2% mg, 5% fg 5% cs, 30% ms, 40% ms, 20% fs, 10% vfs - Color dry (7.5YR 8/2) pinkish white, wet (7.5YR 7/2) pinkish gray, sample slightly moist, poorly sorted cemented w/ caliche, v. strong rx w/ 10% HCl subrd to subang, 65% felsic, 35% mafic	9/12/91 1110 PID < det SJH
35	2 Lith 1 Rec 1 Moist / CaCO3	DB		35' SAND 50% cs, 30% ms, 15% fs, 5% vfs to silt Color dry (10YR 7/1) Harvest, wet (10YR 5/3) brown, sample slightly moist mod sorted subrd to subang 65% felsic, 35% mafic trace mica mod to strong rx w/ 10% HCL	9/12/91 1250 PID < det SJH
				Interbedded Caliche Zones	
40'					

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WHC-SD-EN-DP-044, Rev. 0

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 3 of 15

Location 200W/LLBG/WMA-5

Project W-OM/LLBG

Elevation 695.42 BRASS CAP

Drilling Contractor JDC

Driller Glen White

Drilling Method and Equipment B.E. Cable Tool

Prepared By Samuel J Havens / S.J Havens (Sign/Print Name) Date 9/12/91

Reviewed By R.D.M. [illegible] (Sign/Print Name) Date 9/18/91

Depth (40')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
	2 lith 1 rad 1 CaCO3/ moist	DB		40' SAND 60% cs, 30% ms, 15% vfs, 5% vfs to silt Color dry (10YR 7/1) ltgray, wet (10YR 5/3) brown, sample slightly moist, mod sorted subrd to ang, mod to strong rx w/ 10% HCl, 15% fe stain, 35% mafic, trace mica w/ interbedded caliche zones	9/12/91 1618 PID<det SJH
45'	2 lith 1 rad 1 CaCO3/ moist	DB		45' SAND 80% ms, 15% vfs, 5% vfs to silt Color dry (7.5YR 7/2) pinkish gray wet (7.5YR 5/3) brown, sample slightly moist, well sorted, subrd to subang v strong rx w/ 10% HCl, 60% fe stain, 40% mafic ~~some caliche content~~ CaCO3 SJH 9/12/91 slightly cemented w/ CaCO3	9/12/91 1630 PID<det SJH
50'	2 lith 1 rad 1 mica	DB		50' Sand (See Above)	9/16/91 1050
					Cone change at 54'
55'	2 lith 1 rad 1 moist	DB		55' Sand (90% Sand 5% Gravel 5% Silt) 80% ms 20% FS - 100% Fe 10YR 7/2 Lt Grey Dry 10YR 5/2 Grey Sh Brown Damp. Dry, Friable in Spots, Well Sorted Sub Angular to Angular 60% Felsic 40% % mafic (Biotite) moderate reaction	9/16/91 1110 - Cemented in Spots
				16-10	

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BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 4 of 15

Location 200 West / LLBG / WMA-5

Project W-017 / LLBG

Elevation 895.42 BRASS CAP

Drilling Contractor Jensen Drilling Company

Driller Glen White

Drilling Method and Equipment Cable Tool / BE

Prepared By SW Callison / SW Callison (Sign/Print Name) Date 9/16/91

Reviewed By R.D. Miller (Sign/Print Name) Date 9/19/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
60'	2 lith 1 rad 1 moist	DB		(60') slightly gravelly SAND (10% gravel 85% sand 5% silt) 10YR 7/2 lt. grey (dry) 10YR 5/2 grey brown (nat.) damp to dry 10% FP CS-30% MS-35% FS-20%) subangular to angular 60% felsic 40% mafic mod. 10% HCL rxn	casing depth = 59' slow steady drilling, 10" CS casing 9/16/91 sample < det w/PID
65'	2 lith 1 rad 1 moist	DB		(65') slightly gravelly SAND (same as above)	casing depth = 66' slow steady drilling. 10" CS casing. 9/16/91, sample < det w/PID
70'	2 lith 1 rad 1 moist	DB		(70') SAND (90% sand 5% gravel, 5% silt) 70% ms 20% FS, 5% FP 10YR 7/2 lt. Grey dry 10YR 5/2 grey sl. brown (nat) dry sample well sorted, subangular to angular, 60% felsic, 40% mafic mod. rxn to 10% HCL	casing depth = 69' slow steady drilling 10" CS casing 9/17/91, sample < det w/PID
75'	2 lith 1 rad 1 moist	DB		(75') SAND (90% sand 5% gravel, 5% silt) (same as above)	casing depth = 77' slow steady drilling 10" CS casing 9/17/91, sample < det w/PID

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BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 5 of 15

Location 200 West / LLBG / WMA-5

Project W-017 / LLBG

Elevation 695.42 BRASS CAP

Drilling Contractor Jensen Drilling Company

Driller Glen White

Drilling Method and Equipment Cable Tool / BE

Prepared By SW Callison / SW Callison (Sign/Print Name) Date 9/17/91

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
80'	2 lith 1 rad 1 moist	DB		(80') SAND (90% sand 5% gravel 5% silt)	casing depth ~79'
				10% CS 60% MS 25% FS 5% FP	slow + steady drilling
				10YR 7/2 lt. grey (dry)	10" CS casing
				10YR 5/2 grey sl. brown (nat)	9/17/91 sample < det w/ PID
				dry sample, well sorted subangular to angular 60% felsic 40% mafic	
				mod. rxn to 10% HCL	
				(85') SAND (95% sand 5% silt)	casing depth ~79'
85'				70% MS 25% FS	slow steady drilling
	2 lith 1 rad 1 moist	DB		10 YR 7/2 lt. grey (dry)	10" CS casing
				10 YR 5/2 grey sl. brown (nat)	9/17/91 sample < det w/
				damp to dry sample, well sorted	trace more moisture
				subangular to angular 60% felsic	less coarse than previous
				40% mafic mod. rxn to 10% HCL	
				(90') SAND (95% sand 5% silt)	casing depth ~88'
90'				60% MS 40% FS	steady drilling
	2 lith 1 rad 1 moist	DB		10YR 7/3 very pale brown (dry)	10" CS casing
				10YR 5/3 brown (wet) damp sample	9/17/91 sample < det w/ PID
				well sorted, subangular	becomeing finer
				60% felsic 40% mafic med rxn to 10% HCL	adding water to help w/
					recovery, no moist analysis
				(95') SAND (95% sand 5% silt)	casing depth ~88'
95'				50% felsic 50% mafic	steady drilling
	2 lith 1 rad 1 moist	DB		strong rxn to 10% HCL	10" CS casing
					9/17/91 sample < det w/ PID

9312018.1745

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 6 of 15

Location 200 West / LLBG / WMA-5

Project W-017 / LLBG

Elevation 695.42 BRASS CAP

Drilling Contractor Jensen Drilling Company

Driller Glen White

Drilling Method and Equipment Cable Tool / BE

Prepared By SW Callison / SW Callison (Sign/Print Name) Date

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
100'	2 lith 1 rad 1 moist	DB		(100') SAND (95% sand 5% silt)	casing depth ~ 99'
				60% MS 40% FS	steady drilling
				10YR 7/3 very pale brown (dry)	10" CS casing
				10YR 7/3 very pale brown (nat)	9/17/91 sample < det w/ PID
				dry sample, well sorted, subangular	
				50% felsic 50% mafic	
				strong rxn to 10% HCL	
105'	2 lith 1 rad 1 moist	DB		(105') SAND (95% sand 5% silt)	casing depth ~ 99'
				same as above	steady drilling
				mod. rxn to 10% HCL	10" CS casing
					9/18/91 sample < det w/ PID
110'	2 lith 1 rad 1 moist	DB		(110') SAND (95% sand 5% silt)	casing depth ~ 99'
				40% MS 60% FS	steady drilling
				10YR 7/3 very pale brown (dry)	10" CS casing
				10YR 7/3 very pale brown (nat)	9/18/91 sample < det w/ PID
		112'		dry sample, well sorted, subangular	
				60% felsic 40% mafic	
				mod. rxn to 10% HCL	
					9/19/91 size
				(115') sandy GRAVEL (50% gravel	casing depth ~ 99' 109'
				45% sand 5% silt)	drilling slows, 10" CS casing
115'				SC - 5% CP - 20% MP - 15% FP - 10%	9/18/91 sample < det w/ PID
	2 lith 1 rad 1 moist.	DB •		CS - 20% MS - 15% FS - 10%	no moisture analysis water was
				10YR 7/3 very pale brown (dry)	added to help w/ recovery
				10YR 5/3 brown (wet)	
				moisture probably dry, poorly sorted	
				rounded to angular 60% mafic 40% felsic	
				mod. rxn to 10% HCL	

16-13

9313018.1711

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 7 of 15

Location 200 W / LLBG / WMA-5

Project W-017 / LLBG

Elevation 695.42 BRASS CAP

Drilling Contractor Jensen Drilling Company

Driller Glen White

Drilling Method and Equipment Cable Tool / BE

Prepared By SW Callison / SW Callison (Sign/Print Name) Date 9/18/91

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
120'	2 lith 1 rad 1 moist	DB		(120') sandy GRAVEL (70% gravel 25% sand 5% silt)	casing depth ~ 118' steady but slow
				SC-15% CP-30% MP-15% FP-10%	10" CS casing
				CS-10% MS-10% FS-5%	sample < det w/ PID
				10YR 6/2 lt. brownish gray (dry)	9/18/91
				10YR 6/2 lt. brownish gray (wet)	
				dry sample poorly sorted, subangular	
				60% mafic 40% felsic	
				mod. rxn to 10% HCL	
125'	2 lith 1 rad 1 moist	DB		(125') slightly silty sandy GRAVEL (40% gravel 50% sand 10% silt)	casing depth ~ 125' slow drilling
				CP-15% MP-15% FP-10% CS-15%	10" CS casing
				MS-20% FS-15%	sample < det w/ PID
				10YR 6/2 lt. brownish gray (dry)	no moisture analysis
				10YR 5/3 brown (wet)	water added to aid w/
				sample probably dry, poorly sorted	recovery, 9/18/91
				subangular, 60% mafic 40% felsic	sample seems to have more
				mod rxn to 10% HCL	silt
				(130') sandy GRAVEL	casing depth ~ 129'
130'	2 lith 1 rad 1 moist	DB		(40% gravel 55% sand 5% silt)	slow drilling, 9/19/91
				CP-10% MP-20% FP-25% CS-25%	10" CS casing
				MS-20% FS-15%, 10YR 6/2 lt brown-ish gray (dry)	sample < det w/PID, no moisture analysis water added to aid recovery
				10YR 5/3 brown (wet), dry	
				poorly sorted, subangular, 60% mafic 40% felsic mod rxn to 10% HCL	
135'	2 lith 1 rad 1 moist	DB		(135') sandy GRAVEL (40% gravel 55% sand 5% silt) same as above	casing depth ~ 129' drilling speed quickening 10" CS casing 9/19/91 sample < det w/ PID no moisture analysis

9313018.1747

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 8 of 15

Location 200W WMA-5

Project W017 / W036

Elevation 695.42 BRASS CAP

Drilling Contractor Jacobs

Driller Glen White

Drilling Method and Equipment CABLE TOOL BEECH

Prepared By C. Wright (Sign/Print Name) Date 9/22/91

Reviewed By R.D. Mi[illegible] (Sign/Print Name) Date 10/7/91

Depth (Ft.)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
140'				NO Slight SILTY Sandy Gravel	8/14/91 1150
				(50% Gravel, 40% Sand, 10% SILT	10" CS
				SC = 10% 15% Cp 10% mp 5% Fp - 15% CS	
				15% ms 10% FS 10YR 6/2 LT Brown-Gray	
				dry 10YR 6/2 LT Brown-Gray wet, Dry	
				poorly Sorted, Sub Angular TO Sub Rounded,	
				60% mafic, 40% Felsic, mod. Rxn TO	
				10% HCl	
145					
	2LITH 1Red 1CaCO3/ mrlt			145 (GRAVELLY SAND) @ 75% Sand	8/23/91 0740
				20% Gravel 5% SILT) 20% lp	
				20% mp 60% Fp - 80% CS 10% ms	
				10% FS 10YR 5/2 Grayish Brown	
				Damp 10YR 7/2 LT Gray Dry. Well Sorted	
				Moist, Sub Rounded 80% Basalt - 20%	
				QTZ. No Rxn TO HCL	
150					
	2LITH 1Red CaCO3 1Nonmafic			150 GRAVELLY SAND SIMILAR TO	8/23/91 0805
				145'	Water Added
					Gravel Content Increases
					W/Depth.
155'	2LITH				
	1Red 1CaCO3			155 SILTY SANDY GRAVEL (60% Gravel	No moist 8/23/91 1540
				30% Sand 10% SILT) 10% LC 30% lp	
				20% mp 40% Fp - 60% CS 20% ms	
				20% FS 10YR 5/2 Grayish Brown Damp	
				10YR 7/2 LT Gray dry. Damp, plastic	Pump Frozen added 1726
				Rounded TO Sub Rounded. 70% Basalt,	
				15% Qtz + Quartzite, 15% Granitic, No Rxn	
				TO 10% HCL	
				16-15	

9313018.1711

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 9 of 15

Location 200W WMA-5

Project W017/W036

Elevation 695.42 BRASS CAP

Drilling Contractor Jensen

Driller Glen White

Drilling Method and Equipment Cable Tool BE22W

Prepared By C. Wright (Sign/Print Name) Date 9/22/91

Reviewed By Edward C. Bacon (Sign/Print Name) Date 11/20/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
160'	1 moist 2 Lith 1 Rock	DB		SILTY Sandy Gravel (60% Gravel 30% Sand 10% SILT) 10% CG 30% MG 20% MG 40% FG - 60% CS 20% MS 20% FS 10YR 5/2 LT Greyish Brown Wet 10 YR 7/2 LT (Gray) Dry 70% Basalt 15% Qtz Quartzite 15% Granite, Rounded TO Sub Round Poorly Sorted Moderate Rxn TO 10% HCL	6/23/91 1715 INCREFIRST Added H2O
165'	(1) moist (2) Lith. (1) HPT	DB 15% Ret		(165') Silty, Sandy, GRAVEL (50% gravel, 35% Sand, 15% Silt). 10YR 6/2 Brown - Dry to 10YR 6/3 Dk Brown wet. Gravels comprised of 15% CG, 15% MG 20% FG. Sands comprised of 20% C-MS, 10% FS 5% VFS, 15% Silt or fines. Poorly Sorted, Slight cohesive, Massive, 60% Basalt 25% Qtz, 15% other trace Sunset Muscovite flakes, Slight Rx to 10% HCL	1328 9-26-91 Casing to 164', Material dense. Slow drilling.
170'	(1) moist. (2) Lith. (1) HPT	DB 60% Ret.		(170) Gravelly, Silty SAND. (50% gravel 35 SILT, 45% Sand). Same color as above, Lt brown (10YR 6/2) - dry. Gravels comprised of 10% MG, 5% FG, 5% VFG, 10% VC-CS, 25% MS, 10% FS, 10% VFS, <35% fines. Poorly Sorted Slight cohesive, well rounded to SA. Slight Rx to 10% HCL. Massive. (Fining downward ?). 50% basalt 35% Qtz, 15% other.	1605, 9-26-91 Casing to 160'. Poor Retention
175'	2 Lith 1 Rock 1 Chips	HT		175 SAND (50% Sand, 10% SILT) 50% MS, 20% FS - 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 LT (Gray) Dry Saturated, Loose, Well Sorted, 60% basalt No HCL rxn Hard	1715 10/2/91 HT - Sample where 2 days Down Time - may be Sand Heaved into Drill hole

9313018.1749

BOREHOLE LOG

Boring or Well No. 299 W6-5

Sheet 10 of 15

Location 200W WMA 5

Project W017/LLB6

Elevation 695.4± BRASS CAP

Drilling Contractor Jensen

Driller Glen White/Art Gunion

Drilling Method and Equipment Cable Tool BE22W

Prepared By C. Wright (Sign/Print Name) Date 10/22/91

Reviewed By Edward C. Aylesworth (Sign/Print Name) Date 12/26/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
180'	2 lith 1 Red 1 Quartz	HT		180' Sand (60% Sand, 10% Silt) 80% ms 20% FS 2.5Y 5/2 greyish Brown wet 2.5Y 7/2 Lt Grey Dry Saturated, loose, well sorted, 60% basaltic No HCL Available	10/3/91 1035
185	2 lith 1 Red 1 CaCO3	HT		(185') Sand - same as 180' no noticable difference	10-3-91 1705 End Shift 10-3-91
190'	2 lith 1 Red 1 CaCO3	ST		190' Slightly Silty Slightly Gravelly Sand (70% Sand 15% Gravel 15% Silt 50% SC ~~50%~~ 30% Lp 10% mp 1 UFP - 80% ms 10% FS - 2.5Y 5/2 Greyish Brown wet 2.5Y 7/2 Lt Grey Dry. Dry, loose, well sorted, 60% basaltic	10/8/91 1155 Split Tube while fishing for tools
195'	2 lith 1 Red 1 CaCO3	HT		195' Slightly Silty SAND GRAVEL* 40% Gravel 40% SAND, 20% Silt* Dark Olive Grey; wet; well sorted to Moderate sorted; Subangular to angular; 60% 70% Mafic;	10/22/91 0815 SAMPLE NOT REPRESENTATIVE of true lithology due to Hand tooling ** due to water added to hole for hand tooling

9313018.1755

WHC-SD-EN-DP-044, Rev. 0

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 11 of 15

Location Due North of T-PLANT, 200W WMA-5

Project W-017/LLBG

Elevation 695.42 BRASS CAP

Drilling Contractor JENSEN

Driller A. GWINN

Drilling Method and Equipment Cable tool w/ ~~HARD TOOL~~

Prepared By Robert S. Edington (Sign/Print Name) Date 10/22/91

Reviewed By Edward C. Rafuse (Sign/Print Name) Date 10/26/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level	
200	21 lith 1 Rad 1 $CaCO_3$	HT		200' - See Above	10/22/91	1040
205	21 lith 1 Rad 1 $CaCO_3$	HT		205' - Similar to Above w/ increase in Pebble (both # and size)	10/22/91	1310 ~~1310~~
210	21 lith 1 Rad 1 $CaCO_3$	HT		210' Similar to Above	10/22/91	1655
220	21 lith 1 Rad 1 $CaCO_3$	HT		220' Similar to Above	10/23/91	1325
225						

A-6000-382 (04/90)

9313018.1751

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 12 of 15

Location Due North of T-PLANT, 200 WEST ~~AREA~~

Project W-017 / UCBG

Elevation 695.42 BRASS CAP

Drilling Contractor Jensen Drilling Co.

Driller A. Owen

Drilling Method and Equipment Cable tool w/ Hand tool

Prepared By [signature] / Robert S. Edington (Sign/Print Name) Date 10/28/91

Reviewed By Edward C. Rafuse / Edward C. Rafuse (Sign/Print Name) Date 11/20/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level	
225	2 lith 1 Rad 1 $CaCO_3$	HT		225' - See Above	10/24/91	1250
230	2 lith 1 Rad 1 $CaCO_3$	HT		230' HARD Tooled Sandy Gravel	10/24/91 ~~10/28/91~~	1435
235	2 lith 1 Rad 1 $CaCO_3$	HT		235' Hand tooled Sandy GRAVEL	10/24/91 ~~10/28/91~~	1640
240	2 lith 1 Rad 1 $CaCO_3$	HT		240' Silty SAND GRAVEL Hand tooled, Similar to Above	10/28/91	0900
245						

16-19

9313018.1755

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 13 of 15

Location: Due North of T-Plant, 200 West Area
Project: W-017/LLBG
Elevation: 695.42 BRASS CAP
Drilling Contractor: Jensen Drilling Co.
Driller: A. GWINN
Drilling Method and Equipment: Cable tool w/ Hand tool
Prepared By: D.D. Sam / David Sam (Sign/Print Name) Date: 9/28/91
Reviewed By: Edward C. Arthur / Edward C. Arthur (Sign/Print Name) Date: 11/24/91

Depth	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
245	2 lith 1 Rad 1 $CaCO_3$	HT		245' Silty SANDY GRAVEL Similar to Above w/ INCREASE IN GRAVEL Size	10/28/91 1100
250	2 lith 1 Rad 1 $CaCO_3$	HT		250' Silty SANDY GRAVEL Similar to Above	10/28/91 1540
255	2 lith 1 Rad 1 mois	HT		255' Silty SANDY GRAVEL: (40% Gravel 30% SAND, 30% silt.) 20% mp, 20% FP 10% ms, 20% FS. ANGULAR CLASTS OF Pebbles DO to Being Broken By HARD tool. Poorly sorted clasts / NO RXN to HCl. SANDS MAINLY COMPOSED OF Qtz grains. 20% mafic, 80% Felsic wet. [5Y 3/1] SATURATED SAMPLE DO to RAW H2O Added to Hole.	10/29/91 0940
260	2 Lith 1 RAD 1 mois	HT		260' - SILTY SANDY Gravel. (50% gravel) 40% SAND 10% SILT) ANGULAR PEBBLES DO to HARD tool. Poorly sorted 20% mp, 30% PP, 20% ms, 20% FS NO RXN to HCl. 70% Felsic 30% mafic wet: 5Y 3/1 SATURATED sample - GROUND WATER	10/29/91 1145 Groundwater: 255.14'
265					

16-20

9313018.1753

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 14 of 15

Location 200W / FUTURE DUAL GROUNDS

Project W017 / LLBG

Elevation 695.42 BRASS CAP

Drilling Contractor JENSEN DRILLING

Driller A. GWINN

Drilling Method and Equipment CABLE TOOL

Prepared By DAS / DAVID SEAVER (Sign/Print Name) Date 10/30/91

Reviewed By R.D. Miller (Sign/Print Name) Date 11/9/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
265	2 LITH 1 RAD 1 MOS	SS (169) (354)		265' - SILTY SANDY GRAVEL (60% GRAVEL 20% SAND 30% SILT 10% CP, 10% MP 20% FP, 10% MS, 10% FS. SAMPLE COLLECTED WITH SPLIT SPOON. WELL ROUNDED - SUBROUNDED CLASTS. POCKETS OF WHITE CLAY W/ QTZ & LS. DARK CLAY - MEDIUM TO HCl / WHITE CLAY - NO RXN 60% FELSIC / 40% MAFIC, POORLY SORTED WET: [5Y 3/1] SATURATED SAMPLE	1510 10/29/91
270	2 LITH 1 RAD 1 MOS	HT		270 - SILTY SANDY GRAVEL (50% GRAVEL 30% SAND 20% SILT.) CLASTS BROKEN BY HARD TOOL / 20% MP 30% CP, 10% CS, 10% MS, 10% FS. NO RXN TO HCl SUBROUNDED TO SUBANGULAR CLASTS. POORLY SORTED. 70% MAFIC, 30% FELSIC SATURATED SAMPLE WET = [2.5Y 5/4]	1400 10/30/91
275	2 LITH 1 RAD 1 MOS	SS		275 - SANDY GRAVEL (70% GRAVEL, 30% SAND) 10% MC, 30% CP, 20% MP 10% FP, 20% CS, 10% MS. ROUNDED TO SUBROUNDED CLASTS. NO RXN TO HCl POORLY SORTED. GOOD POROSITY SATURATED SAMPLE WET = [2.5Y 5/4]	1535 10/30/91
280	2 LITH 1 RAD 1 MOS	HT		280 SANDY GRAVEL SAME AS ABOVE	1130 10/31/91

9313018.175"

BOREHOLE LOG

Boring or Well No. 299-W6-5

Sheet 15 of 15

Location 200 W/ One north "T" Rout

Project W017/LLBG

Elevation 695.42 BRASS CAP

Drilling Contractor Jerry Drilling

Driller Art Gwin

Drilling Method and Equipment CABLE TOOL

Prepared By [signature] / DAVID SCHIEL (Sign/Print Name) Date 10/29/91

Reviewed By EDWARD C. ROSS [signature] (Sign/Print Name) Date 11/20/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
285.0	2 with 1 RAD 1 moist	HT		285' - SANDY GRAVEL (60% GRAVEL 40% SAND) CLASTS BROKEN BY HAND TOOL 20% MP, 40% FP, 20% CS, 10% MS 10% FS / ANGULAR - SUBROUNDED CLASTS NO RXN TO HCL POORLY SORTED 60% MAFIC, 40% FELSIC WET = (2.54%)	1445 10/31/91
286.5				T.D. @ 28.5 bls	

9313018.1755

VALIDATED
LSDR 3/10/92
SIGNATURE DATE

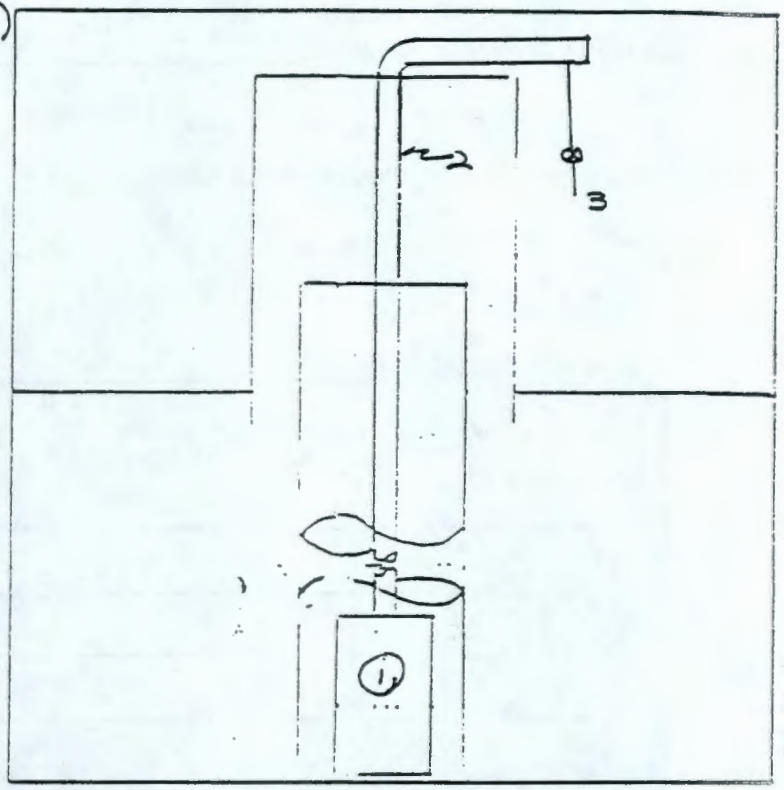
EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

Well Designation 299-W6-5 Depth 290.04' BTOC

Equipment Configuration

Item	Description
1	HYDROSTAR PUMP (MODEL 8001)
2	3/4" S.S. DISCHARGE PIPE
3	SAMPLE PORT

Diagram

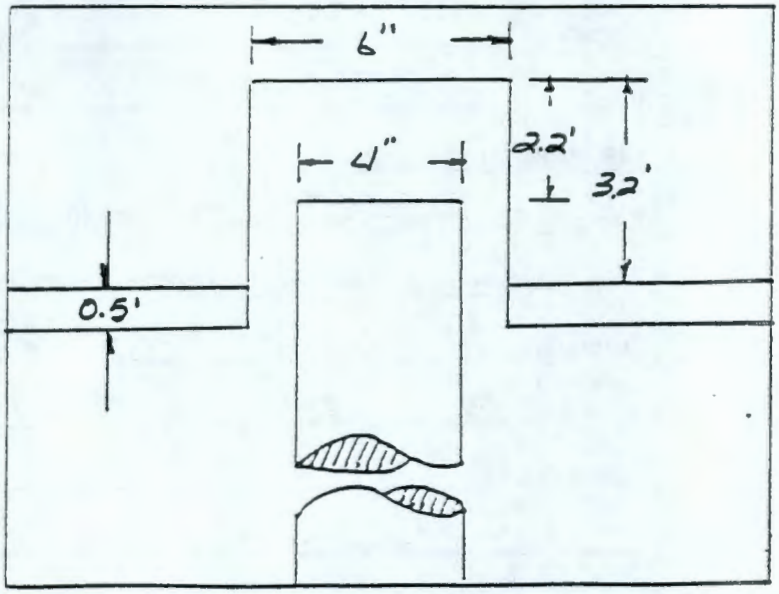


Well Head

Comments

DAMAGE @ S.S. CASING
See F.A.R. #55.

Diagram



Signature of Recorder James A. Coates JAMES A. COATES Date 2-26-92

9313018.175

WELL DEVELOPMENT FORM

Well Designation 299-W6-5 Well Depth 290.04' BTOC

Screened Interval 290.04 -279.3 BTOC Date Well Development is Performed 12-18-91, 12-19-91, 12-20-91

BAILING

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

Type of Surge Block _____ Dimension of Surge Block _____

TD BEFORE	STROKE LENGTH	STROKE FREQUENCY	SURGE INTERVAL	SURGE TIME	TD AFTER	TD DIFFERENCE

AIRLIFT

Depth of Eductor Pipe _____ Airlift Start Time _____

Flow Rate _____ Accumulated Flow _____ Airlift Stop Time _____

Turbidity _____, _____, _____, _____, _____, _____, _____, _____

_____, _____, _____, _____, _____, _____, _____, _____

MECHANICAL PUMPING

Pumping Technique Positive Displacement Pump Depth 282.4' BTOC Pump Start Time 12-18-91 11:45 | 12-19-91 1110

Flow Rate 12-18 4.16gpm | 12-19 3.96gpm Accumulated Flow 474.36 gal Pump Stop Time 1800 | 12-20-91 0010

Turbidity (NTUs) 54.37, 97.57, 94.53, 26.18, 15.45, 22.20, 13.11, 11.26
33.28, 33.21, 17.15, 11, 8.0, 6.2, 5.7, 4.8.

Comments

DEVELOPED USING HYDROSTAR PUMP BECAUSE OF DAMAGE S.S. CASING

Signature of Recorder James A. Gates James A. Gates Date 2-26-92
Sign and Print Name

A-6000-393 (03/90)

9313018.1757

DRAWDOWN/RECOVERY

Well Designation 299-W6-5 Date 2-12-91

Well Depth _____ Screened Interval _____

Pumping Method _____

Equipment Used to Measure Water Level _____ S.N _____ Calibration Due _____

Equipment Used to Measure Flow _____ S.N. _____ Calibration Due _____

Measuring Point _____ Pump Start Time _____ Pump Stop Time _____

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
		DRAWDOWN/RECOVERY NOT PERFORMED BECAUSE OF DAMAGE H2S. CASING		

Signature of Recorder JAMES A. COATES J.A. COATES Date 2-26-92

Sign and Print Name

A-6000-402 (03/90)

9313018.1759

SAMPLING PUMP INSTALLATION FORM

VALIDATED KDR 3/18/92

'8'

Project: W017- LLBC

Well Number: 299-W1-5

Pump Type: HYDROSTAR

Pump Model: 8001

Date Installed: 12-18-91

Installed by: B. STRADE / M. MANSON

Depth to water: 259.66

Depth to Bottom: 290.04

Reported Depth to water: —

Screened Interval: (20.71) 269.33 - 290.04

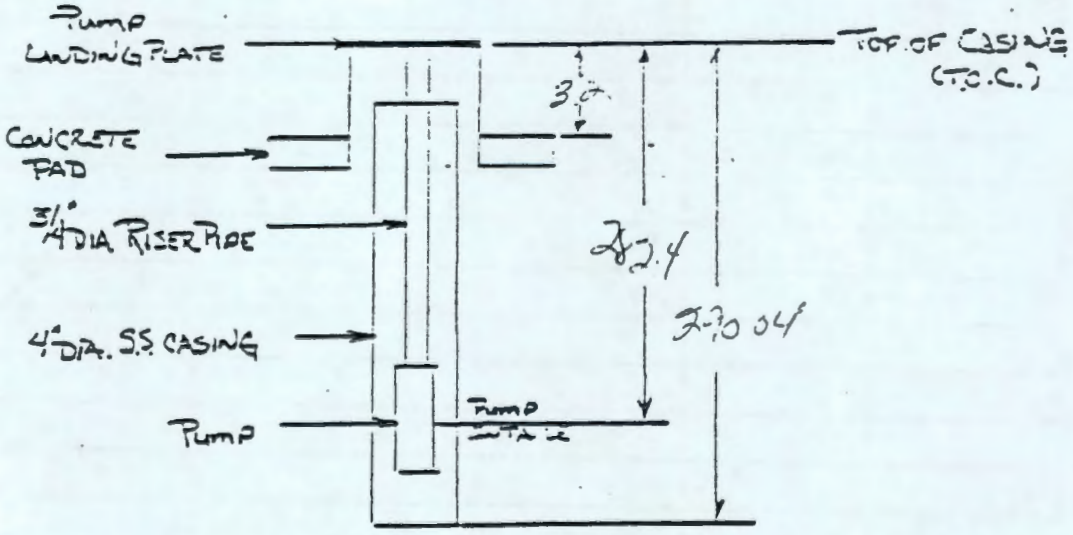
Pump/Riser Pipe Description:
- pipe: 3/4" S.S. DISCHARGE
- pump length: 4.3
- pump screen length: 1.0
- material cleaning: MANUFACTURER

Comments:

PUMP INSTALLATION SKETCH

Total material length: 284.3

Loc. of pump intake: 2124



Completed By: J. A. Cates

Date: 12-18-91

9313018.1759

BOREHOLE TEST INFORMATION

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

Borehole 299-W6-5 Borehole Diameter _____ Hanford Coordinates _____

Interval Tested _____ Depth Interval _____

Test Type _____ Borehole Depth _____

Instruction Used _____

EQUIPMENT

NAME	DESCRIPTION
NA	

MEASUREMENT DATUM

Control Datum _____

Elevation _____

Electric Sounder _____

Steel Tape _____

Pressure Transducer _____

WELL HEAD DIAGRAM

NA

COMMENTS

AQUIFER TEST NOT PERFORMED BECAUSE OF DAMAGE 4"S.S. CASING -

Recorded by: JAMES A. COATES JAMES A. COATES
Sign and Print Name

2-24-92
Date

BD-6000-295 (05/89)

9313018.1765

INSTANTANEOUS SLUG TEST DATA SHEET

Borehole 299-W6-5

Interval Tested

Depth to Water

Date

Measured by

Slug Volume ____ Barometer Reading (Beginning) ____ (End) ____

Time

Transducer Measurement Units

Depth to Transducer

Initial Pressure (P_i)

Slug Level or Pressure (P_{max})

Borehole Diameter

Time		Pressure Trans. Measurement	Time		Pressure Trans. Measurement	Time		Pressure Trans. Measurement
Observed	Elapsed		Observed	Elapsed		Observed	Elapsed	

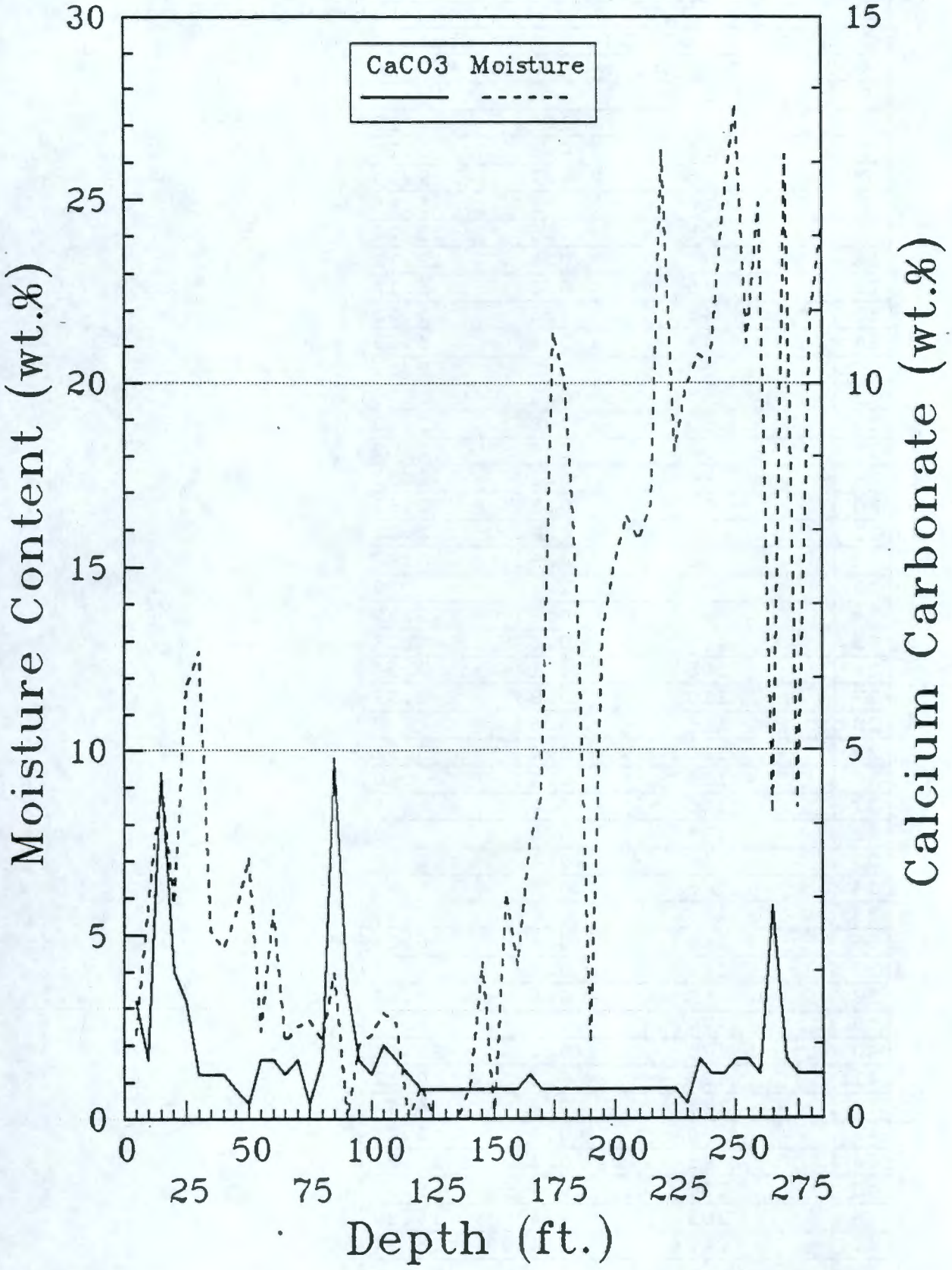
TESTING NOT PERFORMED BECAUSE OF DAMAGED S.S. CASING.

Recorded by JAMES A. GATES JAMES A. GATES (Sign and Print Name) 2-21-92 (Date)

9313018.1761

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

WELL 299-W6-5



2 of 3

	A	B	C
1	WELL 299-W6-5		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	1.6	2.28
7	10	0.8	5.78
8	15	4.7	9.24
9	20	2	5.85
10	25	1.6	11.72
11	30	0.6	12.72
12	35	0.6	5.11
13	40	0.6	4.62
14	45	0.4	5.55
15	50	0.2	7.09
16	55	0.8	2.36
17	60	0.8	5.69
18	65	0.6	2.09
19	70	0.8	2.51
20	75	0.2	2.67
21	80	0.8	2.12
22	85	4.9	3.97
23	90	1.8	0
24	95	0.8	1.99
25	100	0.6	2.3
26	105	1	2.86
27	110	0.8	2.59
28	115	0.6	0
29	120	0.4	0.91
30	125	0.4	0
31	130	0.4	0
32	135	0.4	0
33	140	0.4	0.89
34	145	0.4	4.25
35	150	0.4	0
36	155	0.4	6.14
37	160	0.4	4.16
38	165	0.6	7.44
39	170	0.6	8.71
40	175	0.4	21.42
41	180	0.4	20.12
42	185	0.4	14.01
43	190	0.4	2.05
44	195	0.4	13.24
45	200	0.4	15.08
46	205	0.4	16.39
47	210	0.4	15.74

9313018.1763

383

	A	B	C
48	215	0.4	16.69
49	220	0.4	26.32
50	225	0.4	18.14
51	230	0.2	19.88
52	235	0.8	20.8
53	240	0.6	20.56
54	245	0.6	24.52
55	250	0.8	27.6
56	255	0.8	21.11
57	260	0.6	24.92
58	265	2.9	8.27
59	270	0.8	26.22
60	275	0.6	8.47
61	280	0.6	21.82
62	285	0.6	24.43

11/6/91
KDR
20 slot
10-20 sw

TEST REQUEST

WELL NO. 299 W6-5 DEPTH 275'

SAMPLE/SPECIMEN NO. 2- 0281 COST CODE/WORK ORDER NO. R331H

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 11/5/91

TEST REQUESTED	NO. OF SAMPLES	TEST LAB INFORMATION (PROCEDURE USED)
SIEVE ANALYSIS	1	GEL-07

REMARKS

RECEIVED BY: R.G. ALEXANDER DATE 11/ 1

APPROVED BY: R.G. ALEXANDER DATE 11/5/91

RADIATION RELEASE

Bldg. 299 W6-5 Expiration Date 11/7/91

Released By KD
Health Physics

Remarks 275

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299 W6-5 Expiration Date 11/7/91

Released By KD
Health Physics

Remarks 275

54-3000-022 (01/89)

9313018.1765

SIEVE ANALYSIS DATA SHEET

Sample No. 2-6281 Page 1 of 1

Tested By: JERRY L. ENGLENO Date 11-5-91
Procedure No: GE-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0013 Calibration Due Date 9-16-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SANDY GRAVEL Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2	1087.1	0	0	100
1 1/2		0	0	100
1		221.4	20.4	79.6
3/4		370.9	34.1	65.9
1/2		488.3	44.9	55.1
3/8		574.5	52.9	47.1
4		701.8	64.6	35.4
10	190.8	54.7	28.7	26.2
40		95.1	48.8	18.1
60		131.8	69.1	10.9
100		159.0	83.3	5.9
200		170.1	89.2	3.8

Fineness Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED FINE GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; R.G. ALEXANDER Date 11-5-91

A-6400-204(2-87)

9313018.1775

GRAIN S ANALYSIS PLOT

Sample No. 2-0281

Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 11-5-91

Remarks SANDY GRAVEL

299-W6-5 275'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: R.G. ALEXANDER Date 11-5-91

WHC-SD-EN-DP-044, Rev. 0

16-34

9313018.1767

SIEVE ANALYSIS DATA SHEET

Sample No. [illegible] Page 1 of 1

Tested By: JERRY L ENGLAND Date 11-5-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-18-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 2310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0013 Calibration Due Date 9-16-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SAND Sieve Time 10 (min)

Reduced by ∞ Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	1908	0	0	100
10		54.7	28.7	~~25~~ 71.3
40		98.1	48.8	51.2
60		131.8	69.1	30.9
100		159.0	83.3	16.7
200		170.1	89.2	10.8
N/A	N/A	N/A	N/A	N/A

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By: RG ALEXANDER Date 11-5-91

A-6400-204(2-87)

9313018.1730

WHC-SD-EN-DP-044, Rev. 0

GRAIN SIZE ANALYSIS PLOT

Sample No. 2-0281

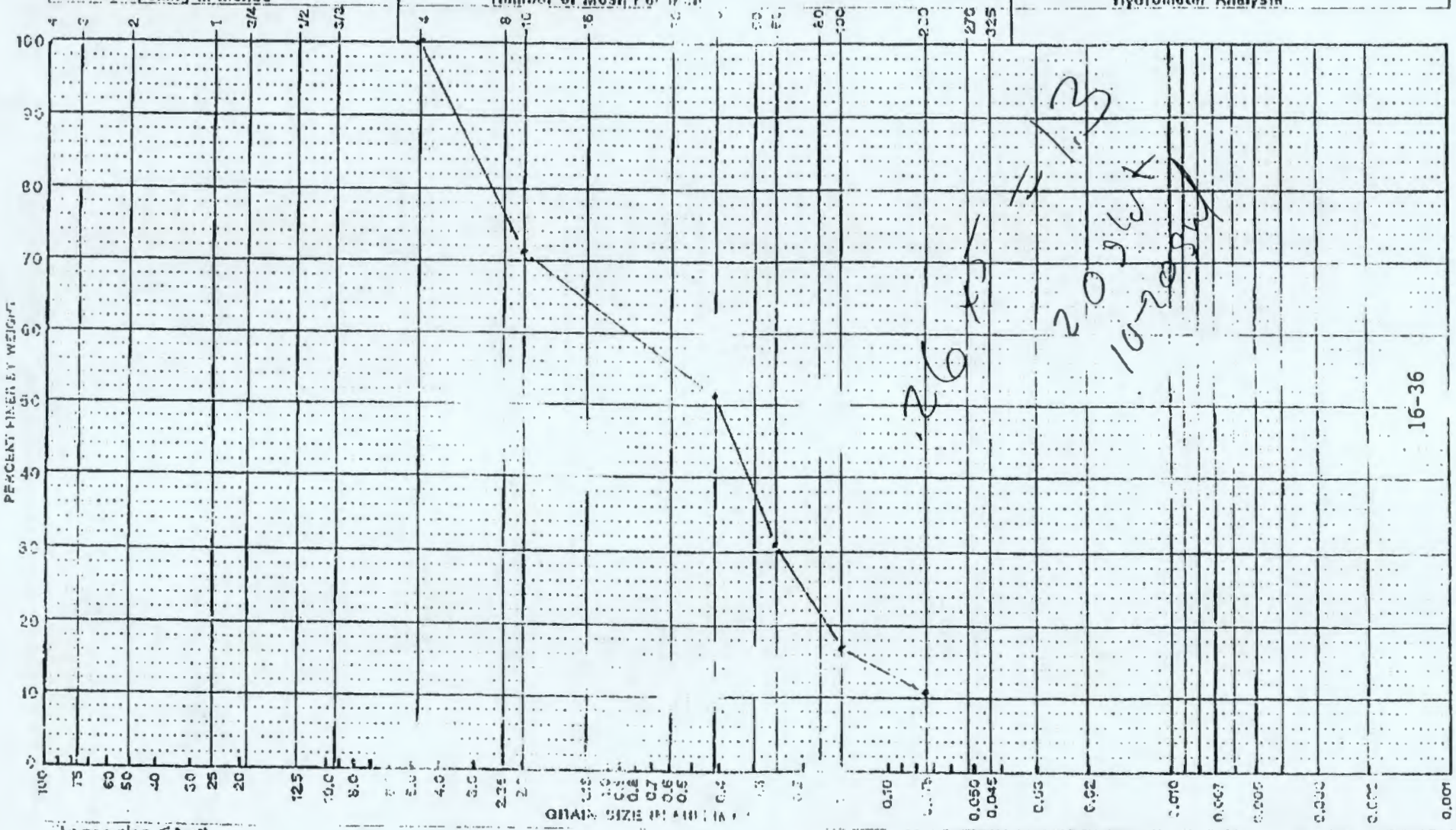
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 5-99

Test Plan No. N/A Rev. N/A Date Issued N/A

Plotted By Terry L. ENGLAND

Date 11-5-99



Remarks SAND

299-W6-5

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By RG ALEXANDER Date 11-5-91

93130181769

TEST REQUEST

WELL NO. 299-W6-5 DEPTH 275'

SAMPLE/SPECIMEN NO. 2- 0281 COST CODE/WORK ORDER NO. R331H

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 11/5/91

TEST REQUESTED	NO. OF SAMPLES	TEST LAB INFORMATION (PROCEDURE USED)
SIEVE ANALYSIS	1	GEL-07

REMARKS

RECEIVED BY: R.G. ALEXANDER DATE 11/5/91

APPROVED BY: R.G. ALEXANDER DATE 11/5/91

RADIATION RELEASE

Bldg. 299 W6-5 Expiration Date 11/7/91

Released By [signature]
Health Physics

Remarks 275

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299 W6-5 Expiration Date 11/7/91

Released By [signature]
Health Physics

Remarks 275

54-3000-022 (01/89)

9313018.1770

SIEVE ANALYSIS DATA SHEET

Sample No. 2.0281 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 11-5-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- 0013 Calibration Due Date 9-16-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SANDY GRAVEL Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2	1087.1	0	0	100
1½		0	0	100
1		221.4	20.4	79.6
¾		370.9	34.1	65.9
½		488.3	44.9	55.1
⅜		574.5	52.9	47.1
4		701.8	64.6	35.4
10	190.8	54.7	28.7	25.2
40		93.1	48.8	18.1
60		131.8	69.1	10.9
100		159.0	83.3	5.9
200		170.1	89.2	3.8

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percemtage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED FINE GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; R.G. ALEXANDER Date 11-5-91

A-6400-204(2-87)

9313018.1771

GRAIN SIZE ANALYSIS PLOT

Sample No. 2-0281

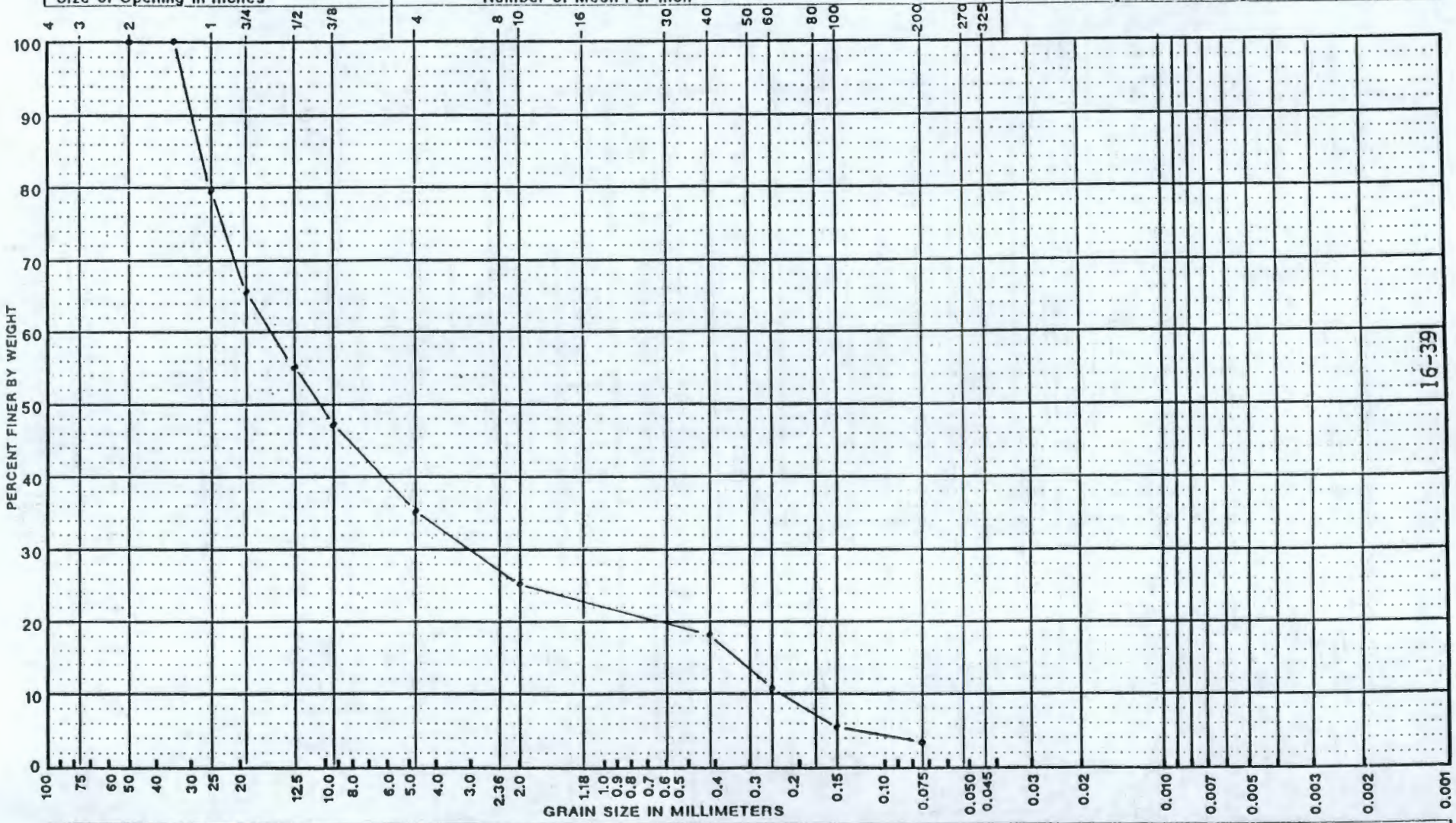
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-87

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 11-5-91



Remarks SANDY GRAVEL

299-W6-5 275'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: R.G. ALEXANDER Date 11-5-91

WHC-SD-EN-DP-044, Rev. 0

16-39

9313018.1277

SIEVE ANALYSIS DATA SHEET

Sample No. 2-0282 Page 1 of 1

Tested By: JERRY L ENGLAND Date 11-5-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-18-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 2310 Calibration Due Date 12.25.91
Thermometer: ETAL- 0013 Calibration Due Date 9.16.92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SAND Sieve Time 10 (min)

Reduced by ∞ Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	190.8	0	0	100
10	↓	54.7	28.7	~~25~~ 71.3
40	↓	93.1	48.8	51.2
60	↓	131.8	69.1	30.9
100	↓	159.0	83.3	16.7
200	↓	170.1	89.2	10.8
N/A	N/A	N/A	N/A	N/A
↓	↓	↓	↓	↓

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percemtage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; RG ALEXANDER Date 11-5-91

A-6400-204(2-87)

9313018.1773

GRAIN SIZE ANALYSIS PLOT

Sample No. 2-0281

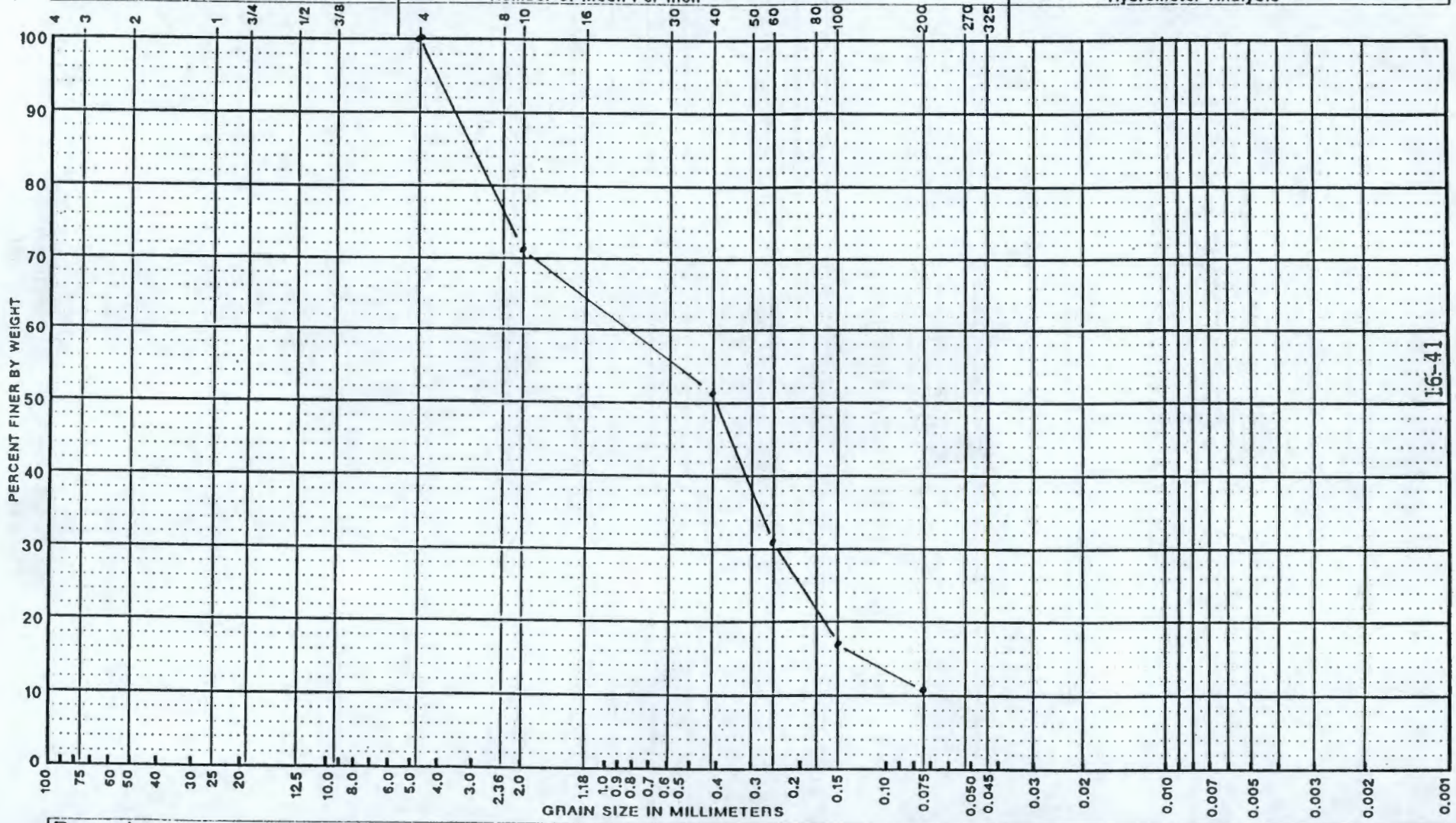
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Test Plan No. N/A Rev. N/A Date Issued N/A

Plotted By JERRY L ENGLAND

Date 11-5-89



Remarks SAND

299-W6-5 275'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: RG ALEXANDER Date 11-5-91

WHC-SD-EN-DP-044, Rev. 0

9313018.1777

☎509 373 5052 TECH TRNG ☑001

ACTIVITY REPORT

TRANSMISSION OK

TRANSACTION =	0599
CONNECTION TEL	66476
CONNECTION ID	G3
START TIME	11/05 14:38
USAGE TIME	03'09
PAGES	6

H

/91

N

REMARKS 299-W6-6
450-451'

RECEIVED BY: R.G. ALEXANDER DATE 10/29/91

APPROVED BY: R.G. ALEXANDER DATE 10/29/91

9313018.1775

RADIATION RELEASE

Bldg. 299-W6-6 Expiration Date 10/31/91

Released By LRP
Health Physics

Remarks 450-451

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299 W6-6 Expiration Date 10/31/91

Released By LRP
Health Physics

Remarks 450-451

54-3000-022 (01/89)

SIEVE ANALYSIS DATA SHEET

Sample No. 2.0274 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 10.31.91
Procedure No: GEL-07 Rev. 1 Date Issued 11.15.89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12.25.91
Thermometer: ETAL- 008 Calibration Due Date 9.16.92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SANDY GRAVEL Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2	1177.9	0	0	100
1½		0	0	100
1		219.3	18.6	81.4
¾		248.5	21.1	78.9
½		274.8	23.3	76.7
⅜		311.4	26.4	73.6
4		443.6	37.7	62.3
10	169.6	53.4	31.5	42.7
40		97.8	57.7	26.4
60		117.3	69.2	19.2
100		130.2	76.8	14.5
200		139.8	82.4	11.0

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percemtage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED FINE GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; R.G. ALEXANDER Date 10-31-91

A-6400-204(2-87)

9313018.1775

GRAIN S ANALYSIS PLOT

Sample No. 2-0274

Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 10-31-91

Remarks SANDY GRAVEL

299-W6-6 450-451'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: R.G. ALEXANDER Date 10-31-91

WHC-SD-EN-DP-044, Rev. 0

9313018.1777

SIEVE ANALYSIS DATA SHEET

Sample No. Z.0274 Page 1 of 1

Tested By: JERRY L. ENGLAND		Date	10.31.91
Procedure No: GEL-07		Rev. 1	Date Issued 11.16.89
Test Plan No: N/A		Rev. N/A	Date Issued N/A
Balance:	ETAL- 3310	Calibration Due Date	12.25.91
Thermometer:	ETAL- 013	Calibration Due Date	9.16.92
N/A :	ETAL- N/A	Calibration Due Date	N/A
N/A :	ETAL- N/A	Calibration Due Date	N/A
N/A :	ETAL- N/A	Calibration Due Date	N/A
N/A :	ETAL- N/A	Calibration Due Date	N/A

Sample Description SAND Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	169.6	0	0	100
10	↓	53.4	31.5	68.5
40	↓	97.8	57.7	42.3
60	↓	117.3	69.2	30.8
100	↓	130.2	76.8	23.2
200	↓	139.8	82.4	17.6
N/A	N/A	N/A	N/A	N/A
↓	↓	↓	↓	↓

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percemtage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; R.G. ALEXANDER Date 10-31-91

A-6400-204(2-87)

GRAIN SI ANALYSIS PLOT

Sample No. 2-0274

Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 10-31-91

Remarks SAND

299-W6-6 450-451'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: R.G. ALEXANDER Date 10-31-91

WHC-SD-EN-DP-044, Rev. 0

16-46

9313018.1779

VALIDATED KDR 3/18/92 SIGNATURE/DATE

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

pg 1 of 2

Requested by: | Phone No. | Well No. 299-W6-5 | Date:

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5'		SOIL	8.14.91	1867.91	44.6	1.5
10'			8-15.91	1886.91	16.1	<D
15'				1887.91	14.1	<D
20'				1885.91	7.4	<D
25'	9.11.91		9.23.91	0593.91B	15.80	0.24
30'	9.12.91			0594.91B	10.26	0.65
35'				0595.91B	23.94	0.65
40'			9.27.91	0803.91B	21.31	0.4
45'				0804.91B	30.10	1.2
50'	9.14.91			0826.91B	11.28	0.86
55'				0827.91B	26.99	1.0
60'	9.17.91		9.25.91	0633.91B	33.54	0.97
65'				0634.91B	23.57	0.8
70				0635.91B	28.35	1.11
75'				0636.91B	15.49	0.14
80'				0637.91B	13.16	1.00
85				0638.91B	18.05	<D
90	9.18.91			0621.91B	35.6	1.20
95				0622.91B	30.84	0.24
100				0626.91B	30.59	1.12
105'				0627.91B	33.10	0.24
110'						
115	9.23.91		9.26.91	0787.91B	16.05	0.15
120				0788.91B	<D	1.19
125'				0789.91B	<D	0.5
130				0790.91B	17.91	0.92
135'				0791.91B	13.42	0.68
140	9.23.9		9.30.91	0857.91B	39.43	0.22
145'				0858.91B	0.89	0.85
150'				0859.91B	28.15	<D
155	9.25.91		10.7.91	0916.91B	12.33	<D
160'				0917.91B	6.36	<D

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1763

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 2 of 2

Requested by:	Phone No.	Well No.	Date:
		299-W6-5	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
165'	10.2.91	SOIL	10.10.91	0996.91B	15.85	0.56
170'	10.11.91		10.16.91	1086.91B	33.11	1.0
175'	10.4.91		10.25.91	1323.91B	27.7	<D
180'	↓		↓	1306.91B	16.36	.89
185	10.7.91		10.24.91	1254.91B	<D	0.2
190'	10.8.91		↓	1263.91B	25.0	0.3
195'	10.22.91		11.1.91	1565.91B	10.5	0.7
200'	10.2.91		10.30.91	1526.91B	2.91	0.24
205'	↓		↓	1527.91B	6.61	0.43
210'			10.31.91	1540.91B	23.99	1.19
215'			11.1.91	1547.91B	20.71	<D
220'	↓		↓	1548.91B	43.05	0.45
225'	10.28.91		11.6.91	1610.91B	35.61	1.07
230'	↓		↓	1605.91B	8.39	2.1
235'	↓		↓	1606.91B	17.51	0.4
240'	10.30.91		↓	1645.91B	1.87	0.9
245'	↓		↓	1646.91B	<D	0.24
250'	↓		↓	1648.91B	22.89	3.00
255'	↓		11.7.91	1649.91B	14.44	0.24
260'	10.28.91		11.6.91	1650.91B	0.63	0.80
265'	↓		11.7.91	1625.91B	19.08	0.52
270'	10.31.91		11.7.91	1678.91B	8.13	0.96
273.8'-275.8'	10.31.91		11.7.91	1679.91B	2.72	0.51
275'	10.31.91		11.11.91	1683.91B	17.36	.32
280'	10.31.91		11.3.91	1682.91B	16.85	0.64
285'	11.5.91	↓	11.8.91	1698.91B	16.76	0.17

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1781

Westinghouse Hanford Company | LOG HEADER |

Well No. 299-W6-5 Area 200 West Date 9/24/91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD29 * Elevation 710.94' Brass Cap

Survey Coordinates 137638.63 N 567493.33 E

Log Measured From Ground Surface

Location Description North Perimeter Road of 200 West Area

Ground Surface Elevation 710.94' Brass Cap

Surface Temperature 18.9°C Weather Clear-Warm

BOREHOLE INFORMATION

Driller Glen White (Jensen)

Drill Rig Type Cable Tool | Bit Type/Diameter ~~Hard Tool~~ AOP 9/24/91 Drive Bailer/10"

Borehole Diameter(s)/Depth 12"/~19.0' 10"/160.0'

Depth Driller 160' | Depth Logger 158.1'

Liquid Level NA | Liquid Density NA

Temperature NA

CASING RECORD

Type 12" Carbon Steel Sch.40 | Interval +0.8'~19.0'

Type 10" Carbon Steel Sch.40 | Interval +1.22'–159.98'

Type | Interval

Type | Interval

Well Screen Interval NA

Comments: Return Error = +0.15' high

Centralizer used.

* Survey data from Kaiser 12/15/92 RSM

16-49/50

9313018.1782

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No. CG27A97

Base Calibration Date: 5/91 | Calibration Reference: PNL-7735 UC-606

Calibration/Probe Factor: 8.84×10^{-3} eU p/m/c/s | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μsec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 158.1' | To: 3.9'

Rerun(s): 50.0' to 10.0'

Pre Survey Verification: Position 1: 302.3 eU | Position 2: 65.9 eU | Background: 55 c/s

Base Calibration Difference: Position 1: 4.9 eU | Position 2: 1.6 eU

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 0715 | Completion Time: 0900

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC-1

Post Survey Verification: Position 1: 304.5 eU | Position 2: 64.5 eU | Background: 55 c/s

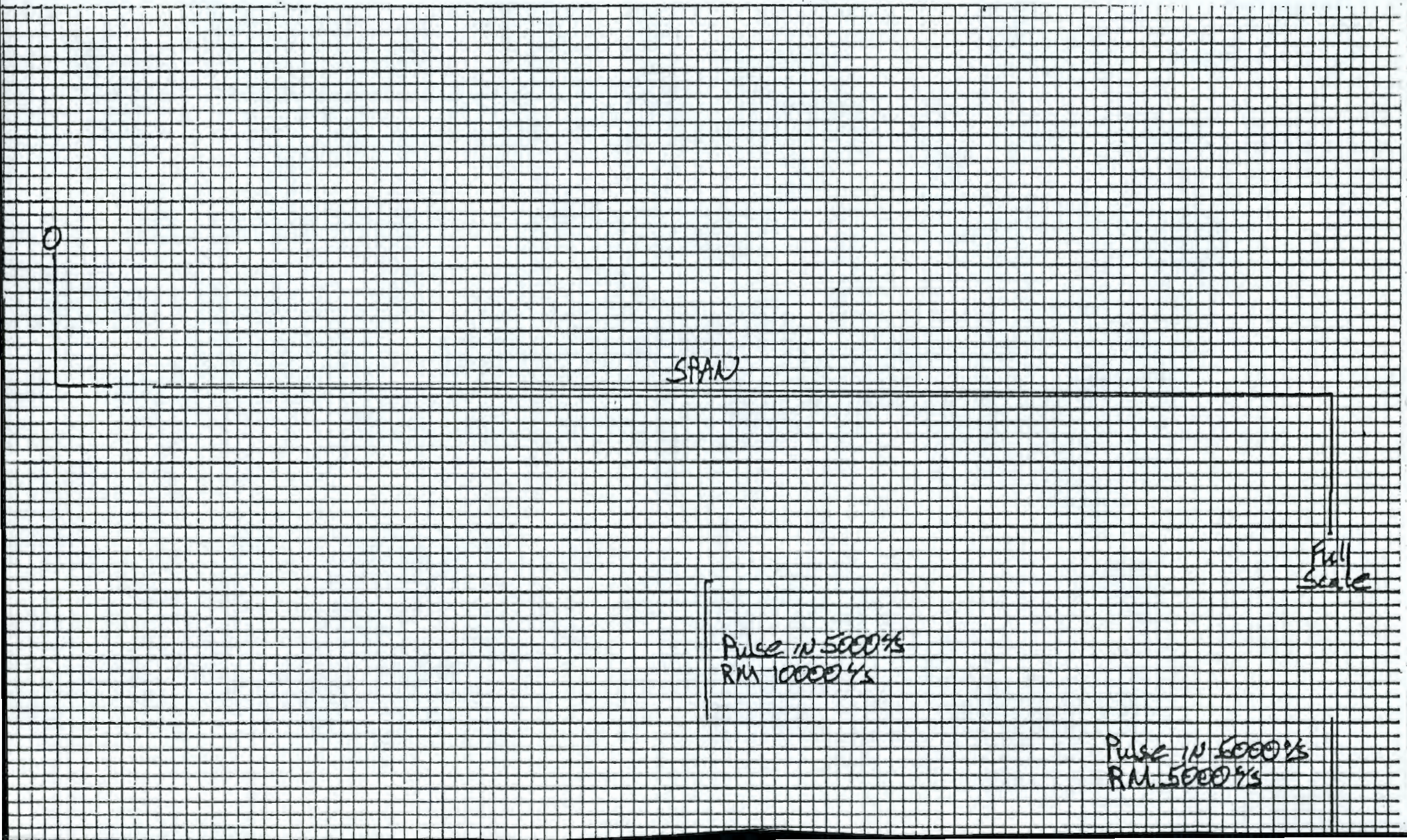
Percent Change: Position 1: 0.7% | Position 2: 2.1%

Comments: Return Error = +0.15' high

Centralizer used

Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 9/24/91

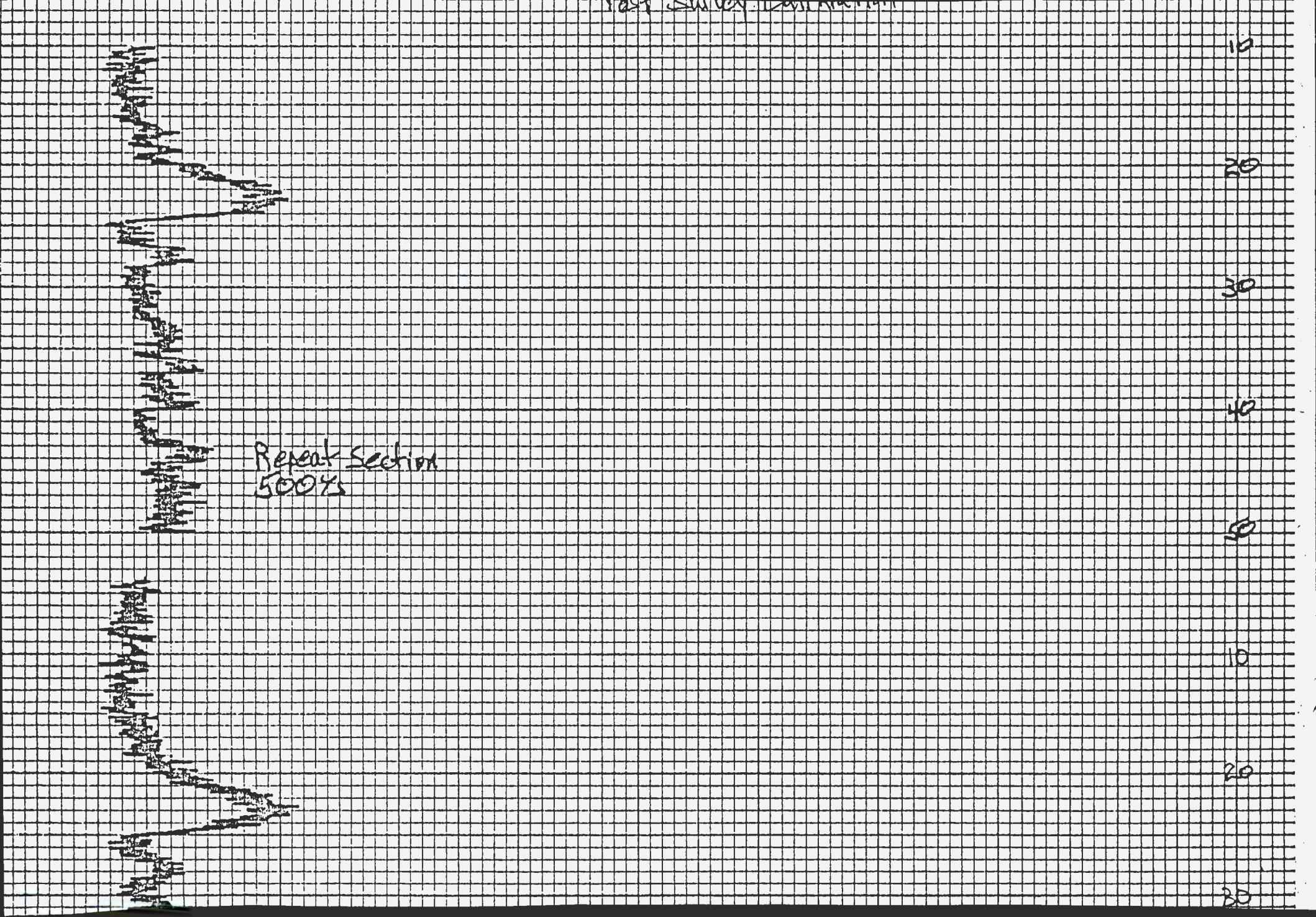
A-6000-520 (05/90)

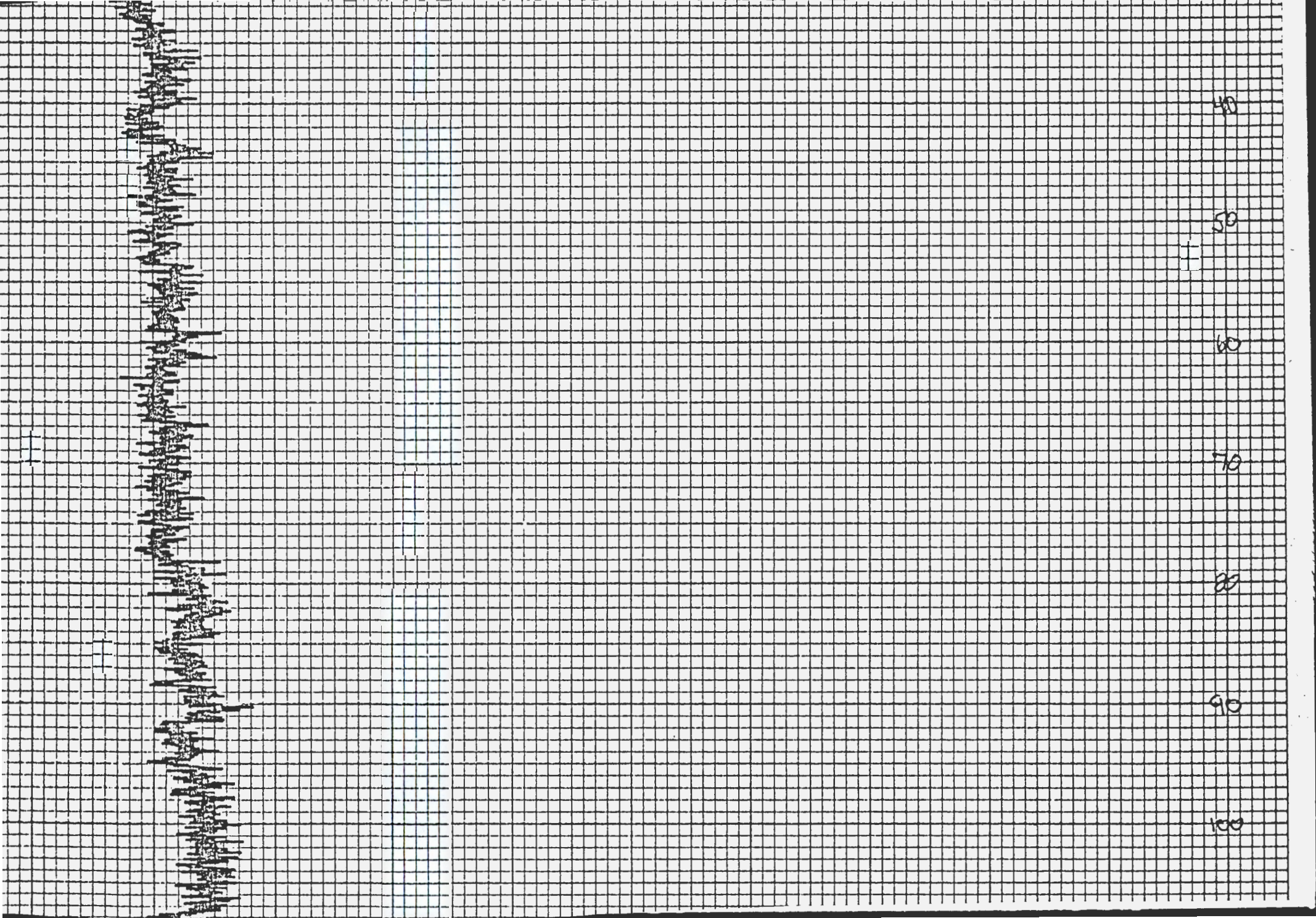


Pos. 2
1000 ys

Pos. 1
500 ys

Background
500 ys


Repeat Section
500%
10
20
30
40
50
10
20
30


40
50
60
70
80
90
100

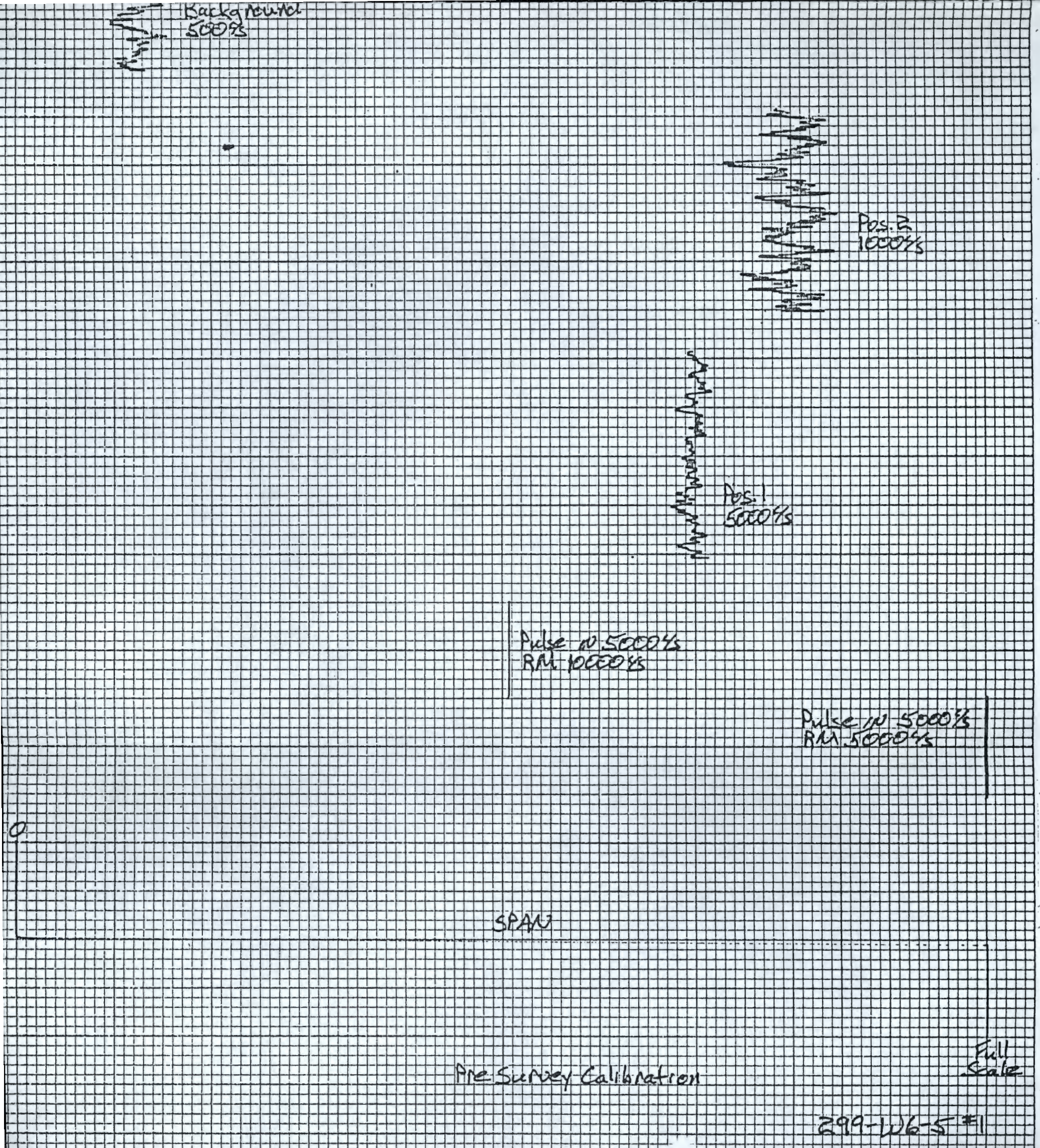
110

120

130

140

150


Background
500 ns
Pos. 2
1000 ns
Pos. 1
5000 ns
Pulse w 5000 ns
RM 10000 ns
Pulse w 5000 ns
RM 5000 ns
0
SPAN
Full Scale
Pre Survey Calibration
299-W6-5 #1

Westinghouse Hanford Company	WHC-SD-EN-DP-044, Rev. 0 LOG HEADER	Page 1 of 2

Well No. 299-W6-5 Area 200 West Date 11/4/91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD29* Elevation 710.94' Brass Cap

Survey Coordinates 137638.63 N 567493.33 E

Log Measured From Ground Surface

Location Description North Perimeter Road of 200 West Area

Ground Surface Elevation 710.94' Brass Cap

Surface Temperature 3.6°C Weather Cloudy - Cool

BOREHOLE INFORMATION

Driller Art Gwin (Jensen Drilling)

Drill Rig Type Cable Tool | Bit Type/Diameter Hard Tool/8"

Borehole Diameter(s)/Depth 12"/19.0' 10"/160.4' 8"/286.8'

Depth Driller 286.8' | Depth Logger 285.3'

Liquid Level 257.0' | Liquid ~~Density~~ Appearance Clean

Temperature 17.5°C

CASING RECORD

Type 12" Carbon Steel Sch. 40 | Interval +0.7' - 19.0'

Type 10" Carbon Steel Sch. 40 | Interval +1.0' - 160.4'

Type 8" Carbon Steel Sch. 40 | Interval +3.4' - 285.94'

Type | Interval

Well Screen Interval NA

Comments: Return Error = +0.25' high

Centralizer used.

* Survey data from Kaiser 12/5/92 RDM

16-51/52

A-6000-520 (05/90)

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson & Brad Gilmore

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No.: CG27A97

Base Calibration Date: 5/91 | Calibration Reference: PNL-7785 UC-606

Calibration/Probe Factor: 8.84×10^{-3} eU/CPS | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μsec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 285.3' | To: 130.0'

Rerun(s): 285.0' to 250.0'

Pre Survey Verification: Position 1: 306.7 eU | Position 2: 65.4 eU | Background: 55 c/s

Base Calibration Difference: Position 1: 9.3 eU | Position 2: 1.1 eU

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 0700 | Completion Time: 0915

Chart Speed(s), f/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC-1

Post Survey Verification: Position 1: 302.3 eU | Position 2: 64.5 eU | Background: 55 c/s

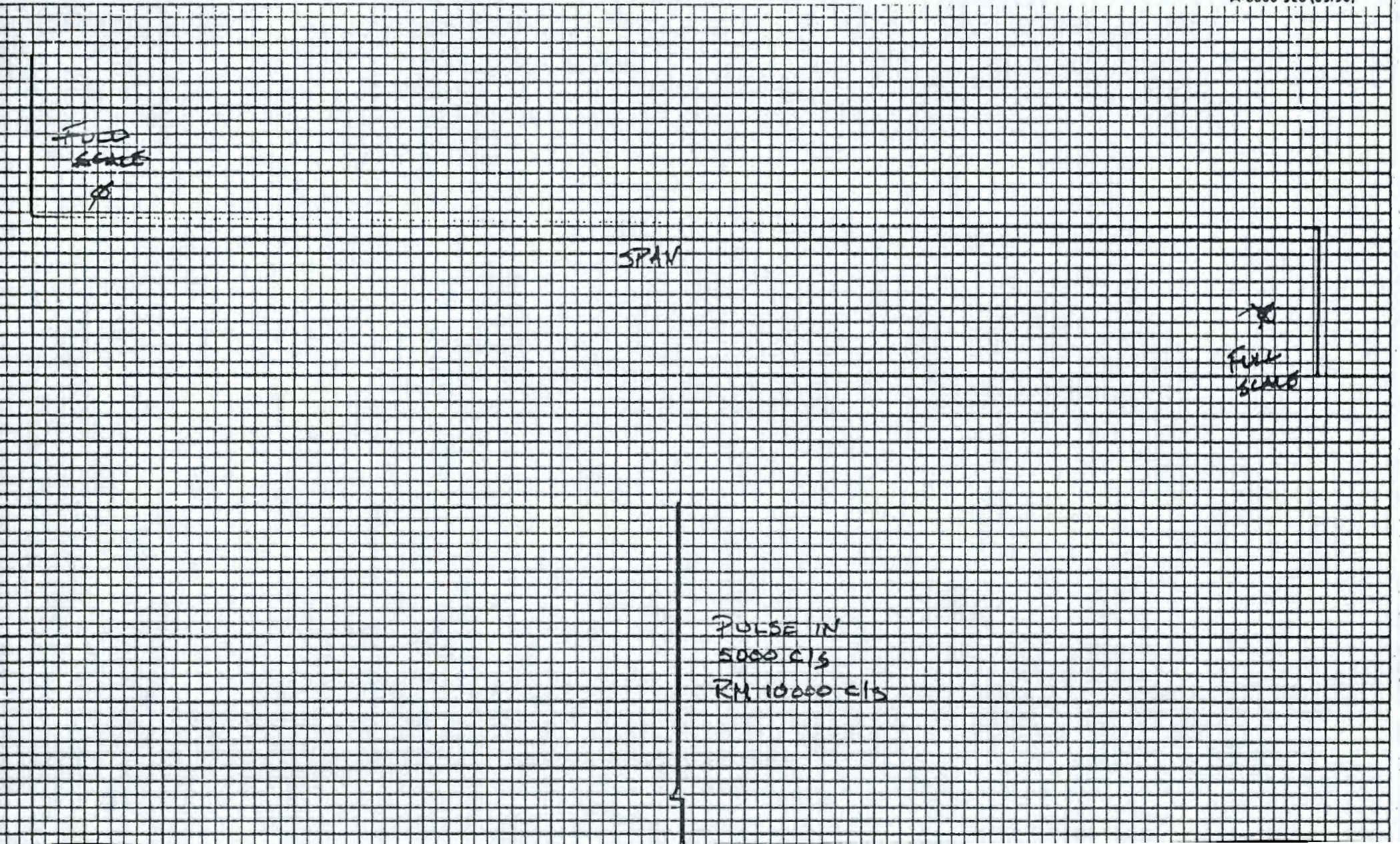
Percent Change: Position 1: 1.4% | Position 2: 1.4%

Comments: Return Error = +0.25' high

Centralizer used.

Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 11/4/91

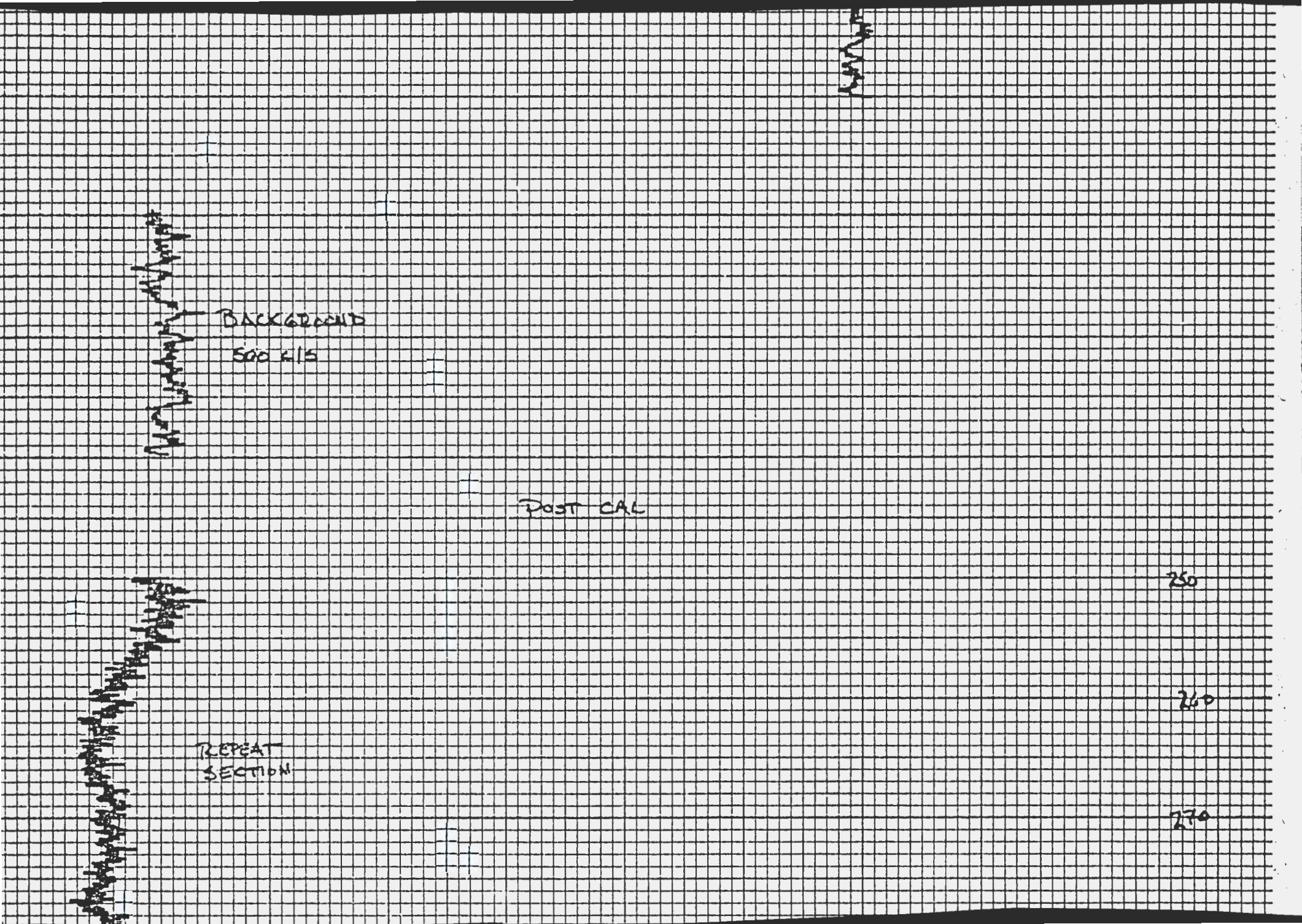
A-6000-520 (05/90)



PULSE IN
5000 c/s
RM 5000 c/s

Pos. 2
1000 c/s

Pos. 1
5000 c/s


BACKGROUND
500 c/s
POST CAL
250
260
REPEAT
SECTION
270

280
285
130
140
150
160
170
180

190

200

210

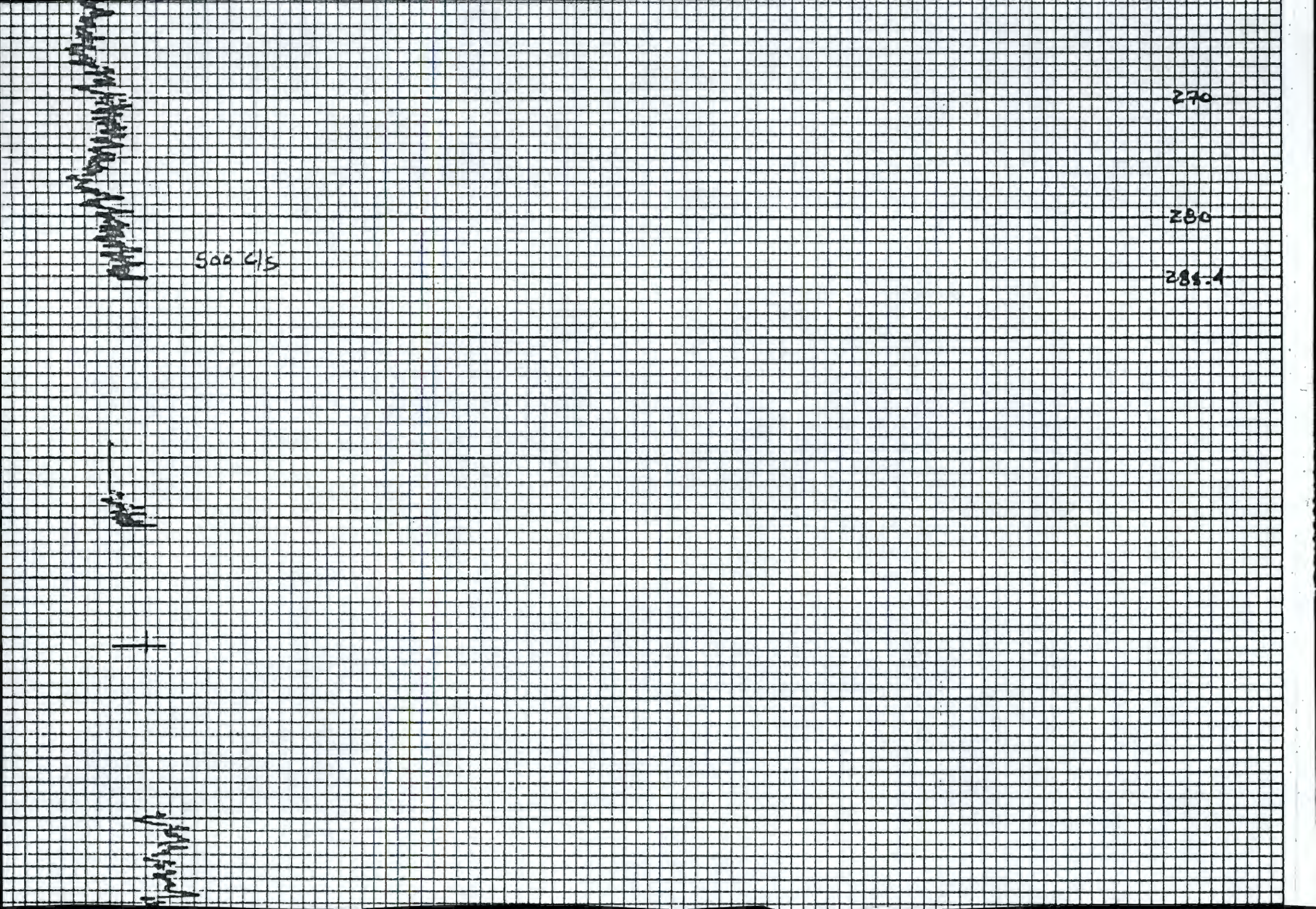
220

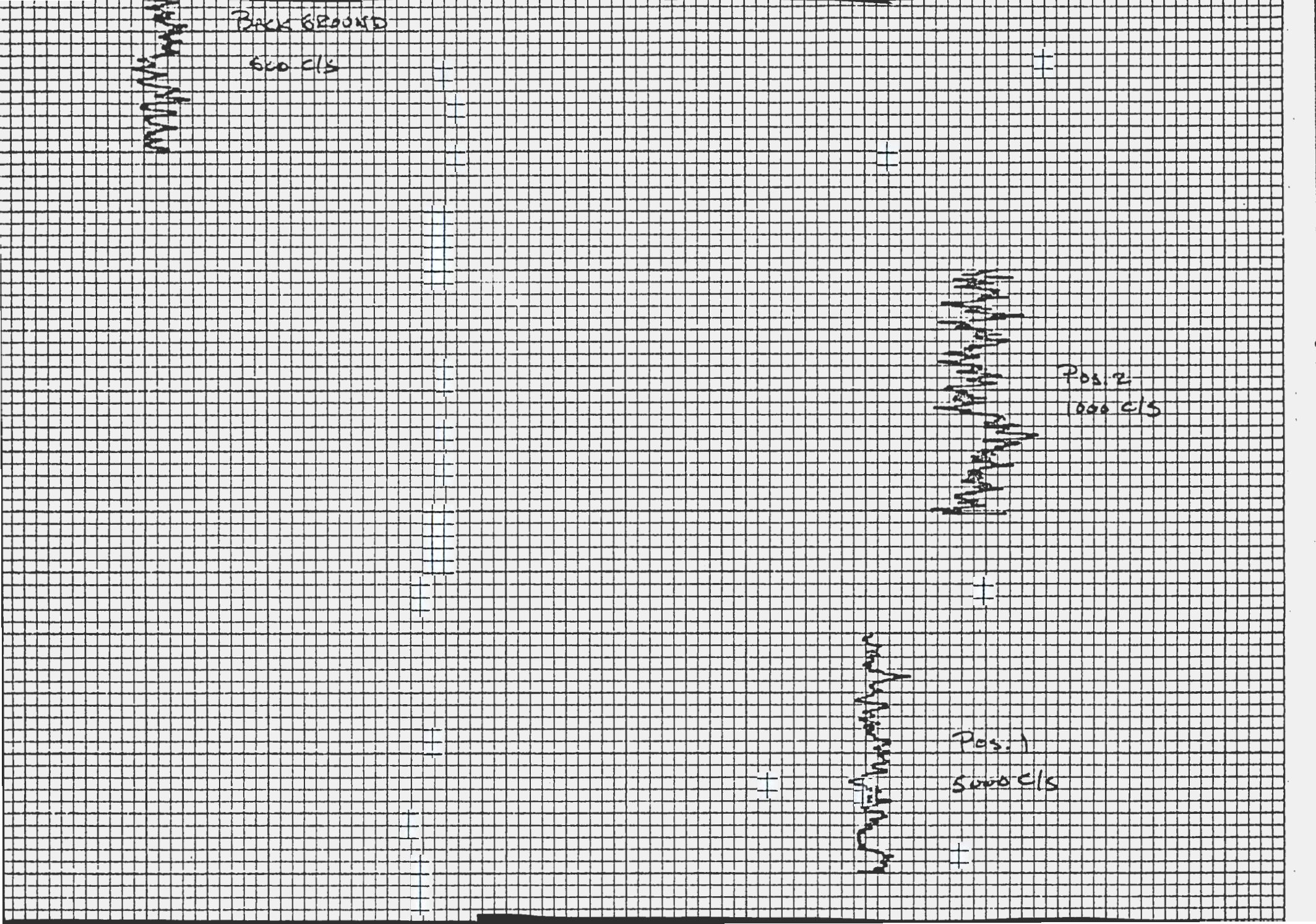
230

240

250

260


500 c/s
270
280
285.1


BACK GROUND
600 c/s
Pos. 2
1000 c/s
Pos. 1
5000 c/s

PULSE IN
5000 c/s
RH 10000 c/s

PULSE IN
5000 c/s
RH 5000 c/s

Ø

SPAN

FULL
SCALE

PRE CAL

299-WC-5
10/5/91

17.0 WELL 299-W6-6

17.1 DRILLING

Construction of this well began on 13 August 1991 and total depth of 472.0 feet was reached on 24 October 1991. The well was drilled using a cable tool rig. Approximately 776 gallons of water were added during drilling activities. Specific well construction information is located in Table 17.1. Well Guard, a non-petroleum based lubricant, was used on the drilling tools. A more detailed description of the drilling is shown in the Well Summary report at the end of this section.

Table 17.1 299-W6-6 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	16"	18.1	ALS
	12"	169.8	ALS
	10"	340.4	ALS
	8"	465.8	ALS
Gross Gamma Logging	9 September	154.5	5.0
	7 October	333.1	120.0
	24 October	474.0	300.0
Backfill	Hole Plug	462.9	435.9
Permanent Casing	4"	418.6	ALS
Screen	4" 20-Slot	429.3	418.6
Filter Pack	8-12 Silica Sand	435.9	429.5
	10-20 Silica Sand	429.5	416.8
	20-40 Silica Sand	416.8	408.4
	8-12 Silica Sand	408.4	406.7
Annular Seal	Bentonite Slurry	406.7	20.7
	Cement Grout	20.7	2
Concrete Pad	4'x4'x6"	2	ALS

BLS - Below Land Surface
ALS - Above Land Surface

Sediments from the Hanford formation, the Plio-Pleistocene unit, and the Ringold Formation were encountered in this borehole. Hanford deposits extended to 26 feet BLS and were primarily gravelly sand and sandy gravel. Approximately 34 feet (26-60 feet BLS) of silty sand, sandy gravel, and

9319018.172

gravelly sand with several caliche zones represents the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (60-472 feet BLS).

The borehole was advanced by the drive barrel and hard tool. Hard tool drilling was done in more resistant zones and below the water table. Approximately 7.4 feet of 8 inch carbon steel temporary casing and the casing shoe was lost in the borehole (458.4-465.8 feet BLS). This portion of the borehole was sealed off with bentonite Hole Plug. Samples were collected at approximately 5 foot intervals for moisture content (above the water table only), radiological screening, carbonate analysis, and lithologic archiving. Grain size analysis was done on samples from the interval to be screened. The borehole log and physical data for this well are located at the end of this section.

Gross gamma logging was conducted as indicated in Table 17.1. Reproductions of these logs are also located at the end of this section.

17.2 WELL COMPLETION

Well completion began on 14 November 1991 and was completed on 13 December 1991. Static water level at the time of completion was 219.6 feet below land surface (BLS). Completion details are presented in Table 17.1. This borehole was completed to monitor the lower portion of the unconfined aquifer. A Nonconformance Report (NCR B05431) was issued during the completion of this well. This report documented the removal and sealing in bentonite grout of the eight inch casing shoe below the screened interval. Approximately 20 gallons of water were removed from the well to settle the filter pack. A 6 inch protective casing with a locking cap, four guard posts, and a brass marker with the well number were also set in the concrete pad. Elevations were determined for the brass marker, the top of the protective casing, and the top of the Hydrostar plate. Lambert and plant (200 West datum) coordinates were established for the centerline of the well. Documentation of well completion activities can be found in the Well Construction Report.

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17.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 16 through 23 December 1991 using a 1.5 horsepower Grundfos submersible pump. Approximately 14,058 gallons of water were removed to develop the well. A dedicated Hydrostar pump was installed on 23 December with the intake located 422.2 feet below the top of the protective casing.

17.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 16 through 23 December 1991. The data from the well development pumping was collected for analysis as drawdown and recovery tests however the data was not interpretable. Results from the testing are presented in Table 17.2. Slug injection and slug withdrawal data plots are shown in Figures 17.1 and 17.2. Raw data from the aquifer testing at 299-W6-6 are located at the end of this section.

Table 17.2 Hydrologic Testing Results from 299-W6-6				
Formation: Ringold		Lithology: Sand	Interval Tested*: 424.0-434.4	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Discharge	17 Dec 91	Not Interpretable	----	----
Recovery	17 Dec 91	Not Interpretable	----	----
Slug Injection	23 Dec 91	Bouwer-Rice (1989)	3	----
Slug Withdrawal	23 Dec 91	Bouwer-Rice (1989)	3	----

* Depth below top of 6" protective casing

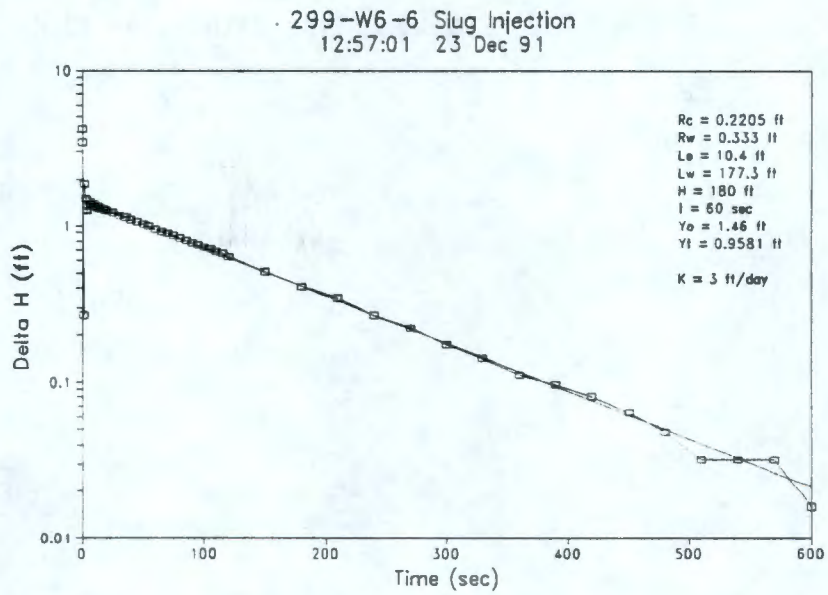

Figure 17.1 299-W6-6 Slug Injection Plot.

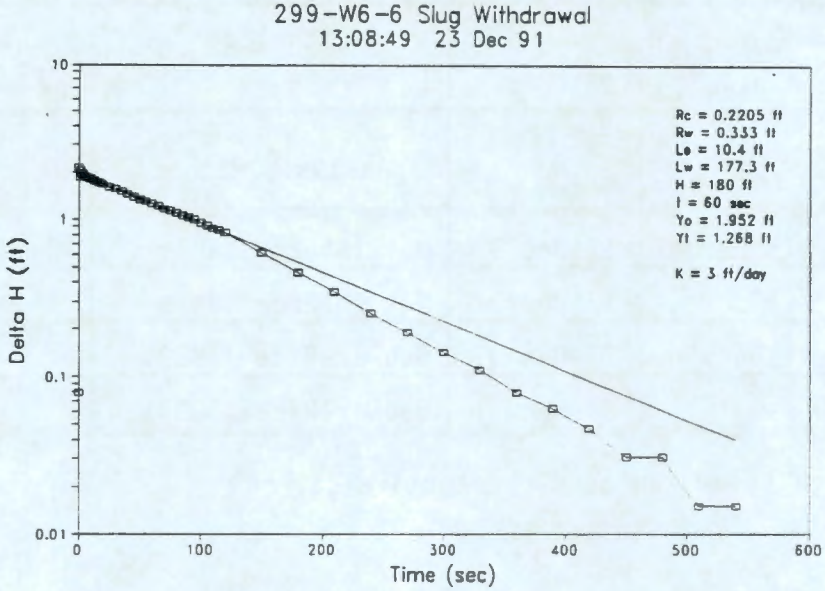

Figure 17.2 299-W6-6 Slug Withdrawal Plot.

9312018.1787

LLBG

WELL 299-W6-6

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
8-13-91	10-24-91	39	N/A	472	*See Comments	776 GALLONS ADDED 10-26-91 HOLE BAILED (UCL REMOVED NOT RECORDED)

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
11-14-91	12-13-91	15	12-2-91 219.6'		419.6' - 429.3'	12-2-91 BAIL WELL TO REMOVE BENTONITE (NO UCL RECORD)
12-2-91	12-13-91	11		462.9' (BENT CHUNKS) 435.9' (9-12 SAND)		12-3-91 BAIL ~ 240 GALLONS 12-4-91 BAIL ~ 20 GALLONS/BAIL 12-5-91 ~150 GALLONS ADDED 150 GALLONS ADDED + 2,60 + GALLON REMOVED

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
**	12-16-91	12-16-91	12-23-91	~14,058 GALLONS
	12-17-91	12-17-91		
	12-18-91	12-18-91		
	[illegible]	[illegible]		
	[illegible]	[illegible]		
	12-23-91	[illegible]		

COMMENTS:

* DRILLING:

DEPTH TO WATER	
9-24-91	237.5'
9-25-91	254'
9-26-91	251.1'
9-30-91	253.2'
10-2-91	254.4'
10-3-91	254.4'
10-10-91	260.9'
10-14-91	255.7'
10-15-91	257.4'
10-16-91	269.4', 259.0'
10-17-91	266.1'
10-21-91	262.7'
10-22-91	263.5'
10-23-91	276.7'
10-24-91	277.3'

** DOCUMENTED CAMERA SURVEY RUN 12-5-91

196

WELL CONSTRUCTION REPORT

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

Specification No. WHC-S-014 Rev No. 5* (See Comment)

ECNs 144240, 144241, 127437, 150204, 150126, 150212, 164990-C

Project W-017/LLBG

Location 200 West/WMA-S

Drilling Company Jensen Drilling Co

Driller John Johnson, Darrel Perkins, S. Mkinner, Dennis J. Mingo

Other (Companies) Ebasco Environmental (EED) HART CROWSER

Geologist(s) Mike Hovens R Weingartz
Chris Wheeler, J.A. Lotte
Myra Vang EBASCO
Stacey Callison ROBERT WINN

Well No. 299-W6-6 Temp. Well No. W6-MW8

Coordinates N: 137,638.72; E: 527,318.74

Casing Elev. 694.47 Ground Elev. 691.31 (GRADE)

Drilling Method

Verification Method Visual Observation

Criteria WHC-S-014: 5.2, 5.3, 7.5 EII 6.7, sect 6.2

			Initials	Date
Rotary	Air NA	Mud NA	NA	NA
Cable Tool	D 0-175'	H 175'-472'	CSW	10/24/91
Drilling Fluid	Raw Water	7% Gel	KDR	11/10/91
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Gross Gamma	154.7'-.5'	9/5/91
"	333.1-120	10/7/91
"	300'-474'	10/24/91
	-	
	-	

Completion Data

Drilled Depth 472'

Completed Depth 429.3

Date Started 8/13/91

Date Completed 10/24/91

Static Water Level/Date 277.3'-10/24/91, 276.7'-10/23/91, 214.6-12-2-91, 12/16/91 - 257.0

Aquifer Testing

Type INSTANTANEOUS SLUG

Flow Meter I.D. No. -NA-

Cal. Due Date -NA-

Length of Test 1 HR

Volume Pumped -NA-

Drawdown -NA-

Date of Test 12-23-91

Completion Results

Cleaning

Verification Method Visual Inspection

Criteria WHC-S-014: 4.2.2, 7.6, 7.7 WHC-CM-7-7: 5.4

	Initials	Date
Drilling Tools/Rig Backhoe	CSW	8/21/91
	MJH	8-13-91
Temporary Materials	MJH	8-13-91
Permanent Materials	MW	12-13-91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014: 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	MW	12-13-91
Material Packing	MW	12-13-91

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014: 7.2

	Identify	Initials	Date
Additives	Raw Water	CSW	8/28/91
Lubricants	WellGard	CSW	8/22/91

Screen

Type	Length	Slot Size
T.304 SS. 4" ID	10.40'	20

Depth(s) 429.3 - 418.59

Verification Method Verify w/ Steel Tape

Criteria WHC-S-014: 4.2.3, 4.2.5, 4.2.1, 12.2.1

Initials MW Date 12-13-91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014: 8.2

Initials RMW RK Date 10-24-91

A-6000-436 (09/90)

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WELL CONSTRUCTION REPORT (continuation sheet)

299-W6-6

Casing (permanent)

Type	Size	Placement
T.304 S.S.	4" ID	41.859 - -6.85

Verification Method: Verify w/ Steel Tape

Criteria: WHC-S-014: 4.2.1, 4.2.4, 4.2.5, 12.2.1

Initials: MW Date: 12-13-91

Well Protection

Verification Method: Visual Observation

Criteria: WHC-S-014: 4.2.10

	Initials	Date
Protective Posts	KDR	3/18/92
Protective Casing	KDR	3/18/92
Site Restored	KDR	3/18/92
Cap, Hasp and Lock	KDR	3/18/92
Surface Pad	KDR	3/18/92

Annular Seal/Filter Pack (4)

Verification Method: Verify w/ Steel Tape Criteria: WHC-S-014: 4.2.6, 4.2.7, 4.2.8, 4.2.9, 5.3.1, 5.3.2

Type	Interval	Volume	Initials	Date
Enviroplug Coarse Bent Inlaplug	462.9 - 435.9	1 sk 12.4 ft³	MW	12-13-91
8-12 sand	435.9 - 429.5	3 sk 3 ft³	MW	12-13-91
10-20 Sand	429.5 - ~~406.7~~ 416.8 MW 12-13-91	~~9 sk~~ 5 3/4 sk 6.2 ft³	MW	12-13-91
8-12 Sand	406.7 - 408.4	1/2 sk .5 ft³	MW	12-13-91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014: 3.4

	Initials	Date
Measurement Point/Surveyed	KDR	3/18/92
Protective Casing/Brass Cap Surveyed	KDR	3/18/92
Well Number Stenciled	KDR	3/18/92
Brass Cap Labeled	KDR	3/18/92

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014: 4.2.2, 4.2.11

	Initials	Date
Pump Decon/Prep	JAC	12-23-91
Installed	JAC	12-23-91
Pump Tested	JAC	12-23-91

Other (initial if performed)

NA Well Abandonment; NA Downhole TV Inspection; RW Complete As-Built Diagram, Driller's/Geologist's Logs; JAC 12-21-91 Well Development

Comments/Remarks: Work done after 10/2/91 was done to WHC-S-014 Rev 6 with ECN's 150432, 164223, 127439, 150130

(*) also -- A. Winn, S. Dingo - J

(4) Enviroplug Bent Grout MW 406.7 - 2.07' 232.5 sk 511.5 ft³ MW 12-13-91

20-40 Silica Sand 416.8' - 406.7' 4 sk 4.5 ft³ MW 12-13-91

TIEII Cement Grout 20.7' - 2' 30 sk 38.6 ft³ MW 12-13-91

Tape wont take on S.S. w/ no problems after completion

Reviewed by (Sign/Print Name): KD Reynolds Date: 3/18/92

A-6000-435 (09/90)

9313018.1795

3 of 6

WELL SUMMARY SHEET

Boring or Well No. 299-W6-6

Sheet 1 of 3

Location 200 W/LLBG/WMA-5

Project W-017/LLBG

Elevation 691' ground elevation

Drilling Contractor Jensen Drilling Co

Driller John Johnson

Drilling Method and Equipment Backhoe/Cable Tool

Prepared By M. Havens (Sign/Print Name) C. Wright

Date 8-14-91

Reviewed By KD Reynolds KDR (Sign/Print Name)

Date 3/18/92

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
16-in i.d. temp C.S. casing				V. Sandy GRAVEL
set to 18.07		10		Gravelly SAND
No Sho				Gravelly SAND
Type I & II Cement Grout.		20		V. Gravelly SAND
20.7' - 2.0'				Sandy Gravel
4" ID T304 S.S. Casing.		30		Sandy Gravel
				Silty Sand
Envoplug Bent Slurry		40		Sandy Gravel (36-5)
406.7' - 20.7'				Gravelley SAND
		50		" Calcareous Silt Bed
				Slightly Gravelly Sand
		60		"
				SAND
		70		"
				Slightly Gravelly Sand
		80		"
				" "
		90		Slighty Silty Slightly Gravelly Sand
				SILTY SAND
		100		SAND
				Slightly Gravelly Sand
		110		" " To 107
				Silty Sandy Gravel
		120		"
				Sandy Gravel
		130		"
				"
		140		Silty Sandy Gravel
				GRAVEL
		150		GRAVEL
				Silty Sandy Gravel
		160		"
12" set at 169.80				"

16 12 10 4 4

17-8

A-6000-384 (04/90)

9313018.1791

476

WELL SUMMARY SHEET

Boring or Well No. 299 - W6 - 6

Sheet 2 of 3

Location 200W / LLBG / WMA5

Project W017 / LLBG

Elevation 691' ground elevation

Drilling Contractor JENSEN DRLG Co.

Driller JOHN JOHNSON / D. PERKINS

Drilling Method and Equipment CABLE TOOL, SPEEDSTAR

Prepared By ROBERT M. WINN (Sign/Print Name) Date

Reviewed By Ken Reynolds (Sign/Print Name) Date 9/16/92

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
12" set at 169.80'		170		SAND / GRAVEL w/ SILT - WET: GRAYISH BROWN AND LIGHT GRAY WHEN DRY
4" ID T304SS casing		180		
Enveloping Bent. Slurry 406.7-20.7'		190		
		200		
		210		
		220		
		230		
		240		SAND - SILTY : CRUSHED GRAVEL (DUE TO DRLG), MODERATE SORTING
		250		
		260		
		270		
		280		
		290		
		300		
		310		
		320		SAND - AS ABOVE
		330		

A-6000-384 (04/90)

9313018.1179

596

WELL SUMMARY SHEET

Boring or Well No. 299-W6-6

Sheet 3 of 3

Location 200W / LLBG / WMA5

Elevation 691' ground elevation

Driller JOHN JOHNSON / D. PERKINS

Prepared By ROBERT WINN (Sign/Print Name) Date

Project W017 / LLBG

Drilling Contractor JENSEN DRLG. Co

Drilling Method and Equipment CABLE TOOL, SPEED STAR

Reviewed By KDReynolds KDR (Sign/Print Name) Date 3/18/92

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
				SAND / GRAVEL: W/SILTS, WET:
10" set at 340.4'		340		2.5Y/5/2 GRAY-BROWN;
				2.5Y 7/2 LIGHT GRAY, SUB-
T.304 SS blankcasing 4"ID		350		ROUND TO ROUND
				✓
Emplaying Bent Grout · 406.7-20.7		360		✓
				✓
		370		✓
				✓
		380		✓
				✓
		390		✓
				✓
		400		✓
				✓
8-12 Sand 406.7-408.4		410		✓
20-40 Sand 416.8-406.7				SAND: F-C-M GRAVELS,
T.304 S.S. 20slot screen 4"ID		420		MATERIAL SAME AS ABOVE
10-20 Sand 429.5-416.8				✓
		430		✓
8-12 sand 435.9-429.5				✓
		440		✓
				✓
Emplaying Course 462.9-435.9		450		✓
				✓
		460		✓
8" set at 165.8				✓
7.4" 8" C.S. casing left in		470		✓
hole · and seal w/				T.D. 472.0'
Bent. hole plug - 465.8-455.4				
Stuff				
T.D. 472.0'				
		17-10		

A-6000-384 (04/90)

9313018.1793

KAISER ENGINEERS
HANFORD

FIELD SKETCH

626

Attachment To Or Description:
200-W Wells Survey

Sheet 2 of 2

WELL NO.	COORDINATES (C/L CASING) PLANT 200-W (FEET)	COORDINATES (C/L CASING) LAMBERT NAD'83 (METERS)	VERT. DATUM	ELEVATIONS (FEET) TOP OF BRASS CAP	HYDROSTAR PLATE N. SIDE	TOP OUTER CASING N. SIDE	TOP INNER CASING N. SIDE
299-W6-6	N:46,511.4	N:137,638.72	PLANT 200-W	691.05	694.23	694.21	N/A
	W:74,052.5	E:567,318.74	NGVD'29	691.31	694.49	694.47	N/A
299-W11-27	N:43,751.5	N:136,796.56	PLANT 200-W	681.55	685.02	685.01	N/A
	W:75,482.7	E:566,884.97	NGVD'29	681.81	685.28	685.27	N/A
299-W11-28	N:43,577.8	N:136,743.74	PLANT 200-W	689.68	693.23	693.22	N/A
	W:75,319.3	E:566,934.89	NGVD'29	689.94	693.49	693.48	N/A
299-W18-31	N:38,105.3	N:135,075.47	PLANT 200-W	660.47	663.92	663.90	N/A
	W:76,032.1	E:566,721.83	NGVD'29	660.73	664.18	664.16	N/A
299-W22-44	N;36,163.9	N:134,484.42	PLANT 200-W	674.51	677.89	677.87	N/A
	W:75,268.6	E:566,955.99	NGVD'29	674.77	678.15	678.13	N/A

9313018.179

BOREHOLE LOG

VALIDATED KDR 3/18/92 SIGNATURE/DATE

Boring or Well No. 299-W6-6

Sheet 1 of 24

Location 200W/LLBG/WMA-S

Project W-017/LLBG

Elevation 691.31

Drilling Contractor Jensen Drilling Co (JDC)

Driller John Johnson

Drilling Method and Equipment Backhoe/Cable Tool

Prepared By Mike Havens (Sign/Print Name) Date 8-13-91

Reviewed By R.D. Miller (Sign/Print Name) Date 8/21/91 RDM

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
5	2Lith 1Rad 1Moist			Very Sandy GRAVEL (60% grav, 40% sand) 20% sc, 5% cp, 15% mp 10% fp, 10% vfp, 10% vcs, 10% cs, 10% ms, 5% fs, 5% vfs Dk brn wet (10YR4/3) pale brn-dry (10YR 6/3) med sort, rounded to subangular, 60% felsic, 40% mafic, Strong HCl react	1037 - 5ft sample 8-13-91
				ms, 40% fs, 10% vfs mike 8-13-91	1130 - 10ft sample
10	2Lith 1Rad 1Moist			Gravelly SAND (25% grav, 75% sand) 5% cp, 7% mp 7% fp, 8% vfp, 5% vcs, 15% cs 15% ms, Dk brn-wet (10YR4/3) V. Pale brn-dry (10YR 7/3) med sort, subrounded to subangular, 65% felsic, 35% mafic, strong HCl react	8-13-91
15	2Lith 1Rad 1Moist			Gravelly SAND (30% grav, 70% sand) 10% cp, 7% mp, 7% fp, 8% vfp, 5% vcs, 5% cs, 10% ms, 30% fs, 20% vfs, Dk brn-wet (10YR4/3), V. pale brn-dry (10YR7/3) med sort, subrounded to subangular, 65% felsic, 35% mafic strong HCl react	1147 - 15 ft sample 8-13-91

9313018.1795

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 2 of 24

Location 200W/LLBG/WMA-S

Project W-017/LLBG

Elevation 691.31

Drilling Contractor JDC

Driller John Johnson

Drilling Method and Equipment BH/CT

Prepared By Mike Havens (Sign/Print Name) Date 8-13-91

Reviewed By R. D. Miller (Sign/Print Name) Date 8/31/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
20	2 Lity 1 Rev ✓ 1 Moist			V. Gravelly SAND (40% grav, 60% sand) 10% CS, 10% MS, 10% FS, 10% VFS, 10% VCS, 10% CS, 20% MS, 10% FS, 10% VFS, ~~Lety~~ MH 8-13-91 Dk Brn-Wet (10YR4/3) V. pale brn (10YR 7/3), moist, well sort, subrounded, 65% felsic, 35% mafic, strong HCl React	20 ft sample @ 1201 8-13-91
	1 Rev 24th				
25				(25) SANDY Gravel (50% Gravel 45% Sand 5% Silt) 50% SC 10% LG 50% MP 35% FP 10% CS 20% MS 10% FS 2.5Y 6/2 Lt Brown Gray Dry 2.5Y 4/2 Dark Grayish Brown wet, moist, Poorly sorted. Sub Rounded To Angular 50% Basalt, 30% Quartzite 20% Granite, Non plastic Strong react To 10% HCL	25' Sample at 1435 8/27/91 26' ± Change to Sand
				Silty Sand	28.2' Change in Lithology
	1 Rev 24th				Hard Caliche?
30				30' Silty Sand (80% Sand 20% Silt) 60% CS, 20% MS 20% FS 2.5Y 7/2 Lt Gray Dry 2.5Y 7/2 Lt Gray wet, moist, well sorted 70% Felsic, 30% mafic Hard, Non plastic, Strong react to HCL	Difficult Drill 1400 8/27/91 - Lots of Cemented Zones
	1 Rev 24th				Runs To 36'
35				35 (36.5 Really) Sandy Gravel (70% Gravel, 30% Sand) 10% LG 40% MS 50% FP 80% CS 10% MS 10 FS Trace Silt 2.5Y 5/2 Grayish Brn Dry 2.5Y 4/2 Dk Grayish Brown Brown, moist, Poorly Sorted, Sub Angular 70-80% Basalt, 20-30% QTZ Non react To 10% HCL	Change at 36.5' No Large Cobbles in Samples

9310018.1729

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 3 of 24

Location 200W UW6 WMA5

Project W017/UW6

Elevation ~~65~~ 691.31

Drilling Contractor Uesser

Driller Dave Porland

Drilling Method and Equipment Cable Tool 72 Speedsix

Prepared By Chris Vincent (Sign/Print Name) Date

Reviewed By R. D. Miller (Sign/Print Name) Date 8/31/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
40	26.5 in 1 Rock			40 Gravelly Sand (80% Sand 20% Gravel	8/28/91 1015
				30% ms, 70% FG, 80% CS 15% ms 5% FS	
				2.5Y 7/1 Lt Grey Dry 2.5Y 5/2 Grey Sil Brown	
				Dry, Moderate well Sorted Sub Angular to	
				Angular · 60% mafic 40% felsic mostly basalt	
				pebbles No Rxn to 10% HCl	
				~~See~~ Silt lens 43'-44'	~~See~~ Silt 43'-44'
45'	26.5 in Wash			45' Gravelly Sand (80% Sand 20% Grav)	
				~~Except Same~~ See Above except	Possible Caliche at 46±47
			Interbedded	Same Fragments of Calcareous silt	8/28/91 1335
				From ±46 To 47±	
50	26.5 in 1 Rock				
				50' ~~Sand~~ Slightly Gravelly Sand	
				C 90% Sand, 10% Gravel 20% ms, 80% fs	
			Gravel Fine Sand	80% CS, 10% ms 10% FS Trace Silt 2.5Y 7/1	52 · Lens of Fine, Calcareous Sand
				Lt Grey dry 2.5Y 5/2 Grayish Brown Dry	Silt.
				Well Sorted, Sub Angular, Dry to Slightly moist	
				~~40%~~ 60% mafic, 40% felsic, No Rxn to	
				HCl	
55'	26.5 in 1 Rock				
				50-52 Calcareous Cemented Silt + Sand	50-52 - Caliche
				Caliche? +	7.52 Back to Sand
				52' → Slightly Gravelly Sand (See Above)	1605 8/28/91
					* 1-2mm Fine Laminations
					W/Gray 2.5Y/7/2 Silt, Wet
					"Caliche" and Small Gravel
					Lenses? - Slackwater
					Deposits? - Not Very
				17-14	Thick - Not Well Bedded

A-6000-382 (04/90)

9313018.1797

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 4 of 24

Location 200W/LLBG/WMA5

Project W017/LLBG

Elevation 691 31

Drilling Contractor JENSEN

Driller Donnel Perkins

Drilling Method and Equipment Cable Tool 22 Speedstar

Prepared By C. Wright (Sign/Print Name) Date

Reviewed By R.D. Miller (Sign/Print Name) Date 8/31/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
60	2LITL (Rec)			60' Sand (90% CS, 10% MS) 5Y 7/1	
				LT Gray Dry 2.5Y 6/2 LT Brownish Gray Damp	8/28/91 1650
				Slightly moist, loose, Well sorted, Sub Angular	
				To Angular, 60-70% mafic (Basalt	
				No Rxn To 10% HCl	
65'	2LITL				
	(Rec)			65' SAND (90% CS, 10% MS, Trace Gravel)	8/29/91 0855
				See Above	Slight moist, Good Drilling
70'	2LITL				
	(Rec)			70' Slightly Gravelly SAND (10% Gravel	8/29/91 0955
				90% Sand, Trace Silt) 10% MS, 90% FS —	Good Drilling
				80% CS 10% MS 10% FS, 5Y 7/1 LT Gray Dry	
				2.5Y 6/2 LT Brownish Gray Damp, Slightly moist	
				Loose, Fairly Well Sorted, Sub Angular To Angular	
				60-70% Basalt, 10% QTZ, 20-30% Granitic Rx.	
				No Rxn To 10% HCl	
				73-74 ± Gray Calcareous Sandy Silt, No Visible	
				Calcite Buildup.	
75'	2LITL				
	(Rec)			75' Slight Gravelly Sand (10% Gravel	8/29/91 1150
				90% Sand, Trace Silt) See Above	Dry, Loose
				Less Gravel Than Above, Dry	
				17-15	

9313018.1755

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 5 of 24

Location 200W/UPG/WMA6

Project W017/LCUBC

Elevation ~~Lt~~ 691.31

Drilling Contractor Jensen Drilling Co

Driller Donald Perkins

Drilling Method and Equipment. Cable Tool 22 Speed Star

Prepared By C. Wagner (Sign/Print Name) Date _____

Reviewed By R.D. Miller (Sign/Print Name) Date 9/7/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
80	2 Liter 1 Bucket	DB		80' Slightly Gravelly Sand (5% Gravel 95% sand, trace Silt) 100% FG, 90% CS 10% MS, Trace FS 5Y7/1 Lt Gray dry, 2.5Y 6/2 Lt Brownish Gray Damp. Dry ~~Poorly~~ Well Sorted Sub Angular 60% mafic 40% Felsic Basalt Debris, No Rxn To 10% HCL	1½ Gallons H_2O Added To Aid Sample Retrieval 8/29/91 1335 1 Gal Added
85'	2 Liter 1 Bucket			85' Slightly SILTY Slightly Gravelly Sand (10% Gravel, 10% SILT 80% Sand) 1% LP 99% Fg - 20% CS 60% MS 30% FS 2.5Y7/2 Lt Gray dry, 2.5Y5/2 Grayish Brown Wet, Dry, Poorly Sorted, Sub Angular To Sub Rounded 80% Basalt pebbles, 20% Qtz, 70% mafic, 30% Felsic Sand, Moderate Rxn To HCL	85' SILT, Strong Rxn to HCL Some Basalt Cobbles, G
90'	2 Liter 1 Bucket			90' SILTY SAND (70% Sand 30% Silt) 30% CS, 50% MS 20% FS) 10YR 8/2 White Dry 10YR 6/2 Lt Grayish Brown Wet, Well Sorted Sub Rounded ? 60% Felsic 40% mafic Very Strong Rxn To ~~Hcl~~ 10% HCL Some Cemented Zones, dry	9/3/91 1115 Calcite ? - Cemented In Spots Possibly Thinner Silt Bed mixed With Sand 5-'
95'	2 Liter 1 Bucket			95' SAND (95% Sand, 5% SILT) ~~5%~~ 20% CS 60% MS 20% FS 10YR 6/2 Lt Brownish Gray Dry 10YR 5/2 Grayish Brown Wet, Dry, Well Sorted 40% mafic Basalt, 60% Felsic No Rxn To HCL	9/3/91 1400

A-6000-382 (04/90)

9313018.1799

BOREHOLE LOG

Boring or Well No. 2GA - WG -6

Sheet 6 of 24

Location 200W/LLB6/Dorm A5

Project W017/LLB6

Elevation LS 691.31

Drilling Contractor Jensen

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool 72 Speedstar

Prepared By C. Wright (Sign/Print Name) Date

Reviewed By R.D. Mitchell (Sign/Print Name) Date 9/7/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
100'	2 Liter 1 Med			100' Slightly Gravelly Sand (85% Sand	Clumps of Carbonate
				10% Gravel 5% Silt) 5% Lp 45% Mp	Rich Silt present.
				80% CS 10% MS 10% FS 10YR 7/3	
				V. Pale Brown Dry, 10YR 5/3 Brown	
				Wet, Dry, Moderately Well Sorted, Sub	~~Well Sorted Gravel~~
			Gravel	Rounded, 60-70% Mafic (Basalt) Strong	
				Rxn to HCl	
105'	2 Liter 1 Med			105' Slightly Gravelly Sand (85% Sand	
			Gravel	10% Gravel, 5% Silt) See Above	Gravel Slightly More
					Rounded, Larger
					107-108' Gradational Contact
					With Gravelly Large Cobbles
					in Drive Barrel
110'	2 Liter 1 Med			110 Silty Sandy Gravel (75% Gravel	
				20% Sand 5% Silt) 10% MC 10%	- Starts ±107
				SC 80% LP 25% Mp 25% Fp	9/4/91 1540
				70% CS 15% MS 15% FS	
				2.5Y 7/2 Lt Gray Dry 2.5Y 5/2	
				Grayish Brown Wet, Dry, Poorly Sorted	
				Rounded to Sub Rounded Pebbles, Sub	
				Rounded to Sub Angular Sand, 80%	
				Basalt, 10% Gtzite, 10% Granitic Rx	
115'	2 Liter 1 Med			No Rxn to 10% HCl	
				115 Silty Sandy Gravel - See Above	9/5/91 0920

17-17

9313018.1800

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 7 of 24

Location 200W/WMA-5

Project W017/LCB6

Elevation LS = Land Survey 641.31

Drilling Contractor Jensen

Driller Darrel Parlant

Drilling Method and Equipment Cable Tool 72 Speed Star

Prepared By C. Wright (Sign/Print Name) Date

Reviewed By R.D. Miller (Sign/Print Name) Date 9/7/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
120				120 SANDY GRAVEL (75% Gravel, 25% Sand, Trace SILT) 5% mc	01/5/91 1055 - No water
				20% SC 25% LP 25% mp 25% FP	
				80% CS 10% mS 10% FS - 2.5Y 7/2	
				Lt Grey Dry 2.5Y 5/2 Grayish Brown Damp	
				Dry, Non plastic, Poorly Sorted Rounded	
				To Sub Rounded, 70% Basalt 15% Quartzite	
				15% Granitic (Granite, Gneiss, Granodiorite) No Rxn	
				To 10% HCL	
125'	2 Liter 1 Rec	DB			
				125' (SANDY GRAVEL) See Above	
130'	2 Liter 1 Rec	DB			
				130' SANDY GRAVEL (60% Sand, 40% Gravel, Trace SILT) 5% mc, 10% SC	More Sand 01/5/91 1345
				10% LP, 30% mp 45% FP - 65% CS	
				20% mS 20% FS 2.5Y 7/2 Lt Gray Dry	
				2.5Y 5/2 Grayish Brown Dry, Dry, Loose	
				Poorly Sorted, Sub Rounded To Rounded -	
				50% Basalt, 25% Quartzite 25% Granitic	- Abundant Red Quartzite
				Slight To Moderate Rxn To 10% HCL	
135'	2 Liter 1 Rec	DB			
				135' SILTY SANDY GRAVEL (75% Gravel	
				15% Sand 10% SILT) 10% SC 25% LP	1725 01/5/91
				25% mp 40% sp 80% CS 10% mS	- More Less SILT
				10% FS, 2.5Y 7/2 Lt Gray Dry 2.5Y 5/2 Grayish	
				Brown Damp Loose Damp From Above Water	
				Poorly Sorted Rounded Pebbles Sub Rounded	
				To Sub Angular Sand. 60% Basalt 30%	- Some Angular Granitic
				Qtz Qtzite, 10% Granitic NO Rxn To 10% HCL	by Calc - SILT Unit - 35% Bitl
				17-18	Cultural Development?

9313018.1801

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 8 of 24

Location 200W/WMA-5

Project W017/4B6

Elevation LS = Land Surface 691.39

Drilling Contractor Jensen

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool - 72 Speed Star

Prepared By C Wright (Sign/Print Name)

Date

Reviewed By R.D. Miller (Sign/Print Name)

Date 9/12/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
140'	2 LITH 1 RAD			140' Gravel (80% Gravel, 15% Sand 5% SILT) 20% SC; 20% LP 30% MP 30% FP - 70% CS 20% MS 10% FS 2.5Y 7/2 LT Grey Dry 2.5Y 5/2 Brownish Green Wet. Dry w/some Added Water Poorly Sorted & Subrounded To Rounded 70% Basalt 15% QTZ + QTZite 15% Granite - Slight To Moderate Rxn To HCL in Sand	9/6/91 0905 Dry - 36 gallons Added - Lots of Cobbles.
145'	2 LITH 1 RAD	DB		145' Gravel. See Above	- Wet From Added Water - Possibly Slightly more Sand. - Sand Lense Appears in Drive Barrel
150'	2 LITH 1 RAD	DB		150' SILTY SANDY GRAVEL (70% GRAVEL 25% SAND 5% SILT) 30% SC, 40% LP-VLP 20% MP, 10% VFP-FP 5% VCS 5% CS 60% MS, 20% FS, 10% VFS; LT GRAY 2.5Y 7/2 DRY, BROWNISH GRAY 2.5Y 5/2 WET; POORLY SORTED, SUBANGULAR TO ROUNDED; 60% BASALT, 20% QUARTZ + QUARTZITE, 20% GRANITE; WEAK REACTION TO HCl	SAMPLE 9/6/91 1530 WET FROM 6 GALS WATER ADDED
155'	2 LITH 1 RAD	DB		155' SILTY SANDY Gravel (60% Gravel 30% Sand 10% Silt) 10% SC 30% LP 30% MP 30% FP - 20% CS - 60% MS 20% FS 2.5Y 7/2 Light Gray Dry 2.5Y 5/2 Grayish Brown Wet, Dry, Loose, Poorly Sorted, Rounded Cobbles + Larger Pebbles W/Angular To Subangular Sand and Fp. 50% QTZ + QTZite, 30% Basalt 20% Granitic, Moderate To Strong Rxn To HCL	Dry - 1300 9/6/91

9313018.1802

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 9 of 24

Location 200W/WMA5

Project W017 LLBG

Elevation CS 691.31

Drilling Contractor Jensen

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool/22 Sp-ed

Prepared By C. Wright (Sign/Print Name)

Date

Reviewed By R.D. Miller (Sign/Print Name)

Date 10/7/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
160'	21TH 1Rel	OB		160 SILTY SANDY GRAVEL (60% Gravel 30% Sand 10% SILT) 10% SG 30% LP 30% MP 30% FP - 20% CS 60% MS 20% FS 2.5Y 7/2 Grayish Brown Wet Poorly Sorted - Rounded to Sub Angular 50% Qtz + Qtz'te 30% Basalt 20% Granite, No Rxn to 10% HCl	Wet From Added Water Hard Drilling
165'	21TH 1Rel	OB		165' SILTY SANDY GRAVEL - See Above. - Some ~~Add~~ Calcified SILT Chunks present in sample.	9/11/91 - 0800 Dry.
170'		OB		170' See Above - Slightly Larger Cobbles 1 inch in Sample	9/11/91 1300 Wet From added H2O
175'	21TH 1Rel	HT		Sandy Gravel (85% Gravel, 10% Sand 5% SILT) 10% LP 60% MP 30% FP 20% CS 60% MS 20% FS?) 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 LT Gray Dry. Wet From Hand Tools, Poorly Sorted Angular, 60% Basalt 20% Qtz+Qtzite, 20% Granite, Some Green Schist. No Rxn to HCl	9/16/91 1110 Wet From Hand Tool

17-20

9313018.1803

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 10 of 24

Location 200W / WMA-5

Project W017/LLBB

Elevation CS 691.31

Drilling Contractor Jensen

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool 22 Speed Star

Prepared By C. Wright (Sign/Print Name) Date

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
180	2LITH 1 Vial	HT		180' SANDY GRAVEL (85% Gravel 10% Sand 5% Silt) 60% m-p 50% FP - 50% CO 25% MS 25% FS 2.5Y 5/2 Grey/Brown WET 2.5Y 5/2 Lt Gray. dry. Wet, poorly sorted, Angular Fragments. Sub Angular to Sub Rounded Sand 60% Basalt 20% Quartzite 20% Granite Some Silt, No Rxn to HCL	WET From Hand Tool 9/18/91 0730 17
185'	2LITH.				
	1 Vial	HT		185' Sandy Gravel - See Above	0940 9/17/91.
	2LITH				
190'	1 Vial	HT		190' Sandy Gravel - See Above	1430 9/17/91
	2LITH				Increase in Water Use From 9/16 - Possible Loss of SILT in Formation Not Detectable on Site
195'	1 Vial	HT		195' Sandy Gravel - See Above	1520 9/17/91

17-21

9313018.180

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 11 of 24

Location 200W UB6 WMA-5

Project W017 UB6

Elevation LS 691.31

Drilling Contractor Jensen

Driller Dwane Perkins

Drilling Method and Equipment Cable Tool Speed Star

Prepared By C. Wright (Sign/Print Name) Date

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
200'	2 with 1 rad			200' SILTY? Sandy Gravel	9/18/91 1130
				(50% Gravel, 40% Sand 10% SILT?	Hard TOOL
				≈ 25% MP - 55% FP - 60% CS 20% MS	
				20% FS 2.5Y 5/2 Grayish Brown Wet	- Gradual Change From
				2.5Y 7/2 Lt Gray Dry. Moderately Poorly	± 190 To Here - more Sand
				Sorted, Sub Rounded To Sub Angular	
				60% Basalt, 30% Qtz + Qtzite, 10%	Gravel layer ±204
				Granite, No Rxn To 10% HCL	
	2 with 1 rad				
206'				205' SILTY Sandy Gravel 45% Gravel	
				45% Sand (10% SILT) AS Above	9/18/91 1415
				Slightly more Sandy	more Sand Than 200'
210'	2 with 1 rad			210' SILTY Sand & Gravel - Similar	9/18/91 1705
				To 205'	
				(215') silty sandy GRAVEL	9/19/91 0840
215'				(50% gravel, 40% sand, 10% silt?)	casing depth ~216'
	2 with 1 rad	HT		same as above	slow drilling
					10" CS casing

9313018.1805

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 12 of 24

Location 200 W LLBG WMA-5

Project W-017 / LLBG

Elevation 691.3 ?

Drilling Contractor Jensen Drilling Company

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool / Speedstar

Prepared By SW Callison / SW Callison (Sign/Print Name) Date 9/19/91

Reviewed By R A Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
220	21th 1 rad	HT		(220') silty ? sandy GRAVEL (50% gravel 40% sand 10% silt) 25%-MP 25%-FP 25%-CS 10%-MS 5%-FS 2.5Y 5/2 grayish brown (wet) 2.5Y 7/2 lt. gray (dry) poorly sorted, subangular to angular 60% mafic 40% felsic some rxn to 10% HCL	casing depth ~ 220' slow drilling 9/19/91 1020 10" CS casing
225	21th 1 rad	HT		(225') silty sandy GRAVEL same as above	casing depth ~ 225' slow drilling 9/19/91 1505 10" CS casing
230	21th 1 rad	HT		(230') silty sandy GRAVEL same as above	casing depth ~ 225' slow drilling 9/19/91 1515 10" CS casing
235	21th 1 rad	H.T.		(235') silty sandy GRAVEL (similar to above)	1520 9-23-91

A-6000-382 (04/90)

9313018.1807

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 13 of 24

Location 200 W LLBG WMA-5

Project W-017 / LLBG

Elevation 691.31

Drilling Contractor Jensen Drilling Company

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool / Speedstar

Prepared By D.B. Drewry / Dale Drewry (Sign/Print Name) Date 9-23-91

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
240	21.7ft 1 Rad	HT		(240') silty sandy GRAVEL (60% gravel 20% sand, 10% silt) 10% CP 30% MP, 20% CP; 10% CS, 5% MS; 5% FS; wet (5Y 3/2) olive brown; (2.5 Y 7/2) light gray; poorly sorted subangular to angular; 60% mafic 40% felsic; felsic; slight reaction to HCl; sample pulverized by H.T.)	1600 9-23-91
245	21.7ft 1 RAD	HT		(245') Silty sandy GRAVEL (50% gravel 40% sand 10% silt) 50% MP 10% FP 30% CS 10% MS); wet (5Y 3/3) olive brown Dry: (5Y 7/1) Brown; Poorly sorted Angular clasts 50% mafic 40% felsic 10% QTZ Broken by H.T.)	1030 9-24-91
250	21.7ft 1 RAD	HT		(250') SANDY GRAVEL (60% gravel 40% sand) 10% CP 30% MP 20% FP 30% CS 10% MS; wet (5Y 3/3) Dry (5Y 7/2) Poorly to moderately sorted subangular 40% mafic 60% felsic	1125 9-24-91
255	21.7ft 1 RAD	HT		(255') Silty Sandy Gravel (50% gravel 30% sand 20% silt) 10% CP 30% MP 10% FP 20% CS 10% MS) wet color: (5Y 3/1) Dry: (2.5Y 7/2) Moderately sorted, subangular to sub rounded / MAFIC = 40% Felsic: 60% Heavily broken by tool	1540 9-24-91

A-6000-382 (04/90)

9313018.1807

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 14 of 24

Location 200 W LLBG - WMA-5

Project W017 / LLBG

Elevation CS 691.31

Drilling Contractor JENSEN

Driller Darrel Perkins

Drilling Method and Equipment CABLE TOOL SPEEDSTAR 72

Prepared By D. Seaver (Sign/Print Name) Date 9/25/91

Reviewed By R.D. Miller (Sign/Print Name) Date 10/7/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level	
26.0	2 L.M 1 RAD	HT		(260') Silty Sandy Gravel (50% gravel 30% sand 20% silt) 10% CP 30% MP 10% FP 10% CS 10% MS 10% FS) wet = (5Y 5/3) dry = (2.5Y 7/3) moderately sorted, subangular, 50% mafic 50% felsic	1650	9/24/91
26.5	2 L.M 1 RAD	HT		(265') Silty Sandy Gravel (80% gravel, 10% sand, 10% silt) 40% CP, 20% MP, 20% FP, 5% MS, 5% FS wet color = (5Y 5/2) Dry = (2.5Y 7/3) subangular clasts, 50% mafic 50% felsic. Poorly sorted	0920	9/25/91
27.0	2 L.M 1 RAD	HT		(270) Sandy Gravel (60% gravel 40% sand) 30% MP 30% FP 10% CS 10% MS 20% FS wet = (5Y 5/3) Dry = (2.5Y 7/3) subrounded to subangular clasts, 35% mafic 65% felsic. Broken by H.T. Lots of muddy water in sample. moderately sorted, saturated sample	1045	9/25/91
27.5	2 L.M 1 RAD	H.T.		(275) Sandy Gravel (50% Gravel 50% sand) 10% CP 20% MP 20% FP 20% CS 10% MS 20% FS / wet = (5Y 5/2) Dry = (2.5Y 7/3) mafic = 70% felsic = 30% Rounded - subangular clasts. Saturated sample	1600	9/25/91

9313018.1807

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 15 of 24

Location 200W WMA-5

Project W017 / WB6

Elevation LS 691.31

Drilling Contractor Jensen

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool 72 speed Star

Prepared By C. Wright (Sign/Print Name) Date 4/26/91

Reviewed By R. D. Miller (Sign/Print Name) Date 10/19/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
280	2LITH Hard Clean	1-11		280' Sandy Gravel (50% Gravel	0810 4/26/91
				45% Sand 5% Clay-SILT. 10% CP	
				~~70% 50% mp 40% Fp 20% CS 10% ms~~	
				40% CS 20% ms 40% FS 5Y/52	Some Thin Mud + Sand
				Olive Gray Wet 2.5Y 7/2 LtGrey Dry	Clots in Sample
				Saturated Nonconcave, 70% mafic 30%	
				Felsic. Slight Rxn To HCl	
285	2LITH Hard Clean	OB		285' SILTY Sandy Gravel (60% Gravel	1155 4/26/91
				30% Sand 10% SILT - 20% SC 30% LP	Drive Barrel Sampl-
				25% mp 25% Fp ~ 10% CS 80% ms	matrix Supported
				10% FS · 2.5Y 5/3 LT Olive Brown Damp	Gravel w/ med Sand matrix
				2.5Y N/7 LtGrey Dry. Saturated,	-
				Poorly Sorted Sub Rounded To Angular	Some Vein Qtz ? Green Schist
				40% Basalt, 40% Granitic & 20% Qtz + Quartzite	-
				moderate to Slight Rxn to HCl	
290'	2LITH Hard Clean	1-11		290' Slightly Silty Gravelly Sand	1535 / 4/26/91
				(25% Gravel 15% SILT 60% Sand)	
				10% LP 30% mp 60% FP - 80% CS 10%	
				ms 10% FS 2.5Y 5/3 LtOlive Brown	
				Damp 2.5Y N/7 LtGrey Dry, Saturated	
				Moderately Sorted, Sub Angular To Sub	≈ 293' - Wood Fragments
				Rounded 40% mafic, 60% Felsic, No Rxn	in Bailer
				To HCl	
					294± Sand Hit. in Hole
295	2LITH Hard Clean	1-11		295 Silty Sandy Gravel (60%	295' Bx
				Gravel, 30% Sand 10% SILT. See	Matrix Supported, White
				285'	Bands - Rimrock Crack

9313018.1809

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 16 of 24

Location 200 W WMA-5

Project W017/LLBG

Elevation LS 691.31

Drilling Contractor Jensen

Driller Donnel Perkins

Drilling Method and Equipment Cable Tool 72 Speed Sa

Prepared By C. Wright Clark (Sign/Print Name) Date 10/2/91

Reviewed By R.D. Hill (Sign/Print Name) Date 10/14/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
300	~~300~~ 2 Silty 1 moist 1 Gravel	HT		300 Silty Sandy Gravel (50% Gravel 35% Sand 15% Silt) 100% FG - 30% CS	9/30/91 1420
				50% MS 30 FS - 2.5Y 5/3 Lt Olive Brown	Bad Sample - Probably
				Damp 2.5Y N/7 Lt Gray Dry - Saturated,	Similar To 285
				Poorly Sorted, Sub Rounded To Sub Angular	
				60% Qtz. Qtzite, 30% Basalt 10% Granitic	
				No Rxn To HCl but Not Good Sample.	
305'	2 Silty 1 ~~Moist~~ 1 Gravel	HT		305' Silty Sandy Gravel	10/1/91 1500
				See Above	- Possibly more Sand.
310'	2 Silty 1 Moist 1 Gravel	HT		310' Silty Sandy Gravel (70% Gravel	10/1/91 1630
				20% Sand 10% Silt) 30% MS, 70% FS	
				80% MS 20% FS 10% Silt 2.5Y 5/3	
				Lt Olive Brown Wet 2.5Y N/7 Lt Gray Dry	
				Saturated, moderate Poorly Sorted.	
				Rounded To Sub Angular Fragments	
				50% Qtz + Qtzite 30% Basalt, 20% Granitic	
				No Rxn To 10% HCl	
315'	2 Silty 1 Moist 1 Gravel	HT		315 Silty Sandy Gravel, Similar	10/2/91 1020
				To Above	

9313018.1812

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 17 of 24

Location 200W WMA-5

Project W017/LLBG

Elevation LS 691.31

Drilling Contractor Jensen

Driller Daniel Perkins

Drilling Method and Equipment Cable Tool 72 Spud SD

Prepared By C. Wright (Sign/Print Name) Date 10/7/91

Reviewed By P. D. Hilbert (Sign/Print Name) Date 10/14/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
320	21th Hand Lacer	HT		320 - Gravel (60% Gravel 10% Sand, Trace Silt.) 10% CS 30% mp 60% FG - 80% CS 20% MS + FS) 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 Gray Dry, Saturated Moderately Well Sorted, Sub Angular to Rounded 50% Qtz + Qtzite, 30% Basalt 20% Granite.	HT, 10/2/91 1150
325	21th Hand Lacer	HT		325 Silty Sandy Gravel (45% Sand 45% Gravel 10% Silt (30% mp 70% FP 80% CS 10% MS 10% FS 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 Lt Gray Dry, Loose, Saturated Moderately Well Sorted, Sub Rounded 50% Qtz + Qtzite, 30% Basalt 20% Granite	HT 10/3/91 0820
330	21th Hand Lacer	HT		Gravelly Sand (75% Sand 20% Gravel 5% Silt) 20% mp 80% FP 80% CS 10% MS 10% FS - 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 Lt Gray Dry Loose, Saturated Sub Angular 50% Qtz + Qtzite, 30% Basalt 20% Granite hx.	10/3/91 1030 HT
335	21th Hand Lacer	HT		Gravelly Sand (See 330')	1430 10/3/91

A-6000-382 (04/90)

9313018.1811

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 18 of 24

Location ~~W017/C~~ 200W WMA-5

Project W017/1136

Elevation LS = Land Surface 691.3

Drilling Contractor Jensen

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool 72 Speed SR

Prepared By C. Wright (Sign/Print Name) Date

Reviewed By R.D. Miller (Sign/Print Name) Date 10/21/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
340	21in Hand Clean	DB		340' Silty Sandy Gravel (60% Gravel 30% Sand 10% Silt) 20% CL 30% Lp 25% mp 25% Fp - 80% CS 10% mS 10% FS 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 Lt Gray, Dry - Saturated Poorly Sorted, Rounded To Sub Rounded 50% Qtz + Qtzite 30% Basalt 20% Granite No HCL on Hand	- Tight Matrix Saturated Rinehold Gravel
345	21in Hand Clean	HT		345 - Silty Sandy Gravel (50% Gravel 40% Sand 10% Silt) 30% CL 20% mp 10% Fp 10% CS 20% mS 10% FS wet (2.5Y 6/2) ~~2.5Y 5/2~~ Dry Poorly Sorted Sub Rounded - Subangular Clasts 50% Mafic 50% Felsic Saturated Sample	
350	21in Hand Clean	HT		350 Silty Sandy Gravel 60% Gravel 30% Sand 10% Silt 30% CL, 20% mp 10% Fp 20% CS 5% mS 5% FS, wet = (2.5Y 5/2) Saturated Sample / Sub Rounded To Subangular Clasts 50% Felsic 50% Mafic	
355	21in Hand Clean	HT		355' Slightly Silty Gravelly Sand. (35% Gravel 55% Sand - 10% Silt.) 10% mp 90% Fp - 90% CS 5% mS 5% FS - 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 Lt Gray Dry, Saturated Poorly Rounded To Sub Angular 60% Qtz, 30% Basalt 10% Granite. No HCL	1000 L 0/10/CL HL
				17-29	

9313018.1812

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 19 of 24

Location 200W WMA-5

Project W017/LLBL

Elevation LS 691.31

Drilling Contractor Jensen

Driller Darrel Perkins

Drilling Method and Equipment Cable Tool 22 Speed Sen

Prepared By L. Wright (Sign/Print Name) Date

Reviewed By R.O. Miller (Sign/Print Name) Date 10/21/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
360	2LTL Mod Loose	HT		Slightly Silty ~~Sa~~ Gravelly Sand	
				See 355'	
365	2LTL Mod Loose	HT		365 (Slightly Silty Sand (15% Silt 85% Sand) 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 LT Gray Dry. Sand 90% Coarse-Med Sand 10% FS Saturated, Well Sorted, Sub Angular 60% Felsic	1645 10/10/91 HT
370	2LTL Mod Loose	HT		370 Slightly Silty Slightly Gravelly Sand (15% Gravel, 70% Sand 15% Silt 100% Fp - 80% CS-MS - 20% FS - Similar to 365	0830 10/14/91 HT
375	2LTL Mod Loose	HT		375' Silty Sandy Gravel (70% Gravel 15% Sand 15% Silt) - 2.0 amp 80% Fp - 10% CS 40% MS 10% FS 2.5Y 5/2 Grayish Brown Wet 2.5Y 7/2 LT Gray Dry Saturated Moderately Well Sorted, Sub Angular to Rounded,	1100 10/14/91 HT

9313018.1813

BOREHOLE LOG

Boring or Well No. 2CC-W6-6

Sheet 20 of 24

Location 200W Area 5

Project W017/LLW86

Elevation LS 691.31

Drilling Contractor Union

Driller Daniel Perkins

Drilling Method and Equipment Cable Tool

Prepared By [illegible] (Sign/Print Name) Date 10/1/91

Reviewed By Edward C. Rafuse (Sign/Print Name) Date 10/1/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
380	2 Liter Lexan	HT		380 Slightly Silty Slightly Gravelly Sand (15% Gravel 70% Sand 15% Silt 100% Fp 80% Cm 20% MD + FS. 2.5Y 7/2 Light Gray Dry 2.5Y 5/2 Grayish Brown Wet, Well Sorted Loose. Sub Angular To Rounded. 60% Feldspar No HCL	10/1/91 HT
					5' SAMPLE — 10/15/91 @ 1120
385	2 Liter Lexan	HT		385 See Above Sand & Gravel	
390	2 Liter Lexan	HT		See Above (385')	10/15/91 1420 HT
395'	2 Liter Lexan	HT		See Above (3980)	10/15/91 1700 HT

9313018.181

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 21 of 24

Location 200 W WMA5

Project WO 17 LLBG

Elevation 641.31

Drilling Contractor JENSEN

Driller DARRELL PERKINS

Drilling Method and Equipment CABLE TOOL

Prepared By ROBERT WINN (Sign/Print Name) Date 11/1/91

Reviewed By (Sign/Print Name) Date 11/1/91

Depth (FEET)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
400'				SANDS — GRAVELS, F-C SAND & F-C GRAVEL ARE ROUNDED TO SUB-ROUNDED; ANGULARITY DUE TO DRILLING; BASALT — QTZ IS ~ 50/50, SILTS DUE TO DRILLING, WET: 5Y 4/3, DRY: 5Y 5/2; BROWN CHERT PEBBLES & GRAVELS NO REACTION W/ 10% HCL	SWL @ 269.4 @ 7:15 AM; VERY WINDY/DUSTY 10/16/91 ---
	2-LITH 1-RAD 1-CaCO3	HT			
405'					5' SAMPLE --- 10/16/91 @ 1000
				SANDS — W/ CRUSHED GRAVELS, SEE ABOVE; SILTY MATRIX W/VOL ~ 50-50 W BASALT, "GRAVELS" ARE RESULT OF HT DRILLING --- PROBABLY A SAND/GRAVEL/PEBBLE UNCEMENTED CONGLOMERATE	
	2-LITH 1-RAD 1-CaCO3	HT			
410'					5' SAMPLE --- 10/16/91 @ 1545
				SAND — GRAVELS, F-C SAND, ANGULARITY DERIVED FROM DRILLING TOOLS; "SAND" COMPOSED OF BASALT & CHERT, ETC ~ 50/50; SEE ABOVE FOR COLORS, OTHER; NO REACTION TO 10% HCl	SAMPLES DIFFICULT TO HOLD IN BAILER
	2-LITH 1-RAD 1-CaCO3	HT			
415'					5' SAMPLE -- 10/16/91 @ 1000
				SAND — F-C-MEDIUM GRAVEL, CRUSHED BY DRILLING TOOLS, SAME MATERIAL AS ABOVE --- SANDS FINING DOWNWARD	
	2-LITH 1-RAD 1-CaCO3	HT			
420'					5' SAMPLE -- 10/17/91 at 1130

A-6000-382 (04/90)

9313018.1815

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 22 of 24

Location 200W WMA5

Project W017 CLBG

Elevation 691.31

Drilling Contractor JENSEN

Driller DARRELL PERKINS

Drilling Method and Equipment CABLE TOOL 72 SPEEDSTAR

Prepared By Robert Winn ROBERT WINN (Sign/Print Name) Date 10/21/91

Reviewed By Edward C. Rifell (Sign/Print Name) Date 11/1/91

Depth (FEET)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
420'				SANDS — CHERT/QTZ AND BASALT AS SANDS & GRAVELS W/ TRACE OF CLAY IN THE F-M MATRIX MATERIAL, REFER TO ABOVE;	
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE -- 10/17/91
425'				SANDS — REFER TO ABOVE, VF-F SANDS COMPOSED OF QTZ & BASALT, COLOR WET: 2.5Y 3/2, DRY: 5Y 5/1. DRILLING ACTIVITY -- THE DRILLING TOOLS "POWDERED" THE MATRIX MATERIAL, SOME CLAY IS PRESENT, NON REACTIVE 10% HCl	@ 1435 HT DRILLING - SAMPLES ARE POOR — FINE TO VF GRAINED MATERIAL
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE - 10/21/91
430'				SANDS — BASALT & CHERT & OTHERS IS ~50:50. CABLE TOOL ACTION VIRTUALLY PULVERIZED THE BASALTS; COLOR IS GRAY-GREEN WET AND GREENISH BROWN DRY.	@ 0930
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE 10/21/91
435'				SANDS — BASALT & CHERT GRAVELS — SUB-ROUNDED TO SUB-ANGULAR DUE TO DRILL TOOL ACTION -- PARTICLE SIZE AND ANGULARITY CONTROLLED BY TOOLS -- ROUNDNESS IS A FUNCTION OF MECHANICAL WEAR SUCH AS STREAM BED SCOURING AND EROSION	@ 1145
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE -- 10/21/91 @ 1445

9313018.18

BOREHOLE LOG

Boring or Well No. 299- W6 - 6

Sheet 23 of 24

Location 200W / WMA5

Project W017 LLBG

Elevation 691.31

Drilling Contractor JENSEN

Driller DARRELL PERKINS

Drilling Method and Equipment CABLE TOOL -- SPEED STAR

Prepared By Robert Winn ROBERT WINN (Sign/Print Name) Date 10/23/91

Reviewed By Edward C. Rafuse (Sign/Print Name) Date 11/1/91

Depth (FEET)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
440'				SANDS - SEE ABOVE - APPEARS TO BE SAME MATERIAL AS ABOVE AND IS A PRODUCT OF THINNER SLURRIES ALLOWING SOME PARTICLES OF COARSE SANDS - COARSE GRAVEL.	
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE -- 10/22/91 @ 1445
445'				SANDS - GRAVELS -- SAME AS ABOVE; NO REACTION TO 10% HCl, SILTS - BOTH NATURAL & TOOL MADE	
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE 10/22/91
450'				SANDS - GRAVELS --- FINE TO MEDIUM GRAVELS & SANDS -- SAME AS ABOVE	
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE -- 10/23/91 @ 1000
455'				SANDS - GRAVEL - AS ABOVE, SOME CLAY	
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE -- 10/23/91 @ 1130

9313018.1817

A-6000-382 (04/90)

BOREHOLE LOG

Boring or Well No. 299-W6-6

Sheet 2A of 2A

Location 200W / WMA5

Project W017 / LLBG

Elevation 691.31

Drilling Contractor JENSEN DRLG

Driller DARRELL PERKINS

Drilling Method and Equipment CABLE TOOL

Prepared By Robert Winn (Sign/Print Name) ROBERT WINN Date

Reviewed By Edward C. Rafferty (Sign/Print Name) Date 4/1/92

Depth (FEET)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
460'				SANDS — GRAVELS -- AS ABOVE — WELL BORE MATERIAL PULVERIZED TO "FLOUR", WET -- DARK GRAY, DRY -- LIGHT GRAY	
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE — 9/23/91 @ 1530
465'				SANDS -- AS ABOVE -- NO DEPTH GAINED -- HT AT VIRTUALLY NO PROGRESS	
	2-LITH 1-RAD 1-$CaCO_3$	HT			5' SAMPLE -- 9/23/91 @ 1630 --
470'		ST		SANDS — SEE ABOVE	2' SAMPLE --- 9/24/91 SPLIT TUBE — RECOVERED .8', SANDS & GRAVELS AS ABOVE
				T.D. 472.0' bls	
475'					

9313018.181

EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

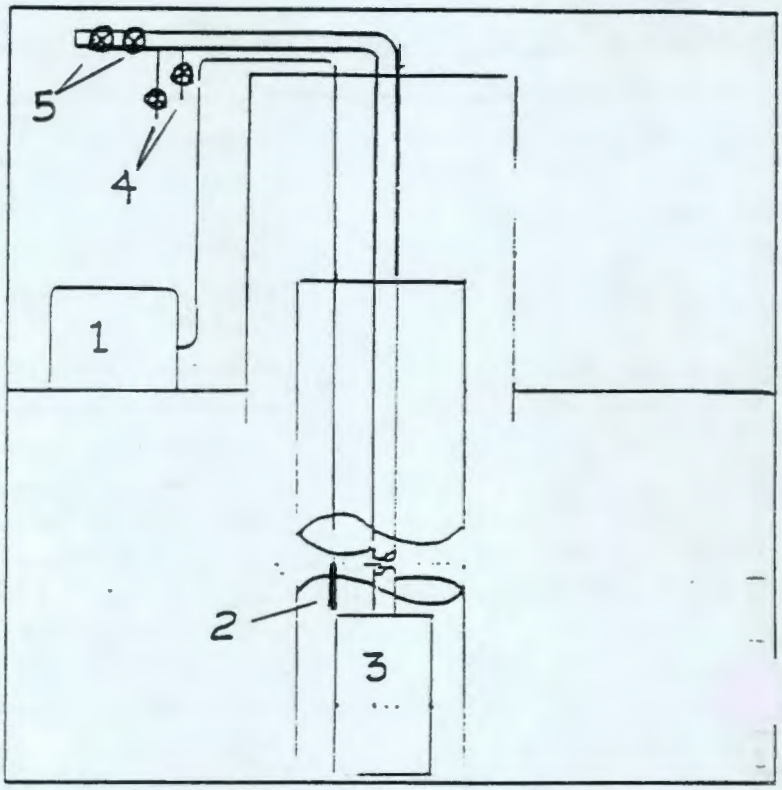
Well Designation 299-W6-6 Depth 434.41' BTOC

VALIDATE KDK 3/18 SIGNATURE/DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K192
2	TRANSDUCER SN-2303
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

Diagram

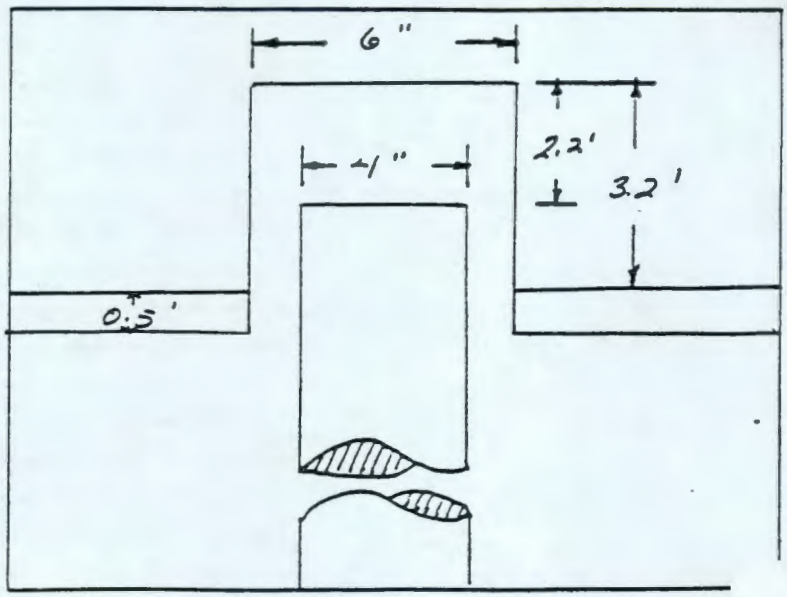


Well Head

Comments

BTOC - Below top of 6" casing

Diagram



Signature of Recorder JAMES A. GATES JAMES A. GATES Date 6/23/92

A-6000-417 (08/89)

9313018.1819

WELL DEVELOPMENT FORM

Well Designation 299-W6-6 Well Depth 434.41' BTOC

Screened Interval 434.41' - 424.01' BTOC Date Well Development is Performed 12-16-91 - 12-21-91

BAILING

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

Type of Surge Block _____ Dimension of Surge Block _____

TD BEFORE	STROKE LENGTH	STROKE FREQUENCY	SURGE INTERVAL	SURGE TIME	TD AFTER	TD DIFFERENCE

AIRLIFT

Depth of Eductor Pipe _____ Airlift Start Time _____

Flow Rate _____ Accumulated Flow _____ Airlift Stop Time _____

Turbidity _____, _____, _____, _____, _____, _____, _____, _____

_____, _____, _____, _____, _____, _____, _____, _____

MECHANICAL PUMPING

Pumping Technique CONSTANT DISCHARGE Pump Depth ~~433.2'~~ 433.2' BTOC JAC

	12-17-91	12-18-91	12-19-91
Pump Start Time	1320	1345	0935
Pump Stop Time	2145	0035	1035

Flow Rate 12-17-91 10.5 | 12-18-91 9.6 GPM | 12-19-91 9.7 GPM Accumulated Flow 14,058 GAL

** 12-18-19

Turbidity 35, 39, 38, 35, 32, 35, 39, 33

● 12-19-91 ◆ 12-21-91

30, 32, 40, 30, 35, 37, 38, 21.5

12-21-91

Comments * Pump Start Time 1110 | ** Turbidity ~~readings~~ started at

Pump Stop Time 1345 | >100 on 12-17-91 and 12-18-91

12-21-91

Flow Rate 9.8 GPM | ** Note: Above Turbidity readings for last 16 readings only

Signature of Recorder ~~James A. Coates~~ JAMES A. COATES Date 12/23/91

Sign and Print Name

17-37

9313018.182

DRAWDOWN/RECOVERY

Well Designation 299-W6-6 Date 12-16-91 through 12-21-91

Well Depth 434.41' BTOC Screened Interval 434.41' - 424.01' BTOC

Pumping Method CONSTANT DISCHARGE

Equipment Used to Measure Water Level E.TAPE / TRANSDUCER S.N ET-1 / 2303 Calibation Due 1-24-92 / 7-19-92

Equipment Used to Measure Flow — NA — S.N. — NA — Calibation Due — NA —

Measuring Point TOP OF CASING 6" (T.O.C. 6") Pump Start Time 1345-0035 (12-16) 1320-2145 (12-18) 0935-1035 (12-19) 1110 - 1345 (12-21) Pump Stop Time

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD.
				5 gal / 28.6 sec = 10.5 GPM
				~~5 gal / 33 sec = 9.1 GPM~~ JAC
				5 gal / 31.4 sec = 9.6 GPM
				5 gal / 30.9 sec = 9.7 GPM
				5 gal / 30.6 sec = 9.8 GPM
		SEE ATTACHED		

Signature of Recorder James A. Coates JAMES A. COATES Date 12/23/91

Sign and Print Name

A-6000-402 (03/90)

9313018.1821

299-W6-6 BASELINE PAGE 2 OF 12

SE2000
Environmental Logger
12/19 07:40

Unit# 192 Test 0

INPUT 1: Level (F) TOC

Reference	257.040
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/16 11:29:48

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	256.073	-256.073
1.0000	0.0167	256.089	-256.089
2.0000	0.0333	256.120	-256.120
3.0000	0.0500	256.152	-256.152
4.0000	0.0667	256.200	-256.200
5.0000	0.0833	256.231	-256.231
6.0000	0.1000	256.263	-256.263
7.0000	0.1167	256.295	-256.295
8.0000	0.1333	256.342	-256.342
9.0000	0.1500	256.374	-256.374
10.0000	0.1667	256.406	-256.406
11.0000	0.1833	256.437	-256.437
12.0000	0.2000	256.469	-256.469
13.0000	0.2167	256.501	-256.501
14.0000	0.2333	256.532	-256.532
15.0000	0.2500	256.564	-256.564
16.0000	0.2667	256.596	-256.596
17.0000	0.2833	256.643	-256.643
18.0000	0.3000	256.659	-256.659
19.0000	0.3167	256.691	-256.691
20.0000	0.3333	256.723	-256.723
21.0000	0.3500	256.738	-256.738
22.0000	0.3667	256.770	-256.770
23.0000	0.3833	256.802	-256.802
24.0000	0.4000	256.834	-256.834
25.0000	0.4167	256.865	-256.865
26.0000	0.4333	256.881	-256.881
27.0000	0.4500	256.913	-256.913
28.0000	0.4667	256.944	-256.944
29.0000	0.4833	256.976	-256.976
30.0000	0.5000	256.992	-256.992
31.0000	0.5167	257.024	-257.024

9313018.1827

SE2000
Environmental Logger
12/19 07:38

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	257.040
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/17 13:24:10

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.00000	0.00000	264.138	-264.138
0.00830	0.00014	256.469	-256.469
0.01660	0.00028	257.499	-257.499
0.02500	0.00042	257.689	-257.689
0.03330	0.00056	257.863	-257.863
0.04160	0.00069	258.022	-258.022
0.05000	0.00083	258.133	-258.133
0.05830	0.00097	258.339	-258.339
0.06660	0.00111	258.561	-258.561
0.07500	0.00125	258.719	-258.719
0.08330	0.00139	258.798	-258.798
0.10000	0.00167	259.242	-259.242
0.11660	0.00194	259.559	-259.559
0.13330	0.00222	259.939	-259.939
0.15000	0.00250	260.319	-260.319
0.16660	0.00278	260.589	-260.589
0.18330	0.00306	260.922	-260.922
0.20000	0.00333	261.175	-261.175
0.21660	0.00361	261.619	-261.619
0.23330	0.00389	261.888	-261.888
0.25000	0.00417	262.173	-262.173
0.26660	0.00444	262.474	-262.474
0.28330	0.00472	262.902	-262.902
0.30000	0.00500	263.172	-263.172
0.31660	0.00528	263.473	-263.473
0.33330	0.00556	263.821	-263.821
0.41660	0.00694	265.200	-265.200
0.50000	0.00833	266.610	-266.610
0.58330	0.00972	267.989	-267.989
0.66660	0.01111	269.399	-269.399
0.75000	0.01250	270.714	-270.714
0.83330	0.01389	271.982	-271.982
0.91660	0.01528	273.218	-273.218
1.00000	0.01667	274.073	-274.073
1.08330	0.01805	275.182	-275.182

9313018.1823

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299-W6-6 DRAWDOWN PAGE 7 OF 12

1.16660	0.01944	275.991	-275.991
1.25000	0.02083	277.005	-277.005
1.33330	0.02222	278.035	-278.035
1.41660	0.02361	278.811	-278.811
1.50000	0.02500	279.698	-279.698
1.58330	0.02639	280.554	-280.554
1.66660	0.02778	281.346	-281.346
1.75000	0.02917	282.138	-282.138
1.83330	0.03056	282.931	-282.931
1.91660	0.03194	283.628	-283.628
2.00000	0.03333	284.341	-284.341
2.50000	0.04167	288.350	-288.350
3.00000	0.05000	291.836	-291.836
3.50000	0.05833	294.688	-294.688
4.00000	0.06667	296.938	-296.938
4.50000	0.07500	298.729	-298.729
5.00000	0.08333	300.123	-300.123
5.50000	0.09167	301.311	-301.311
6.00000	0.10000	302.294	-302.294
6.50000	0.10833	302.928	-302.928
7.00000	0.11667	303.545	-303.545
7.50000	0.12500	303.894	-303.894
8.00000	0.13333	304.322	-304.322
8.50000	0.14167	304.544	-304.544
9.00000	0.15000	304.623	-304.623
9.50000	0.15833	304.813	-304.813
10.00000	0.16667	304.940	-304.940
12.00000	0.20000	305.384	-305.384
14.00000	0.23333	304.575	-304.575
16.00000	0.26667	304.369	-304.369
18.00000	0.30000	304.401	-304.401
20.00000	0.33333	304.449	-304.449
22.00000	0.36667	304.544	-304.544
24.00000	0.40000	304.718	-304.718
26.00000	0.43333	304.750	-304.750
28.00000	0.46667	304.972	-304.972
30.00000	0.50000	304.924	-304.924
32.00000	0.53333	305.082	-305.082
34.00000	0.56667	305.035	-305.035
36.00000	0.60000	304.972	-304.972
38.00000	0.63333	305.019	-305.019
40.00000	0.66667	304.987	-304.987
42.00000	0.70000	305.082	-305.082
44.00000	0.73333	305.035	-305.035
46.00000	0.76667	305.067	-305.067
48.00000	0.80000	305.098	-305.098
50.00000	0.83333	305.178	-305.178
52.00000	0.86667	305.162	-305.162
54.00000	0.90000	305.162	-305.162
56.00000	0.93333	305.241	-305.241

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58.00000	0.96667	305.178	-305.178
60.00000	1.00000	304.956	-304.956
62.00000	1.03333	305.051	-305.051
64.00000	1.06667	305.003	-305.003
66.00000	1.10000	305.003	-305.003

299-W6-6 DRAWDOWN

68.00000	1.13333	305.035	-305.035
70.00000	1.16667	305.019	-305.019
72.00000	1.20000	304.956	-304.956
74.00000	1.23333	305.067	-305.067
76.00000	1.26667	305.209	-305.209
78.00000	1.30000	304.956	-304.956
80.00000	1.33333	305.051	-305.051
82.00000	1.36667	305.035	-305.035
84.00000	1.40000	304.908	-304.908
86.00000	1.43333	305.019	-305.019
88.00000	1.46667	304.892	-304.892
90.00000	1.50000	304.987	-304.987
92.00000	1.53333	305.019	-305.019
94.00000	1.56667	305.098	-305.098
96.00000	1.60000	305.035	-305.035
98.00000	1.63333	304.908	-304.908
*********	1.66667	304.940	-304.940
*********	1.75000	304.876	-304.876
*********	1.83333	304.750	-304.750
*********	1.91667	304.766	-304.766
*********	2.00000	304.892	-304.892
*********	2.08333	304.750	-304.750
*********	2.16667	304.861	-304.861
*********	2.25000	304.876	-304.876
*********	2.33333	304.671	-304.671
*********	2.41667	304.829	-304.829
*********	2.50000	304.892	-304.892
*********	2.58333	304.908	-304.908
*********	2.66667	304.750	-304.750
*********	2.75000	304.797	-304.797
*********	2.83333	304.734	-304.734
*********	2.91667	304.702	-304.702
*********	3.00000	304.845	-304.845
*********	3.08333	304.655	-304.655
*********	3.16667	304.655	-304.655
*********	3.25000	304.686	-304.686
*********	3.33333	304.845	-304.845
*********	3.41667	304.861	-304.861
*********	3.50000	304.465	-304.465
*********	3.58333	304.227	-304.227
*********	3.66667	304.290	-304.290

9313018.1825

299-W6-6 RECOVERY PAGE 6 OF 12

SE2000
Environmental Logger
12/19 07:34

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	257.040
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/17 21:47:28

Time:min Time:hrs D-T-W:Ft d(WL):Ft

SE2000
Environmental Logger
12/19 07:34

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	257.040
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/17 21:47:28

Time:min Time:hrs D-T-W:Ft d(WL):Ft

299-W6-6 RECOVERY PAGE OF

SE2000
Environmental Logger
12/19 07:34

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	257.040
SG	1.000
Linearity	0.000

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Scale factor 50.170
Offset 0.000
Delay mSEC 50.000

Step 0 12/17 21:47:28

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	304.718	-304.718
0.0083	0.0001	304.686	-304.686
0.0166	0.0003	303.672	-303.672
0.0250	0.0004	303.878	-303.878
0.0333	0.0006	304.338	-304.338
0.0416	0.0007	304.227	-304.227
0.0500	0.0008	304.100	-304.100
0.0583	0.0010	304.132	-304.132
0.0666	0.0011	303.751	-303.751
0.0750	0.0013	303.435	-303.435
0.0833	0.0014	303.514	-303.514
0.1000	0.0017	303.086	-303.086
0.1166	0.0019	302.880	-302.880
0.1333	0.0022	302.341	-302.341
0.1500	0.0025	302.104	-302.104
0.1666	0.0028	301.628	-301.628
0.1833	0.0031	301.232	-301.232
0.2000	0.0033	300.963	-300.963
0.2166	0.0036	300.487	-300.487
0.2333	0.0039	300.250	-300.250
0.2500	0.0042	299.822	-299.822
0.2666	0.0044	299.505	-299.505
0.2833	0.0047	298.871	-298.871
0.3000	0.0050	298.713	-298.713
0.3166	0.0053	298.301	-298.301
0.3333	0.0056	297.873	-297.873
0.4166	0.0069	296.352	-296.352
0.5000	0.0083	294.625	-294.625
0.5833	0.0097	293.024	-293.024
0.6666	0.0111	291.329	-291.329
0.7500	0.0125	289.823	-289.823
0.8333	0.0139	288.413	-288.413
0.9166	0.0153	287.003	-287.003
1.0000	0.0167	285.720	-285.720
1.0833	0.0181	284.531	-284.531

9313018.1827

1.1666	0.0194	283.248	-283.248
1.2500	0.0208	282.107	-282.107
1.3333	0.0222	280.998	-280.998
1.4166	0.0236	279.968	-279.968
1.5000	0.0250	278.969	-278.969
1.5833	0.0264	278.035	-278.035
1.6666	0.0278	277.163	-277.163

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1.7500	0.0292	276.339	-276.339
1.8333	0.0306	275.610	-275.610
1.9166	0.0319	274.929	-274.929
2.0000	0.0333	274.279	-274.279
2.5000	0.0417	271.364	-271.364
3.0000	0.0500	269.763	-269.763
3.5000	0.0583	268.559	-268.559
4.0000	0.0667	267.577	-267.577
4.5000	0.0750	266.753	-266.753
5.0000	0.0833	266.071	-266.071
5.5000	0.0917	265.501	-265.501
6.0000	0.1000	265.010	-265.010
6.5000	0.1083	264.614	-264.614
7.0000	0.1167	264.265	-264.265
7.5000	0.1250	263.980	-263.980
8.0000	0.1333	263.726	-263.726
8.5000	0.1417	263.520	-263.520
9.0000	0.1500	263.346	-263.346
9.5000	0.1583	263.203	-263.203
10.0000	0.1667	263.061	-263.061
12.0000	0.2000	262.712	-262.712
14.0000	0.2333	262.522	-262.522
16.0000	0.2667	262.411	-262.411
18.0000	0.3000	262.348	-262.348
20.0000	0.3333	262.300	-262.300
22.0000	0.3667	262.268	-262.268
24.0000	0.4000	262.253	-262.253
26.0000	0.4333	262.221	-262.221
28.0000	0.4667	262.205	-262.205
30.0000	0.5000	262.189	-262.189
32.0000	0.5333	262.173	-262.173
34.0000	0.5667	262.173	-262.173
36.0000	0.6000	262.173	-262.173
38.0000	0.6333	262.158	-262.158
40.0000	0.6667	262.158	-262.158
42.0000	0.7000	262.158	-262.158
44.0000	0.7333	262.158	-262.158
46.0000	0.7667	262.158	-262.158
48.0000	0.8000	262.158	-262.158
50.0000	0.8333	262.158	-262.158
52.0000	0.8667	262.158	-262.158
54.0000	0.9000	262.158	-262.158
56.0000	0.9333	262.158	-262.158
58.0000	0.9667	262.158	-262.158
60.0000	1.0000	262.158	-262.158
62.0000	1.0333	262.158	-262.158
64.0000	1.0667	262.158	-262.158
66.0000	1.1000	262.158	-262.158

68.0000	1.1333	262.158	-262.158
70.0000	1.1667	262.158	-262.158

9313008.1825

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72.0000	1.2000	262.158	-262.158
74.0000	1.2333	262.158	-262.158
76.0000	1.2667	262.158	-262.158
78.0000	1.3000	262.158	-262.158
80.0000	1.3333	262.158	-262.158
82.0000	1.3667	262.158	-262.158
84.0000	1.4000	262.158	-262.158
86.0000	1.4333	262.158	-262.158
88.0000	1.4667	262.158	-262.158
90.0000	1.5000	262.142	-262.142
92.0000	1.5333	262.142	-262.142
94.0000	1.5667	262.142	-262.142
96.0000	1.6000	262.142	-262.142
98.0000	1.6333	262.142	-262.142
100.0000	1.6667	262.142	-262.142
105.0000	1.7500	262.126	-262.126
110.0000	1.8333	262.126	-262.126
115.0000	1.9167	262.126	-262.126
120.0000	2.0000	262.126	-262.126
125.0000	2.0833	262.110	-262.110
130.0000	2.1667	262.110	-262.110
135.0000	2.2500	262.110	-262.110
140.0000	2.3333	262.110	-262.110
145.0000	2.4167	262.094	-262.094
150.0000	2.5000	262.094	-262.094
155.0000	2.5833	262.094	-262.094
160.0000	2.6667	262.094	-262.094
165.0000	2.7500	262.078	-262.078
170.0000	2.8333	262.094	-262.094
175.0000	2.9167	262.094	-262.094
180.0000	3.0000	262.078	-262.078
185.0000	3.0833	262.078	-262.078
190.0000	3.1667	262.078	-262.078
195.0000	3.2500	262.078	-262.078
200.0000	3.3333	262.078	-262.078
205.0000	3.4167	262.078	-262.078
210.0000	3.5000	262.078	-262.078
215.0000	3.5833	262.078	-262.078
220.0000	3.6667	262.062	-262.062
225.0000	3.7500	262.062	-262.062
230.0000	3.8333	262.078	-262.078
235.0000	3.9167	262.062	-262.062
240.0000	4.0000	262.062	-262.062
245.0000	4.0833	262.062	-262.062
250.0000	4.1667	262.062	-262.062
255.0000	4.2500	262.062	-262.062
260.0000	4.3333	262.062	-262.062
265.0000	4.4167	262.062	-262.062
270.0000	4.5000	262.047	-262.047
275.0000	4.5833	262.062	-262.062
280.0000	4.6667	262.047	-262.047
285.0000	4.7500	262.047	-262.047
290.0000	4.8333	262.047	-262.047

9313018.1829

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299-W6-6 RECOVERY

295.0000	4.9167	262.047	-262.047
300.0000	5.0000	262.047	-262.047
305.0000	5.0833	262.047	-262.047
310.0000	5.1667	262.047	-262.047
315.0000	5.2500	262.047	-262.047
320.0000	5.3333	262.031	-262.031
325.0000	5.4167	262.047	-262.047
330.0000	5.5000	262.031	-262.031
335.0000	5.5833	262.031	-262.031
340.0000	5.6667	262.031	-262.031
345.0000	5.7500	262.015	-262.015
350.0000	5.8333	262.015	-262.015
355.0000	5.9167	262.015	-262.015
360.0000	6.0000	262.015	-262.015
365.0000	6.0833	262.015	-262.015
370.0000	6.1667	262.015	-262.015
375.0000	6.2500	262.015	-262.015
380.0000	6.3333	261.999	-261.999
385.0000	6.4167	261.999	-261.999
390.0000	6.5000	262.015	-262.015
395.0000	6.5833	261.999	-261.999
400.0000	6.6667	261.999	-261.999
405.0000	6.7500	261.999	-261.999
410.0000	6.8333	261.999	-261.999
415.0000	6.9167	261.999	-261.999
420.0000	7.0000	261.999	-261.999
425.0000	7.0833	261.999	-261.999
430.0000	7.1667	261.999	-261.999
435.0000	7.2500	261.983	-261.983
440.0000	7.3333	261.983	-261.983
445.0000	7.4167	261.983	-261.983
450.0000	7.5000	261.983	-261.983
455.0000	7.5833	261.983	-261.983
460.0000	7.6667	261.983	-261.983
465.0000	7.7500	261.983	-261.983
470.0000	7.8333	261.983	-261.983
475.0000	7.9167	261.983	-261.983
480.0000	8.0000	261.967	-261.967
485.0000	8.0833	261.983	-261.983
490.0000	8.1667	261.967	-261.967
495.0000	8.2500	261.967	-261.967
500.0000	8.3333	261.967	-261.967
505.0000	8.4167	261.967	-261.967
510.0000	8.5000	261.967	-261.967
515.0000	8.5833	261.967	-261.967
520.0000	8.6667	261.967	-261.967
525.0000	8.7500	261.967	-261.967
530.0000	8.8333	261.967	-261.967
535.0000	8.9167	261.967	-261.967
540.0000	9.0000	261.967	-261.967
545.0000	9.0833	261.983	-261.983
550.0000	9.1667	261.983	-261.983
555.0000	9.2500	261.967	-261.967
560.0000	9.3333	261.967	-261.967
565.0000	9.4167	261.983	-261.983

9343008.0885

299-W6-6 RECOVERY

570.0000	9.5000	261.983	-261.983
575.0000	9.5833	261.983	-261.983
580.0000	9.6667	261.983	-261.983
585.0000	9.7500	261.983	-261.983
590.0000	9.8333	261.983	-261.983
595.0000	9.9167	261.983	-261.983
600.0000	10.0000	261.983	-261.983
605.0000	10.0833	261.983	-261.983
610.0000	10.1667	261.983	-261.983
615.0000	10.2500	261.983	-261.983
620.0000	10.3333	261.983	-261.983
625.0000	10.4167	261.983	-261.983
630.0000	10.5000	261.983	-261.983
635.0000	10.5833	261.983	-261.983
640.0000	10.6667	261.999	-261.999
645.0000	10.7500	261.999	-261.999
650.0000	10.8333	261.999	-261.999
655.0000	10.9167	261.999	-261.999
660.0000	11.0000	261.999	-261.999
665.0000	11.0833	262.015	-262.015
670.0000	11.1667	262.015	-262.015
675.0000	11.2500	262.015	-262.015
680.0000	11.3333	262.015	-262.015
685.0000	11.4167	262.015	-262.015
690.0000	11.5000	262.015	-262.015
695.0000	11.5833	262.015	-262.015
700.0000	11.6667	262.015	-262.015
705.0000	11.7500	262.031	-262.031
710.0000	11.8333	262.031	-262.031
715.0000	11.9167	262.015	-262.015
720.0000	12.0000	262.031	-262.031
725.0000	12.0833	262.031	-262.031
730.0000	12.1667	262.031	-262.031
735.0000	12.2500	262.047	-262.047
740.0000	12.3333	262.031	-262.031
745.0000	12.4167	262.031	-262.031
750.0000	12.5000	262.031	-262.031
755.0000	12.5833	262.047	-262.047
760.0000	12.6667	262.047	-262.047
765.0000	12.7500	262.047	-262.047
770.0000	12.8333	262.047	-262.047
775.0000	12.9167	262.047	-262.047
780.0000	13.0000	262.047	-262.047
785.0000	13.0833	262.031	-262.031
790.0000	13.1667	262.047	-262.047
795.0000	13.2500	262.047	-262.047
800.0000	13.3333	262.047	-262.047
805.0000	13.4167	262.047	-262.047
810.0000	13.5000	262.031	-262.031
815.0000	13.5833	262.031	-262.031
820.0000	13.6667	262.047	-262.047
825.0000	13.7500	262.031	-262.031

9313018.1831

830.0000	13.8333	262.047	-262.047
835.0000	13.9167	262.047	-262.047
840.0000	14.0000	262.031	-262.031

299-W6-6 RECOVERY

845.0000	14.0833	262.031	-262.031
850.0000	14.1667	262.031	-262.031
855.0000	14.2500	262.047	-262.047
860.0000	14.3333	262.047	-262.047
865.0000	14.4167	262.047	-262.047
870.0000	14.5000	262.047	-262.047
875.0000	14.5833	262.047	-262.047
880.0000	14.6667	262.047	-262.047
885.0000	14.7500	262.047	-262.047
890.0000	14.8333	262.047	-262.047
895.0000	14.9167	262.047	-262.047
900.0000	15.0000	262.047	-262.047
905.0000	15.0833	262.062	-262.062
910.0000	15.1667	262.062	-262.062

9313006.1822

SAMPLING PUMP INSTALLATION FORM

19

VALIDATED KDR 3/10/92 SIGNATURE

Product: W017-LLBG

Well Number: 299-W6-6

Pump Type: HYDROSTAR

Pump Mode: 8001

Date Installed: ~~257.04~~ 3/5/92

Installed by: G. STEADE / M. MUNSON

Depth to water: 257.04

Depth to Bottom: 434.41

Reported Depth to water: ~~257.04~~

Screened Interval: (10.4) 434.41 - 224.01

Pump/Riser Pipe Description:

pipe: 3/4" SS DISCHARGE

pump length: 4'

pump screen length: 5'0

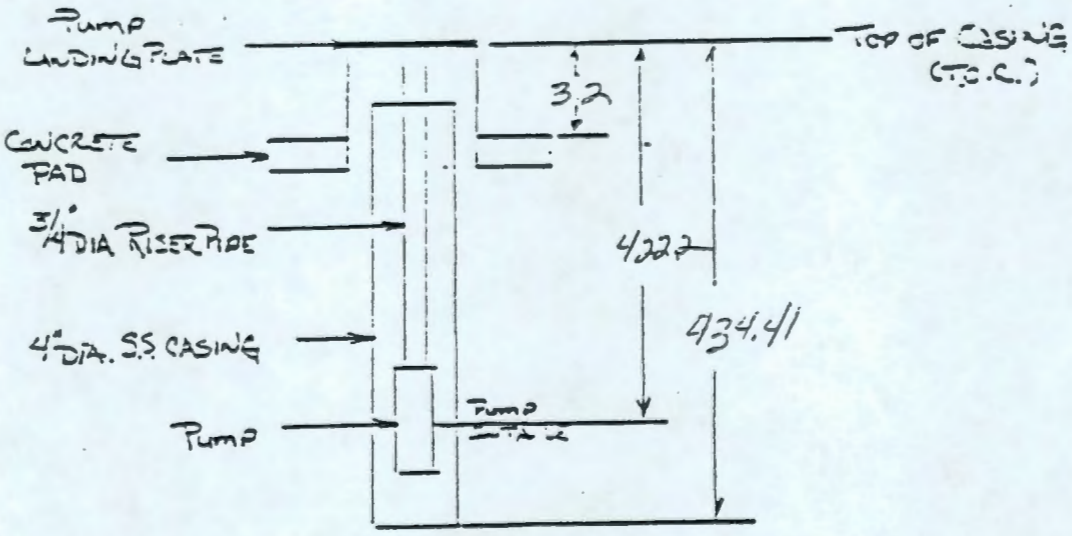
material cleaning: MANUFACTURED

Comments:

PUMP INSTALLATION SKETCH

Total material length 424.2

Loc. of pump intake: 422.2



Completed By: J. A. Gates

Date: 12-16-91

9313018.1833

BOREHOLE TEST INFORMATION

Borehole 299-W6-4 Borehole Diameter 4" Hanford Coordinates — NA —

Interval Tested 434.41' - 424.01' BTOC Depth Interval 434.41' - 424.01' BTOC

Test Type Instantaneous Slug Test Injection/Withdrawal Borehole Depth 434.41' BTOC

Instruction Used WHC-CM-7-7-EII 10.1

VALIDATED KDR 3/18/92

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOUNST SN-ET-1
DATA LOGGER.	IN-SITU INC. SN.- 2K192
PRESSURE TRANSDUCER	IN-SITU INC. S.N.- 2302
SLUGGING ROD	2.0' x 6.0' 0.13 ft³
STEEL MEASURING TAPE	500' GRADUATED STEEL TAPE

MEASUREMENT DATUM

Control Datum TOP OF CASING 6" (T.O.C. 6")

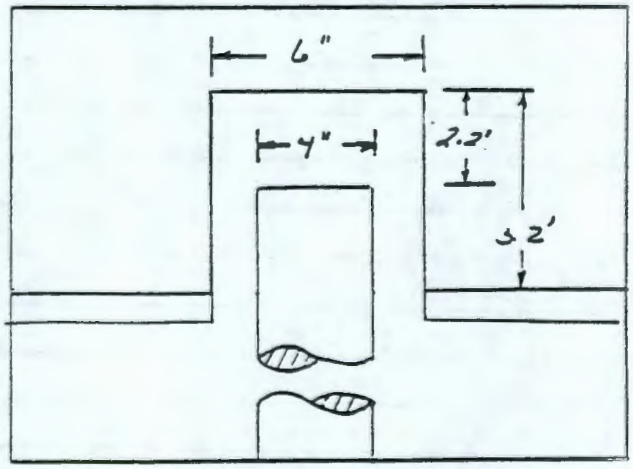
Elevation NA

Electric Sounder T.O.C. 6"

Steel Tape T.O.C. 6"

Pressure Transducer T.O.C. 6"

WELL HEAD DIAGRAM



COMMENTS

Recorded by: James A. Gates JAMES A. GATES 12/23/91

Sign and Print Name Date

9313018.183

INSTANTANEOUS SLUG TEST DATA SHEET

INJECTION

Borehole 299-W6-6

Interval Tested 4134.41' - 4124.01' BTOC

Depth to Water 257.04' BTOC

Date 12-23-91

Measured by JAMES A. COATES

Slug Volume .13ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time Injection baseline-1245, Injection-1255

Transducer Measurement Units FEET

Depth to Transducer 12.605' BWL

Initial Pressure (P_i) 257.040'

Slug Level or Pressure (P_{max}) 252.888'

Borehole Diameter 4"

Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement
		SEE ATTACHED			SEE ATTACHED			

Recorded by James A Coates JAMES A. COATES (Sign and Print Name) 12/03/91 (Date)

9313018.1835

SE2000
Environmental Logger
12/26 09:13

Unit# 192 Test 4

INPUT 1: Level (F) TOC

Reference	257.040
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/23 12:45:51

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	257.040	-257.040
1.0000	0.0167	257.055	-257.055
2.0000	0.0333	257.040	-257.040
3.0000	0.0500	257.040	-257.040
4.0000	0.0667	257.040	-257.040
5.0000	0.0833	257.040	-257.040
6.0000	0.1000	257.040	-257.040
7.0000	0.1167	257.040	-257.040
8.0000	0.1333	257.040	-257.040
9.0000	0.1500	257.040	-257.040
10.0000	0.1667	257.024	-257.024

9313018.1827

SE2000
Environmental Logger
12/26 09:11

Unit# 192 Test 5

INPUT 1: Level (F) TOC

Reference	257.040
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/23 12:57:01

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	253.569	-253.569
0.0083	0.0001	252.888	-252.888
0.0166	0.0003	256.770	-256.770
0.0250	0.0004	257.119	-257.119
0.0333	0.0006	255.170	-255.170
0.0416	0.0007	255.534	-255.534
0.0500	0.0008	255.566	-255.566
0.0583	0.0010	255.756	-255.756
0.0666	0.0011	255.788	-255.788
0.0750	0.0013	255.693	-255.693
0.0833	0.0014	255.677	-255.677
0.1000	0.0017	255.613	-255.613
0.1166	0.0019	255.645	-255.645
0.1333	0.0022	255.693	-255.693
0.1500	0.0025	255.661	-255.661
0.1666	0.0028	255.709	-255.709
0.1833	0.0031	255.677	-255.677
0.2000	0.0033	255.724	-255.724
0.2166	0.0036	255.709	-255.709
0.2333	0.0039	255.740	-255.740
0.2500	0.0042	255.740	-255.740
0.2666	0.0044	255.740	-255.740
0.2833	0.0047	255.740	-255.740
0.3000	0.0050	255.756	-255.756
0.3166	0.0053	255.772	-255.772
0.3333	0.0056	255.788	-255.788
0.4166	0.0069	255.819	-255.819
0.5000	0.0083	255.867	-255.867
0.5833	0.0097	255.899	-255.899
0.6666	0.0111	255.946	-255.946

9313018.1837

299-W6-6 INJECTION

0.7500	0.0125	255.978	-255.978
0.8333	0.0139	256.010	-256.010
0.9166	0.0153	256.041	-256.041
1.0000	0.0167	256.089	-256.089
1.0833	0.0181	256.120	-256.120
1.1666	0.0194	256.152	-256.152
1.2500	0.0208	256.168	-256.168
1.3333	0.0222	256.200	-256.200
1.4166	0.0236	256.231	-256.231
1.5000	0.0250	256.263	-256.263
1.5833	0.0264	256.279	-256.279
1.6666	0.0278	256.311	-256.311
1.7500	0.0292	256.326	-256.326
1.8333	0.0306	256.358	-256.358
1.9166	0.0319	256.374	-256.374
2.0000	0.0333	256.406	-256.406
2.5000	0.0417	256.532	-256.532
3.0000	0.0500	256.628	-256.628
3.5000	0.0583	256.691	-256.691
4.0000	0.0667	256.770	-256.770
4.5000	0.0750	256.818	-256.818
5.0000	0.0833	256.865	-256.865
5.5000	0.0917	256.897	-256.897
6.0000	0.1000	256.929	-256.929
6.5000	0.1083	256.944	-256.944
7.0000	0.1167	256.960	-256.960
7.5000	0.1250	256.976	-256.976
8.0000	0.1333	256.992	-256.992
8.5000	0.1417	257.008	-257.008
9.0000	0.1500	257.008	-257.008
9.5000	0.1583	257.008	-257.008
10.0000	0.1667	257.024	-257.024

9313108.1639

6 7

INSTANTANEOUS SLUG TEST DATA SHEET

WITHDRAWAL

Borehole 299-W6-6

Interval Tested 434.41'-424.01' BTOC

Depth to Water 257.04' BTOC

Date 12-23-91

Measured by JAMES A. COATES

Slug Volume .13ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time 1305

Transducer Measurement Units FEET

Depth to Transducer 12.065' BWL

Initial Pressure (P_i) 257.040'

Slug Level or Pressure (P_{max}) 259.163'

Borehole Diameter 4"

Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement	Time Observed	Time Elapsed	Pressure Trans. Measurement
		SEE ATTACHED			SEE ATTACHED			

Recorded by James A. Coates JAMES A. COATES (Sign and Print Name) 12/23/91 (Date)

17-56

9313018.1839

SE2000
Environmental Logger
12/26 09:09

Unit# 192 Test 6

INPUT 1: Level (F) TOC

Reference	257.040
SG	1.000
Linearity	0.000
Scale factor	50.170
Offset	0.000
Delay mSEC	50.000

Step 0 12/23 13:08:49

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	257.119	-257.119
0.0083	0.0001	259.163	-259.163
0.0166	0.0003	258.909	-258.909
0.0250	0.0004	259.084	-259.084
0.0333	0.0006	258.988	-258.988
0.0416	0.0007	258.988	-258.988
0.0500	0.0008	258.973	-258.973
0.0583	0.0010	258.957	-258.957
0.0666	0.0011	258.957	-258.957
0.0750	0.0013	258.941	-258.941
0.0833	0.0014	258.925	-258.925
0.1000	0.0017	258.909	-258.909
0.1166	0.0019	258.893	-258.893
0.1333	0.0022	258.878	-258.878
0.1500	0.0025	258.862	-258.862
0.1666	0.0028	258.846	-258.846
0.1833	0.0031	258.830	-258.830
0.2000	0.0033	258.814	-258.814
0.2166	0.0036	258.798	-258.798
0.2333	0.0039	258.782	-258.782
0.2500	0.0042	258.782	-258.782
0.2666	0.0044	258.767	-258.767
0.2833	0.0047	258.751	-258.751
0.3000	0.0050	258.735	-258.735
0.3166	0.0053	258.719	-258.719
0.3333	0.0056	258.719	-258.719
0.4166	0.0069	258.656	-258.656
0.5000	0.0083	258.608	-258.608
0.5833	0.0097	258.545	-258.545
0.6666	0.0111	258.497	-258.497

9313013.0948

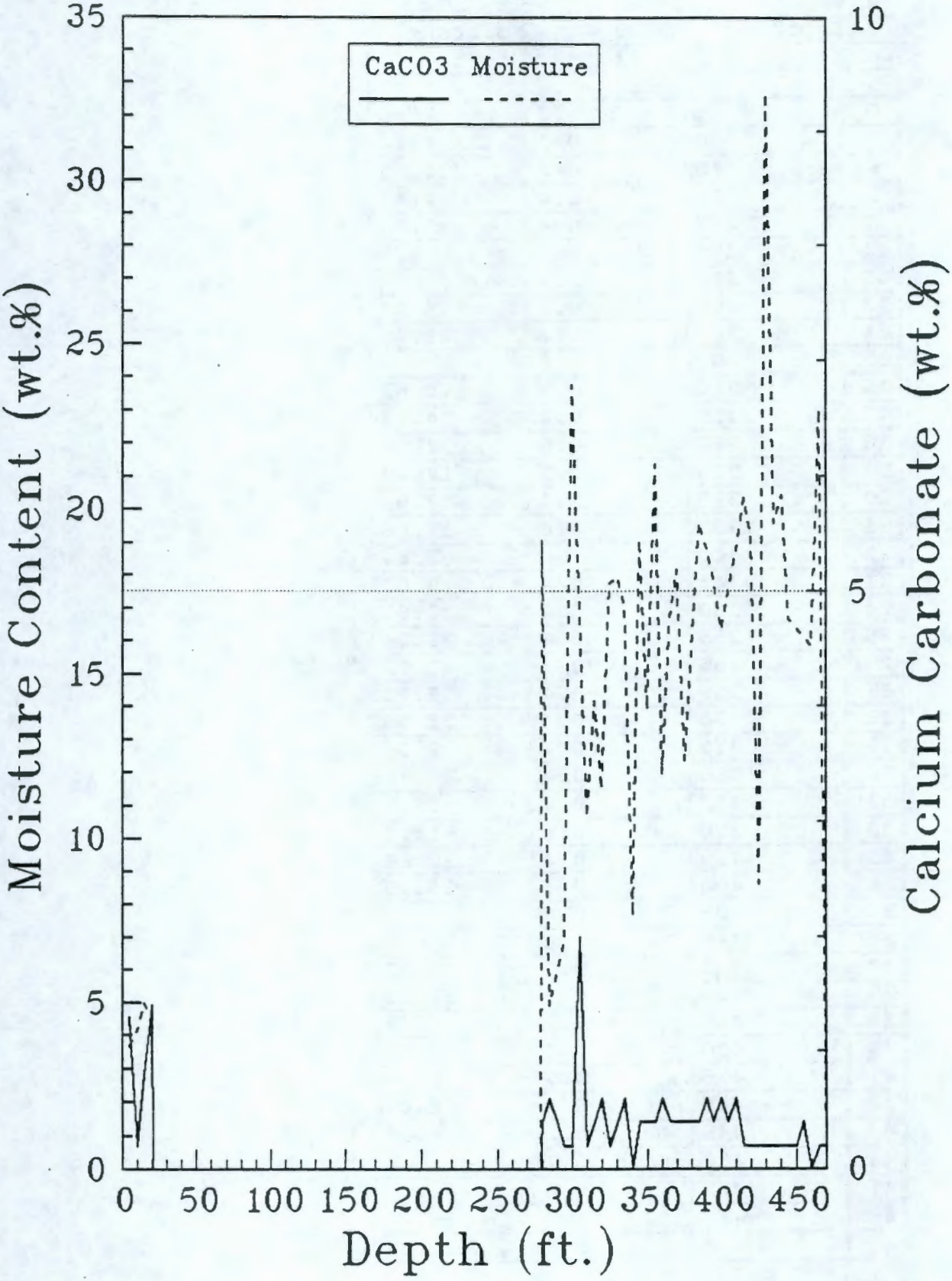
0.7500	0.0125	258.434	-258.434
0.8333	0.0139	258.386	-258.386
0.9166	0.0153	258.355	-258.355
1.0000	0.0167	258.307	-258.307
1.0833	0.0181	258.260	-258.260
1.1666	0.0194	258.212	-258.212
1.2500	0.0208	258.180	-258.180
1.3333	0.0222	258.133	-258.133
1.4166	0.0236	258.101	-258.101
1.5000	0.0250	258.069	-258.069
1.5833	0.0264	258.038	-258.038
1.6666	0.0278	257.990	-257.990
1.7500	0.0292	257.959	-257.959
1.8333	0.0306	257.927	-257.927
1.9166	0.0319	257.895	-257.895
2.0000	0.0333	257.863	-257.863
2.5000	0.0417	257.657	-257.657
3.0000	0.0500	257.499	-257.499
3.5000	0.0583	257.388	-257.388
4.0000	0.0667	257.293	-257.293
4.5000	0.0750	257.230	-257.230
5.0000	0.0833	257.182	-257.182
5.5000	0.0917	257.150	-257.150
6.0000	0.1000	257.119	-257.119
6.5000	0.1083	257.103	-257.103
7.0000	0.1167	257.087	-257.087
7.5000	0.1250	257.071	-257.071
8.0000	0.1333	257.071	-257.071
8.5000	0.1417	257.055	-257.055
9.0000	0.1500	257.055	-257.055

9313018.1841

VALIDATED KD 2 3/18/92

18

WELL 299-W6-6



9313018.1842

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	A	B	C
1	WELL299-W6-6		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	1.3	3.65
7	10	0.2	4.14
8	15	0.8	4.95
9	20	1.4	4.47
10	280	0.4	19.08
11	285	0.6	4.9
12	290	0.4	
13	295	0.2	6.88
14	300	0.2	23.75
15	305	2	
16	310	0.2	10.65
17	315	0.4	14.15
18	320	0.6	11.5
19	325	0.2	17.73
20	330	0.4	17.94
21	335	0.6	17.06
22	340	0	7.64
23	345	0.4	19.07
24	350	0.4	13.91
25	355	0.4	21.34
26	360	0.6	11.97
27	365	0.4	16.73
28	370	0.4	18.16
29	375	0.4	12.36
30	380	0.4	
31	385	0.4	19.6
32	390	0.6	18.8
33	395	0.4	17.88
34	400	0.6	16.35
35	405	0.4	
36	410	0.6	18.76
37	415	0.2	20.33
38	420	0.2	19.21
39	425	0.2	8.64
40	430	0.2	32.67
41	435	0.2	19.6
42	440	0.2	20.44
43	445	0.2	16.66
44	450	0.2	
45	455	0.4	
46	460	0	15.87
47	465	0.2	23.04

9313018.1843

2a

	A	B	C
48	470	0.2	

9313018.184"

KDK
11/11/91
10-20 sml
20 slot

TEST REQUEST

SAMPLE/SPECIMEN NO. 2-0274 COST CODE/WORK ORDER NO. R331H

REQUESTED BY: ORG. 81231 PERSON B. WILLIAMS DATE 10/29/91

TEST REQUESTED	NO. OF SAMPLES	TEST LAB INFORMATION (PROCEDURE USED)
SIEVE ANALYSIS	1	GEL-07

REMARKS 299-W6-6 450-451' RECEIVED BY: R.G. ALEXANDER DATE 10/29/91

APPROVED BY: R.G. ALEXANDER DATE 10/29/91

RADIATION RELEASE

Bldg. 299-W6-6 Expiration Date 11/91

Released By [signature] Health Physics

Remarks 450-451

54-3000-022 (01/89)

RADIATION RELEASE

Bldg. 299 W6-6 Expiration Date 10/31/91

Released By [signature] Health Physics

Remarks 450-451

54-3000-022 (01/89)

9313018.1845

SIEVE ANALYSIS DATA SHEET

Sample No. 3-[illegible] Page 1 of 1

Tested By: JERRY L. EVERLAND Date 10-31-91
Procedure No: GEN-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3310 Calibration Due Date 12-25-91
Thermometer: ETAL- [illegible] Calibration Due Date 9-16-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SANDY GRAVEL Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2	1177.9	0	0	100
1½		0	0	100
1		219.3	18.6	81.4
¾		248.5	21.1	78.9
½		274.8	23.3	76.7
⅜		311.4	26.4	73.6
4		443.6	37.7	62.3
16	169.6	53.4	31.5	42.7
40		97.8	57.7	26.4
60		117.3	69.2	19.2
100		130.2	76.8	14.5
200		139.8	82.4	11.0

Finess Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED FINE GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By: R.G. ALEXANDER Date 10-31-91

A-6400-204(2-87)

9313018.18

GRAIN S ANALYSIS PLOT

Sample No. 2-0274

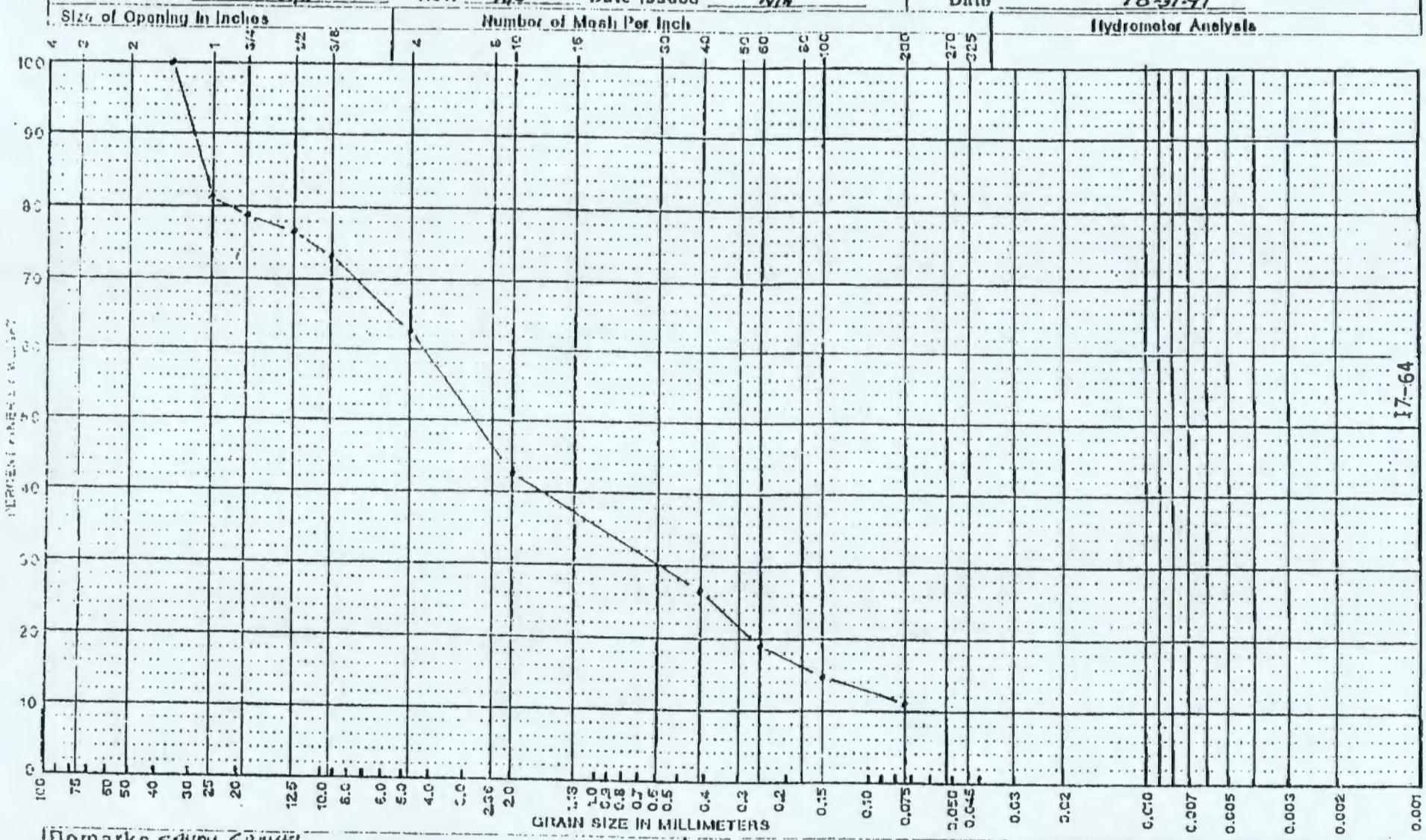
Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89

Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A

Date 10-31-91



Remarks SANDY GRAVEL

299-W6-6 1450-451'

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: R.G. ALEXANDER Date 10-31-91

WHC-SD-EN-DP-044, Rev. 0

9313018.1847

SIEVE ANALYSIS DATA SHEET

Sample No. 2-0275 Page 1 of 1

Tested By: TERRY L. ENGLAND Date 10-31-91
Procedure No: GEL-07 Rev. 1 Date Issued 11-15-85
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: ETAL- 3210 Calibration Due Date 12-25-91
Thermometer: ETAL- 013 Calibration Due Date 9-16-92
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A
N/A : ETAL- N/A Calibration Due Date N/A

Sample Description SAND Sieve Time 10 (min)

Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	169.6	0	0	100
10		53.4	31.5	68.5
40		97.8	57.7	42.3
60		117.3	69.2	30.8
100		130.2	76.8	23.2
200		139.8	82.4	17.6
N/A	N/A	N/A	N/A	N/A

Finess Modules (FM) N/A (See ASTM C 136-23, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = ((D-E)/D)*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By: RG ALEXANDER Date 10-31-91

A-6400-204(2-87)

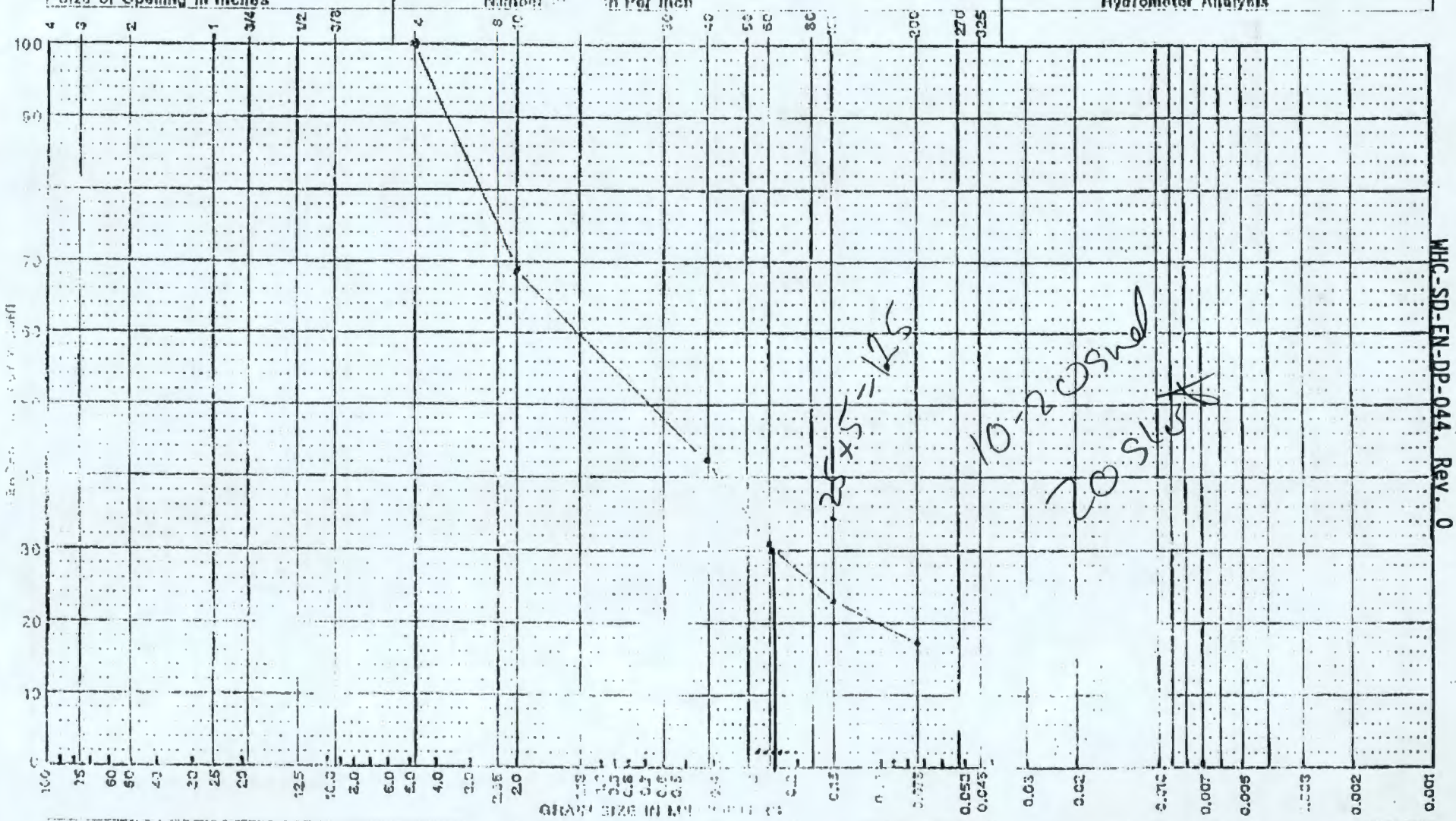
9313018.1845

GRAIN SIZE ANALYSIS PLOT

Sample No. Z-0274 Page 1 of 1

Procedure No. GEL-07 Rev. 1 Date Issued 11-15-89 Plotted By JERRY L. ENGLAND

Test Plan No. N/A Rev. N/A Date Issued N/A Date 10-31-91



Remarks SAND

299-W6-6 450

All data accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: R.G. ALEXANDER Date

VALIDATED
KDR 3/16/92
SIGNATURE/DATE
Pg 1 of 3

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Requested by: | Phone No. | Well No. 299-W6-6 | Date:

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5'		SOIL	8.14.91	1878.91	<D	2.0
10'				1879.91	7.4	2.3
15'				1880.91	5.6	3.4
20'				1881.91	<D	<D
25'	9.3.91		9.9.91	0358.91B	6.48	0.30
30'				0367.91B	19.995	1.43
36.5'			9.5.91	0380.91B	24.42	1.27
40'				0379.91B	23.69	1.19
45'	9.4.91		9.6.91	0428.91B	12.79	.87
50'	9.6.91			0446.91B	9.91	0.79
55'				0419.91B	18.80	<D
60'	9.4.91			0426.91B	45.17	1.44
65'	9.3.91		9.5.91	0407.91B	23.80	0.72
70'	9.4.91		9.6.91	0422.91B	26.20	0.37
75'	9.3.91		9.6.91	0413.91B	24.44	0.95
80'	9.4.91		9.5.91	0402.91B	30.60	1.27
85'	9.3.91		9.6.91	0412.91B	19.94	0.37
90'	9.6.91			0441.91B	10.08	0.95
95'				0440.91B	33.34	0.22
100'				0445.91B	7.75	1.19
105'	9.12.91		9.13.91	0517.91B	33.17	2.83
110'	9.9.91			0483.91B	1.8	1.30
115'	9.5.91		9.6.91	0480.91B	13.18	<D
120'	9.5.91			0475.91B	19.76	0.21
125'	9.9.91		9.16.91	0565.91B	13.42	0.16
130'				0558.91B	1.79	0.37
135'				0568.91B	3.23	0.80
140'				0561.91B	12.07	1.86
145'				0562.91B	12.42	0.96
150'	9.12.91		9.23.91	0528.91B	48.87	2.66
155'	9.11.91		9.25.91	0711.91B	23.57	0.32
160'	9.11.91		9.26.91	0731.91B	9.78	0.72

Performed By: _____ Date: _____

Page: ____ of ____

9313018.1855

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 2 of 3

Requested by:	Phone No.	Well No.	Date:
		299-W6-6	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
165'	9.13.91	SOIL	9.26.91	0737.91B	5.27	1.2
170'				0756.91B	22.60	0.4
175'			27	0823.91B	8.44	<D
180'	9.17.91			0822.91B	19.65	0.74
185'				0824.91B	19.76	0.59
190'	9.18.91		9.25.91	0614.91B	17.30	1.20
195'				0612.91B	9.03	<D
200'	9.23.91		9.27.91	0792.91B	4.3	0.86
205'				0835.91B	44.1	1.2
210'				0793.91B	16.76	0.74
215'				0794.91B	20.23	0.89
220'			10.1.91	0866.91B	30.93	<D
225'						
230'			9.27.91	0856.91B	18.78	<D
235'	10.7.91		10.8.91	0961.91B	31.37	0.13
240'				0962.91B	33.70	<D
245'	9.24.91		10.7.91	0921.91B	11.79	<D
250'	9.25.91			0922.91B	0.55	<D
255'	10.7.91			0963.91B	12.08	<D
260'	10.2.91			0945.91B	21.26	<D
265'						
270'	10.2.91		10.7.91	0944.91B	12.08	<D
275'	9.30.91		10.10.91	0992.91B	15.26	1.21
280'						
285'	10.11.91		10.16.91	1088.91B	32.63	1.10
290'				1085.91B	35.66	<D
295'				1084.91B	7.62	.37
300'	10.2.91		10.15.91	1035.91B	35.86	1.22
305'			10.14.91	1021.91B	27.08	0.88
310'				1014.91B	18.73	<D
315'	10.16.91		10.22.91	1170.91B	15.51	0.1
320'				1171.91B	17.86	0.63

Performed By: _____ Date: _____

Page: ____ of ____

9313018.1851

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 3 of 3

quested by:	Phone No.	Well No.	Date:
		299-W6-6	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
325'	10.4.91	SOIL	10.25.91	1324.91B	26.35	<D
330'	10.14.91		↓	1307.91B	15.82	0.70
335'	10.16.91		10.22.91	1193.91B	18.19	1.16
340'	↓		10.23.91	1222.91B	23.26	<D
345'	10.10.91		10.25.91	1338.91B	16.52	0.2
350'	↓		↓	1341.91B	21.14	0.22
355'	10.14.91		↓	1284.91B	8.72	1.43
360'	↓		↓	1290.91B	29.08	<D
365'	10.16.91		10.29.91	1398.91B	0.43	11.24
370'	↓		↓	1399.91B	9.09	0.19
375'	↓		↓	1400.91B	11.89	0.87
380'	↓		10.25.91	1369.91B	24.61	<D
385'	↓		↓	1372.91B	27.46	<D
390'	10.18.91		10.29.91	1448.91B	15.99	0.24
395'	↓		↓	1449.91B	9.45	<D
400'	10.16.91		10.25.91	1435.91B	6.12	0.25
405'	10.18.91		10.30.91	1450.91B	4.62	<D
410'	↓		↓	1451.91B	1.81	0.39
415'	↓		↓	1483.91B	2.91	1.91
420'	↓		↓	1484.91B	6.15	<D
425'	10.22.91		11.1.91	1572.91B	29.15	<D
430'	↓		↓	1567.91B	13.40	0.60
435'	10.22.91		11.1.91	1568.91B	21.49	<D
440'	10.22.91		↓	1562.91B	21.99	<D
445'	10.24.91		10.30.91	1524.91B	0.73	0.24
450'	↓		↓	1535.91B	15.99	0.72
450'-451'	10.28.91		10.29.91	1576.91B	9.69	0.8
455'	10.24.91		11.1.91	1545.91B	45.97	0.72
460'	↓		10.31.91	1536.91B	1.82	0.80
465'	↓		10.30.91	1511.91B	2.8	1.47
470'	↓	↓	↓	1521.91B	11.9	2.39

Performed By: _____ 17-69

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1655

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Westinghouse Hanford Company | LOG HEADER | Page 1 of 2

Well No. 299-W6-6 Area 200 West Date 9/9/91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD 29* Elevation 706.82' Brass Cap

Survey Coordinates 137638.72 N 567318.74 E

Log Measured From Ground Surface

Location Description NW of T-Plant on the North Perimeter Road of 200

Ground Surface Elevation 706.82' Brass Cap

Surface Temperature 27.9 °C Weather Clear-Warm

BOREHOLE INFORMATION

Driller Darrel Perkins

Drill Rig Type Cable Tool | Bit Type/Diameter Drive Barrel/10"

Borehole Diameter(s)/Depth 16"/18.07' 12"/156.0'

Depth Driller 156.0' | Depth Logger 154.7'

Liquid Level NA | Liquid Density NA

Temperature NA.

CASING RECORD

Type 16" Carbon Steel Sch.40 | Interval +1.0'-18.07'

Type 12" Carbon Steel Sch.40 | Interval +4.6'-156.02'

Type | Interval

Type | Interval

Well Screen Interval NA

Comments: Return Error = +0.2' high

Centralizer used.

* Survey data from Kaiser 12/15/92

A-6000-520 (05/90)

9313018.1853

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No.: CG27A97

Base Calibration Date: 5/91 | Calibration Reference:

Calibration/Probe Factor: 8.84×10^{-3} eU p/m/c/s | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μsec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 154.7' | To: 0.5'

Rerun(s): 80.0' to 25.0'

Pre Survey Verification: Position 1: 301.9 eU | Position 2: 64.1 eU | Background: 60 c/s

Base Calibration Difference: Position 1: 4.5 eU | Position 2: 0.2 eU

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: ~~1515~~ 1515 | Completion Time: 1715

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC=1

Post Survey Verification: Position 1: 297.5 eU | Position 2: 63.2 eU | Background: 60 c/s

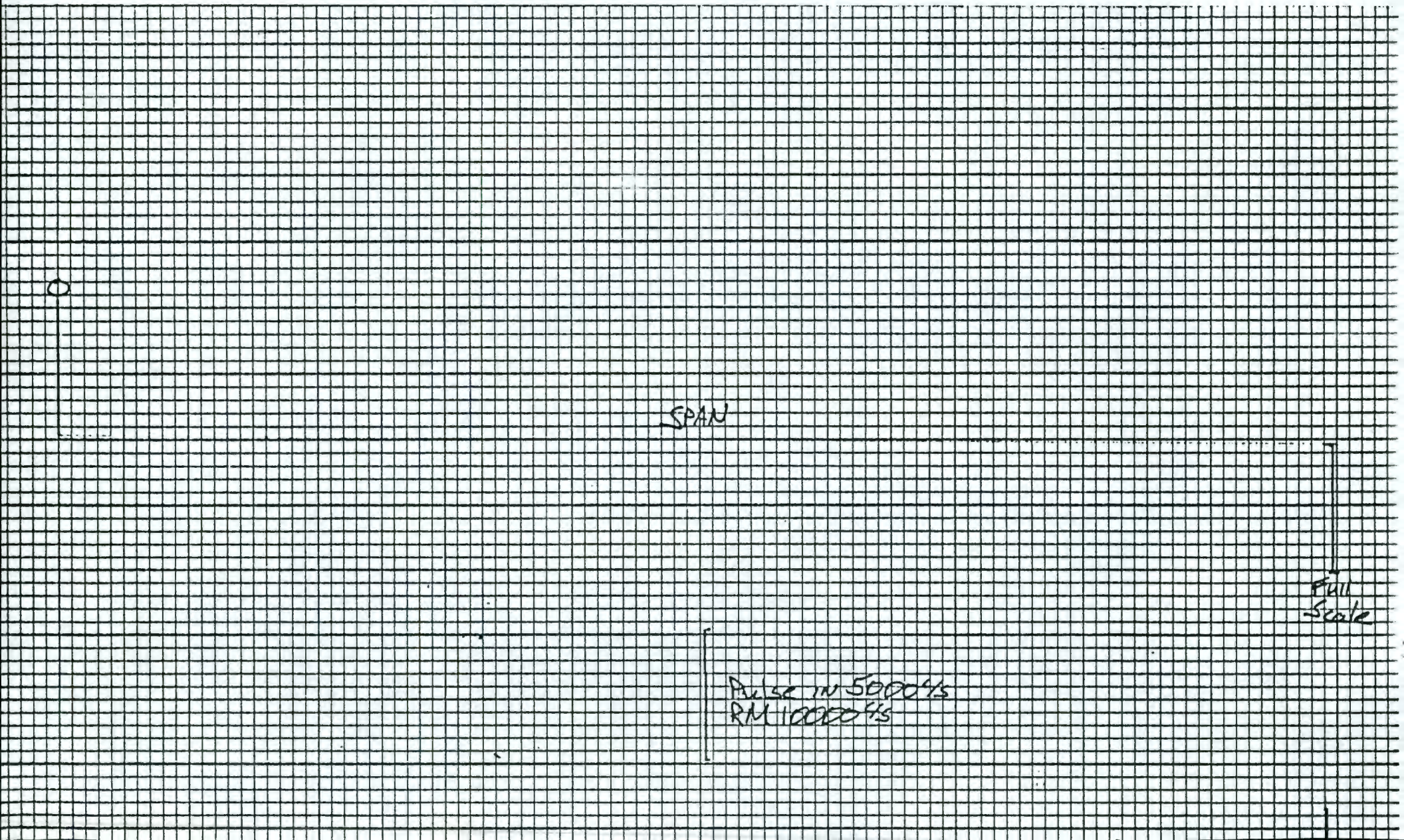
Percent Change: Position 1: 1.5% | Position 2: 1.4%

Comments: Return Error = +0.2' high

Centralizer used

Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 9/9/91

A-6000-520 (05/90)



Pulse 10 5000%
RM 5000%

Pos. 2
1000%

Pos. 1
5000%

Background
500 c/s

Post Survey Calibration

30

40

50

60

70

Repeat Section
500 c/s

80
70
60
50
40
30
20
10

70

80

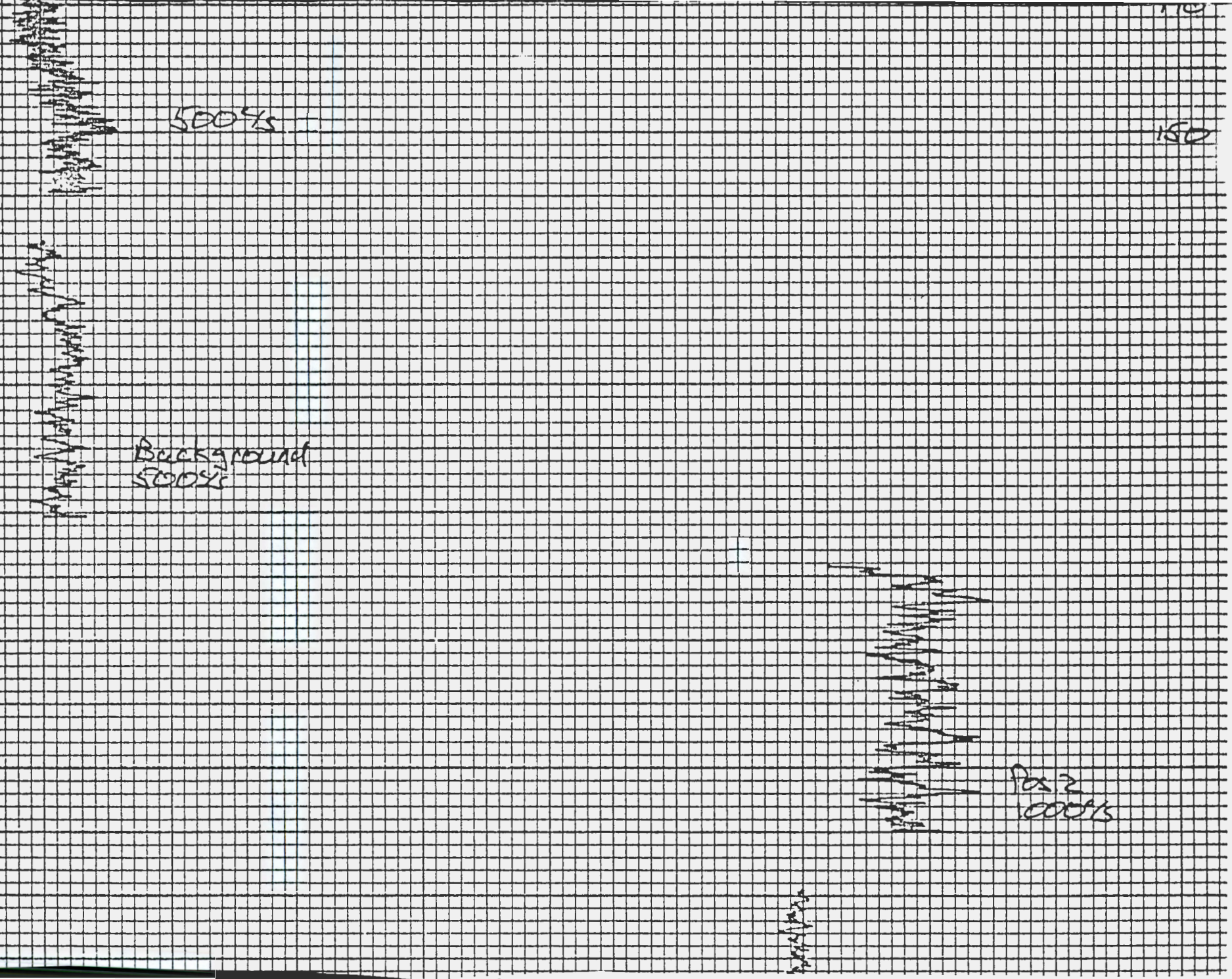
90

100

110

120

130


500ks
150
Background
500ks
Pos 2
000ks

Pos. 1
5000 c/s

Pulse IN 5000 c/s
RM 10000 c/s

Pulse IN 5000 c/s
RM 5000 c/s

0

SPAN

Full Scale

Pre Survey Calibration

299-W6-6 #1

Westinghouse Hanford Company	LOG HEADER	Page 1 of 2

Well No. ~~299-W6-7~~ 299-W6-6 Area 200 West Date 10/7/91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD29* Elevation 706.82' Brass Cap

Survey Coordinates 137638.72 N 567318.74 E

Log Measured From Ground Surface

Location Description 200 West Area/North Perimeter Road

Ground Surface Elevation 706.82' Brass Cap

Surface Temperature 11.6 °C Weather Clear-Cool

BOREHOLE INFORMATION

Driller Darrel Perkins

Drill Rig Type Cable Tool Bit Type/Diameter Hard Tool/10"

Borehole Diameter(s)/Depth 16"/18.1' 12"/169.8' 10"/339'

Depth Driller 339' Depth Logger 333.1'

Liquid Level 272.8' Liquid ~~Density~~ Appearance Clear

Temperature 16.5 °C

CASING RECORD

Type 16" Carbon Steel Sch.40 Interval +1.0' - 18.07'

Type 12" Carbon Steel Sch.40 Interval +1.0' - 169.80'

Type 10" Carbon Steel Sch.40 Interval +2.3' - 339.30'

Type Interval

Well Screen Interval NA

Comments: Return Error = 0.25' high

Centralizer used.

Could not get to bottom of borehole => due to thick drill mud/cutting on bottom of borehole

* Survey data from Kaiser 12/15/92 RBM

17-67/68

17-73/74

A-6000-520 (05

9313018.1854

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No.: CG27A97

Base Calibration Date: 5/91 | Calibration Reference: PNL-7735 UC-606

Calibration/Probe Factor: 8.84x10^-3 eU/cps | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μsec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 333.1' | To: 120.0'

Rerun(s): 275.0' to 245.0'

Pre Survey Verification: Position 1: 297.3 | Position 2: 64.3 | Background: 62

Base Calibration Difference: Position 1: | Position 2:

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 cps/in

Start Time: 0715 | Completion Time: 0915

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 cps/in. | Time Constant(s): TC-1

Post Survey Verification: Position 1: 303.9 | Position 2: 64.3 | Background: 62

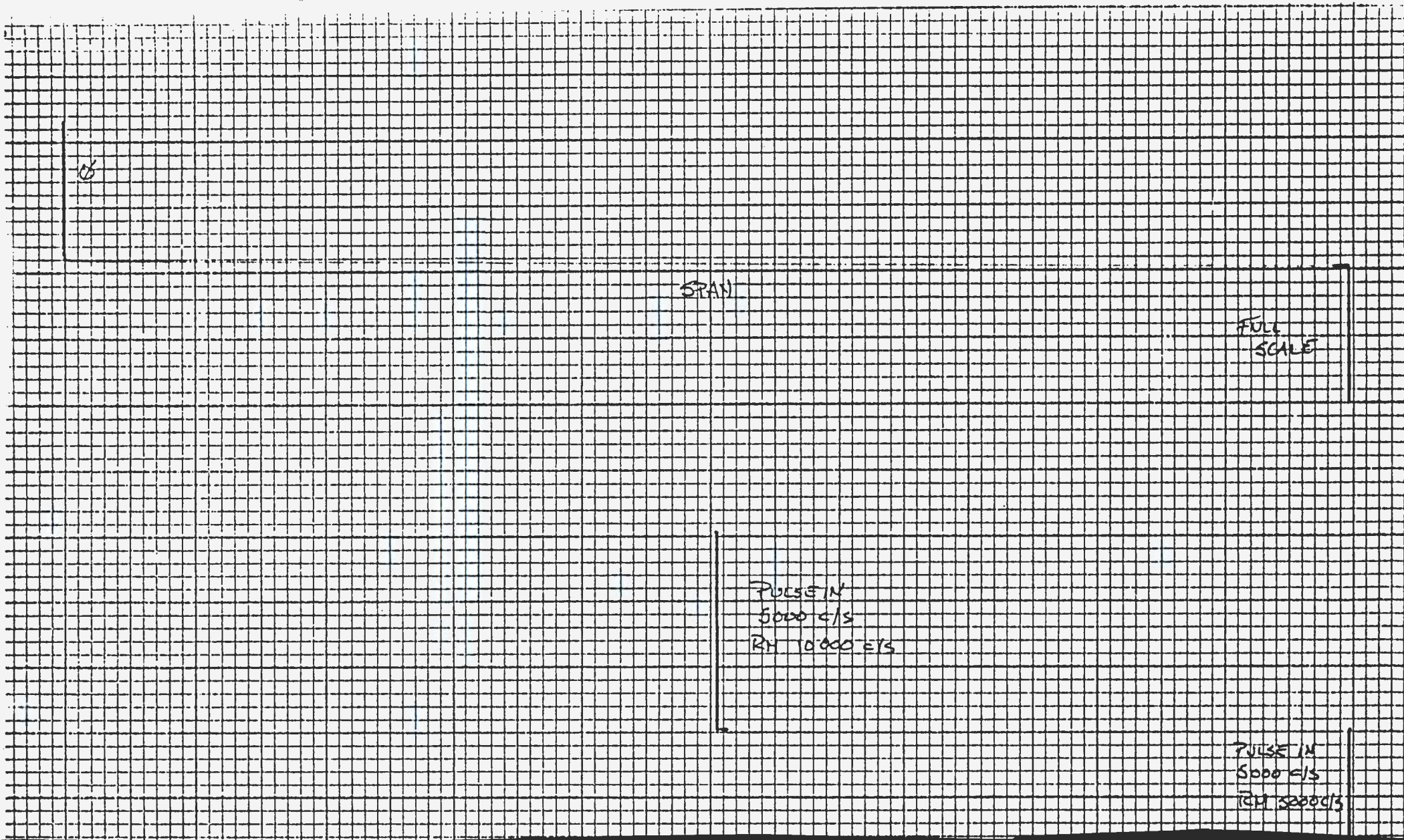
Percent Change: Position 1: 2.2% | Position 2: 0

Comments Return Error = +0.25' high

Centralizer used.

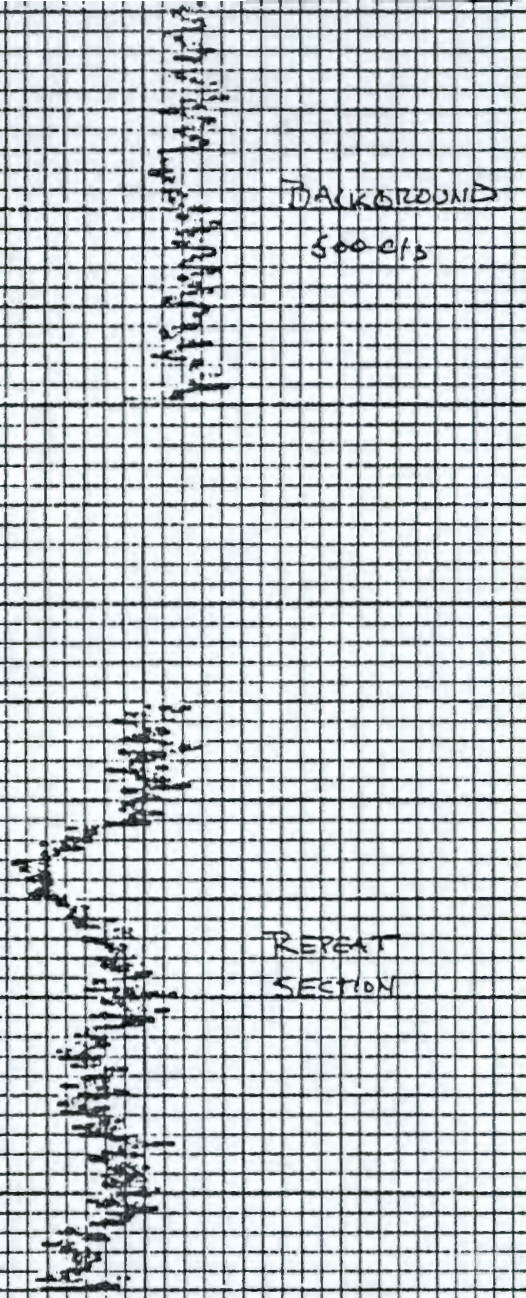
Witnessed and Verified by: (sign and print name) Alan Pearson / Alan Pearson Date: 10/7/91

A-6000-520 (05/90)



Pos. 2
1000 c/s

Pos. 1
5000 c/s



POST SURVEY CAL

145

150

160

170

175

120
130
140
150
160
170
180
190

200

210

220

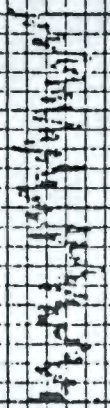
230

240

250

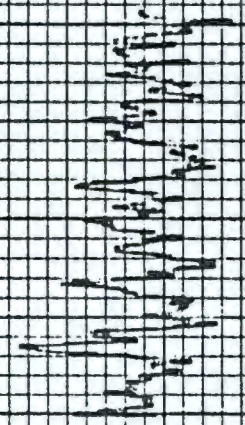
260

500 cfs
270
280
290
300
310
320
330
333.1



BACKGROUND

500 c/s



Pos. 2

1000 c/s

Pos. 1

5000 c/s

PULSE IN
5000 c/s
RM 10000 c/s

PULSE IN
5000 c/s
RM 5000 c/s

Ø

SPAN

FULL
SCALE

PRE SURVEY CALIBRATION

299W66
10-7-81

Westinghouse Hanford Company	LOG HEADER	Page 1 of 2

Well No. 299-W6-6 Area 200 West Date 10/24/91

Log Run #3 Log Type Gross Gamma

Elevation Datum NGVD 29* Elevation 706.82' Brass Cap

Survey Coordinates 137638.72 N 567318.74 E

Log Measured From Ground Surface

Location Description North Perimeter Road / 200 West Area

Ground Surface Elevation 706.82' Brass Cap

Surface Temperature 10.3°C Weather Overcast - Cool

BOREHOLE INFORMATION

Driller Darrel Perkins

Drill Rig Type Cable Tool | Bit Type/Diameter Hard Tool / 8"

Borehole Diameter(s)/Depth 16"/ 18.1' 12"/169.8' 10"/340.4 8"/472.0'

Depth Driller ~~272.0'~~ 472.0' | Depth Logger 472.0'

Liquid Level 277.3' | Liquid ~~Density~~ Appearance Muddy

Temperature 17.8°C

CASING RECORD

Type 16" Carbon Steel Sch. 40 | Interval +0.1' - 18.07'

Type 12" Carbon Steel Sch. 40 | Interval +0.3' - 169.79'

Type 10" Carbon Steel Sch. 40 | Interval +1.0' - 340.35'

Type 8" Carbon Steel Sch. 40 | Interval +5.3' - 465.58'

Well Screen Interval NA

Comments: Return Error = +0.21' high

Centralizer used.

* Survey data from Kaiser 12/15/97

17-69/70

9313018.1855

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No. C627A97

Base Calibration Date: 5/91 | Calibration Reference: PNL-7785 UC-606

Calibration/Probe Factor: 8.84×10^{-3} eU P/M/C/S | Base Calibration Datum (eU): Position 1: 297.4 eU | Position 2: 64.3 eU

Dead Time: 11.8 μsec | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 472.0' | To: 300.0'

Rerun(s): 380.0' to 335.0'

Pre Survey Verification: Position 1: 302.6 eU | Position 2: 65.2 eU | Background: 52 c/s

Base Calibration Difference: Position 1: 5.2' eU | Position 2: 0.9 eU

Logging Speed: 5 ft./min. | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 1230 | Completion Time: 1500

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC-1

Post Survey Verification: Position 1: 302.6 eU | Position 2: 65.7 eU | Background: 52 c/s

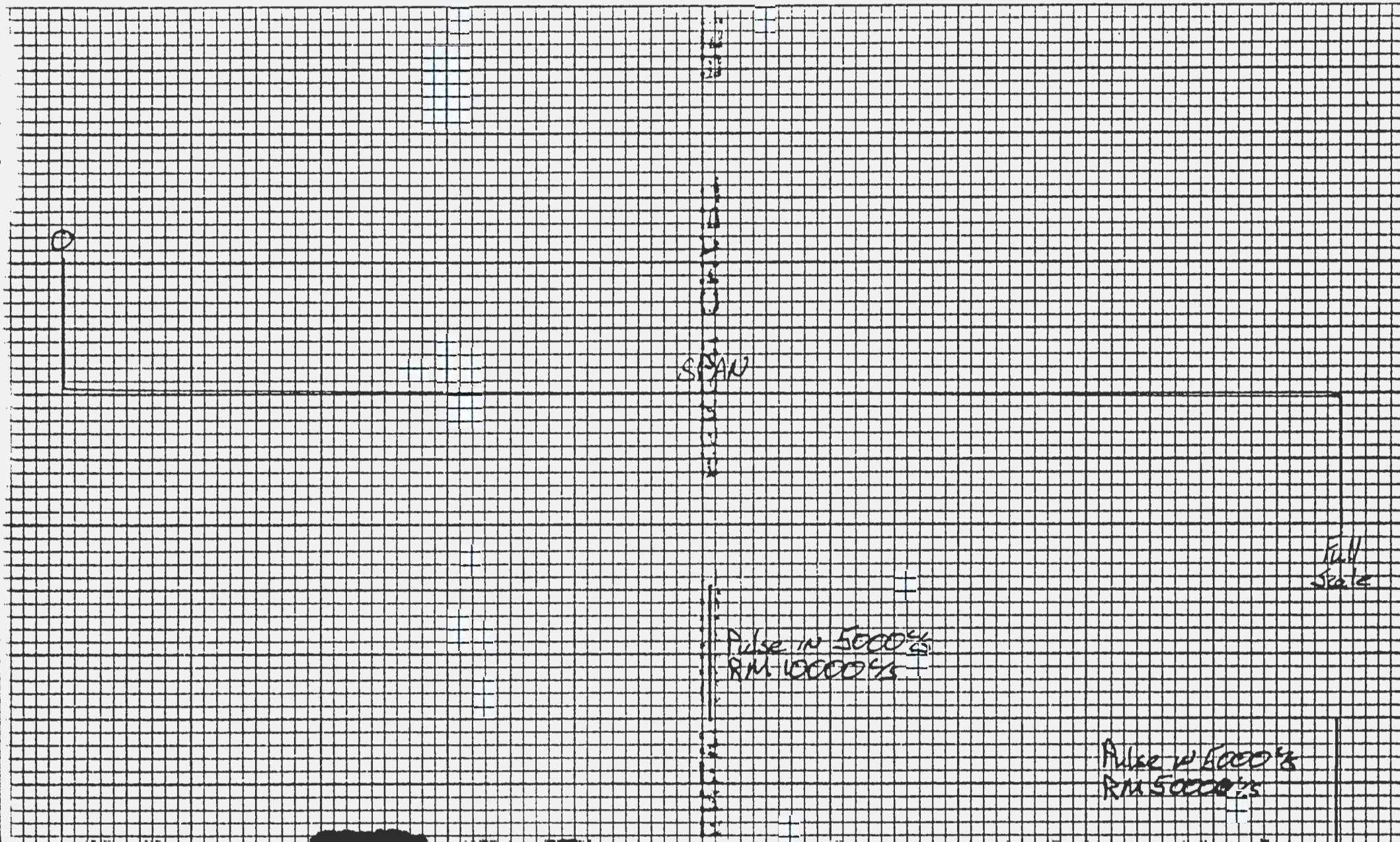
Percent Change: Position 1: 0.0% | Position 2: 0.8%

Comments: Return Error = +0.21' high

Centralizer used

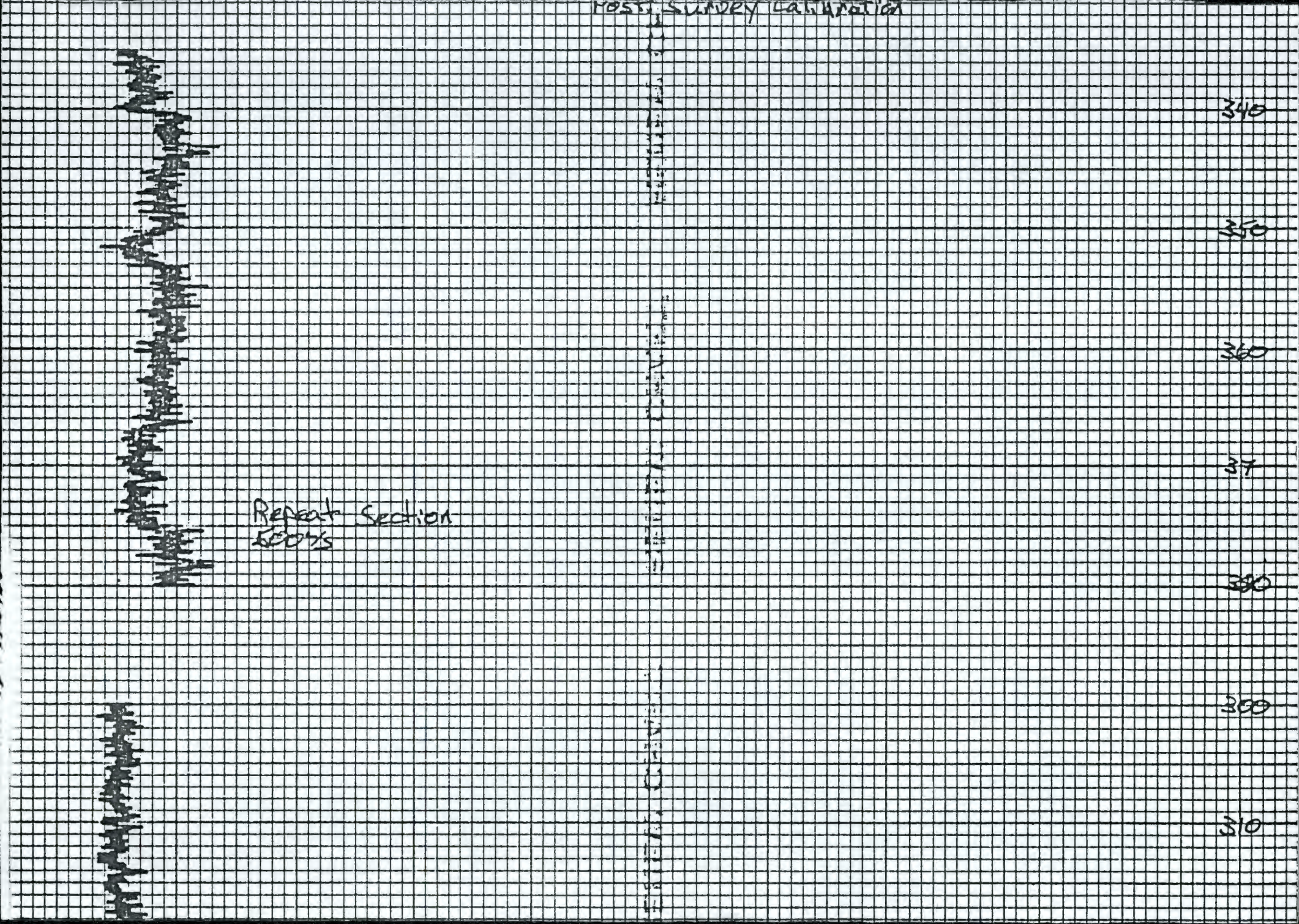
Witnessed and Verified by: (sign and print name) Alan Pearson Alan Pearson Date: 10/24/91

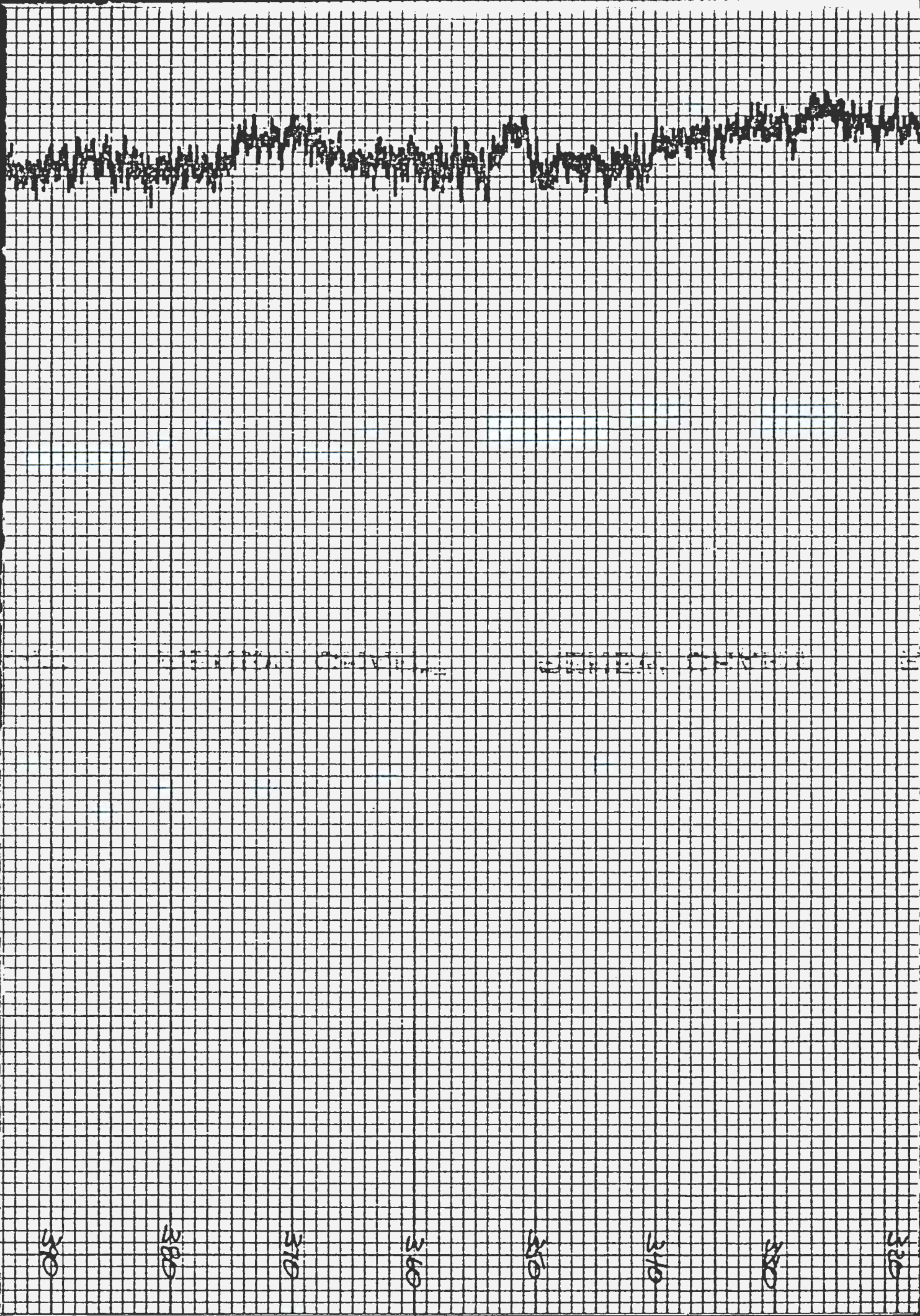
A-6000-520 (05/90)

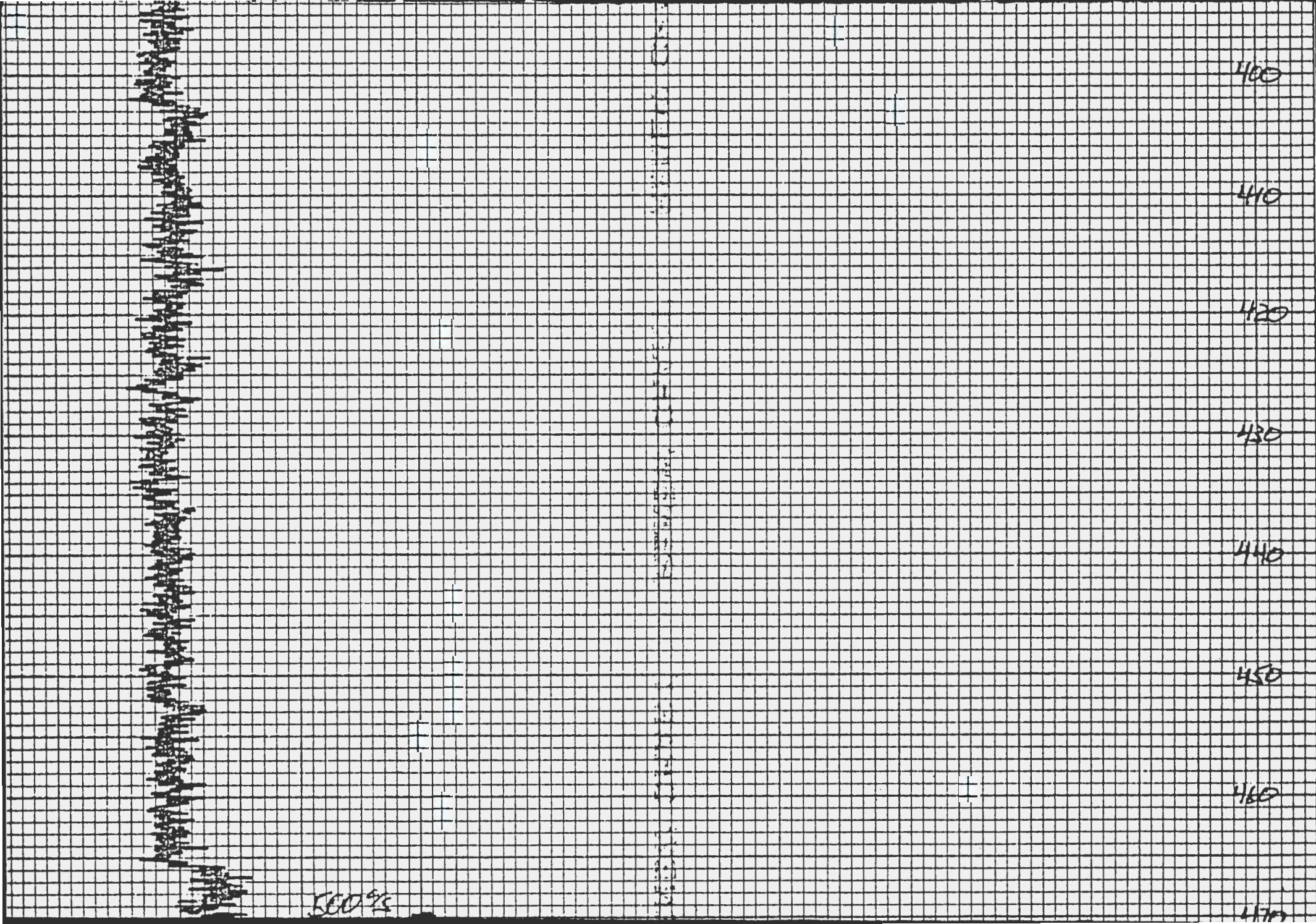


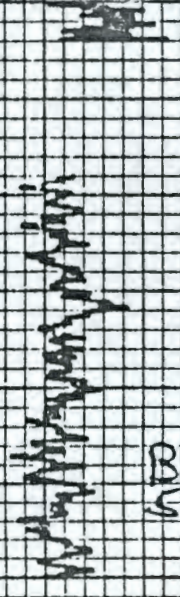
Pos. 2
1000 c/s
Pos. 1
5000 c/s
Background
500 c/s

Post Survey Calibration





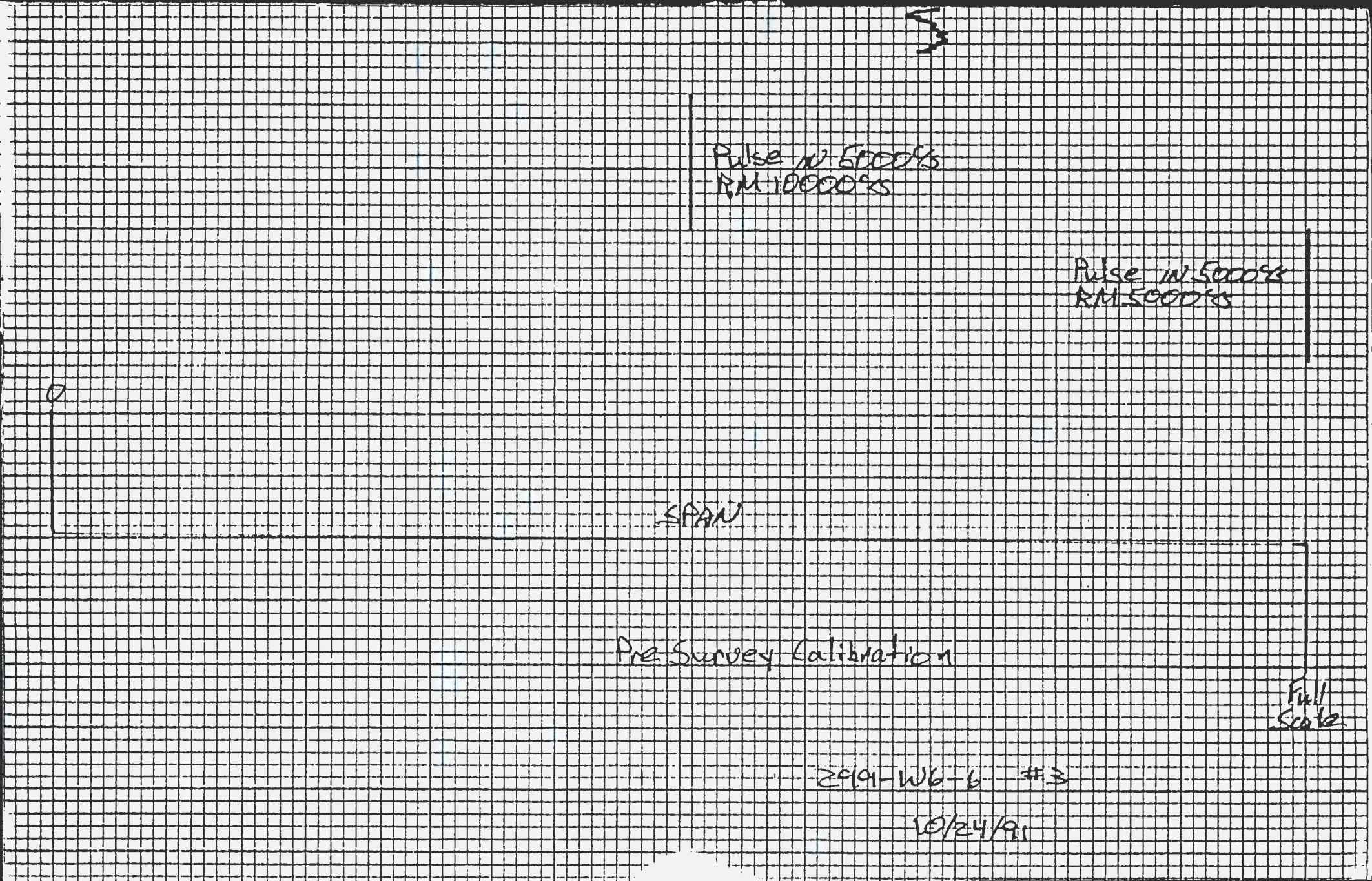

400
410
420
430
440
450
460
470
500%



Background
500 s

Pos. 2
1000 s

Pos. 1
500 s



Pre Survey Calibration

2919-W6-6 #3

10/24/91

18.0 WELL 299-W6-7

18.1 DRILLING

Construction of this well began on 14 May 1991 and total depth of 276.2 feet was reached on 18 July 1991. The well was drilled using a cable tool rig. Approximately 1682 gallons of water were added during drilling activities. Specific well construction information is located in Table 18.1. Well Guard, a non-petroleum based lubricant, was used on the drilling tools. A Nonconformance Report (NCR B04111) was issued during the construction of this well regarding stencilling on the temporary casing used in the construction of this well. A more detailed description of the drilling is shown in the Well Summary report at the end of this section.

Table 18.1 299-W6-7 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	19.7	ALS
	10"	155.4	ALS
	8"	276.2	ALS
Gross Gamma Logging	27 June	157.9	2.9
	18 July	275.1	125.0
Backfill	Hole Plug	276.2	268.1
Permanent Casing	4"	246.5	ALS
Screen	4" 10-Slot	267.2	246.5
Filter Pack	20-40 Silica Sand	268.1	242.3
Annular Seal	Bentonite Pellets	242.3	238.9
	Bentonite Crumbles	238.9	21.6
	Cement Grout	21.6	3.4
Concrete Pad	4'x4'x6"	3.4	ALS

BLS - Below Land Surface
ALS - Above Land Surface

Sediments from the Hanford formation, early "Palouse" soil, Plio-Pleistocene unit, and the Ringold Formation were encountered in this borehole. Hanford deposits extended to 22.5 feet BLS and were entirely sandy gravel. Approximately 22.5 feet (22.5-45 feet BLS) of slightly silty sand, gravelly sand, and sand with some caliche zones represent the early "Palouse" soil and the Plio-Pleistocene unit. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (45-272.6 feet BLS).

9313018.1857

The borehole was advanced for the first 5 feet by the drive barrel. Subsequent drilling was by hard tool. Samples were collected at approximately 5 foot intervals for moisture content (above the water table only), radiological screening, carbonate analysis, and lithologic archiving. Grain size analysis was done on samples from the interval to be screened. The borehole log and physical data for this well are located at the end of this section.

Gross gamma logging was conducted as indicated in Table 18.1. Reproductions of these logs are also located at the end of this section.

18.2 WELL COMPLETION

Well completion began on 29 July 1991 and was completed on 8 August 1991. Static water level at the time of completion was 250.0 feet below land surface (BLS). Completion details are presented in Table 18.1. Approximately 0 gallons of water were removed from the well to settle the filter pack. A 6 inch protective casing with a locking cap, four guard posts, and a brass marker with the well number were also set in the concrete pad. Elevations were determined for the brass marker, the top of the protective casing, and the top of the Hydrostar plate. Lambert and plant (200 West datum) coordinates were established for the centerline of the well. Documentation of well completion activities can be found in the Well Construction Report.

18.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 8 October 1991 using a 1.5 horsepower Grundfos submersible pump. Approximately 680 gallons of water were removed to develop the well. A dedicated Hydrostar pump was installed on 8 October with the intake located 267.0 feet below the top of the protective casing.

18.4 AQUIFER TESTING

Instantaneous slug injection and withdrawal tests were conducted on 8 October 1991. The data from the well development pumping was collected for analysis as drawdown and recovery tests however the data was not interpretable. Results from the testing are presented in Table 18.2. Slug injection and slug withdrawal data plots are shown in Figures 18.1 and 18.2. Raw data from the aquifer testing at 299-W6-7 are located at the end of this section.

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Table 18.2 Hydrologic Testing Results from 299-W6-7				
Formation: Ringold		Lithology: Sandy Gravel	Interval Tested*: 254.7-269.8	
Test Type	Date	Analysis Method	K (ft/day)	T (ft^2/day)
Constant Discharge	7 Oct 91	Not Interpretable	----	----
Recovery	7 Oct 91	Not Interpretable	----	----
Slug Injection	8 Oct 91	Bouwer-Rice (1989)	22	----
Slug Withdrawal	8 Oct 91	Bouwer-Rice (1989)	16	----

* Depth below top of 6" protective casing

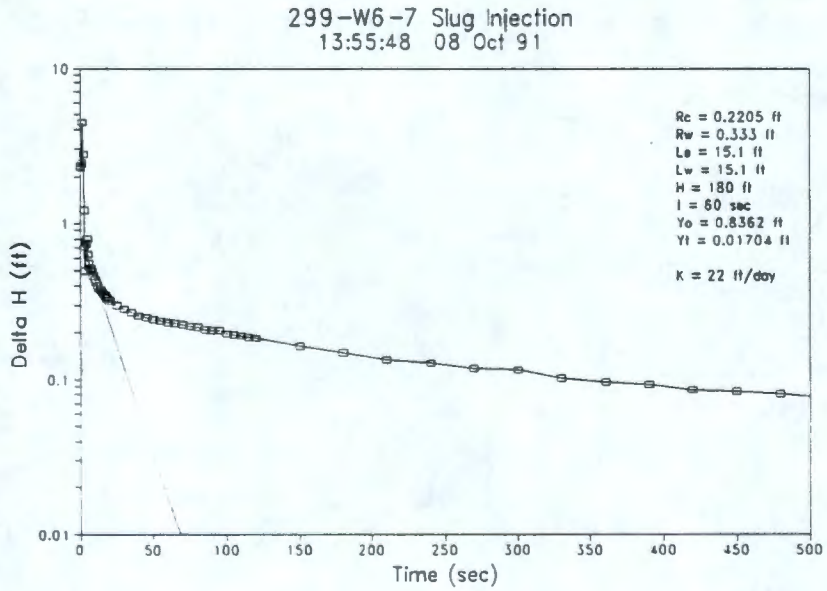

Figure 18.1 299-W6-7 Slug Injection Plot.

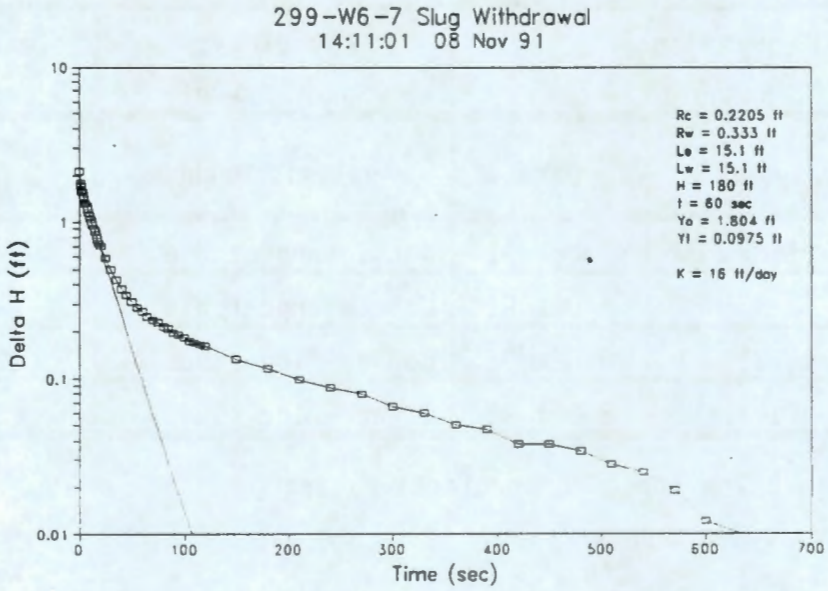

Figure 18.2 299-W6-7 Slug Withdrawal Plot.

9313018.1859

LLBG FACILITY 1991

WELL 299-W6-7

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
5/14/91	7/12/91	46		276.2'	251.13'	1681.5

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
7/29/91	8/8/91	8	250.5	268.1'	267.2-246.5'	0

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
~~10/8/91~~ N/A	10/8/91	10/8/91	10/8/91	~~350~~ 680 12-26-91 K.L.

COMMENTS:

9313018.1825

WELL CONSTRUCTION REPORT

VALIDATED KDR 3/18/92 SIGNATURE/DATE

Specification No. WHC-S-014 Rev No. 5

ECNs 144240, 144241 127437

Project RCRA W-017/LLBG

Location 200W/LLBG/WMA-5

Drilling Company Kaiser Engineers Hanford

Driller Don Kruger, B. Peters

Other (Companies) Ebasco Envr.

Geologist(s) Susan J. Havens, R. Wangaard, Brent Jones, J.A. Coates, Paul Anderson

Well No. 299-W6-7 Temp. Well No. N/A

Coordinates N: 137,638.8; E: 567,311.3 (LAMBERT)

Casing Elev. 694.73' Ground Elev. 691.34' BRAC

Drilling Method

Verification Method Visual Observation

Criteria WHC-S-014, 5.2, 5.3, 7.5, E11 6.7 sec 6.2

			Initials	Date
Rotary	Air N/A	Mud N/A	N/A	N/A
Cable Tool	D 0-6, 35-45'	H 6-35, 45-276.2	SJH	5/17/91
Drilling Fluid	Raw Water	168 GAL	SJH	5/17/91
Other	NA			

Geophysical Logging

Sondes	Interval	Date
Gross Gamma	157.9 - 2.9'	6/27/91
Gross Gamma	275.1 - 125.0	7/18/91
	-	
	-	
	-	

Completion Data

Drilled Depth 276.2

Completed Depth 263.1*

Date Started 5/14/91

Date Completed 7/17/91

Static Water Level/Date 254.7' 7/17/91

Aquifer Testing

Type INSTANTANEOUS SLUG

Flow Meter I.D. No. -NA-

Cal. Due Date -NA-

Length of Test -1 HR-

Volume Pumped -NA-

Drawdown -NA-

Date of Test 10-8-91

Completion Results

Cleaning

Verification Method Visual Inspection/Direct Observ

Criteria WHC-S-014, 7.6, 7.7, 4.2.2 WHC-CN-7.7 sec 5.4

	Initials	Date
Drilling Tools/Rig	SJH	5/16/91
Temporary Materials	SJH	5/14/91 (1)*
Permanent Materials	RW	8-5-91

Material Storage/Packing

Verification Method Visual Inspection

Criteria WHC-S-014, 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	RW	8-6-91
Material Packing	RW	8-6-91

Screen

	Type	Length	Slot Size
wirewrap	T.304 4" S.S.	20.75'	10

Depth(s) 267.2 - 246.5'

Verification Method Steel tape Measurement

Criteria WHC-S-014 Section 4.2.1, 4.2.3, 4.2.5, 12.2.1

Initials RW Date 8-5-91

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014 7.2

	Identify	Initials	Date
Additives	Raw Water	SJH	5/17/91
Lubricants	Jet Lube (Well Guard)	SJH	5/17/91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014 Section 8.2

Initials SJH Date 7/18/91

A-6000-436 (09/90)

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WHC-SD-EN-DP-044, Rev. 0

WELL CONSTRUCTION REPORT
(continuation sheet)

299-W6-7

Casing (permanent)

Type	Size	Placement
T-304 Stainless Steel	4"	246.5 - 0' (4.3') Stickup
		-
		-
		-

Verification Method: Visual Observation using steel tape

Criteria: WHC-S-014 4.2.1, 4.2.4, 4.2.5, 12.21

Initials: [illegible] Date: 8-7-91

Well Protection

Verification Method: Visual Observation, Measurement with steel tape

Criteria: WHC-S014 4.2.10

	Initials	Date
Protective Posts	KDR	3/18/92
Protective Casing	KDR	3/18/92
Site Restored	KDR	3/18/92
Cap, Hasp and Lock	KDR	3/18/92
Surface Pad	KDR	3/18/92

Annular Seal/Filter Pack

Verification Method: Visual Observation using steel tape Criteria: WHC S-014 4.2.6, 4.2.7, 4.2.8, 4.2.9, 5.3.1 ~~as 5.3.7~~ SSH 7/17/91

Type	Interval	Volume	Initials	Date
3/8" Bentonite Pellet	242.3 - 238.9	261 ft³ 350# buckets	RW	8-5-91
20-40 sand	268.1 - 242.3	20.2 ft³. 18 100# bag.	RW	8-5-91
8-20 mesh Bentonite crumbles	2423 - 21.6	233.6 ft³ 329 50# bag	RW	8-7-91
Portland Type I+II cement	21.6 - 3.4	242 ft³ 18 94# bag	RW	8-8-91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014 Section 3.4

	Initials	Date
Measurement Point/Surveyed	KDR	3/18/92
Protective Casing/Brass Cap Surveyed	KDR	3/18/92
Well Number Stenciled	KDR	3/18/92
Brass Cap Labeled	KDR	3/18/92

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014, 4.2.11, 4.2.2

	Initials	Date
Pump Decon/Prep	JAC	10-9-91
Installed	JAC	10-9-91
Pump Tested	JAC	10-9-91

Other (initial if performed)

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

JAC 10-9-91 Well Development

Comments/Remarks (1) SJH 7/10/91 60' 8" casing delivered to site, 50' of 8" casing removed due to NCR # B-04111, hole overdrilled RW 8-5-91

Reviewed By (Sign/Print Name): Edward C. Rafuse / EDWARD C. RAFUSE Date: 8/27/91

A-6000-436 (09/90)

9313018.1863

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-7

Sheet 1 of 2

Location 200 W WMA-5

Elevation 691.34 BRASS CAP

Driller Donkinger / B. Peters

Prepared By R. Wanek (Sign/Print Name) Date 8-13-91

Project WD17 LLBG

Drilling Contractor KEH

Drilling Method and Equipment Cable tool BE

Reviewed By Edward C. Rafuse (Sign/Print Name) Date 12/27/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
				Sandy GRAVEL
12" C.S. Temp Casing set at 19.7'		10		
		20		SLIGHTLY SILTY SAND (22')
Cement grout 20.6' to 19'				
		30		GRAVELLY SAND (37') CALCIUM CEMENTED (CALICHE)
		40		SAND (40') CALCIUM CEMENT SAND
		50		GRAVELLY SAND
		60		SAND
		70		SANDY GRAVEL
		80		SAND INTERSENDREING W/CALCIUM CEMENTED SAND STRINGERS
		90		
		100		
		110		SANDY GRAVEL (106')
		120		
		130		
		140		
10" ID Temp CS Casing set at 155.38		150		
		160		

18-8

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-7

Sheet 2 of 2

Location 200W WMA-5

Project 41017 LLBG

Elevation 691.34' BRASS CAP

Drilling Contractor KEH

Driller Don Kruger / B. Peters.

Drilling Method and Equipment Cable Tool - BE 21081

Prepared By R. Weinbar (Sign/Print Name) Date 8-13-91

Reviewed By Edward C. Norris (Sign/Print Name) Date 8/27/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
				SANDY GRAVEL
		170		
8-20 mesh. bentonite crumbles from 242.3 to 21.6'		180		
		190		
		200		
		210		
1/4"-1/2" bentonite Pellets. from 242.3 to 238.9		220		
20-40 silica Sand 242.3 to 268.1		230		
4" T-304 wire wrap. S.S. screen. from 246.5-267.2		240		
water level 250.5' on 7-29-91		250		
		260		
Backfill of Bentonite hole Plug 276.2 to 268.1		270		269' SANDY GRAVEL (SOME ENCLOSURES)
TD of hole 278.2		280		276.2' TOTAL DEPTH DRILLED

A-6000-384 (04/90)

9313018.1811

BOREHOLE LOG

VALIDATED KDR 3/18/92 SIGNED/DATE

Boring or Well No. 299-W6-7

Sheet 1 of 14

Location LLBG/200W/WMA-5

Project W-017/LLBG

Elevation 691.34

Drilling Contractor Kaiser Engineers

Driller Dan Kruger

Drilling Method and Equipment Cable Tool / Drive Barrel / Hand Tool

Prepared By Susan A. Hawkins/S.J. Hawkins (Sign/Print Name) Date 5/14/91

Reviewed By R.D. Miller (Sign/Print Name) Date 5/31/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
0					
5	21th 1 rad 1 moist	DB		5' Sandy GRAVEL (50% Sand, 50% Gravel) 5% lg cobble, 5% lrg pebble, 10% med pebble, 10% c pebble, 5% med pebble, 5% f pebble, 5% vf pebble, 15% vc sand, 15% c sand, 10% med sand, 5% f sand, 5% vf sand. 2.5Y 4/2 dark grayish brown (wet), 2.5Y 6/2 lt brownish gray dry - sample dry. V poorly sorted, angular - subrd. Strong reaction w/10% HCl. 65% mafic, 25% felsic, 10% qtz	PID ≤ Det
10	21th 1 rad 1 CaCO3	HT		10' Sandy GRAVEL	
				Crushed Fragments of Basalt & Granite 90% mafic, 10% felsic unbroken pebbles subrd. V weak reaction w/10% HCL	PID ≤ Det 5/17/91
15	21th 1 rad 1 CaCO3	100/3" ST		15' Sandy GRAVEL	PID ≤ Det 5/23/91
				Mostly Crushed Fragments of Basalt & Granite 90% mafic 5% qtz, 5% felsic unbroken pebbles are rd - Subrd 2.5Y 4/2 dark grayish brown, wet (sample wet) 2.5Y 6/2 lt brownish gray (dry) Strong reaction to 10% HCL	sample was refused after 100 blows only 3" recovered mostly HT affected. sample wet
	20'			18-10	

9313018.1865

BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 2 of 14

Location 200W/LLBG/WP1A-5

Project W-017 LLBG

Elevation 691.34

Drilling Contractor Kaiser

Driller Don Kruger

Drilling Method and Equipment Cable Tool/BE R1081

Prepared By: Susan J. Havens/SJ Havens (Sign/Print Name) Date 5/25/91

Reviewed By R.D. Willey (Sign/Print Name) Date 6/1/91

Depth (ft.)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
20	2 1/4 rad 1 moist	HT		20' Sandy GRAVEL	HT PID & Det
				Fragments of Crushed Basalt & Granite	
				90% Basalt, 5% Felsic, 5% Qtz, 2.5Y 4/2 dk grayish	
				brn wet (sample wet) 2.5Y 6/2 ltbr gry (dry)	
				Ang-subrd Weak reaction to 10% HCL	
				22' Slightly Silty SAND (described in 25'	
				sample)	
25				25' Slightly Silty SAND	DB PID & Det 5/29/91
	2 1/4 rad 1 moist	DB		5% ms, 35% fs, 40% vfs, 20% slt	
				2.5Y 6/3 ltyellow brn (wet) 2.5Y 7/2 ltgry	
				(dry) (sample wet) Well sorted, rd-subrd,	
				strong reaction to HCL (10%) 40% basalt,	
				35% felsic, 25% Qtz	
				27' Gravelly SAND 20% cp, 50% fs,	
				10% vfs, 20% slt, 7.5YR 8/2 pinkish white	
				(dry) 7.5YR 8/3 pink (wet) (sample dry)	
				well cemented, v strong reaction to 10% HCL	
				pebbles basaltic, sand felsic	
30	2 1/4 rad 1 moist	HT		30' Gravelly SAND	HT PID & Det 5/30/91
				Same as described at ~~27'~~ 27' SJH 5/30/91	
				crushed fragments of basalt & feldspar	
				strong reaction to 10% HCL, ang-subrd	
				20% basaltic, 80% felsic	
35'	2 1/4 rad 1 lb/ft3	HT		35' Gravelly SAND	HT PID & Det 5/30/91
				crushed basalt & minor amounts of granite	
				90% basaltic, 10% felsic, strong reaction	
				w/ 10% HCL, ang to subrd	

A-6000-382 (04/90)

9313018.1865

BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 3 of 14

Location 200W/LLBG/WMA-5

Project W-017

Elevation 691.34

Drilling Contractor Kaiser

Driller Don Krueger

Drilling Method and Equipment Cabletool/BE R1081 RSM

Prepared By Susan D. Havens/SJ Havens (Sign/Print Name) Date 5/30/91

Reviewed By RD Miller (Sign/Print Name) Date 6/4/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
40	1 rad 1 calcs/ moist 2 lith	DB		40' SAND	DB PID ≤ Det
				30% vcs, 30% cs, 20% ms, 10% ats, 5% vfs,	
				5% silt, 10YR 5/3 brn (wet), 10YR 8/2	
				pale brn (dry) sample sltly moist, poorly	
				sorted, ang-subrd, strong reaction w/ 10%	
				HCL, frg grains basaltic, trace felsic & qtz	
				70% basalt, 30% felsic & qtz	
				44' Course grn Calcium cemented SAND	DB
45'	1 rad 1 calcs 2 lith	HT		45' Gravelly SAND	HT PID ≤ Det 6/3/91
				Fragments of Basalt & Granite 10YR 5/2 brn, wet	
				10YR 8/2 white dry (sample wet) Larger fragments	
				90% Basalt 10% Felsic - ang. Smlers sand	
				SSR w/ 13M' grains 40% basalt, 60% felsic & qtz	
				ang-subrd strong reaction w/ 10% HCl	
50'	1 rad 1 calcs 2 lith	HT		50' Gravelly SAND	HT PID ≤ Det 6/3/91
				Same as described in 45' sample	
55	1 rad 1 calcs 2 lith	HT		55' Gravelly SAND	
				Same as described in 45' Sample	HT PID ≤ Det 6/3/91
60'					

A-6000-382 (04/90)

9313018.1867

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BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 4 of 14

Location 200W/LLBG/WMA-5

Project W017/LLBG

Elevation 691.34

Drilling Contractor Kaiser Engineers

Driller Don Krugar

Drilling Method and Equipment Cable Tool/BE R1081

Prepared By S. J. Havens/SJ Havens (Sign/Print Name) Date 6/3/91

Reviewed By R.D. Miller (Sign/Print Name) Date 6/10/91

Depth (60')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
60'	1rad 1CaCO3 21ith	HT		60' Gravelly SAND	HT PID & Det 6/3/91
				Fragments of Basalt & Granite 10YR 5/3 brn wet	
				10YR 8/2 white dry (sample wet) Large Frag	
				90% Basalt, 10% Felsic ang, smaller crs	
				sand grains 40% basalt, 60% Felsic + Qtz	
				ang-subrd, strong reaction w/ 10% HCL	
65'	1rad 1CaCO3 moist 2 lith	ST 5/28/33/43		65' SAND	
				5% vf pebble, 10% vc sand, 50% c sand,	ST PID & Det 6/4/91
				20% m sand, 10% f sand, 5% vf sand	Blows are per 6"
				10YR 5/3 brown wet, 10YR 7/1 ltgray dry	
				sample moist, poorly sorted, ang-subrd,	
				strong reaction w/10% HCL 50% basalt,	
12				30% felsic, 20% Qtz	Drill Slowed down ≈ 68'
					(GRAVEL)
70'	1rad 1CaCO3 21ith	HT		70' Sandy GRAVEL	HT PID & Det 6/5/91
				Fragments of Basalt and Minor frags of Granite	
				10YR 5/3 brown wet, (sample wet)	
				90% Basalt 10% Felsic, ang-subrd	
				72' SAND	6/5/91 Easier Drilling
				(described in 75' SJH 6/10/91 sample)	SAND rising in csg
75'				75' SJH 6/10/91	
	1rad 1CaCO3 21ith	HT		SAND	HT, PID & Det 6/6/91
				2% vf pebble, 10% vc sand, 48% c sand, 20% m sand	75' SJH 6/10/91 Sand flowing into
				10% f sand, 10 vf sand, 10YR 5/3 brown wet	csg from below (70' sample
				10YR 7/1 ltgray dry (sample wet)	was taken)
				poorly sorted, ang-subrd, strong reaction w/10% HCL	
				80% basalt, 30% felsic & qtz	
80'					

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BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 5 of 14

Location 200W / LLBG / WMA-S

Project W-017 / LLBG

Elevation 691 34

Drilling Contractor Kaiser

Driller Dan Kruger

Drilling Method and Equipment Bucyrus Erie / R1091

Prepared By S.J. Havens / Susan A. Havens (Sign/Print Name) Date 6/7/91

Reviewed By R.D. Miller (Sign/Print Name) Date 6/11/91

Depth (80')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
80'	1 rad 1 CaCO3 2 lith	4/7/10		82.2-83.7' SAND	ST PID ≤ det 6/7/91
				10% vcs, 20% cs, 50% msand, 10% fsand	1.5' recovered
				10% vfsand, ~~5/3~~ SJH 6/7/91 10Y 5/2 brown (wet),	
				10YR 7/2 ltgray dry (sample moist), poorly	
				sorted, ang-subrd, strong reaction w/ 10% HCl	
				40% basalt, 40% felsic, 20% qtz	
85'	1 rad 1 CaCO3 / moist 2 lith	DB		85' SAND	DB PID ≤ det 6/7/91
				1% vf pebble, 10% vcs, 20% cs, 50% ms,	
				9% fs, 10% vfsand, 10Y 5/3 brown (wet)	
				10YR 7/2 ltgray dry (sample moist) poorly	
				sorted, ang-subrd, strong reaction w/ 10%	
				HCL, 40% basalt, 40% felsic, 20% qtz	
UR				loose sand, w/ interfingering calcium	
				cemented zones	
90'	1 rad 1 CaCO3 / moist 2 lith	DB		90' SAND	
				10% vcs, 10% cs, 40% ms, 20% fs, 20% vfs	DB PID ≤ det 6/11/91
				10Y 5/3 brown wet, 10YR 7/2 ltgray dry	Hard drilling
				sample moist, poorly sorted, ang-subrd,	
				strong reaction w/ 10% HCl, 30% basalt,	
				50% felsic, 20% qtz	
95'	1 rad 1 CaCO3 2 lith	HT		95' SAND	HT PID ≤ det 6/11/91
				same as described in 90' sample	
				w/ flakes of biotite	

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BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 2 of 14

Location 200W/LLBG/WMA-5

Project W-017/LLBG

Elevation 691.34

Drilling Contractor Kaiser

Driller Don Kruger

Drilling Method and Equipment Bucyrus Erie Cable Tool R1081

Prepared By Susan J Havens / SJ Havens (Sign/Print Name) Date 6/11/91

Reviewed By R D Miller (Sign/Print Name) Date 6/20/91

Depth (100')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
100'	1rad 1CaCO3 2lith	HT		100' SAND	HT PID ≤ det 6/11/91
				10YR 5/3 brown wet, 10YR 7/2 lt gray dry	
				sample wet (HT) poorly sorted, ang-subrd	
				strong reaction w/ 10% HCL, 30% basaltic,	
				40% felsic, 30% qtz w/flakes of biotite	
R					
105'	1rad 1CaCO3 2lith	ST 3/28/45/93		105' SAND	ST PID ≤ det 6/12/91
				same as described at 100' grading into	
				106.8' Sandy ~~GRAVEL~~ SANDY GRAVEL	
				45% gravel, 55% sand (20% s cobble,	
				5% vc pebble, 5% c pebble, 10% m pebble, 10% fp	
				5% vfp, 20% vcs, 15% cs, 10% ms, 3% fs, 2% vfs)	
				2.5Y 5/2 grayish brown wet, 10YR 8/2 white dry	
				sample moist (from HT) poorly sorted, ang-subrd	
				med strong reaction w/ 10% HCL, cobbles-basalt	
110'	1rad 1CaCO3 2lith	HT		sand 30% basalt, 30% felsic, 40% qtz w/ biotite	
				flakes)	
				110' Sandy GRAVEL	HT PID ≤ det 6/13/91
				Crush Basaltic + Felsic Fragments	
E				80% Basalt 15% Felsic, 5% Qtz, ang-subrd	
				2.5Y 5/2 grayish brown wet, 10YR 8/2 white dry (mud)	
				sample wet (HT) strong reaction to 10% HCl	
115	1rad 1CaCO3 2lith	HT		115' Sandy GRAVEL	HT PID ≤ det 6/13/91
				(Same as described at 110')	hard drilling
120'					

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BOREHOLE LOG

Boring or Well No. Z99-W6-7

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Location 200W/LLBG/WMA-5

Project W-017/LLBG

Elevation 641.34

Drilling Contractor Kaiser

Driller Don Krueger

Drilling Method and Equipment Bucyrus Erie Cable Tool

Prepared By Susan J. Havens, S.J. Havens (Sign/Print Name) Date 6/18/91

Reviewed By R.D. Mitchell (Sign/Print Name) Date 6/25/91 RDM

Depth (120')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
120'	1rad 1CaCO3 2lith	HT		120' Sandy GRAVEL (5Y 4/1) dark gray wet, (5Y 7/1) ltgray dry sample wet, poorly sorted, ang-subrd ~~Sty~~ SJH 6/18/91 strong rx w/ 10% HCl. Crushed fragments of Basalt & Granite, 85% Basaltic, 15% felsic & qtzic	6/18/91 HT PID ≐ det Hard drilling
125'	1rad 1CaCO3 2lith	3/33/100/4 ST		124.8 - 126.5' Sandy GRAVEL (40% GRAVEL) (5Y 4/1) dark gray wet (5Y 7/1) ltgray dry sample wet. 20% sc, 3% vcp, 10% cp, 2% mp, 5% mp, 5% fp, 15% vcs, 20% cs, 10% ms, 5% fs, 5% vfs, sample poorly sorted Ang to subrd, mild Rx w/ 10% HCl 80% Basaltic, 15% felsic, 5% qtzic	6/19/91 ST PID ≐ det Sample moist from HT
130'	1rad 1CaCO3 2lith	HT		130' Sandy GRAVEL same as described in sample at 124.8-126.5'	6/20/91 HT PID ≐ det hard drilling ½'/hr
135'	1rad 1CaCO3 2lith	HT		135' Sandy Gravel same as described in sample at 124.8-126.5'	6/20/91 HT PID ≐ det
140'					

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BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 8 of 14

Location 200W/LLBG/WMA-5

Project W-017/LLBG

Elevation 691.34

Drilling Contractor Kaiser

Driller Don Kruger

Drilling Method and Equipment Burgess Ernie Cable Tool

Prepared By S.J. Havens / Susan J. Havens (Sign/Print Name) Date 6/24/91

Reviewed By R.A. Miller (Sign/Print Name) Date 7/2/91

Depth (140')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
140'	1 rad 1 CaCO3 2 lith	25/40/35/100 60% rec ST SSH 6/24/91		140-142' Sandy GRAVEL (30% sand, 70% GRAVEL) 20% sm cobble, 15% vcp, 15% cp, 10% mp, 5% fp, 5% vfp, 15% cs, 10% ms, 5% fs (5Y 6/1) gray-dry, (5Y 5/2) olive gray-wet very poorly sorted, mod rx w/ 10% HCL, dry, subrd 80% mafic, 20% felsic	SSH 6/24/91 unconsolidated 6/21/91 PID ≤ det hard drilling
145'	1 rad 1 CaCO3 2 lith	HT		145' Sandy GRAVEL (5Y 7/1) lt gray dry, (5Y 5/2) olive gray wet, sample wet, poorly sorted, ang to subrd, 75% mafic, 20% felsic, 5% qtzic strong rx w/ 10% HCL	6/25/91 HT PID ≤ det hard drilling
150'	1 rad 1 CaCO3 2 lith	HT		150' Sandy GRAVEL (5Y 7/1) lt gray dry (5Y 5/2) olive gray wet sample wet, poorly sorted, ang to subrd, 70% mafic 20% felsic, 10% qtzic strong rx w/ 10% HCL	6/26/91 HT PID ≤ det
155'	1 rad 1 CaCO3 2 lith	HT		155' Sandy GRAVEL same as described in sample at 150'	6/26/91 HT PID ≤ det
160'					

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BOREHOLE LOG

Boring or Well No. 299-W6-7

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Location 200W/LLBG/LwMA-5

Project W-017/LLBG

Elevation 641.34

Drilling Contractor Kaiser

Driller Don Kruger

Drilling Method and Equipment Bucyrus Erie Cable Tool RSM

Prepared By Susan J. Havens, S.J. Havens (Sign/Print Name) Date 6/28/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/2/91

Depth (160')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
160'	1rad 1CaCO3 2lith	HT		160' Sandy GRAVEL (5Y 8/1) white dry (5Y 5/2) olive gray wet + sample wet, poorly sorted, ang to sub rd, 65% mafic, 20% felsic, 15% qtzic, strong rx w/ 10% HCl, trace biotite	6/28/91 HT PID ≤ det
165'	1rad 1CaCO3 2lith	HT		165' Sandy GRAVEL Same as described in 160' sample	6/28/91 HT PID ≤ det
170'	1rad 1CaCO3 2lith	17/20.5 ST 47% rec		170'-170.9' Sandy GRAVEL Sample mostly HT cuttings and broken large pebbles 20% lrg cobbles, 10% sm cobbles, 5% vcp, 20% cp, 5% mp, 5% fp, 10% vcs, 20% cs, 10% msand + finer (5Y 7/1) lt gray dry, (5Y 5/2) olive gray wet, sample wet (from HT), v poorly sorted, ang to sbrd strong rx to 10% HCl, 60% mafic 20% felsic, 20% qtzic trace biotite	7/1/91 ST PID ≤ det sample was wasted in order to obtain description - therefore % of fine material is not accurate
175'	1rad 1CaCO3 2lith	HT		175' Sandy GRAVEL (5Y 7/1) lt gray dry (5Y 5/2) olive gray wet sample wet, v poorly sorted, ang to sbrd weak reaction to 10% HCl 70% mafic, 20% felsic 10% qtzic trace biotite	7/1/91 HT PID ≤ det
180'					

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BOREHOLE LOG

Boring or Well No. 299-W6-7

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Location 200W/LLBG/WMA-5

Project W-017/LLBG

Elevation 491.34

Drilling Contractor Kaiser

Driller Don Kruger

Drilling Method and Equipment Bucyrus Erie, Cable Tool, Hard Tool

Prepared By Susan J. Havens / SJ Havens (Sign/Print Name) Date 7/3/91

Reviewed By Edward Rafuse / EDWARD RAFUSE (Sign/Print Name) Date 07/10/91

Depth (200')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
200'	1rad 1CaCO3 2lith	HT		200' Sandy GRAVEL (5Y 7/1) lt gray dry (5Y 5/2) olive gray wet sample wet, poorly sorted, ang to subrd strong rx to 10% HCl, 65% mafic, 20% felsic, 15% qtz, trace pyrite	7/3/91 HT PID ≤ det; Drilling rate 2ft/hr
205'	1rad 1CaCO3 2lith	HT		205' Sandy GRAVEL (5Y 7/2) lt gray dry (5Y 5/2) olive gray wet sample wet, poorly sorted, ang to subrd v. weak rx w/10% HCl, 60% mafic, 25% felsic, 15% qtz trace pyrite sample seems to contain more sand	7/8/91 HT PID ≤ det
210'	1rad 1CaCO3 2lith	HT		210' Sandy GRAVEL same as described in 205' sample	7/9/91 HT PID ≤ det
215	1rad 1CaCO3 2lith	HT		215' Sandy GRAVEL same as described in 205' sample	7/9/91 HT PID ≤ det
220'					

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BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 10 of 14

Location 200W/UBG/WMA-5

Project W-017/LLBG

Elevation 691 34

Drilling Contractor Kaiser

Driller Don Kruger

Drilling Method and Equipment Bucyrus Erie, Cable Tool

Prepared By Susan G. Havens/SJ Havens (Sign/Print Name) Date 7/2/91

Reviewed By Edward C. [illegible]/Edward C. [illegible] (Sign/Print Name) Date 07/08/91

Depth (180')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
180'	1 rad 1 CaCO3 2 lith	HT		180' Sandy GRAVEL (5Y 7/1) lt gray dry, (5Y 5/2) olive gray wet, sample ~~dry gray~~ SJH 7/2/91 wet, poorly sorted, ang to subrd mild rx to 10% HCL 65% mafic, 20% felsic 15% qtz	7/2/91 HT PID=det
185	1 rad 1 CaCO3 2 lith	HT		185' Sandy GRAVEL (5Y 7/1) lt gray dry (5Y 5/1) gray wet sample wet, poorly sorted, ang to subrd weak rx to 10% HCL 70% mafic, 20% felsic, 10% qtz	7/2/91 HT PID=det
190'	1 rad 1 CaCO3 2 lith	HT		190' Sandy GRAVEL (5Y 7/1) lt gray dry (5Y 5/2) olive gray wet sample wet, poorly sorted, ang to subrd no rx to 10% HCL 75% mafic, 15% felsic, 10% qtz trace ~~biotite~~ SJH 7/3/91 pyrite	7/3/91 HT PID=det drill rate increased from 1/2'/hr to 2'/hr very loose frame work, very porous
195'	1 rad 1 CaCO3 2 lith	HT		195' Sandy GRAVEL (5Y 7/1) lt gray dry (5Y 5/2) olive gray wet, sample wet, poorly sorted, ang to subrd no rx to 10% HCL 75% mafic, 15% felsic, 10% qtz trace pyrite	7/3/91 HT PID

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BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 12 of 14

Location 200W/LLBG/WMA-5

Project W-017/LLBG

Elevation 691 34

Drilling Contractor Kaiser Engineers

Driller Dan Kruger

Drilling Method and Equipment Bucyrus Erie, Cable Tool, Hard Tool

Prepared By Susan O'Haynes/SI Havens (Sign/Print Name) Date 7/10/91

Reviewed By Edward C. Kaiser (Sign/Print Name) Date 1/2/92

Depth (220')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
220'	1rad 1CaCO3 2lith	HT		220' Sandy GRAVEL (5Y 7/1) lt gray dry (5Y 5/2) olive gray wet sample wet, poorly sorted, ang to subrd very weak rx w/10% HCL, 65% mafic, 20% felsic, 15% qtz, trace pyrite	7/9/91 HT PID & det
225'	1rad 1CaCO3 2lith	HT		225' Sandy GRAVEL same as described in 220' sample	7/9/91 HT PID & det
230'	1rad 1CaCO3 2lith	HT		230' Sandy GRAVEL same as described in 220' sample	7/10/91 HT PID & det
235'	1rad 1CaCO3 2lith	HT		235' Sandy GRAVEL (5Y 7/1) lt gray dry (5Y 5/2) olive gray wet sample wet, poorly sorted, ang to subrd no rx w/10% HCL, 50% mafic, 30% felsic 20% qtz	7/11/91 HT PID & det
					Begin shift 7/12 235.7'
	1RAD 1Mast 2Lithdays	H.T.		(240') Sandy, GRAVEL.	7/12/91 HT PID & det.

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BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 13 of 14

Location 200W/LLBG/WMA-5

Project W017 / LLBG

Elevation 641.34

Drilling Contractor Kaiser Engineering, Hanford

Driller Don Krueger

Drilling Method and Equipment Bucyrus Erie Cable tool

Prepared By Susan J. Havens / S.J. Havens (Sign/Print Name) Date 7/12/91

Reviewed By Edward C. Rafuse / Edward C. Rafuse (Sign/Print Name) Date 07/17/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
240'	1 RAD 1 $CaCO_3$ 2 Lithology			(240) Sandy, GRAVEL. (5Y 7/1) Light gray (dry) to (5Y 7/2) Olive gray (wet). Saturated Sample due to Hard tooling loose. Poorly Sorted. VA-SR fragments. 55% matic-basaltic, 45% felsic-Qtzic. No rx to 10% HCl	7/12/91 0940 Casing to 239' PID ≤ detection Limit 7/12/91 W.L. measured at 242.6' BLS.
	1 Rad. 1 $CaCO_3$ 2 Lithology			(245') Sandy, GRAVEL (59% gravel, 41% Sand). Light gray (5Y 7/1) dry to (5Y 7/2) olive gray (wet). Saturated Sample due to hard tooling. Same as above w/ increase in gravel % 60% mafic, 40% Qtzic. loose, Poorly Sorted.	7/12/91 1120 Casing to 245'. PID ≤ detection 7/12/91
245'					
250	1 rad 1 $CaCO_3$ 2 lith	ST 28/26/20/18 3" 80% rec		(251.5-253') Sandy GRAVEL (45% gravel, 50% sand, 5% silt + clay) (5Y 8/2) white dry, (5Y 5/2) olive gray wet. Sample wet to moist, (due to HT) Very poorly sorted 10% lrg cobble, 25% sm cobble, 5% c coarse to coarse pebble, 5% mp, 5% fp, 5% vf p, 25% vcs to cs, 15% m to fs, 10% vfs to clay size, nonplastic, no rx w/ 10% HCl, ang to subrd 55% matic 45% felsic qtz. Sample showed signs of weathering, ~~pass bit~~ 5Y 7/1 5/91 limonite	ST 7/15/91 PID ≤ det Try 2nd ST refused after 105 blows 3"
255	1 rad 1 $CaCO_3$ 2 lith	HT		255' Sandy GRAVEL (5Y 7/1) dry light gray (5Y 5/2) olive gray wet Sample wet, poorly sorted, ang to subrd, no rx w/ 10% HCl. 55% matic, 45% felsic qtz	HT 7/15/91 PID ≤ det

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BOREHOLE LOG

Boring or Well No. 299-W6-7

Sheet 14 of 14

Location 200W/UBC/WMA-5

Project W-017/UBC

Elevation 691.34

Drilling Contractor Kaiser Engineering

Driller Don Kruger

Drilling Method and Equipment BE, Cable Tool

Prepared By Susan J. Havens / S.J. Havens (Sign/Print Name) Date 7/16/91

Reviewed By Edward C. Lance / Edward C. Lance (Sign/Print Name) Date 07/8/91

Depth (260')	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
260'	1rad 1CaCO3 21ith	HT		260 Sandy GRAVEL (5Y 7/1) dry light gray (5Y 5/2) olive gray wet, sample wet, poorly sorted, ang to subrd, no rx w/ 10% HCL, 55% mafic, 45% felsic qtz	HT 7/16/91 PID=det water level at 254.7'
265'	1rad 1CaCO3 21ith	5T 9/21/200 80% rec		(265.6-267.1') Sandy GRAVEL (60% gravel, 35% sand, 5% silt & clay) (5Y 7/2) lt gray dry (5Y 5/2) olive gray wet, sample wet to moist, very poorly sorted, ang to subrd, 20% lrg cobble (or larger*) 15% sm cobble, 10% vcp, 5% mp, 5% fp 25% vcs to cs, 15% ms to fs, 5% vfs to clay, non-plastic, weak rec to 10% HCL, 60% mafic, 40% felsic & qtz. Sample shows signs of weathering, limonite	5T 7/17/91 PID=det refused after 1.5' penetration 80% rec in tube * Many cobble broken by 5T and Tube was refused indicating boulder size possible
270'	1rad 1CaCO3 21ith	HT		(270') Sandy GRAVEL (40% gravel, 60% sand) (5Y 7/2) lt gray dry, (5Y 5/2) olive gray wet, sample wet, poorly sorted, ang to subrd. no rec w/ 10% HCL	HT 7/17/91 PID=det * More sand in sample - less gravel may be due to low wet sample is, no mud to support larger gravel fragments
275'	1rad 1CaCO3 21ith	HT		(275') Sandy GRAVEL* (5Y 7/2) lt gray dry, (5Y 5/2) olive gray wet sample wet, poorly sorted, ang to subrd no rec w/ 10% HCL TD 276.2	HT 7/17/91 PID=det * Primarily sand in sample due to water in hole, sample had to by bailed w/ sand pump

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VALIDATED 3/18/92 SIGNATURE/DATE

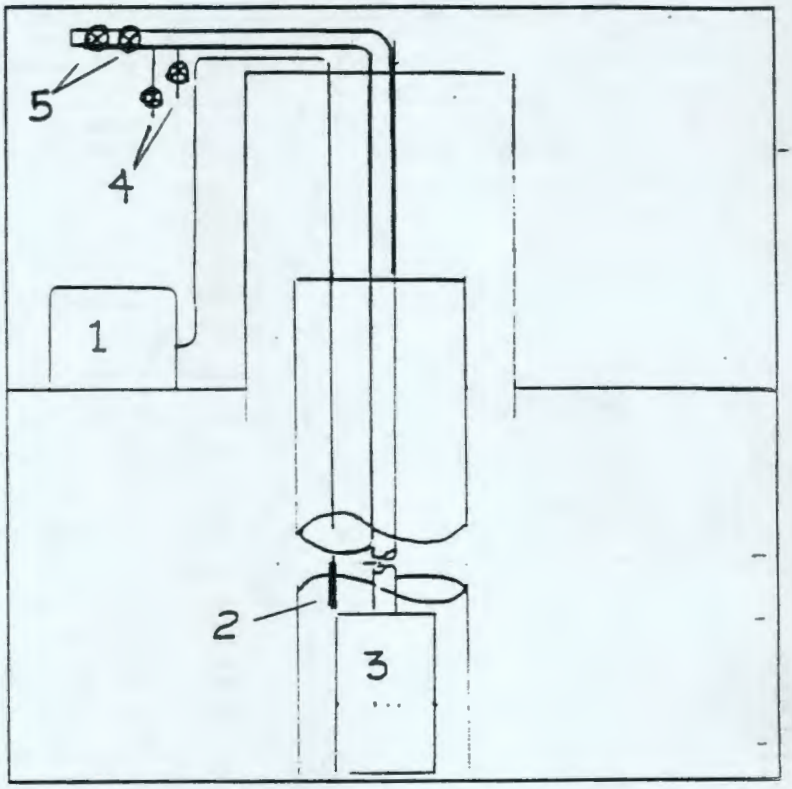
EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

Well Designation 299-W6-7 Depth 269.8' BTOC

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN-2K192
2	TRANSDUCER SN-350975
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

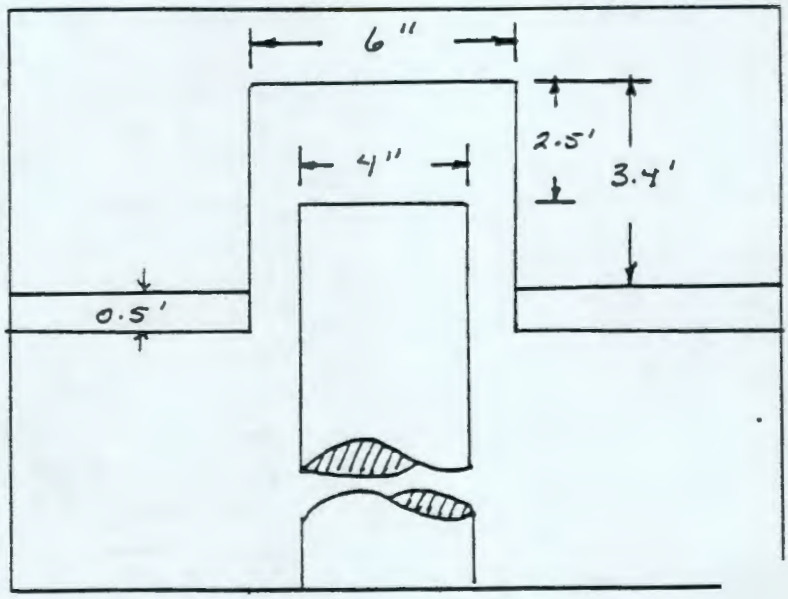
Diagram



Well Head

Comments

Diagram



Signature of Recorder James A. Coates James A. Coates Date 12-2-91

A-6000-417 (08/89)

9313018.1879

WELL DEVELOPMENT FORM

Well Designation 299-W6-7 Well Depth 269.8' BTOC

Screened Interval 269.8'-249.0' Date Well Development is Performed 10-7-91 / 10-8-91

BAILING

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

Type of Surge Block _____ Dimension of Surge Block _____

TD BEFORE	STROKE LENGTH	STROKE FREQUENCY	SURGE INTERVAL	SURGE TIME	TD AFTER	TD DIFFERENCE

AIRLIFT

Depth of Eductor Pipe _____ Airlift Start Time _____

Flow Rate _____ Accumulated Flow _____ Airlift Stop Time _____

Turbidity _____, _____, _____, _____, _____, _____, _____, _____

_____, _____, _____, _____, _____, _____, _____, _____

MECHANICAL PUMPING

Pumping Technique Constant Discharge Pump Depth 268.2' BTOC Pump Start Time 1135 / 1330 - 10/7/91 0710 / 0800 / 0915 - 10/8/91

Flow Rate 1.67 / 1.04 GPM - 10/7 1.4 GPM 10/8 Accumulated Flow 680 gal Pump Stop Time 1320 / 1500 - 10/7/91 0740 / 0830 / 1235 - 10/8

Turbidity 97 NTU, 7100 NTU, 72 NTU, 7100 NTU, 45 NTU, 46 NTU, 7100 NTU, 45 NTU

14.5 NTU, 38 NTU, 47.2 NTU, 11.2 NTU, 6.2 NTU, 4.4 NTU, —, —

Comments _____

Signature of Recorder James A. Coates James A. Coates Date 12-2-91

Sign and Print Name

A-6000-393 (03/90)

9313018.1855

DRAWDOWN/RECOVERY

Well Designation 299-W6-7 Date 10-7-91

Well Depth 269.8' BTOC Screened Interval 269.8' - 249.0' BTOC

Pumping Method CONSTANT DISCHARGE

Equipment Used to Measure Water Level E.TAPE / TRANSDUCER S.N E7-5 / 350976 Calibration Due 1-24-92 / 5-9-92

Equipment Used to Measure Flow — NA — S.N. — NA — Calibration Due — NA —

Measuring Point TOP OF CASING 6" (T.O.C. 6") Pump Start Time 1135 / 1320 / 0710/0800/0915 Pump Stop Time 1330 / 1500 / 0740/0830/1235 10/7/

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD.
				5 gal / 3 min = 1.67 GPM
				5 gal / 4.44 min = 1.04 GPM
				5 gal / 3 min 40 sec = 1.4 GPM
		SEE		
		ATTACHED		

Signature of Recorder JAMES A. COATES JAMES A. COATES Date 12-2-91

Sign and Print Name

A-6000-402 (03/90)

9313018.1881

SE2000
Environmental Logger
08 10:02

Unit# 192 Test 0

INPUT 1: Level (F) TOC

Reference	254.700
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 10/08 13:40:55

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0	0.0000	254.713	-254.713
1	0.0167	254.710	-254.710
2	0.0333	254.707	-254.707
3	0.0500	254.707	-254.707
4	0.0667	254.703	-254.703
5	0.0833	254.700	-254.700
6	0.1000	254.700	-254.700
7	0.1167	254.700	-254.700
8	0.1333	254.700	-254.700
9	0.1500	254.697	-254.697
10	0.1667	254.700	-254.700
11	0.1833	254.700	-254.700
12	0.2000	254.696	-254.696

SE2000
Environmental Logger
10/07 16:39

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	254.700
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 10/07 11:32:24

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	254.456	-254.456
0.0083	0.0001	254.956	-254.956
0.0166	0.0003	255.118	-255.118
0.0250	0.0004	255.257	-255.257
0.0333	0.0006	255.409	-255.409
0.0416	0.0007	255.542	-255.542
0.0500	0.0008	255.675	-255.675
0.0583	0.0010	255.802	-255.802
0.0666	0.0011	255.928	-255.928
0.0750	0.0013	256.055	-256.055
0.0833	0.0014	256.169	-256.169
0.1000	0.0017	256.407	-256.407
0.1166	0.0019	256.635	-256.635
0.1333	0.0022	256.847	-256.847
0.1500	0.0025	257.072	-257.072
0.1666	0.0028	257.284	-257.284
0.1833	0.0031	257.487	-257.487
0.2000	0.0033	257.693	-257.693
0.2166	0.0036	257.895	-257.895
0.2333	0.0039	258.095	-258.095
0.2500	0.0042	258.295	-258.295
0.2666	0.0044	258.475	-258.475
0.2833	0.0047	258.665	-258.665
0.3000	0.0050	258.855	-258.855
0.3166	0.0053	259.048	-259.048
0.3333	0.0056	259.223	-259.223
0.4166	0.0069	260.049	-260.049
0.5000	0.0083	260.886	-260.886
0.5833	0.0097	261.687	-261.687
0.6666	0.0111	262.438	-262.438
0.7500	0.0125	263.160	-263.160
0.8333	0.0139	263.838	-263.838

9313018.1883

299-W6-7 DRAWDOWN

0.9166	0.0153	264.506	-264.506
1.0000	0.0167	265.130	-265.130
1.0833	0.0181	265.181	-265.181
1.1666	0.0194	265.048	-265.048
1.2500	0.0208	264.854	-264.854
1.3333	0.0222	264.626	-264.626
1.4166	0.0236	264.341	-264.341
1.5000	0.0250	264.059	-264.059
1.5833	0.0264	263.765	-263.765
1.6666	0.0278	263.461	-263.461
1.7500	0.0292	263.192	-263.192
1.8333	0.0306	262.929	-262.929
1.9166	0.0319	262.697	-262.697
2.0000	0.0333	262.473	-262.473
2.5000	0.0417	261.266	-261.266
3.0000	0.0500	260.404	-260.404
3.5000	0.0583	259.495	-259.495
4.0000	0.0667	258.786	-258.786
4.5000	0.0750	258.266	-258.266
5.0000	0.0833	257.930	-257.930
5.5000	0.0917	257.604	-257.604
6.0000	0.1000	257.408	-257.408
6.5000	0.1083	257.348	-257.348
7.0000	0.1167	257.246	-257.246
7.5000	0.1250	257.221	-257.221
8.0000	0.1333	257.167	-257.167
8.5000	0.1417	257.281	-257.281
9.0000	0.1500	257.199	-257.199
9.5000	0.1583	257.199	-257.199
10.0000	0.1667	257.176	-257.176
12.0000	0.2000	257.129	-257.129
14.0000	0.2333	257.002	-257.002
16.0000	0.2667	256.986	-256.986
18.0000	0.3000	256.958	-256.958
20.0000	0.3333	256.958	-256.958
22.0000	0.3667	256.933	-256.933
24.0000	0.4000	257.002	-257.002
26.0000	0.4333	256.958	-256.958
28.0000	0.4667	256.974	-256.974
30.0000	0.5000	256.955	-256.955
32.0000	0.5333	256.958	-256.958
34.0000	0.5667	256.983	-256.983
36.0000	0.6000	256.977	-256.977
38.0000	0.6333	256.990	-256.990
40.0000	0.6667	256.980	-256.980
42.0000	0.7000	256.983	-256.983
44.0000	0.7333	256.999	-256.999
46.0000	0.7667	257.009	-257.009
48.0000	0.8000	257.081	-257.081
50.0000	0.8333	257.142	-257.142
52.0000	0.8667	257.233	-257.233
54.0000	0.9000	257.230	-257.230

9313018.1811

299-W6-7 DRAWDOWN

56.0000	0.9333	257.252	-257.252
58.0000	0.9667	257.246	-257.246
60.0000	1.0000	257.265	-257.265
62.0000	1.0333	257.291	-257.291
64.0000	1.0667	257.272	-257.272
66.0000	1.1000	257.287	-257.287
68.0000	1.1333	257.294	-257.294
70.0000	1.1667	257.392	-257.392
72.0000	1.2000	257.506	-257.506
74.0000	1.2333	258.098	-258.098
76.0000	1.2667	258.383	-258.383
78.0000	1.3000	258.605	-258.605
80.0000	1.3333	258.786	-258.786
82.0000	1.3667	258.893	-258.893
84.0000	1.4000	258.985	-258.985
86.0000	1.4333	259.083	-259.083
88.0000	1.4667	259.140	-259.140
90.0000	1.5000	259.210	-259.210
92.0000	1.5333	259.242	-259.242
94.0000	1.5667	259.273	-259.273
96.0000	1.6000	259.365	-259.365
98.0000	1.6333	259.330	-259.330
100.0000	1.6667	259.346	-259.346

9313018.1885

879

299-W6-7 RECOVERY

SE2000
Environmental Logger
10/07 16:29

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	254.700
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 10/07 14:58:43

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	264.994	-264.994
0.0083	0.0001	264.889	-264.889
0.0166	0.0003	264.829	-264.829
0.0250	0.0004	264.709	-264.709
0.0333	0.0006	264.588	-264.588
0.0416	0.0007	264.468	-264.468
0.0500	0.0008	264.348	-264.348
0.0583	0.0010	264.205	-264.205
0.0666	0.0011	264.082	-264.082
0.0750	0.0013	263.945	-263.945
0.0833	0.0014	263.828	-263.828
0.1000	0.0017	263.575	-263.575
0.1166	0.0019	263.340	-263.340
0.1333	0.0022	263.093	-263.093
0.1500	0.0025	262.865	-262.865
0.1666	0.0028	262.631	-262.631
0.1833	0.0031	262.396	-262.396
0.2000	0.0033	262.168	-262.168
0.2166	0.0036	261.937	-261.937
0.2333	0.0039	261.712	-261.712
0.2500	0.0042	261.497	-261.497
0.2666	0.0044	261.288	-261.288
0.2833	0.0047	261.066	-261.066
0.3000	0.0050	260.857	-260.857
0.3166	0.0053	260.667	-260.667
0.3333	0.0056	260.464	-260.464
0.4166	0.0069	259.603	-259.603
0.5000	0.0083	258.725	-258.725
0.5833	0.0097	257.984	-257.984
0.6666	0.0111	257.452	-257.452
0.7500	0.0125	257.069	-257.069
0.8333	0.0139	256.762	-256.762

9313018.1863

0.9166	0.0153	256.502	-256.502
1.0000	0.0167	256.299	-256.299
1.0833	0.0181	256.138	-256.138
1.1666	0.0194	256.014	-256.014
1.2500	0.0208	255.928	-255.928
1.3333	0.0222	255.862	-255.862
1.4166	0.0236	255.811	-255.811
1.5000	0.0250	255.776	-255.776
1.5833	0.0264	255.745	-255.745
1.6666	0.0278	255.713	-255.713
1.7500	0.0292	255.697	-255.697
1.8333	0.0306	255.685	-255.685
1.9166	0.0319	255.681	-255.681
2.0000	0.0333	255.662	-255.662
2.5000	0.0417	255.704	-255.704
3.0000	0.0500	255.780	-255.780
3.5000	0.0583	255.780	-255.780
4.0000	0.0667	255.770	-255.770
4.5000	0.0750	255.751	-255.751
5.0000	0.0833	255.738	-255.738
5.5000	0.0917	255.662	-255.662
6.0000	0.1000	255.507	-255.507
6.5000	0.1083	255.285	-255.285
7.0000	0.1167	255.406	-255.406
7.5000	0.1250	255.428	-255.428
8.0000	0.1333	255.428	-255.428
8.5000	0.1417	255.425	-255.425
9.0000	0.1500	255.422	-255.422
9.5000	0.1583	255.412	-255.412
10.0000	0.1667	255.406	-255.406

9313018.1887

SAMPLING PUMP INSTALLATION FORM

191

VALIDATED 3/18/92 KDR SIGN/DATE

Project: W-017, LLBG

Well Number 299-W6-7

Pump Type HYDROSTAR

Pump Model 8001

Date Installed: 10-8-91

Installed by: B. STRODE / M. MULSON

Depth to water: 25'

Depth to Bottom 269.8'

Reported Depth to water: 254.7 BTOC

Screened Interval: 269.8' - 249.0'

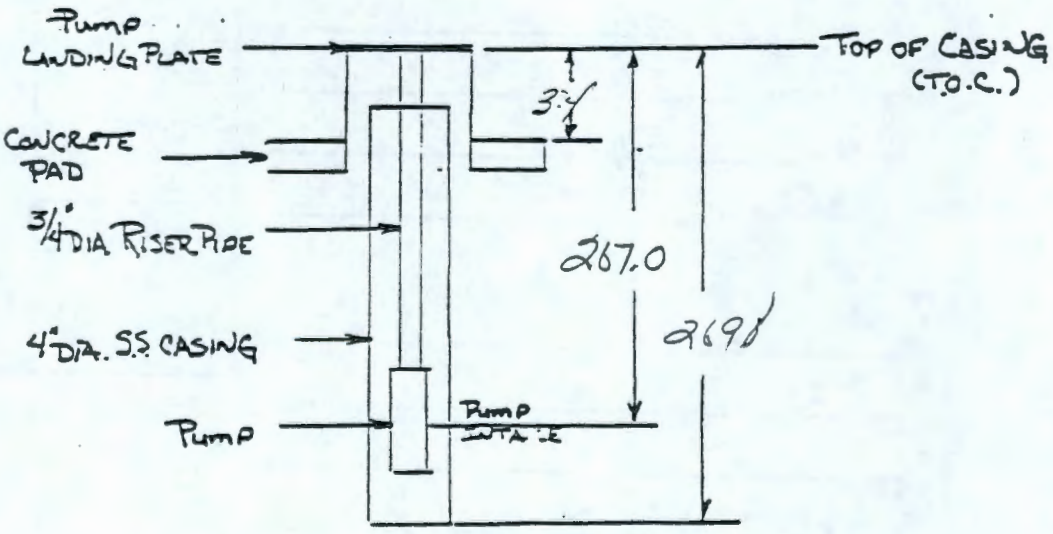
Pump/Riser Pipe Description:
pipe: 3/4" SS
pump length: 4.32
pump screen length 1.42
material cleaning: MANUFACTURE

Comments:

269.8
3.8
266

PUMP INSTALLATION SKETCH

Total material length 269.3
Loc. of pump intake: 267.0' BTOC



Completed By: J.A. Coates

Date: 10-8-91

9313018.1800

BOREHOLE TEST INFORMATION

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

Borehole 299-W6-7 Borehole Diameter 4" Hanford Coordinates N/A

Interval Tested 269.8' - 249.0' BTOC Depth Interval 269.8' - 249.0'

Test Type Instantaneous Slug Test Injection/Withdrawal Borehole Depth 269.8'

Instruction Used WHC-CM-7-7-EII 10.1

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOUNST SN-ET-5
DATA LOGGER.	IN-SITU INC. SN.-2K192
PRESSURE TRANSDUCER	IN-SITU INC. S.N.-35097D
SLUGGING ROD	6.0' x 2.0' 0.13 ft3
STEEL MEASURING TAPE	500' GRADUATED STEEL TAPE

MEASUREMENT DATUM

Control Datum TOP OF CASING 6" (T.O.C. 6")

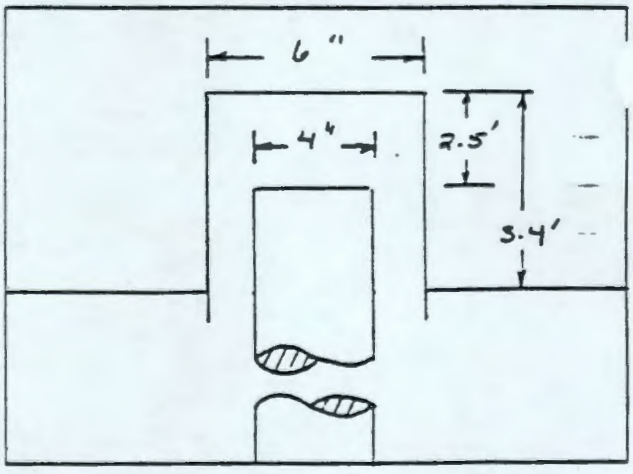
Elevation NA

Electric Sounder T.O.C. 6"

Steel Tape T.O.C. 6"

Pressure Transducer T.O.C. 6"

WELL HEAD DIAGRAM



COMMENTS

Recorded by: JAMES A. COATES JAMES A. COATES 12-2-91
Sign and Print Name Date

BD-6000-295 (05/89)

9313018.1889

INSTANTANEOUS SLUG TEST DATA SHEET

INJECTION

Borehole 299-W6-7

Interval Tested 269.8'-249.0' BTOC

Depth to Water 254.7' BTOC

Date 10/8/91

Measured by JAMES A. COATES

Slug Volume .13ft³ Barometer Reading (Beginning) -NA- (End) -NA-

Time 1350-injection, 1335-baseline inj.

Transducer Measurement Units FEET.

Depth to Transducer 11.268' BWL

Initial Pressure (P_i) 254.700'

Slug Level or Pressure (P_{max}) 250.233

Borehole Diameter 4"

Time		Pressure	Time		Pressure	Time		Pressure
Observed	Elapsed	Trans. Measurement	Observed	Elapsed	Trans. Measurement	Observed	Elapsed	Trans. Measurement
		SEE ATTACHED			SEE ATTACHED			

Recorded by JAMES A. COATES (Sign and Print Name) JAMES A. COATES 12-2-91 (Date)

18-35

9313018.1899

SE2000
Environmental Logger
10/09 13:46

Unit# 192 Test 0

INPUT 1: Level (F) TOC

Reference	254.700
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 10/08 13:40:55

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0	0.0000	254.725	-254.725
1	0.0167	254.722	-254.722
2	0.0333	254.719	-254.719
3	0.0500	254.719	-254.719
4	0.0667	254.715	-254.715
5	0.0833	254.712	-254.712
6	0.1000	254.706	-254.706
7	0.1167	254.706	-254.706
8	0.1333	254.706	-254.706
9	0.1500	254.703	-254.703
10	0.1667	254.700	-254.700
11	0.1833	254.700	-254.700
12	0.2000	254.696	-254.696

9313018.1891

SE2000
Environmental Logger
10/09 13:44

Unit# 192 Test 1

INPUT 1: Level (F) TOC

Reference	254.700
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 10/08 13:55:48

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	252.349	-252.349
0.0083	0.0001	252.394	-252.394
0.0166	0.0003	252.264	-252.264
0.0250	0.0004	250.233	-250.233
0.0333	0.0006	251.922	-251.922
0.0416	0.0007	253.490	-253.490
0.0500	0.0008	253.990	-253.990
0.0583	0.0010	254.202	-254.202
0.0666	0.0011	253.949	-253.949
0.0750	0.0013	253.904	-253.904
0.0833	0.0014	254.069	-254.069
0.1000	0.0017	254.142	-254.142
0.1166	0.0019	254.186	-254.186
0.1333	0.0022	254.209	-254.209
0.1500	0.0025	254.237	-254.237
0.1666	0.0028	254.262	-254.262
0.1833	0.0031	254.281	-254.281
0.2000	0.0033	254.300	-254.300
0.2166	0.0036	254.313	-254.313
0.2333	0.0039	254.326	-254.326
0.2500	0.0042	254.338	-254.338
0.2666	0.0044	254.348	-254.348
0.2833	0.0047	254.354	-254.354
0.3000	0.0050	254.367	-254.367
0.3166	0.0053	254.373	-254.373
0.3333	0.0056	254.380	-254.380
0.4166	0.0069	254.402	-254.402
0.5000	0.0083	254.418	-254.418
0.5833	0.0097	254.430	-254.430
0.6666	0.0111	254.443	-254.443
0.7500	0.0125	254.449	-254.449
0.8333	0.0139	254.456	-254.456

9313018.1892

299-6W-7 INJECTION

0.9166	0.0153	254.462	-254.462
1.0000	0.0167	254.468	-254.468
1.0833	0.0181	254.471	-254.471
1.1666	0.0194	254.475	-254.475
1.2500	0.0208	254.481	-254.481
1.3333	0.0222	254.484	-254.484
1.4166	0.0236	254.490	-254.490
1.5000	0.0250	254.494	-254.494
1.5833	0.0264	254.494	-254.494
1.6666	0.0278	254.503	-254.503
1.7500	0.0292	254.506	-254.506
1.8333	0.0306	254.509	-254.509
1.9166	0.0319	254.513	-254.513
2.0000	0.0333	254.516	-254.516
2.5000	0.0417	254.535	-254.535
3.0000	0.0500	254.551	-254.551
3.5000	0.0583	254.566	-254.566
4.0000	0.0667	254.573	-254.573
4.5000	0.0750	254.582	-254.582
5.0000	0.0833	254.585	-254.585
5.5000	0.0917	254.598	-254.598
6.0000	0.1000	254.604	-254.604
6.5000	0.1083	254.608	-254.608
7.0000	0.1167	254.614	-254.614
7.5000	0.1250	254.617	-254.617
8.0000	0.1333	254.620	-254.620
8.5000	0.1417	254.623	-254.623
9.0000	0.1500	254.627	-254.627
9.5000	0.1583	254.630	-254.630
10.0000	0.1667	254.630	-254.630
12.0000	0.2000	254.642	-254.642

9312018.1893

INSTANTANEOUS SLUG TEST DATA SHEET

WITHDRAWAL

Borehole 299-W6-7

Time 1407

Interval Tested 269.8'-249.0' BTOC

Transducer Measurement Units FEET.

Depth to Water 254.7' BTOC

Depth to Transducer 11.268' BWL

Date 10/8/91

Initial Pressure (P_i) 254.700'

Measured by JAMES A. COATES

Slug Level or Pressure (P_{max}) 256.822

Slug Volume .13ft^3 Barometer Reading (Beginning) -NA- (End) -NA-

Borehole Diameter 4"

Time		Pressure	Time		Pressure	Time		Pressure
Observed	Elapsed	Trans. Measurement	Observed	Elapsed	Trans. Measurement	Observed	Elapsed	Trans. Measurement
		SEE ATTACHED			SEE ATTACHED			

Recorded by JAMES A. COATES (Sign and Print Name) JAMES A. COATES 12-2-91 (Date)

9313018.1821

SE2000
Environmental Logger
10/09 13:37

Unit# 192 Test 2

INPUT 1: Level (F) TOC

Reference	254.700
SG	1.000
Linearity	0.000
Scale factor	10.029
Offset	0.000
Delay mSEC	50.000

Step 0 10/08 14:11:01

Time:min	Time:hrs	D-T-W:Ft	d(WL):Ft
0.0000	0.0000	254.335	-254.335
0.0083	0.0001	256.822	-256.822
0.0166	0.0003	256.489	-256.489
0.0250	0.0004	256.391	-256.391
0.0333	0.0006	256.407	-256.407
0.0416	0.0007	256.280	-256.280
0.0500	0.0008	256.271	-256.271
0.0583	0.0010	256.226	-256.226
0.0666	0.0011	256.169	-256.169
0.0750	0.0013	256.134	-256.134
0.0833	0.0014	256.090	-256.090
0.1000	0.0017	256.030	-256.030
0.1166	0.0019	255.966	-255.966
0.1333	0.0022	255.906	-255.906
0.1500	0.0025	255.849	-255.849
0.1666	0.0028	255.792	-255.792
0.1833	0.0031	255.745	-255.745
0.2000	0.0033	255.694	-255.694
0.2166	0.0036	255.650	-255.650
0.2333	0.0039	255.605	-255.605
0.2500	0.0042	255.567	-255.567
0.2666	0.0044	255.529	-255.529
0.2833	0.0047	255.495	-255.495
0.3000	0.0050	255.457	-255.457
0.3166	0.0053	255.428	-255.428
0.3333	0.0056	255.400	-255.400
0.4166	0.0069	255.285	-255.285
0.5000	0.0083	255.194	-255.194
0.5833	0.0097	255.124	-255.124
0.6666	0.0111	255.076	-255.076
0.7500	0.0125	255.042	-255.042
0.8333	0.0139	255.010	-255.010

9313018.1895

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299-W6-7 WITHDRAWAL

0.9166	0.0153	254.985	-254.985
1.0000	0.0167	254.969	-254.969
1.0833	0.0181	254.950	-254.950
1.1666	0.0194	254.937	-254.937
1.2500	0.0208	254.928	-254.928
1.3333	0.0222	254.915	-254.915
1.4166	0.0236	254.909	-254.909
1.5000	0.0250	254.896	-254.896
1.5833	0.0264	254.890	-254.890
1.6666	0.0278	254.883	-254.883
1.7500	0.0292	254.874	-254.874
1.8333	0.0306	254.871	-254.871
1.9166	0.0319	254.867	-254.867
2.0000	0.0333	254.861	-254.861
2.5000	0.0417	254.833	-254.833
3.0000	0.0500	254.817	-254.817
3.5000	0.0583	254.798	-254.798
4.0000	0.0667	254.788	-254.788
4.5000	0.0750	254.779	-254.779
5.0000	0.0833	254.766	-254.766
5.5000	0.0917	254.760	-254.760
6.0000	0.1000	254.750	-254.750
6.5000	0.1083	254.747	-254.747
7.0000	0.1167	254.738	-254.738
7.5000	0.1250	254.738	-254.738
8.0000	0.1333	254.734	-254.734
8.5000	0.1417	254.728	-254.728
9.0000	0.1500	254.725	-254.725
9.5000	0.1583	254.719	-254.719
10.0000	0.1667	254.712	-254.712
12.0000	0.2000	254.706	-254.706
14.0000	0.2333	254.700	-254.700

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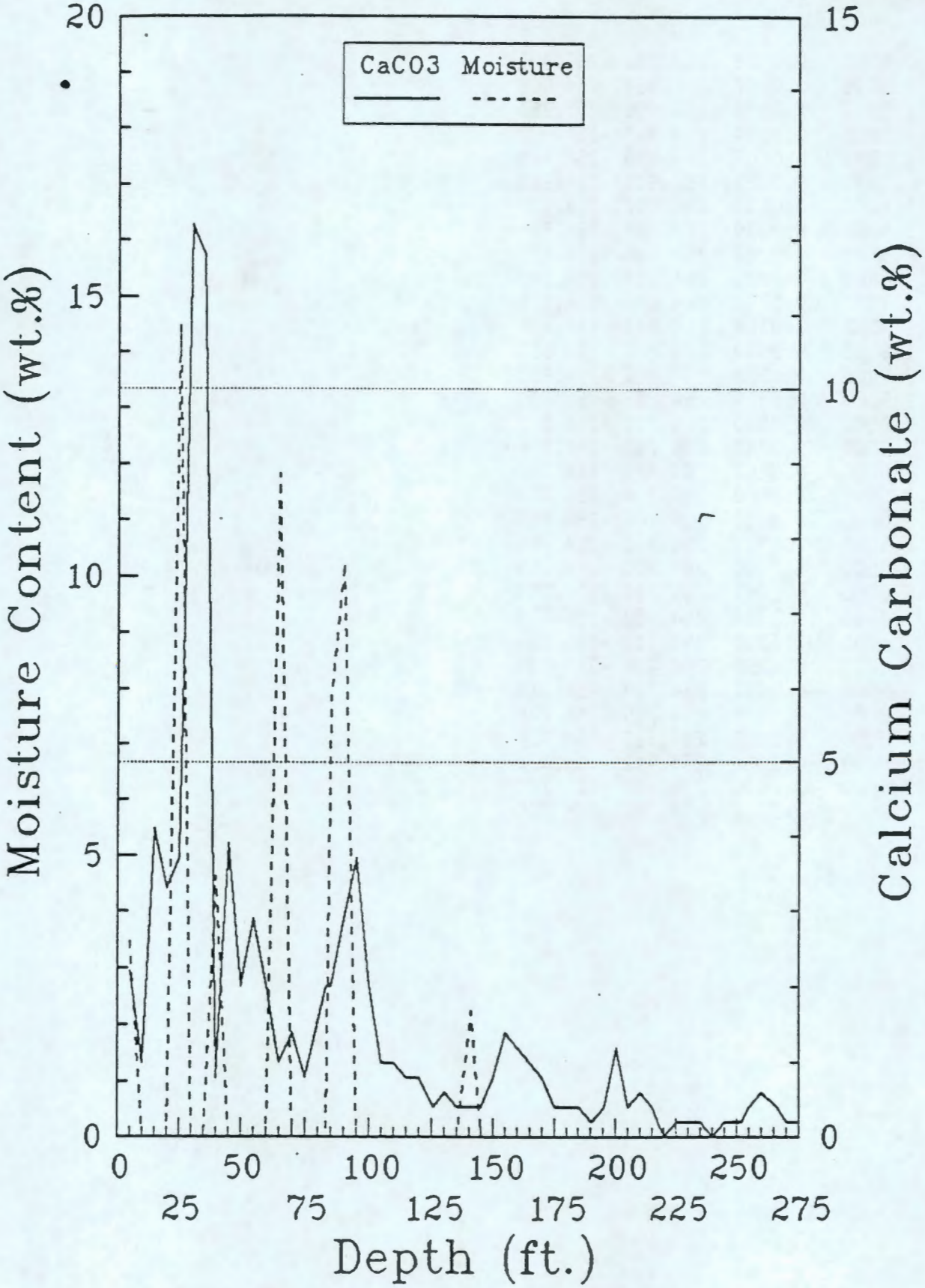
VALIDATED
KDR 3/18/92
SIGNATURE/DATE

WELL 299-W6-7



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	A	B	C
1	WELL 299-W6-7		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	2.2	3.45
7	10	1	
8	15	4.1	
9	20	3.3	
10	25	3.7	14.46
11	30	12.2	
12	35	11.8	
13	40	0.8	4.62
14	45	3.9	
15	50	2	
16	55	2.9	
17	60	2	
18	65	1	11.81
19	70	1.4	
20	75	0.8	
21	82.2-83.7	2	
22	85	2	7.83
23	90	2.9	10.23
24	95	3.7	
25	100	2	
26	105	1	
27	110	1	
28	115	0.8	
29	120	0.8	
30	124.8-126.	0.4	
31	130	0.6	
32	135	0.4	
33	140-142	0.4	2.23
34	145	0.4	
35	150	0.8	
36	155	1.4	
37	160	1.2	
38	165	1	
39	170	0.8	
40	175	0.4	
41	180	0.4	
42	185	0.4	
43	190	0.2	
44	195	0.4	
45	200	1.2	
46	205	0.4	
47	210	0.6	
48	215	0.4	
49	220	0	
50	225	0.2	
51	230	0.2	
52	235	0.2	
53	240	0	
54	245	0.2	
55	251.5-253	0.2	
56	255	0.4	
57	260	0.6	
58	265.6-267.	0.4	
59	270	0.2	
60	275	0.2	

9313018.1800

SIEVE ANALYSIS DATA SHEET

Sample No. 1-1651 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 7-22-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: GEL- 3310 Calibration Due Date 9-21-91
Thermometer: GEL- 0007 Calibration Due Date 8-1-91
N/A : GEL- N/A Calibration Due Date N/A
N/A : GEL- N/A Calibration Due Date N/A
N/A : GEL- N/A Calibration Due Date N/A
: GEL- N/A Calibration Due Date N/A

Sample Description SANDY GRAVEL Sieve Time 10 (min)
Reduced by (X) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
2½	1309.5	0	0	100
2		243.4	18.6	81.4
1½		243.4	18.6	81.4
1		434.4	33.2	66.8
3/4		540.9	41.3	58.7
1/2		607.5	46.4	53.6
3/8		707.9	54.1	45.9
4		885.1	67.6	32.4
10	132.8	215	16.2	27.2
40		44.9	33.8	21.4
60		66.5	50.1	16.2
100		87.4	65.8	11.1
200		101.5	76.4	7.6

Finess Modules (FM) N/A (See ASTM C 136-85, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING		Remarks
C = Percentage of material passing a 200 Sieve	N/A %	
D = Original Dry Weight of Sample	N/A g	WASHED FINE GRADING
E = Dry Weight of Sample After Washing/Sieve	N/A g	
C = <(D-E)/D>*100		

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By; R.G. ALEXANDER Date 7-22-91

A-6400-204(2-87)

9313018.1899

GRAIN SIZE ANALYSIS PLOT

Sample No. 1-1681

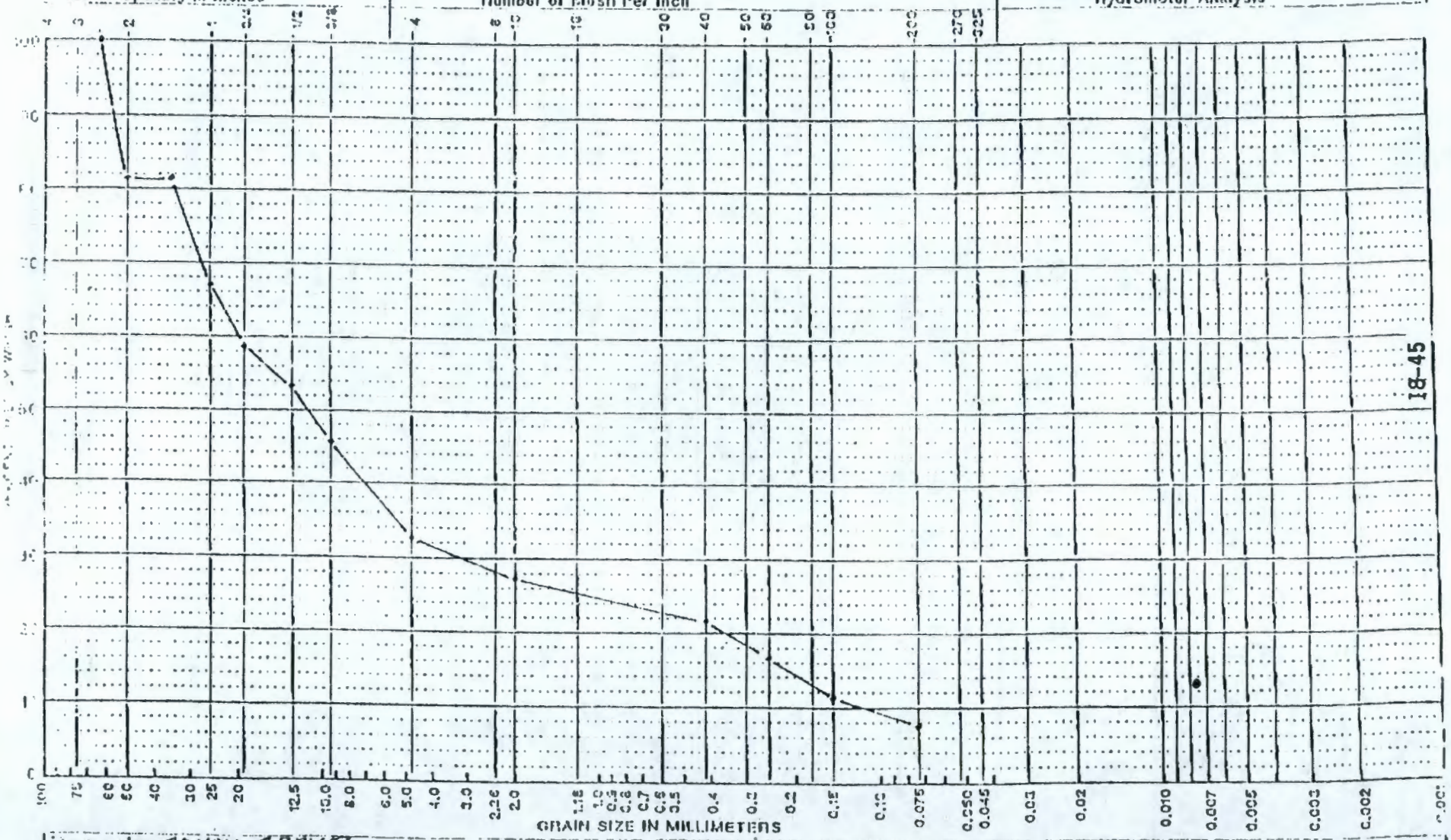
Page 1 of 1

Procedure No. ETAL-07 Rev. 1 Date Issued 11-15-89

Test Plan No. N/A Rev. N/A Date Issued N/A

Plotted By TERRY L. ENGLAND

Date 7-22-91



Remarks SANDY GRAVEL

299-W6-7 265.6-267.1

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked by: RG ALEXANDER Date 7-22-91

18-45

WHC-SD-EN-DP-044, Rev. 0

9313018.1961

SIEVE ANALYSIS DATA SHEET

Sample No. 1-1641 Page 1 of 1

Tested By: JERRY L. ENGLAND Date 7-22-91
Procedure No: ETAL-07 Rev. 1 Date Issued 11-15-89
Test Plan No: N/A Rev. N/A Date Issued N/A
Balance: GEL- 3310 Calibration Due Date 9-21-91
Thermometer: GEL- 0007 Calibration Due Date 6-1-91
N/A : GEL- N/A Calibration Due Date N/A
N/A : GEL- N/A Calibration Due Date N/A
N/A : GEL- N/A Calibration Due Date N/A
N/A : GEL- N/A Calibration Due Date N/A

Sample Description SAND Sieve Time 10 (min)
Reduced by (✓) Splitting ( ) Quartering ( ) Stockpile

Sieve Size	Sample Weight	Cumulative Wt. Retained	Cumulative % Retained	Cumulative % Passed
4	132.8	0	0	100
10		21.5	16.2	83.8
40		44.9	33.8	66.2
60		66.5	50.1	49.9
100		87.4	65.8	34.2
200		101.5	76.4	23.6
N/A	N/A	N/A	N/A	N/A

Fineas Modules (FM) N/A (See ASTM C 136-83, Section 8.2)

MATERIALS FINER THAN NO. 200 SIEVE BY WASHING

C = Percentage of material passing a 200 Sieve N/A %
D = Original Dry Weight of Sample N/A g
E = Dry Weight of Sample After Washing/Sieve N/A g
C = <(D-E)/D>*100

Remarks
WASHED GRADING

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.
Checked By: R.G. ALEXANDER Date 7-22-91

A-6400-204(2-87)

9313018.1901

GRAIN SIZE ANALYSIS PLOT

Sample No. L-1661

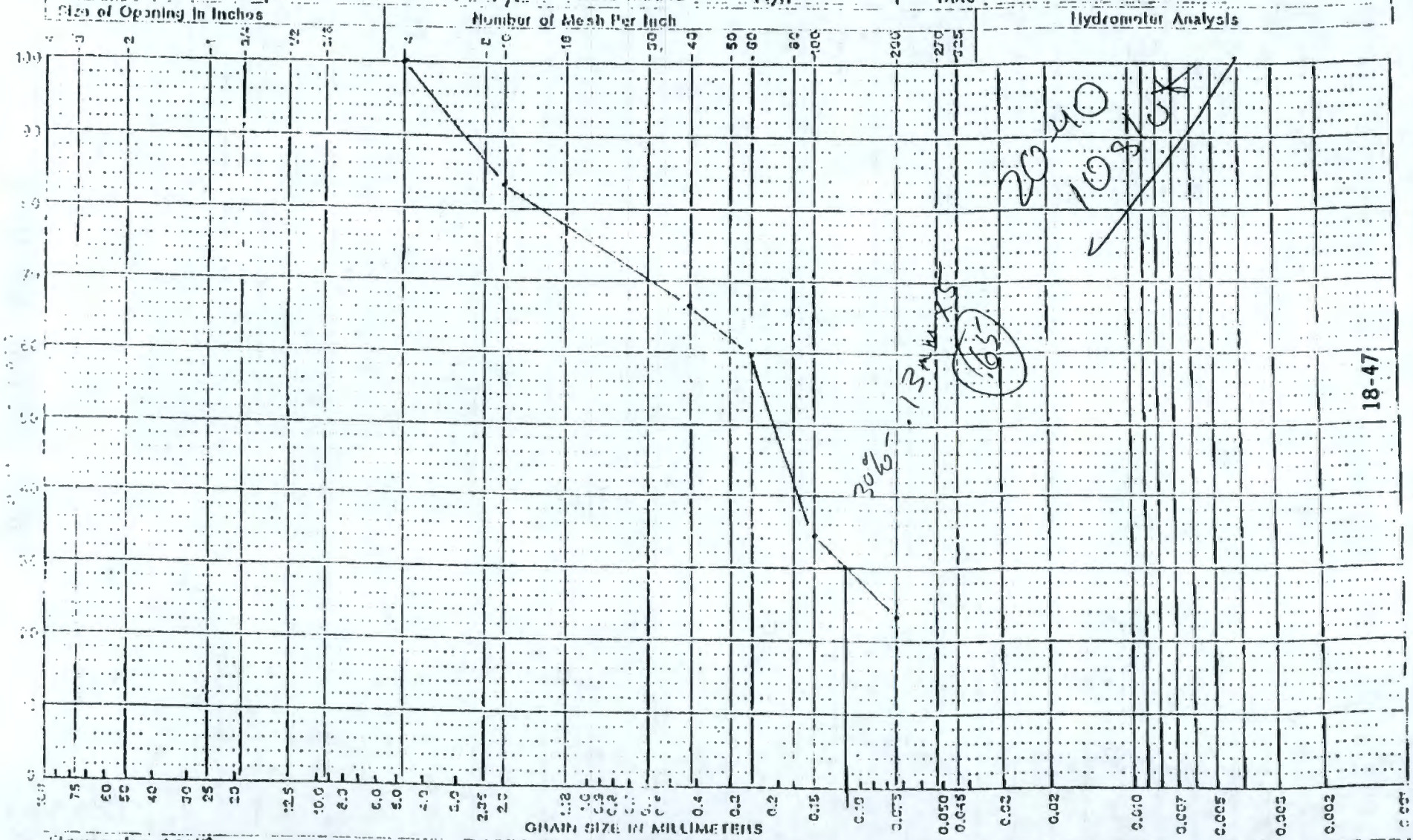
Page 1 of 1

Procedure No ETAL-07 Rev. 1 Date Issued 11-15-89

Plotted By JERRY L. ENGLAND

Test Plan No N/A Rev. N/A Date Issued N/A

Date 7-22-91



Remarks SAND

299-W6-7 265.6-267.1

All data are accurately and completely recorded. The test operator was trained and used calibrated instruments.

Checked By: G ALEXANDER Date 7-22-91

9313018.1961

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Requested by:	Phone No.	Well No	Date:
		W6-7	8/8/2

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamme (pCi/gr)	Results Alpha (pCi/gr)
5'	5.15.91	SOIL	5.15.91	0995.91	6.3	<D
10'	5.20.91		5.20.91	1003.91	7.6	.2
15'	5.24.91		5.31.91	1028.91	25.5	.7
20'	5.29.91		6.3.91	1065.91	11.8	.3
25'	5.30.91		6.4.91	1108.91	18.7	<D
30'	5.31.91		6.5.91	1139.91	19.0	.2
35'				1140.91	15.9	.4
40'				1156.91	15.8	<D
45'	6.4.91		6.7.91	1197.91	15.5	<D
50'				1198.91	18.4	.5
55'			6.10.91	1203.91	8.1	.7
60'				1204.91	8.5	.2
65'	6.7.91		6.11.91	1225.91	14.2	.2
70'				1229.91	8.7	.1
70'	6.7.91			1233.91	13.3	.3
82'	6.7.91		6.17.91	1264.91	16.9	.4
85'	6.10.91			1266.91	14.0	.2
90'	6.12.91			1290.91	20.8	.6
95'				1298.91	18.5	<D
100'				1299.91	8.6	<D
105'-107'			6.20.91	1319.91	7.1	.2
110'	6.13.91			1335.91	16.6	<D
115'	6.14.91			1352.91	5.1	.2
120'	6.19.91		6.25.91	1391.91	13.5	.1
125'	6.20.91		6.26.91	1428.91	14.5	<D
130'	6.21.91		6.28.91	1446.91	15.5	.6
135'				1457.91	<D	.3
140'-142'	6.21.91			1464.91	16.6	.6
145'	6.26.91		7.11.91	1511.91	<D	<C
150'				1519.91	15.1	.3

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9313018.1903

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 2 of 2

uested by:	Phone No.	Well No.	Date:
		W6-7	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
155'	6.27.91	SOIL	7.11.91	1540.91	<D	1.1
160'	↓		↓	1555.91	<D	.3
165'	7.1.91		7.15.91	1565.91	33.3	.2
170'	↓		↓	1566.91	25.8	.3
175'	7.2.91		7.16.91	1595.91	3.8	.3
180'	↓		↓	1599.91	<D	.7
185'	↓		↓	1600.91	29.2	.3
190'	7.9.91		↓	1604.91	4.2	.8
195'	↓		↓	1605.91	13.2	<D
200'	↓		↓	1606.91	<D	.9
205'	↓		↓	1610.91	11.5	.1
210'	7.10.91		7.18.91	1621.91	11.3	<D
215'	↓		↓	1622.91	7.5	1.0
220'	7.11.91		7.23.91	1637.91	37.7	2.3
225'	↓		↓	1638.91	14.2	2.0
230'	↓		7.24.91	1648.91	19.2	1.0
235'	↓		↓	1657.91	8.2	.4
240'	↓		↓	1658.91	9.4	.8
245'	↓		↓	1659.91	12.6	.5
251.5'-253.5'	7.16.91		7.24.91	1697.91	2.8	<D
255'	↓		↓	1696.91	18.4	<D
260'	7.23.91		7.25.91	1717.91	<D	.5
265.6'-267.1'	↓		↓	1714.91	<D	<D
270'	↓		↓	1720.91	<D	<D
275'	7.24.91	↓	↓	1730.91	1.1	<D

Performed By: _____

Date: _____

Page: _____ of _____

9313018.1904

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Well No. 299-W6-7 Area 200 West Date 6/27/91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD 29* Elevation 706.85' Brass Cap

Survey Coordinates 137638.8 N 567311.3

Log Measured From Ground Surface

Location Description North Perimeter Road of 200 West Area

Ground Surface Elevation 706.85' Brass Cap

Surface Temperature 17.8°C Weather Clear-Warm

BOREHOLE INFORMATION

Driller Don Krager

Drill Rig Type Cable Tool | Bit Type/Diameter Hard Tool / 10"

Borehole Diameter(s)/Depth 12"/19.7' 10"/158.6'

Depth Driller 158.6' | Depth Logger 157.9'

Liquid Level NA | Liquid Density NA

Temperature NA

CASING RECORD

Type 12" Carbon Steel Sch.40 | Interval +0.9' - 19.7'

Type 10" Carbon Steel Sch.40 | Interval +2.2' - 155.38

Type | Interval

Type | Interval

Well Screen Interval NA

Comments: Return Error = +0.3' high

Centralizer was used.

* Survey data from Kaiser 12/15/92 RBM

18-45/51

A-6000-52

9313018.1937

LOG HEADER

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS | Equipment Type: Analog

Tool Type: Gamma Ray | Serial No.: CG27A97

Base Calibration Date: 8/90 | Calibration Reference: PNL-7460 UC-606

Calibration/Probe Factor: 7.87×10^{-2} eU P/M/C/S | Base Calibration Datum (eU): Position 1: 291.4 eU | Position 2: 48.5 eU

Dead Time: 17.8 μsec. | Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 157.9' | To: 2.9'

Rerun(s): 157.9' to 135.0' & 65.0' to 15.0'

Pre Survey Verification: Position 1: 279.0 eU | Position 2: 48.8 eU | Background: 55 c/s

Base Calibration Difference: Position 1: 12.4 eU | Position 2: 0.3 eU

Logging Speed: 5 ft./min | Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 0730 | Completion Time: 1000

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. | Time Constant(s): TC-1

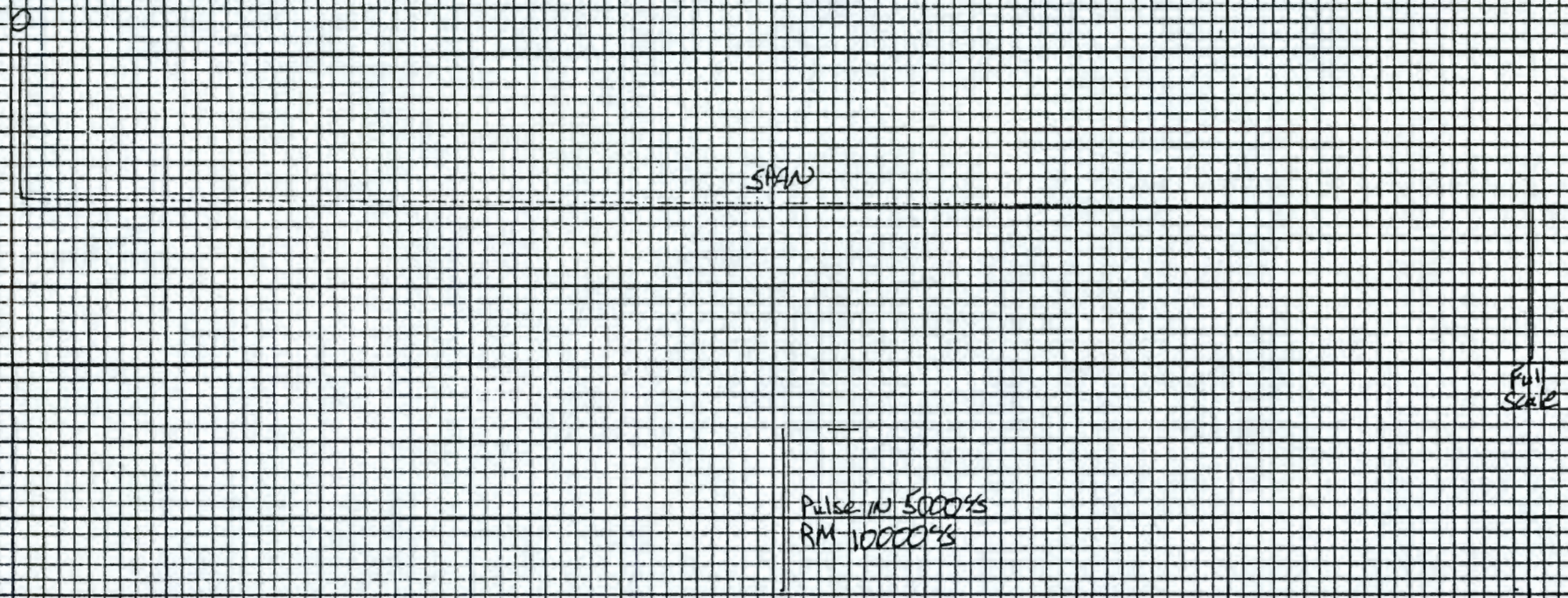
Post Survey Verification: Position 1: 281.0 eU | Position 2: 48.4 eU | Background: 55 c/s

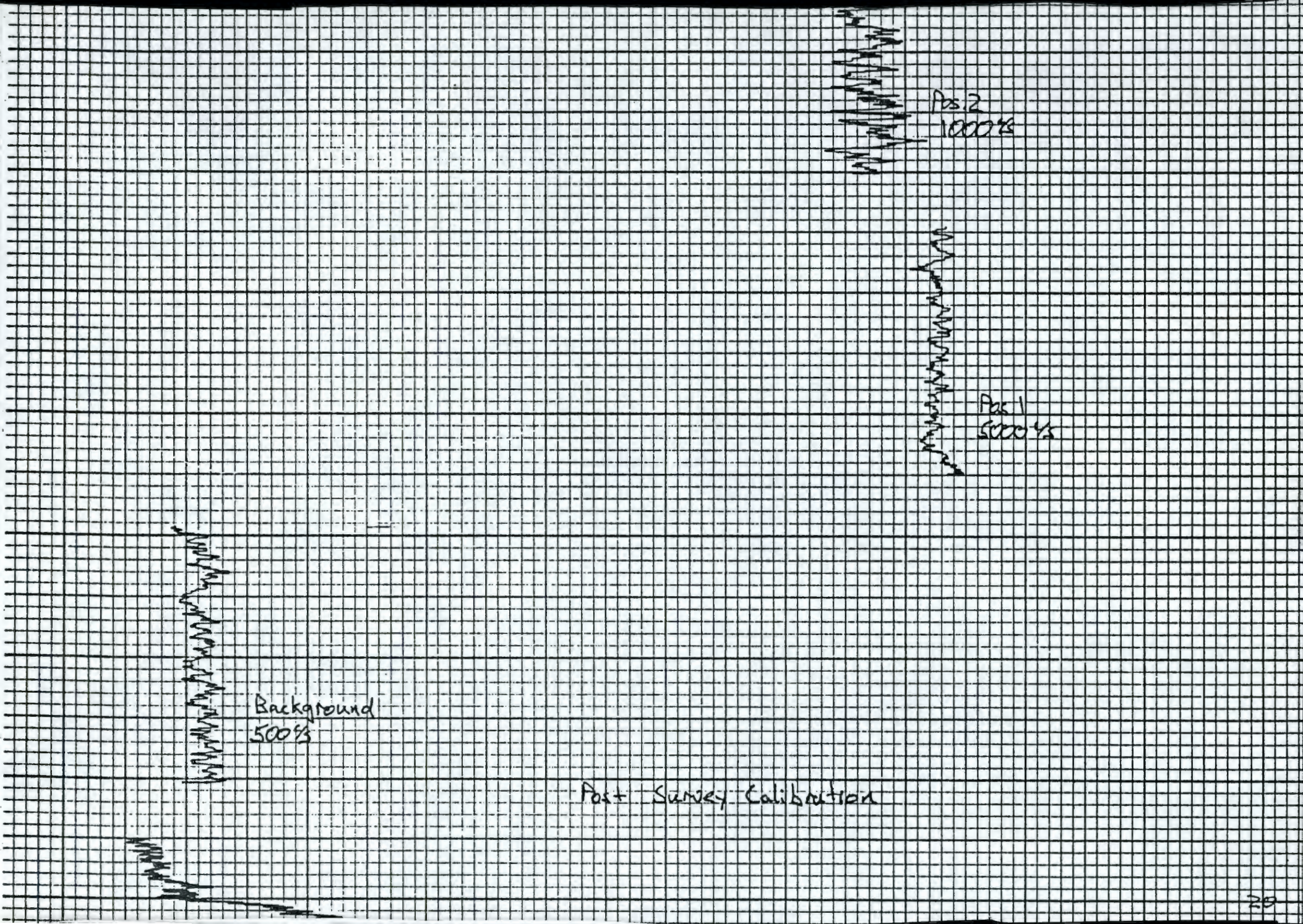
Percent Change: Position 1: 0.7% | Position 2: 0.8%

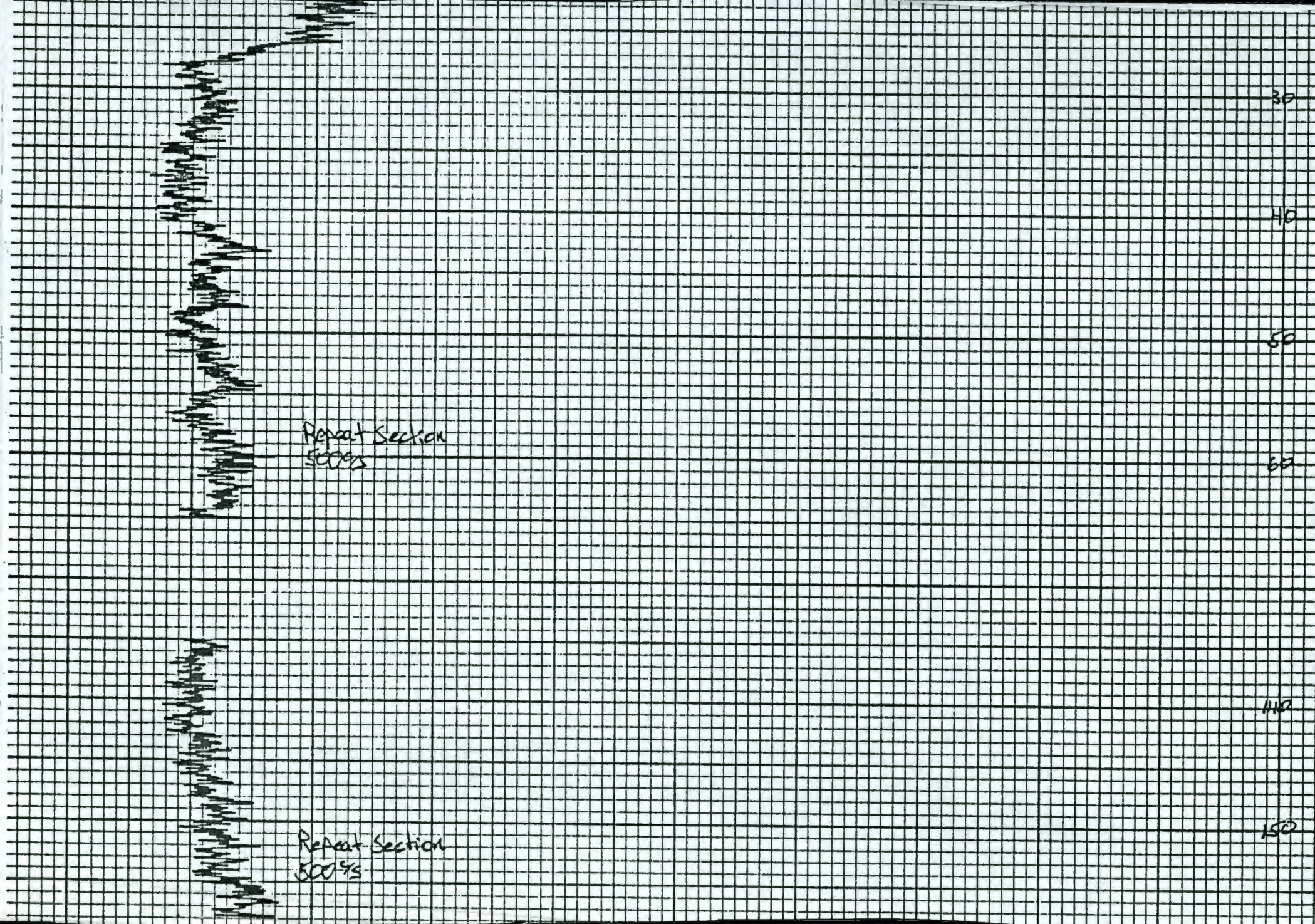
Comments: Return Error = +0.3' high

Centralizer used.

Witnessed and Verified by: (sign and print name) Kent Reynolds / Kent D Reynolds Date: 6/27/91




Pos. 2
1000 c/s
Pos 1
5000 c/s
Background
500 c/s
Post Survey Calibration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Repeat Section
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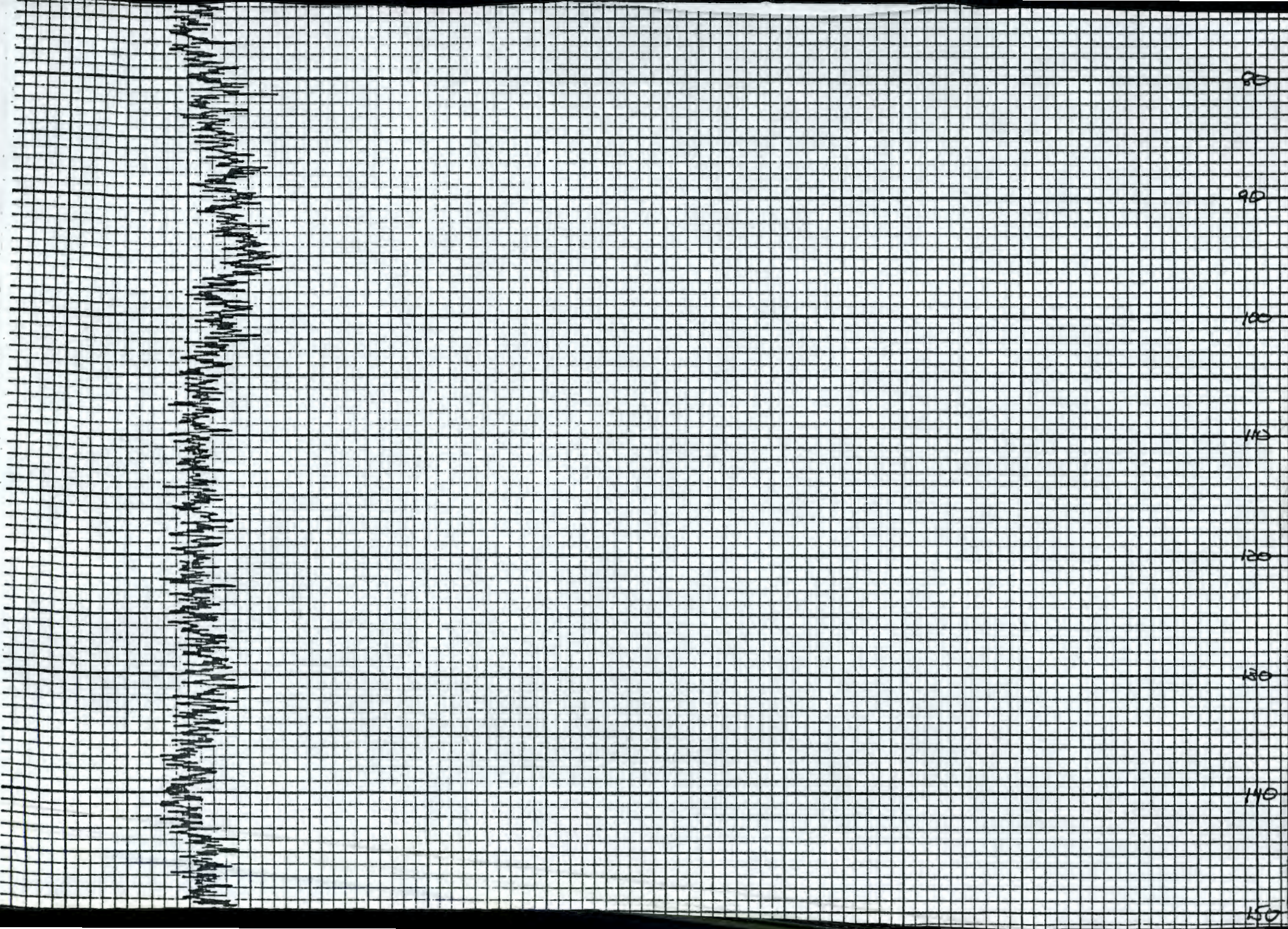
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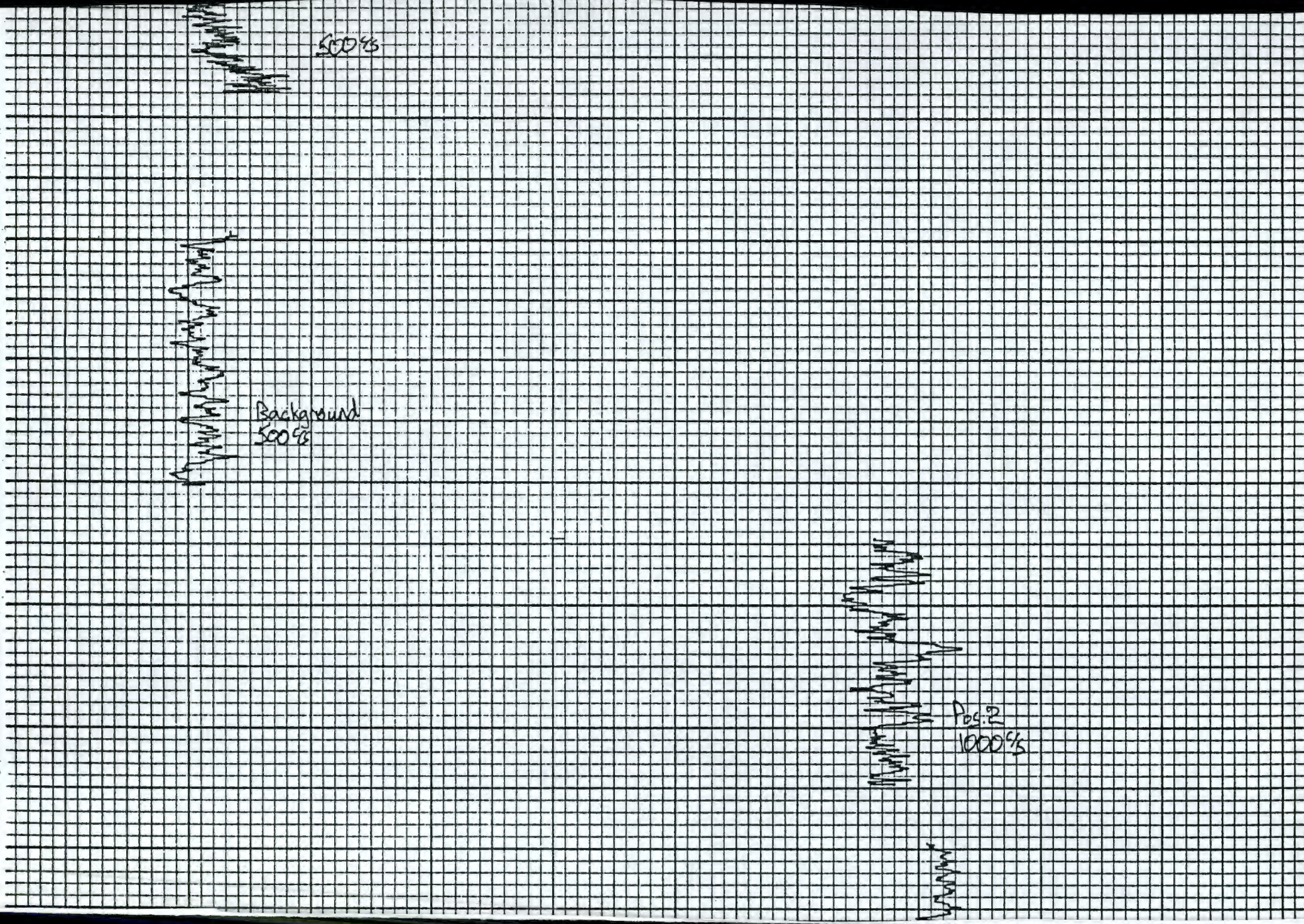
90
100
110
120
130
140
150


500 c/s
Background
500 c/s
Pos. 2
1000 c/s

Pos. 1
5000 ¢/s
Pulse w/ 5000 ¢/s
RM 10000 ¢/s
Pulse w/ 5000 ¢/s
RM 5000 ¢/s
0
SPAN
Pre Survey Calibration
Full Scale
299-W6-7 #1

Westinghouse Hanford Company | LOG HEADER | Page 1 of

Well No. 299-W6-7 Area 200West Date 7-18-91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD 29* Elevation 706.85' Brass Cap

Survey Coordinates 137638.8 N 567311.3

Log Measured From Ground Surface

Location Description North Perimeter Road of 200 West

Ground Surface Elevation 706.85' Brass Cap

Surface Temperature 25.2°C Weather Clear-Hot

BOREHOLE INFORMATION

Driller Don Kruger

Drill Rig Type Cable Tool | Bit Type/Diameter Hard Tool /8"

Borehole Diameter(s)/Depth 12"/19.7' 10"/155.4' 8"/276.2'

Depth Driller 276.2' | Depth Logger 275.1'

Liquid Level 250.8' | Liquid ~~Density~~ Appearance Slightly Turbid

Temperature 20.2°C

CASING RECORD

Type 12" Carbon Steel Sch. 40 | Interval +0.3' - ~~275.35'~~ AWT 7/18/91 19.70'

Type 10" Carbon Steel Sch. 40 | Interval +1.2' - 155.38'

Type 8" Carbon Steel Sch. 40 | Interval +2.2' - 275.35'

Type | Interval

Well Screen Interval NA

Comments: Return Error = +0.3' high

Centralizer used.

* Survey data from Kaiser 12/15/92 RDM

18-51/

18-53/54

A-6000-520

9313018.1938

(06/90)

LOG HEADER	Page 2 of 2

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS — Equipment Type: Analog

Tool Type: Gamma Ray — Serial No.: CG27A97

Base Calibration Date: 5/91 — Calibration Reference: PNL-7460 UC-606

Calibration/Probe Factor: 7.87×10^{-2} eU P/M/C/S — Base Calibration Datum (eU): Position 1: 291.4 eU — Position 2: 48.5 eU

Dead Time: 17.8 usec. — Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 275.1 — To: 125.0'

Rerun(s): 275.1 to 240.0'

Pre Survey Verification: Position 1: 277.0 eU — Position 2: 48.0 eU — Background: 55 c/s

Base Calibration Difference: Position 1: 14.4 eU — Position 2: 0.5 eU

Logging Speed: 5 ft./min. — Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 1115 — Completion Time: 1315

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. — Time Constant(s): TC-1

Post Survey Verification: Position 1: 27.1 eU — Position 2: 47.6 eU — Background: 55 c/s

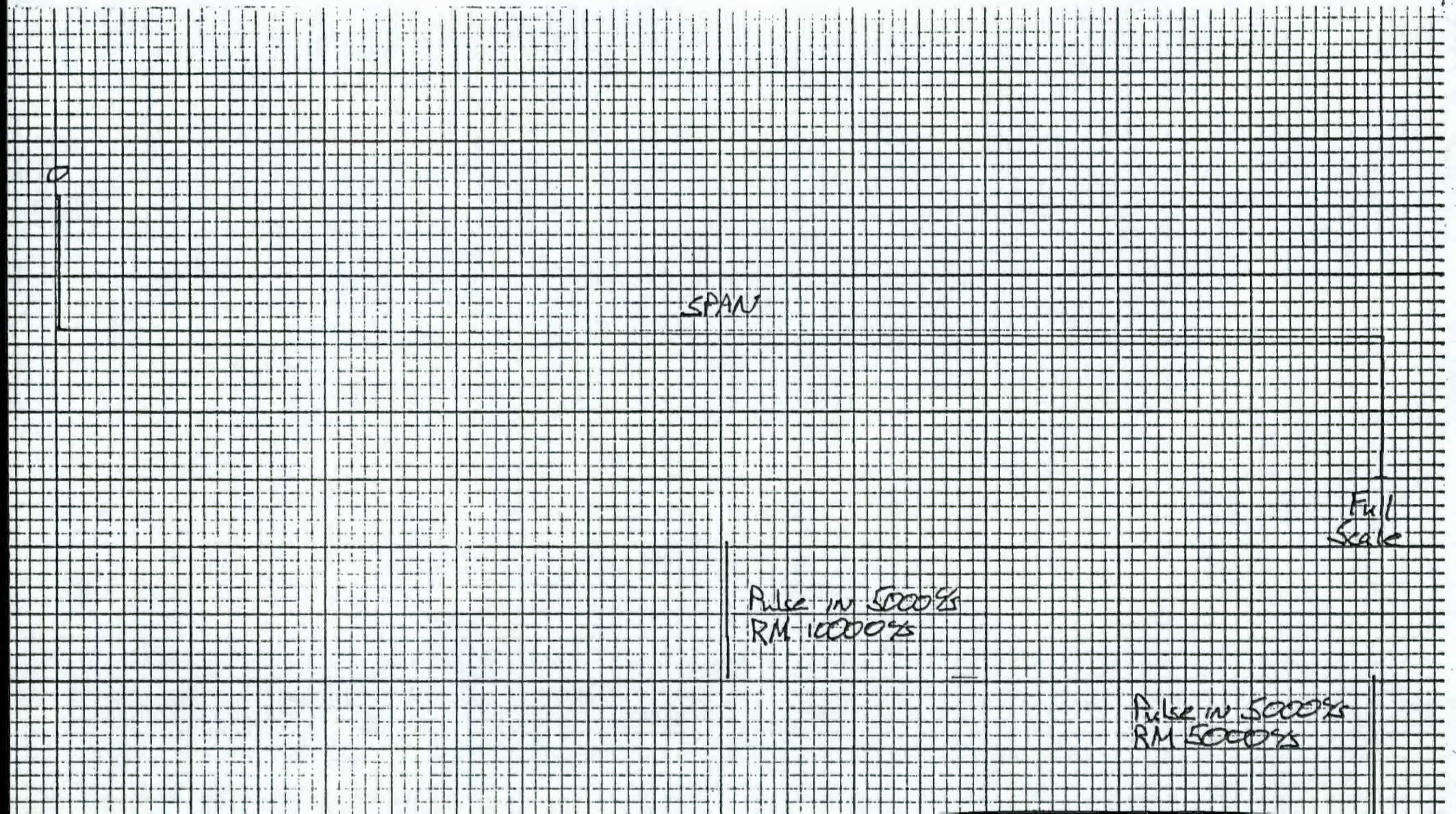
Percent Change: Position 1: >1% — Position 2: 0.8%

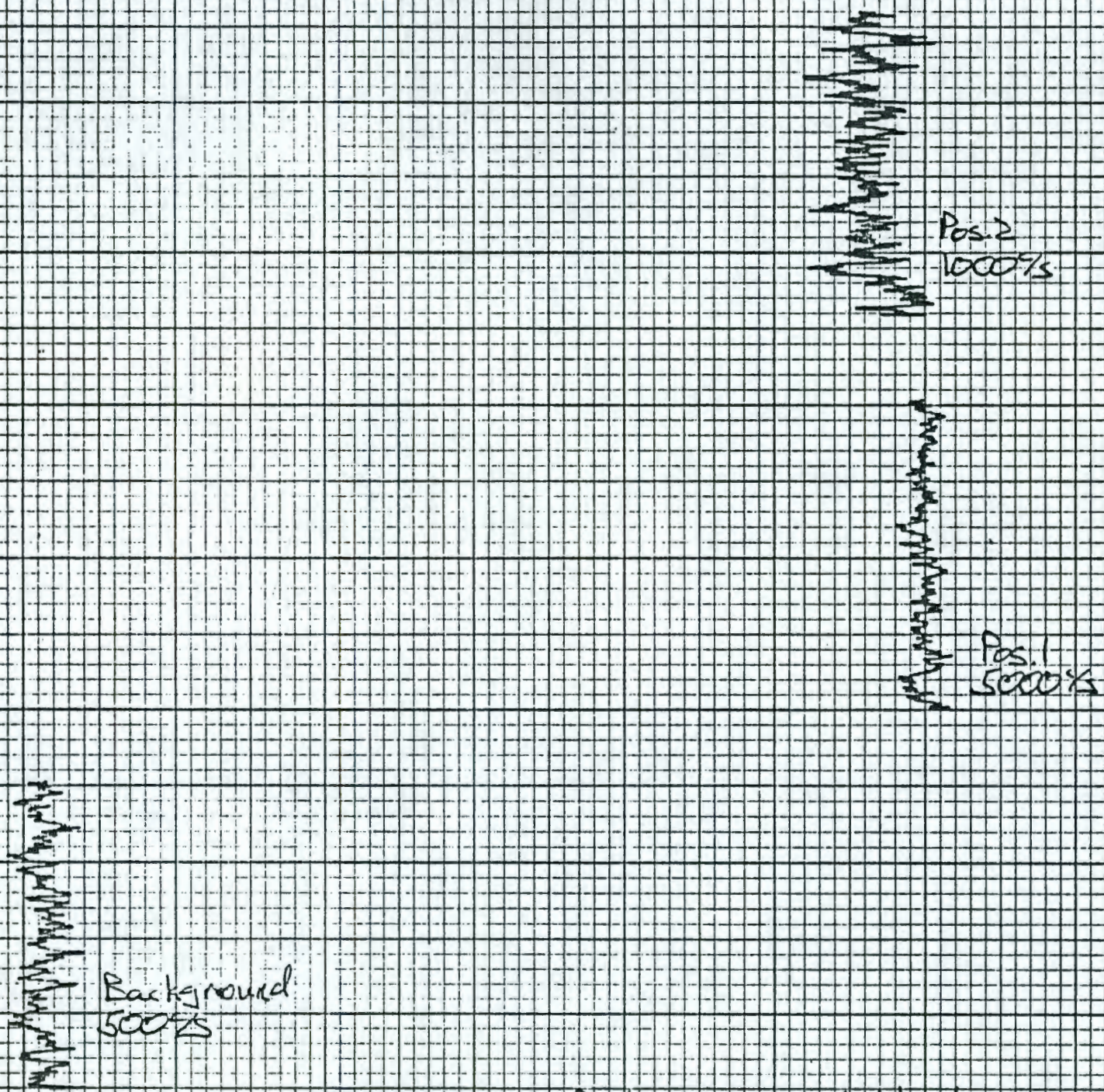
Comments Return Error = +0.3' high

Centralizer used.

Witnessed and Verified by: (sign and print name) Date:

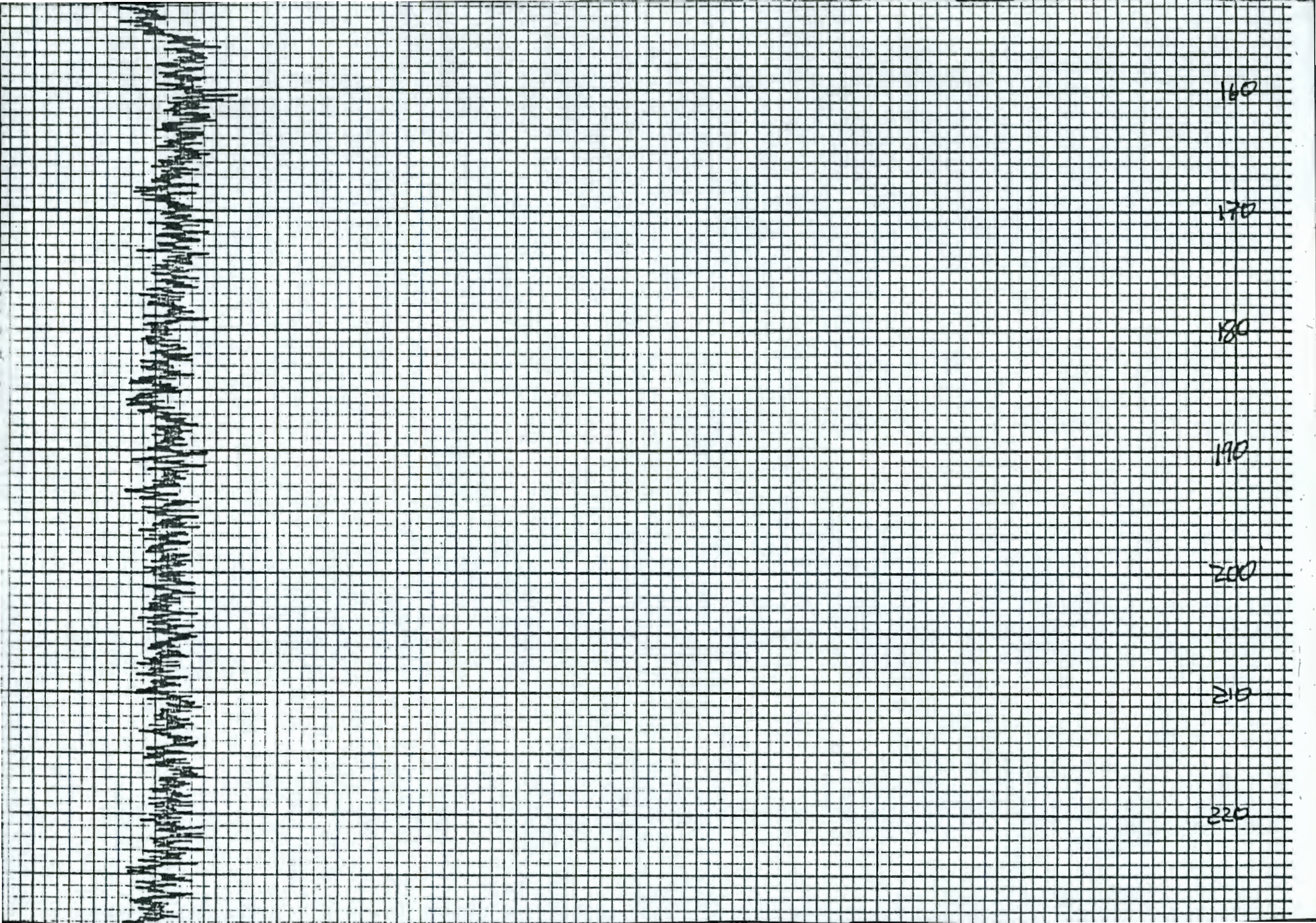
A-6000-520 (05/90)

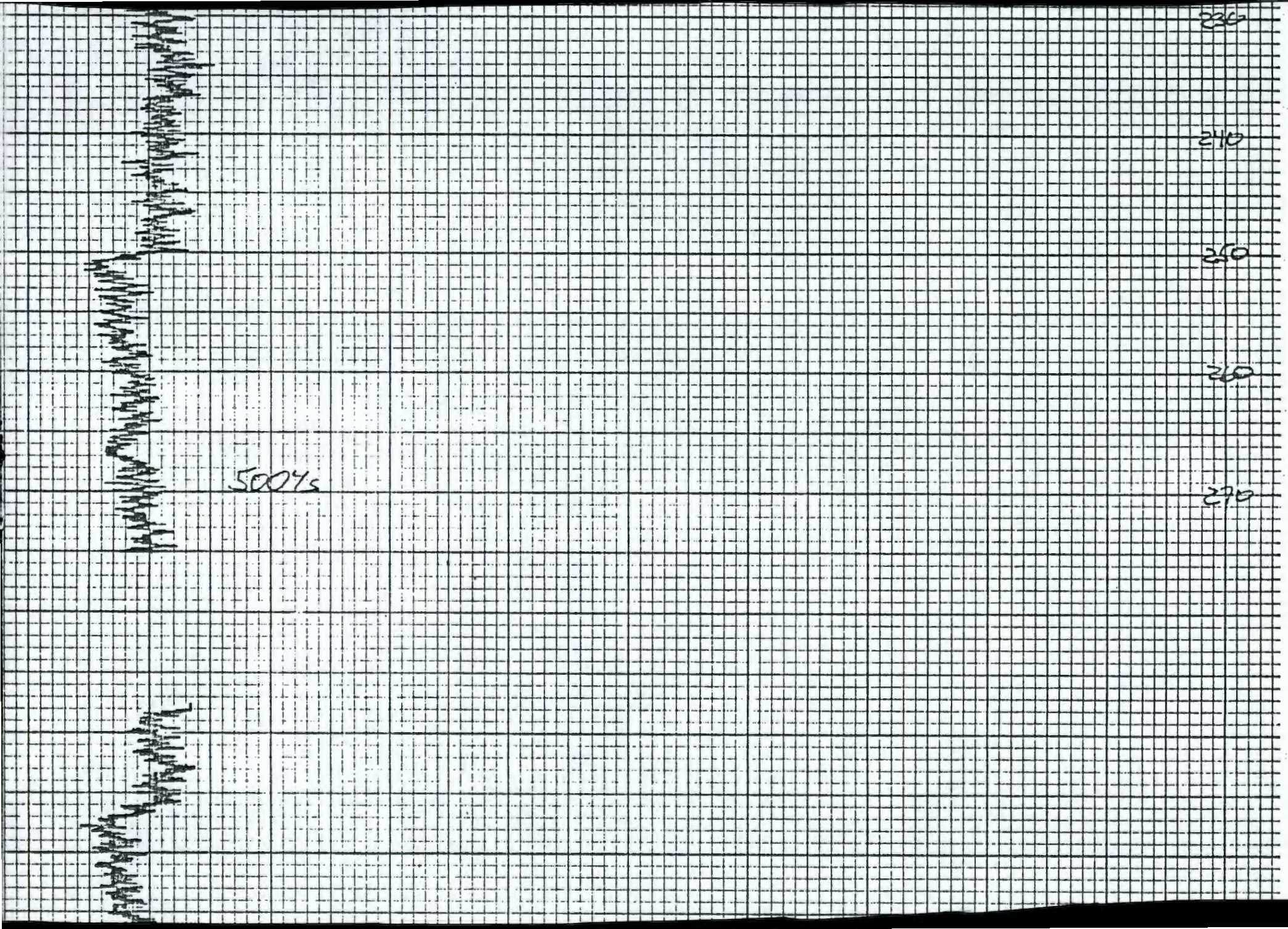




Back-Scatter Calibration

240
250
260
Repeat Section
500ys
270
130
140
150

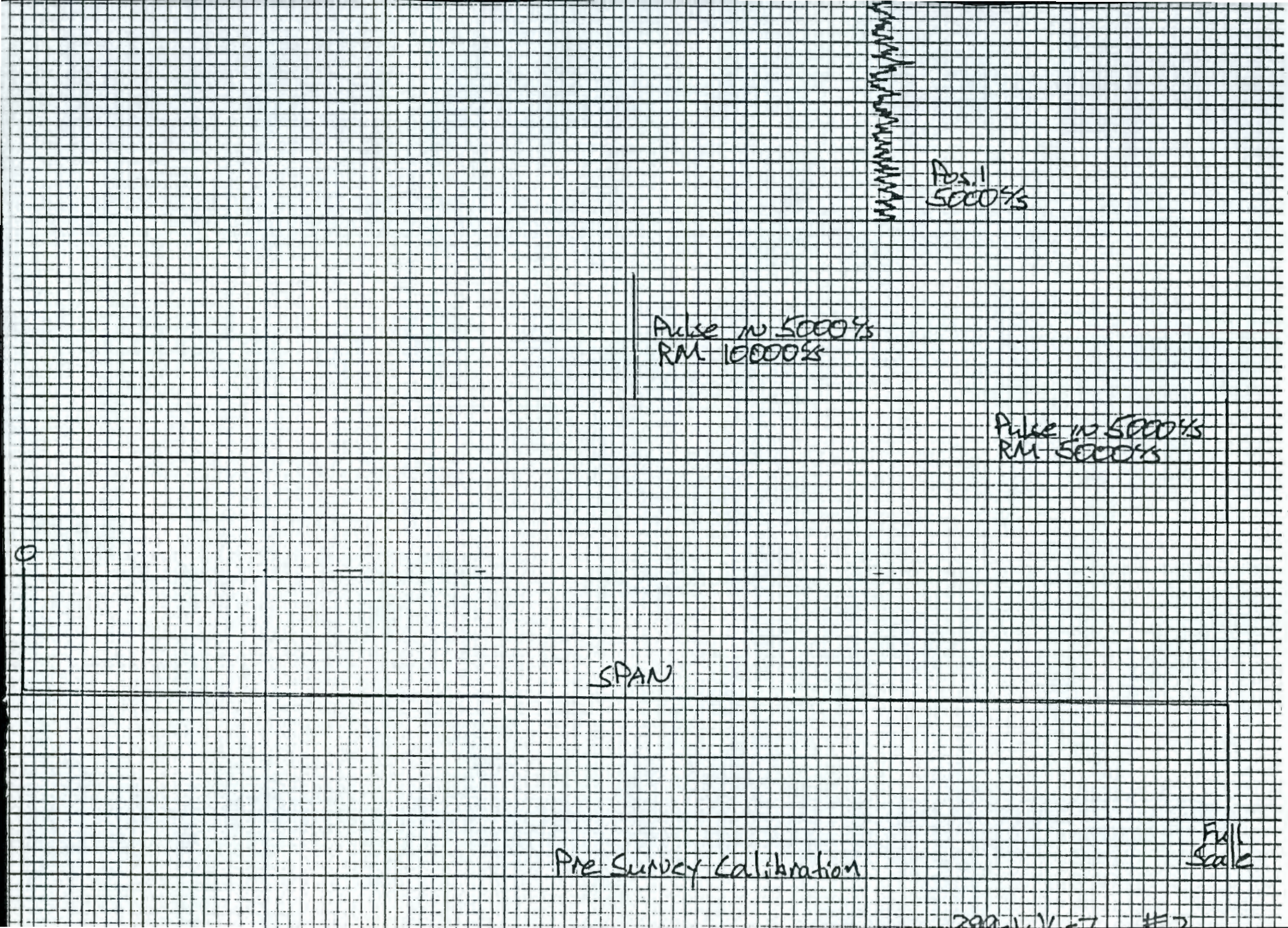

160
170
180
190
200
210
220


230
240
250
260
270
500ms

Disregard - Depth incorrect

Background
500 c/s

Pos. 2
1000 c/s


Posi
5000%
Pulse IN 5000%
RM 10000%
Pulse IN 5000%
RM 5000%
0
SPAN
Full
Scale
Pre Survey Calibration

19.0 WELL 299-W6-8

19.1 DRILLING

Construction of this well began on 29 April 1991 and total depth of 252.0 feet was reached on 6 June 1991. The well was drilled using a cable tool rig. Approximately 1355 gallons of water were added during drilling activities. Specific well construction information is located in Table 19.1. Well Guard, a non-petroleum based lubricant, was used on the drilling tools. A more detailed description of the drilling is shown in the Well Summary report at the end of this section.

Table 19.1 299-W6-8 Construction Particulars

	Size/Type/Date	Interval (ft BLS)	
Temporary Casing	12"	19.9	ALS
	10"	161.9	ALS
	8"	251.7	ALS
Gross Gamma Logging	5 June	162.0	4.0
	24 June	249.5	130.0
Permanent Casing	4"	229.6	ALS
Screen	4" 10-Slot	250.6	229.6
Filter Pack	20-40 Silica Sand	251.0	225.9
Annular Seal	Bentonite Pellets	225.9	222.1
	Bentonite Crumbles	222.1	21.0
	Cement Grout	21.0	1.8
Concrete Pad	4'x4'x6"	1.8	ALS

BLS - Below Land Surface
ALS - Above Land Surface

Sediments from the Hanford formation, early "Palouse" soil, Plio-Pleistocene unit, and the Ringold Formation were encountered in this borehole. Hanford deposits extended to 20 feet BLS and were primarily gravelly sand and sandy gravel. Approximately 25 feet (20-45 feet BLS) of silty sands and gravels, sandy gravel, gravelly sand represent the early "Palouse" soil and the Plio-Pleistocene unit. A caliche layer exists from 23.0 to 23.5 feet BLS. Ringold Formation deposits comprise the remainder of the sediments encountered in this borehole (45-252 feet BLS).

The borehole was advanced by the drive barrel and hard tool drilling. Samples were collected at approximately 5 foot intervals for moisture content (above the water table only), radiological screening, carbonate analysis, and

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lithologic archiving. Grain size analysis was done on samples from the interval to be screened. The borehole log and physical data for this well are located at the end of this section.

Gross gamma logging was conducted as indicated in Table 19.1. Reproductions of these logs are also located at the end of this section.

19.2 WELL COMPLETION

Well completion began on 26 June 1991 and was completed on 26 August 1991. Static water level at the time of completion was 216.8 feet below land surface (BLS). Completion details are presented in Table 19.1. Approximately 35 gallons of water were removed from the well to settle the filter pack. A 6 inch protective casing with a locking cap, four guard posts, and a brass marker with the well number were also set in the concrete pad. Elevations were determined for the brass marker, the top of the protective casing, and the top of the Hydrostar plate. Lambert and plant (200 West datum) coordinates were established for the centerline of the well. Minor damage to the permanent 4 inch stainless steel casing occurred during well completion however a downhole camera survey revealed no breach in the casing. Documentation of well completion activities can be found in the Well Construction Report.

19.3 WELL DEVELOPMENT AND PUMP INSTALLATION

Well development took place on 26 November 1991 using a HydroStar pump. Approximately 354 gallons of water were removed to develop the well. The intake of the dedicated Hydrostar pump was located 253.4 feet below the top of the protective casing.

19.4 AQUIFER TESTING

Aquifer testing was not conducted at this well because the damage to the permanent casing prevented installation of a transducer and Grundfos pump.

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LLBG

WELL 299-W6-8

DRILLING

START DATE	FINISH DATE	TOTAL DAYS	CURRENT DEPTH	FINAL DEPTH	DEPTH TO WATER	WATER ADDED(GAL)
4-29-91	6-24-91	40	N/A	252.0	6-20-91 234.3 6-21-91 233.6	1355 GALLONS

DOWN HOLE COMPLETION

START DATE	FINISH DATE	TOTAL DAYS	DEPTH TO WATER	DEPTH TO BOTTOM	DEPTH OF SCREEN	WATER ADDED/ REMOVED (GAL)
6-26-91	8-26-91	20	6-26-91 212.6' 6-27-91 212.8'	249.9'	229.6-250.6'	35 GALLONS REMOVED TO DEVELOP GRAVEL PACK

DEVELOPMENT AND ASSOCIATED ACTIVITIES

TV CAMERA DATE	AQUIFER TEST DATE	DEVELOPMENT DATE	HYDROSTAR PLACEMENT DATE	WATER REMOVED(GAL)
N/A	11-26-91 11-27-91	11-26-91 11-27-91	11-26-91	354

COMMENTS:

CAMERA SURVEY 11-15-91

WHC-SD-EN-DP-044, Rev. 0
WELL CONSTRUCTION REPORT

VALIDATED KDR 7/18/92
SIGNATURE/DATE

Specification No. WHC-S-014 (See Comments) Rev No. 5

ECNs 144240, 144241, 127437 (See Comments)

Project W-017/LLBG

Location 200W/LLBG WMA5

Drilling Company Kaiser Engineers Hanford

Driller Moe Wraspir, Jody Carpenter (completion) Bill Peters (completion)

Other (Companies) WHC, ESI

Geologist(s) Paul Anderson (ESI)
Stacey Callison (completion)
R Weinhold (ESI) - completion
J.A. Coates

Well No. 299-W6-8 Temp. Well No. W6-MW12

Coordinates N: 137,638.8 ; E: 567,028.8 (LAMBERT)

Casing Elev. 710.28 Ground Elev. 706.85 BRAS

Drilling Method

Verification Method Visual Observation

Criteria WHC-S-014 5.2, 5.3, 7.5, ESI 6.7 sec. 6.2

			Initials	Date
Rotary	Air N/A	Mud N/A	N/A	N/A
Cable Tool	D 0-10' 22.5-80'	H 10-22.5 80'-252.0'	PWA	6/21/91
Drilling Fluid	Raw Water	NA 1355 GAL.	SWC	6/26/91
Other	NA	NA	NA RD 7/24/92	NA

Geophysical Logging

Sondes	Interval	Date
Gross Gamma	162.0-4.0	6/5/91
Gross Gamma	249.5-130.0	6/24/91
	-	
	-	
	-	

Completion Data

Drilled Depth 252.0' b/s

Completed Depth 251.0' b/s

Date Started 4/30/91

Date Completed 8-26-91

Static Water Level/Date 233.6' b/s 6/21/91

Aquifer Testing

Type INSTANTANEOUS SLUG

Flow Meter I.D. No. — NA —

Cal. Due Date — NA —

Length of Test — NA —

Volume Pumped — NA —

Drawdown — NA —

Date of Test — NA —

Completion Results

Cleaning

Verification Method Visual Observation (document review)

Criteria WHC-S-014 secs. 4.2.2, 7.6, 7.7 WHC-CM-7.7 sec. 5.4

	Initials	Date
Drilling Tools/Rig	PWA.	4/17/4/25/4/26
Temporary Materials	SWC *	6/26/91
Permanent Materials	SWC *	6/25/91

Screen

Type	Length	Slot Size 100/ft
4" SS S.S. wire wrap	20.75'	0.010
0.3' end cap		

Depth(s) 229.6' - 250.6'

Verification Method Steel Tape Measurement

Criteria WHC-S-014, 4.2.3, 4.2.5, 12.2.1, 4.2.1

Initials SWC Date 7/1/91

Material Storage/Packing

Verification Method Visual Observation

Criteria WHC-S-014 4.2.2, 7.3

	Initials	Date
Mtl. Handling/Storage	SWC	6/26/91
Material Packing	SWC	6/26/91

Lubricants/Additives

Verification Method Visual Observation

Criteria WHC-S-014 7.2

	Identify	Initials	Date
Additives	Raw Water	PWA/SWC	6/26/91
Lubricants	Well Guard	PWA/SWC	6/26/91

Straightness Test

Verification Method Visual Observation

Criteria WHC-S-014 8.2

Initials PWA. Date 6/24/91

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A-6000-436 (09/90)

WELL CONSTRUCTION REPORT
(continuation sheet)

Casing (permanent)

Type	Size	Placement
T-304 stainless steel	4" OD	+3.5 - 250.6
		-
		-
		-

Verification Method: verify using Steel tape

Criteria: WHC-S-014 4.2.1, 4.2.4, 4.2.5, 12.2.1

Initials: SWC Date: 7/1/91

Well Protection

Verification Method: Visual Measure w/ Steel Tape

Criteria: WHC-S-014 4.2.10

	Initials	Date
Protective Posts	KDR	3/18/92
Protective Casing	KDR	3/18/92
Site Restored	KDR	3/18/92
Cap, Hasp and Lock	KDR	3/18/92
Surface Pad	KDR	3/18/92

Annular Seal/Filter Pack

Verification Method: Measure using Steel Tape Criteria: WHC-S-014 4.2.6, 4.2.7, 4.2.8, 4.2.9, ~~Sister~~ 5.3.1 (SWC 8/20/91)

Type	Interval	Volume	Initials	Date
20-40 Colorado Silica sand	251.0 - 225.9	8.5-100# bags (9.5 ft³)	SWC	7/1/91
1/4" - 3/8" bentonite pellets	225.9 - 222.1	3-50# buckets (1.9 ft³)	SWC	7/1/91
8-20 mesh bentonite crumbles	222.1 - 21.0'	260-50# bags (184.6 ft³)	SWC	8/23/91
cement grout	21.0' - 1.8'	23 94# bags (29.2 ft³)	RW	8-26-91

Well Survey/Labeling

Verification Method: Review of Survey Report

Criteria: WHC-S-014 3.4

	Initials	Date
Measurement Point/Surveyed	KDR	3/18/92
Protective Casing/Brass Cap Surveyed	KDR	3/18/92
Well Number Stenciled	KDR	3/18/92
Brass Cap Labeled	KDR	3/18/92

Pump Installation

Verification Method: Visual Observation

Criteria: WHC-S-014 4.2.11, 4.2.2

	Initials	Date
Pump Decon/Prep	JAC	11/26/91
Installed	JAC	11/26/91
Pump Tested	JAC	11/26/91

Other (initial if performed)

NA Well Abandonment KDR Downhole TV Inspection ECL Complete As-Built Diagram, Driller's/Geologist's Logs

11/27/91 JAC Well Development

Comments/Remarks: ⊛ Mel Thorson - driller; J. Noonin; H. Baker

*: RW 8-13-91

*: RW 8-26-91 - permit equip

All work done after 10/2/91 is done to specifications of WHC-S-014 Rev 6 with ECN's 150132, 164223, 127439

Reviewed By (Sign/Print Name): Edward C. Rafuse / EDWARD C. RAFUSE Date: 8/26/91

A-6000-436 (09/90)

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-8

Sheet 1 of 2

Location 200 W LLBG WMAS Ave. 27th Str.

Project W-017 / LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Jody Carpenter (completion), M. Thoreson, Moe Wraspir

Drilling Method and Equipment Cable Tool

Prepared By Stacy W. Collins (Sign/Print Name) Paul Anderson Date 6/26/91

Reviewed By R.D. Miller (Sign/Print Name) Date 9/12/91

CONSTRUCTION DATA: Description	Diagram	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA: Graphic Log	Lithologic Description
				gravelly SAND
bottom of 12" CS casing		10		sandy GRAVEL
@ 19.9' b/s				" "
		19.9		silty sandy GRAVEL
		20		
top of 8-20 bentonite		20		gravelly silty SAND caliche 23.0'-23.5'
crumbles + bottom of				slightly gravelly SAND
		30		
type I+II cement				sandy GRAVEL
grout @ 21.0' b/s				gravelly SAND
		40		
				slightly gravelly SAND
				" " "
		50		
				" " "
				SAND
		60		
				slightly gravelly SAND
				silty gravelly SAND
		70		
				silty SAND
				CALICHE
		80		
				slightly gravelly SAND
				gravelly SAND
		90		
				sandy GRAVEL
				" "
		100		
				" "
				" "
		110		
				" "
				" "
		120		
				" "
				" "
		130		
				" "
				" "
		140		
				" "
bottom of 10" CS casing		150		" "
@ 161.9' b/s				" "
				slightly sandy GRAVEL
		160		
		161.9		sandy GRAVEL

A-6000-384 (04/90)

9313018.1923

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WELL SUMMARY SHEET

Boring or Well No. 299-W6-8

Sheet 2 of 2

Location 200W LLBG WMAS 27th Str.

Project W-017 LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Jody Carpenter, Moe Wraspir, Mel Thorson

Drilling Method and Equipment Cable Tool

Prepared By S.W. Callison (Sign/Print Name) Date 6/26/91

Reviewed By (Sign/Print Name) Date 9/12/91

RBM

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
		170		sandy GRAVEL
				" "
		180		" "
				" "
top of 1/4" bentonite pellets @ 222.1' bls		190		gravelly SAND
				" "
		200		sandy GRAVEL
top of 20-40 silica sand @ 225.9' bls				" "
		210		" "
				" "
bottom of .10 slot stainless steel screen @ 250.6'		220		gravelly SAND
		222.1' 225.9' 229.6'		sandy GRAVEL
		230		" "
bottom of 20-40 silica sand @ 251.0' bls		233.6'		" "
		240		slightly gravelly SAND
				gravelly SAND
water level @ 233.6' bls on 6/21/91	250.6'	250		sandy GRAVEL
		251.7'		
bottom of 8" UH 14 WT SC 10" CS casing @ 251.7' bls				
TD of borehole @ 252.0' bls				
		19-7		

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WHC-SD-EN-DP-044, Rev. 0
BOREHOLE LOG

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

Boring or Well No. 299-W6-8

Sheet 1 of 14

Location 200W/LLBG MMA5

Project WF017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Brett Strode

Drilling Method and Equipment cable tool rig/drive barrel

Prepared By Paul Anderson/Paul W. Anderson (Sign/Print Name) Date 4/30/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
0.0					
				large cobbles, small boulders, sand	
	1 moist. 2 lith. 1 rad.	D.B.		5.0': gravelly SAND	1415 SSO: PID < det.
5.0				40% rounded to subrounded gravel, 60% sand	8" ID drive barrel
				gravel: 5% small cobbles, 10% vcp, 10% cp,	
				10% mp, 5% fp, 5% vfp; SAND: 30% medium,	
				30% fine; strong reaction to 10% HCL,	
				poorly sorted, 10YR 5/2 grayish brown - dry	
				2.5Y 4/3 olive brown - wet	
				60% mafic, 40% felsic	
	1 moist. 2 lith. 1 rad.	D.B		10.0': sandy GRAVEL	1000 SSO: PID < det.
10.0				70% gravel; round to subround: 20% small	
				cobbles, 20% vcp, 10% cp, 10% mp, 5% fp,	
				5% vfp; 30% sand: 15% cse, 10% m, 5% fine	
				strong reaction to 10% HCL, poorly sorted,	
				loose 10YR 6/2, light brownish gray - dry	
				10YR 3/2, grayish brown - wet	
				70% mafic, 30% felsic	
	1 moist 2 lith. 1 rad.	H.T.		15.0': sandy GRAVEL	0845 SSO: PID < det.
15.0				same material as in previous	
				sampled interval, moisture content	
				unknown due to addition of water for	
				hard tool	
					18.5'-20.0' drilling fast,
					more silt, less large cobbles
20.0				19-8	

A-6000-382 (04/90)

9313018.1921

BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 2 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool rig/hard tool, drive barrel

Prepared By Paul W Anderson/Paul Anderson (Sign/Print Name) Date 5/6/91

Reviewed By R. D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
20.0	21.th 1rad. 1moist.	H.T.		20.0': silty sandy GRAVEL 50% gravel: subangular to round, less angular fragments of broken cobbles; 20% mp, 20% fp, 10% vfp; 30% sand: 10% medium, 20% fine; 20% silt: cohesive, strong rxn. to 10% HCL; 80% mafic, 20% felsic 10YR 4/3, brown-wet moderately 10YR 6/3, pale brown-dry sorted	1325 SSO check: PID < det. moisture content unknown due to water added to bore-hole for hard tool drilling
22.5	21.th. 1rad. 1moist	D.B.		22.5' slightly silty SAND 5% rounded med. pebbles, 10% slightly cohesive silt, 85% sand: 35% fine sand, 50% vf sand well sorted, dry, moderate reaction to 10% HCL, 2.5Y 7/2 light grey-dry 2.5Y 6/3, light yellowish brown-wet	PID < det.
23.0					23.0-23.5' caliche layer
23.5					
25.0	1moist. 21.th. 1rad.	D.B.		25.0'- gravelly silty SAND 40% rounded to subangular gravel: 20% cp, 10% mp, 5% fp, 5% vfp; 20% cohesive silt 40% sand: 10% cse sand, 20% med., 10% fine strong rxn. to 10% HCL dry, loose, poorly sorted 2.5Y 6/3 light yellowish brown-dry 2.5Y 5/3 light olive brown-wet	PID < det.
30.0	1moist. 21.th. 1rad.	D.B.		30.0' slightly gravelly SAND 20% angular to subrounded gravel: 5% mp 5% fp, 10% vfp; 80% sand: 10% ms, 20% fs, 50% vfs, loose, dry, strong rxn. to 10% HCL 10YR 4/3 brown-wet 60% mafic, 40% 2.5Y 7/2 light grey-dry felsic	PID < det.
33.0					33.0': lithology change - see 35' sample for description
35.0					

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 3 of 14

Location 200W/LLBG WMAS

Project W-017/LLBG

Elevation 706.55

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wiraspir

Drilling Method and Equipment cable tool/drive barrel

Prepared By Paul W. Anderson/Paul W. Anderson (Sign/Print Name) Date 5/7/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
35.0	1 rad. 21th. 1 moist.	D.B.		35.0 sandy GRAVEL (began @ 33.0 ft.)	SSO check: PID < det.
				70% subangular to rounded gravel: 10% cp,	
				10% mp, 20% fp, 30% vfp; sand: 30% coarse;	
				no reaction to 10% HCL, well sorted, loose	
				dry, 90% mafic 10% felsic	
				10YR 3/1 very dark gray - wet	
				10YR 5/1 gray - dry	
	1 rad. 21th. 1 moist.	D.B.		40.0': gravelly SAND	PID < det.
40.0				45% subangular to subrounded gravel: 10% mp,	
				15% fp, 20% vfp; 55% sand: 25% vcse sand,	
				30% cse sand; loose, dry, well sorted, no reaction	
				to 10% HCL, 40% felsic, 60% mafic	
				7.5YR N6/ gray - dry	
				10YR 4/2 dark grayish brown - wet	
					43.0-43.5': fine, very fine sand lense
	1 rad 21th 1 moist.	D.B.		45.0': slightly gravelly SAND	PID < det.
45.0				15% subrnd to subangular gravel: 5% mp,	
				5% fp, 5% vfp; 85% sand: 50% coarse, 20%	
				medium, 10% fine, 5% vfine (cohesive); well	
				sorted, loose, dry, moderate reaction to 10%	
				HCL; 10YR 6/3 pale brown - wet	
				2.5Y 6/4 light yellowish brown - dry	
				60% felsic, 40% mafic	
	1 rad. 21th. 1 moist	D.B.		50.0': slightly gravelly SAND	PID < det.
50.0				same as last sample	
55.0'					

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 4 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/drive barrel

Prepared By Paul W. Anderson/Paul Anderson (Sign/Print Name) Date 5/9/91

Reviewed By R D Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
55.0	1 moist. 1 rad. 21 lith.	D.B.		55.0': slightly gravelly SAND	PID<det.
				5% angular to subround gravel: 5% fp.	
				95% sand: 55% coarse, 40% medium, very	
				well sorted, loose, dry, no reaction to 10% HCL	
				10YR 7/2 light grey-dry 60% felsic,	
				10YR 5/3 brown-wet 40% mafic	
	1 moist. 21 lith. 1 rad.	D.B.		60.0': SAND	PID<det.
60.0				1% angular to subround fine gravel; 99%	
				medium sand, very well sorted, loose, dry	
				no reaction to 10% HCL, 70% felsic, 30%	
				mafic, 10YR 7/2 light gray-dry	
				10YR 5/2 grayish brown-wet	
	1 moist. 21 lith. 1 rad.	D.B.		65.0': slightly gravelly SAND	PID<det.
65.0				10% angular to subrounded gravel: 5% fp, 5%	
				vfp; 90% sand: 10% vcs, 20% cs, 30% ms,	
				20% fs, 10% vfs; very well sorted, loose,	
				dry, no reaction to 10% HCL, 70% felsic,	
				30% mafic, 10YR 7/2 light grey-dry	
				10YR 6/3 pale brown-wet	
	1 moist. 21 lith. 1 rad.	D.B.		70.0': silty gravelly SAND	PID<det.
70.0				15% angular to subrounded gravel: 10% calcite	
				cemented aggregates of fine gravel, 5% fp,	
				65% sand: 10% cs, 10% ms, 10% fs, 35% vfs,	
				20% silt (loose); sample is moderately sorted,	
				loose, dry; strong reaction to 10% HCL,	
				5Y 7/2 light grey-dry 70% felsic,	
				5Y 6/2 light olive grey-wet 30% mafic	
75.0					

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 5 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wrasgir

Drilling Method and Equipment Cable tool/hard tool & drive barrel

Prepared By Paul W Anderson/Paul Anderson (Sign/Print Name) Date 5/15/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (Feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
75.0	1rad. 21th. 1moist.	D.B.		75.0': silty SAND	PID<det.
				80% sand: 15% vcs, 10% cs, 10% ms, 20% fs,	
				25% vfs: 70% silt; dry, uncemented, loose,	
				moderate sorting, mod. rxn. to 10% HCl; 65%	
				mafic, 30% felsic, 5% other 10YR 6/3 pale brown	
				(dry) 10YR 6/4, light yellowish brown-wet; trace	
				muscovite, magnetics	
					79.0': fm. change to caliche
	1rad. 21th. 1moist.	D.B.			
80.0				80.0': CALICHE	PID<det.
				highly cemented silt and sand, strong rxn.	
				to 10% HCl due to calcite cement. very fine	
				material from pulverized cemented layer	
				90% felsic, 10% mafic, tr. pyrite	
				10YR 8/2 white-dry	
				10YR 7/2 light grey-wet	
	1rad. 21th. 1moist.	H.T.			
85.0				85.0: slightly gravelly SAND	PID<det., formation change,
				10% angular to subround gravel: 5% mp (mafic)	@ 85 ft, easier drilling
				5% fp (caliche) 90% sand: 45% cs, 45% ms	
				slight reaction to 10% HCl, well sorted, loose,	moisture content unknown-
				50% mafic, 50% felsic (sand)	water added to a.d hard
				2.5Y 6/2 light brownish grey-wet	tooling
				10YR 8/2 white-dry	
	1rad. 21th 1moist.	H.T.			
90.0				90.0: gravelly SAND	PID<det.
				40% angular to rounded gravel: 10% cp, 10%	
				mp, 20% fp: 60% sand: 10% vcs, 20% cs, 20%	moisture content unknown-
				ms, 10% fs. poorly sorted, loose, moderate	water added to a.d drilling
				reaction to 10% HCl	
				2.5Y 6/2 light brownish grey-wet	
				10YR 8/2 white-dry	
				90'-92' split spoon taken - see next	
				page for details.	

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No 299-W6-8

Sheet 6 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cabletool/hard tool

Prepared By Paul W. Anderson / Paul Anderson (Sign/Print Name) Date 5/15/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
90.0	1rad. 21.th. 1moist.	ST.		90.0-91.0 same as last sample	
91.0		5/87/100 (4") 60% rec.		91.0 sandy GRAVEL 60% angular to rounded gravel: 30% small cobbles, 5% vcp, 5% cp, 10% mp, 5% fp, 5% vfp 40% sand: 10% cs, 20% ms., 10% fs, strong reaction to 10% HCl, well cemented (w/ calcite) hard, slightly moist, 60% mafic, 40% felsic, 10YR 6/2 light brownish grey - dry; 10YR 5/2 grayish brown wet	PID < det., formation change at 91.0 ft.
95.0	1moist. 21.th. 1rad.	H.T.		95.0: sandy GRAVEL similar to last sample, 80% mafic, 20% felsic, no rxn. to 10% HCl; probably not cemented	PID < det.
100.0'	1moist. 21.th. 1rad.	H.T.		100.0': sandy GRAVEL 60% angular to subround gravel: 10% fp, 5% vfp, 45% > fp - this is the angular gravel component made up of broken coarser gravel and cobbles. 40% sand: 20% csp, 10% m, 10% fic, poorly sorted, no rxn. to HCl, 70% mafic, 30% felsic 10YR 7/1 light grey - dry; 5Y 6/2 light olive grey - wet	PID < det. moisture content unknown due to water added to hole
105.0	1moist. 21.th. 1rad.	H.T.		105.0': sandy GRAVEL similar to last sample; 60% mafic, 40% felsic	PID < det. moisture content unknown, water added to borehole
110.0					

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 7 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/hard tool

Prepared By Paul W. Anderson/Paul Anderson (Sign/Print Name) Date 5/28/91

Reviewed By (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
110.0	1 moist 21.1th 1 rad.	H.T.		110.0': sandy GRAVEL	PID < det.
				60% subround to angular gravel: 25% fp, 15% vfp, 20% coarser (angular - broken by hard tool)	moisture content unknown,
				40% sand: 10% cs, 20% ms, 10% fs: no rxn. to	water added to borehole
				10% HCL, poorly sorted 60% mafic (gravel), 40%	
				felsic (sand) 5Y 7/1 light grey - dry	
113.0		S.T. 5/15/30/22 70% rec.		2.5Y 6/2, light brownish grey - wet	
	1 moist. 21.1th. 1 rad.			113.0-115.0': sandy GRAVEL	PID < det.
115.0				70% rounded to angular gravel: 30% small	
				cobbles, 15% vcp, 10% cp, 10% mp, 5% fp; 30%	
				sand: 20% cs, 5% ms, 5% fs: slight reaction	
				to 10% HCL, very poorly sorted hard, slightly	
				moist - 70% mafic (cobbles, pebbles), 30% felsic	
				10YR 5/2, grey - wet; 5Y 7/1 light grey - dry	
				some cementation of sand onto gravels	
	1 moist 21.1th. 1 rad	H.T.		120.0': sandy GRAVEL	PID < det.
120.0'				similar to last sample, no reaction to	
				10% HCL	moisture content unknown,
					water added to borehole
	1 moist 21.1th. 1 rad.	H.T.		125.0': sandy GRAVEL	PID < det.
125.0'				70% subrounded to angular gravel; 50%	
				angular - from larger material broken up by	moisture content unknown,
				hard tool, 10% fp, 10% vfp. 30% sand: 15%	water added to borehole to
				coarse, 15% medium, poorly sorted, no	aid drilling
				reaction to 10% HCL, 75% mafic, 25%	
				felsic, 5Y 5/1 grey - wet	
				10YR 7/1 light grey - dry	
130.0'					

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 8 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/hard tool, split tube

Prepared By Paul W. Anderson / Paul W. Anderson (Sign/Print Name) Date 5/29/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
130.0	1 moist. 21.th. 1 rad.	H.T.		130.0': sandy GRAVEL	PID < det.
				same as last sampled interval	
					moisture content unknown -
					water added to borehole
133.0	1 moist 21.th. 1 rad.	S.T. 10/38/41/46 60% rec.		133-135.0': sandy GRAVEL	PID < det.
				80% subround to angular gravel: 30% small	
				cobbles, 20% vcp, 10% cp, 10% mp, 5% fp, 5% vfp	
135.0				70% sand: 5% cs, 15% ms; no reaction to	
				10% HCL, very poorly sorted, slightly moist,	
				70% mafic, 30% felsic 10YR 6/2 light brown-	
				ish grey - wet; 10YR 7/2 light grey - dry	
	1 moist 21.th. 1 rad.	H.T.		140.0': sandy GRAVEL	PID < det.
140.0				60% angular to subround gravel: 40% angular,	
				larger than mp; 10% fp, 10% vfp; 40% sand: 10% c,	moisture content unknown due
				10% m, 20% f; mod. rxn. to 10% HCL, poorly sorted,	to water added to hole
				70% felsic, 30% mafic; 5Y 8/1 white - dry	
				2.5Y 4/2 dark grayish brown - wet	
143.0	1 moist. 21.th. 1 rad.	S.T. 10/55/51/52 80% rec.		143-145.0': sandy GRAVEL	PID < det.
				70% subrounded to angular gravel: 40% small	
				cobbles, 10% vcp, 10% cp, 5% mp, 5% fp; 30%	
145.0				sand: 10% coarse, 70% med., 10% fine; strong	
				reaction to 10% HCL, very poorly sorted,	
				slightly moist, some cementation: 50%	
				mafic, 50% felsic; 10YR 7/1 light grey - dry;	
				wet - 2.5Y 6/2 light brownish grey	
150.0					

19-15

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 9 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/hard tool

Prepared By Paul W. Anderson/Paul Anderson (Sign/Print Name) Date 6/1/91

Reviewed By R. D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
150.0	1 moist. 2 lith. 1 rad.	H.T.		150.0': sandy GRAVEL similar to last sample interval	PID < det.
					moisture content unknown; H_2O added to aid drilling
	1 moist. 2 lith. 1 rad.	H.T.		155.0': sandy GRAVEL	PID < det.
155.0				70% subround to angular gravel: 40% larger than med. pebbles, 20% fp, 20% vfp; 30% sand: 10% ms, 20% fs; strong rxn. to 10% HCL, poorly sorted, 50% felsic, 50% mafic; 5Y 7/2 light grey-dry, 2.5Y 5/2 grayish brown-wet	moisture content unknown; H_2O added during drilling
	1 moist. 2 lith. 1 rad.	H.T.		160.0': slightly sandy GRAVEL	PID < det.
160.0				80% rounded to subangular gravel; 50% larger than med. pebbles, 20% fp, 10% vfp 20% sand: 10% ms, 10% fs: no rxn to 10% HCL, poorly sorted, 50% mafic, 50% felsic	moisture content unknown; H_2O added during drilling
162.0		8/46/100 (3") S.T. 10% rec.		10YR 7/1 - light grey-dry 10YR 5/1, grey-wet.	
				162-164.0': slightly sandy GRAVEL, similar to last sample	PID < det.; no sample jars filled due to lack of recovery
164.0	1 moist 2 lith 1 rad.	H.T.		165.0': sandy GRAVEL	PID < det.
165.0				60% angular to rounded gravel: 70% larger than medium pebbles (angular, broken by hard tool), 20% fine p., 20% vfp.; 40% sand: 5% coarse, 30% med., 5% fine.; no reaction to 10% HCL, poorly sorted, 60% felsic, 40% mafic, 10YR 6/2, light brownish grey-wet 10YR 7/1 - light grey-dry	moisture unknown due to water added during drilling
170.0					

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 10 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.8 S

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/hard tool,

Prepared By Paul W Anderson/Paul Anderson (Sign/Print Name) Date 6/14/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
170.0	moist 2lith. 1rad.	H.T.		170.0': sandy GRAVEL similar to last sample interval	PID <det.
					moisture unknown, water added to borehole
173.0				173-174 possible sandy layer-driller easier in this interval	
174.0	moist. 2lith. 1rad.	H.T.			
175.0				175.0': sandy GRAVEL similar to previous sample intervals	PID <det.
					moisture content unknown due to water added to borehole.
179.0	moist. 2lith. 1rad.	S.T. 15/29/100 (6") 20% rec.		179.0-180.5': sandy GRAVEL 70% rounded to angular gravel; 30% small cobbles, 10% vcp, 10% cp, 10% mp, 5% fp, 5% vfp; 30% sand: 20% coarse, 10% medium, very poorly sorted, medium density, no rxn. to 10% HCL, 60% felsic, 40% mafic; 5Y 7/2 light grey-dry; 5Y 6/2 light olive grey-wet (5Y 7/4 pale yellow - minor amount (10%) of the sand)	PID <det. moisture unknown-water added to borehole during drilling
180.5					
185.0	moist 2lith 1rad.	H.T.		185.0': sandy GRAVEL 60% gravel: subround to angular; 20% mp, 30% fp, 10% vfp; 40% sand: 10% coarse, 20% med., 10% fine; gravels were 60% mafic, 40% felsic; sand 50% mafic 50% felsic; no reaction to 10% HCL, poorly sorted, 5Y 4/2 olive grey-wet 5Y 7/2 light grey-dry	PID <det. moisture unknown-water added during drilling
190.0					

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 11 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/hardtool, split tube

Prepared By Paul W Anderson/Paul Anderson (Sign/Print Name) Date 6/14/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
190.0	1 moist. 2 lith 1 rad.	H.T.		190.0': gravelly SAND	PID<det.
				30% subrnd. to angular gravel: 10% mg, 10% fg	
				10% vfg 70% sand: 10% cse, 50% med., 10% fine	moisture content unknown
				sand is 70% felsic, 30% mafic, no HCL rxn, poorly	
				sorted, 2.5Y 5/3 grayish brown-wet 2.5Y 7/2 light grey-dry	
193.0'				193.0-194.0': probable sand layer - drilling	
				became easier	
194.0'					
195.0'	1 moist 2 lith	H.T.		195.0': gravelly SAND	PID<det.
	1 rad.			60% sand (70% felsic, 30% mafic): 5% cs, 40%	
				med. s., 15% fs; 40% gravel: angular to sub-	moisture content unknown-
				rounded: 10% larger than med. pebbles, 20% fg,	water added to borehole
				10% vfg. no reaction to HCL, poorly sorted	aid drilling
				5Y 6/2 light olive grey-wet 2.5Y 7/2 light grey-dry	
				199.5-200.2' SAND	PID<det.
199.5'		S.T.		80% med., 5% cse, 15% fine, very well sorted	1 lith. from each interval
	1 moist 2 lith. 1 rad.	5/33/55/100		dry, loose, no rxn. to HCL, 80% felsic (quartz	of split tube
				& feldspar) 20% mafic (basalt sand) 5Y 8/2	
		70% rec.		white - dry 5Y 6/2 light olive grey - wet	
201.0				200.2-201.0: sandy GRAVEL	PID<det.
				70% rounded gravel: 30% vcg, 5% cg, 5% mg,	
				15% fg, 15% vfg; 30% sand: 5% cse, 5% med.,	
				20% fine, no reaction to HCL, very poorly	
				sorted, loose, dry, 70% felsic, 30% mafic,	
				5Y 8/2 white - dry; 2.5Y 6/2 light brownish grey	
	1 rad. 2 lith 1 moist.	H.T.		205.0': sandy GRAVEL	PID<det.
205.0				70% angular to subrounded gravel: 20%	
				med. pebbles or larger fragments, 25% fg, 25%	moisture content unknown
				vfg; 30% sand: 5% cse., 20% med., 5%	
				fine, no reaction to HCL, poorly sorted,	
				50% mafic, 50% felsic, 5Y 8/1 white-dry	
				5Y 6/1 grey-wet	
210.0					

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 12 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineering Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/hard tool, split tube

Prepared By Paul W. Anderson/Paul Anderson (Sign/Print Name) Date 6/18/91

Reviewed By R.D. Mahr (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
210.0	1 moist. 21ith. 1 rad.	H.T.		210.0': sandy GRAVEL 65% rnd. to angular gravel (high feldspar content, ~70%) 20% mo. or larger fragments, 25% fp, 20% vfp; 35% sand: 5% cs, 15% ms, 15% fs; 50% mafic, 50% felsic (whole sample) no reaction to HCL, poorly sorted, 5Y 5/2 olive grey-wet; 5Y 8/2 white-dry	PID < det. moisture content unknown; water added to borehole for hard tool drilling
	1 moist. 21ith. 1 rad.	H.T.		215.0' sandy GRAVEL 70% angular to rounded gravel, 50% fels., 50% maf. 40% med. peb. + larger (fragments) 15% fp, 15% vfp 30% sand; 80% fel., 20% maf., 5% cs, 15% ms, 10% fs no rxn. to HCL, poorly sorted, 5Y 7/2 light grey-dry 5Y 5/2 olive grey-wet.	PID < det. moisture content unknown
218.0				218.0-219.5: probable sand layer, drilling much faster	
219.5		S.T.		219.5-221.5: gravelly SAND	PID < det.
	1 moist. 21ith. 1 rad.	6/11/25/75 30% rec		60% sand (80% felsic, 20% mafic) 5% cs, 50% ms, 5% fs; 40% gravel; rounded to subangular 10% small cobbles, 10% cp, 10% mp, 5% fp, 5% vfp.; no reaction to HCL, poorly sorted, loose, 5Y 6/3 pale olive-dry 5Y 5/3 olive; wet	moisture content unknown, some moisture from borehole in sample.
221.5					
	1 moist. 21ith. 1 rad.	H.T.		225.0': sandy GRAVEL 60% angular to subangular gravel: 10% med. or larger fragments, 30% fp, 20% vfp.; 40% sand: 10% cs, 20% ms, 10% fs; 60% mafic, 40% felsic; no reaction to 10% HCL, poorly sorted, 10YR 8/1, white-dry 5Y 4/2 olive grey-wet	PID < det. moisture content unknown, due to water added to bore-hole
225.0					
230.0					

9313018.1911

BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 13 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/hard tool

Prepared By Paul W. Anderson/Paul Anderson (Sign/Print Name) Date 6/18/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
230.0	1 moist. 21th. 1 rad.	H.T.		230.0': sandy GRAVEL similar to last sample	PID<det.
	1 moist. 21th. 1 rad.				
235.0		H.T.		235.0': sandy GRAVEL 60% angular to subangular gravel - (crushed by hard tool): 10% mp, 30% fp, 20% vfp; 40% sand: 20% coarse, 10% med., 10% fine; 60% mafic, 40% felsic, no reaction to 10% HCL, poorly sorted, 5Y 4/2 olive grey - wet 5Y 8/2 white - dry (major color - sand was mottled when dry)	PID<det. moisture content unknown - water added to borehole during drilling
	1 moist. 21th. 1 rad.	H.T.			
240.0				240.0': slightly gravelly SAND 80% sand: 30% cse, 20% med., 20% fine 20% angular to subrounded gravel: 10% fp 10% vfp; moderate sorting, no reaction to HCL, 70% mafic (coarse sand + gravel) 30% felsic (fine sand) 5Y 2.5/ black; wet (cse) 5Y 3/2 olive grey - wet (fines) 5Y 7/2 light grey - dry	PID<det. moisture content unknown
	1 moist. 21th. 1 rad.	H.T.			
245.0				245.0': gravelly SAND 65% sand: 20% cse, 15% med., 30% fine 35% angular to subangular gravel: 5% med. p., 15% fp, 15% vfp; no reaction to 10% HCL, poorly sorted; 70% felsic, 30% mafic (coarse material; fine sand primarily quartz) 5Y 4/2 olive grey - wet (fines); 5Y 8/1 - white (fine sand - dry)	PID<det. moisture content unknown
				19-20	
250.0					

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BOREHOLE LOG

Boring or Well No. 299-W6-8

Sheet 14 of 14

Location 200W/LLBG WMA5

Project W-017/LLBG

Elevation 706.85

Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wraspir

Drilling Method and Equipment cable tool/split tube

Prepared By Paul W. Anderson/Paul Anderson (Sign/Print Name) Date 6/24/91

Reviewed By R.D. Miller (Sign/Print Name) Date 7/1/91

Depth (feet)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
249.5		S.T.		249.5-250.5' : Sandy GRAVEL	PID<det.
	moist. 21th. rad.	7/55/155(1") 30% rec		60% gravel; rounded to angular : 15% vcp	
250.5				15% cp, 10% mp, 10% fp, 10% vfp; 30% sand	
				5% coarse, 10% medium, 15% fine; 10% silt	
				moderate reaction to 10% HCL, cemented,	
				wet, poorly sorted 5Y 4/2 olive grey-wet	
				2.5Y 5/6 lt. olive brown-dry	

9313018.1905

EQUIPMENT CONFIGURATION AND WELL HEAD DIAGRAM

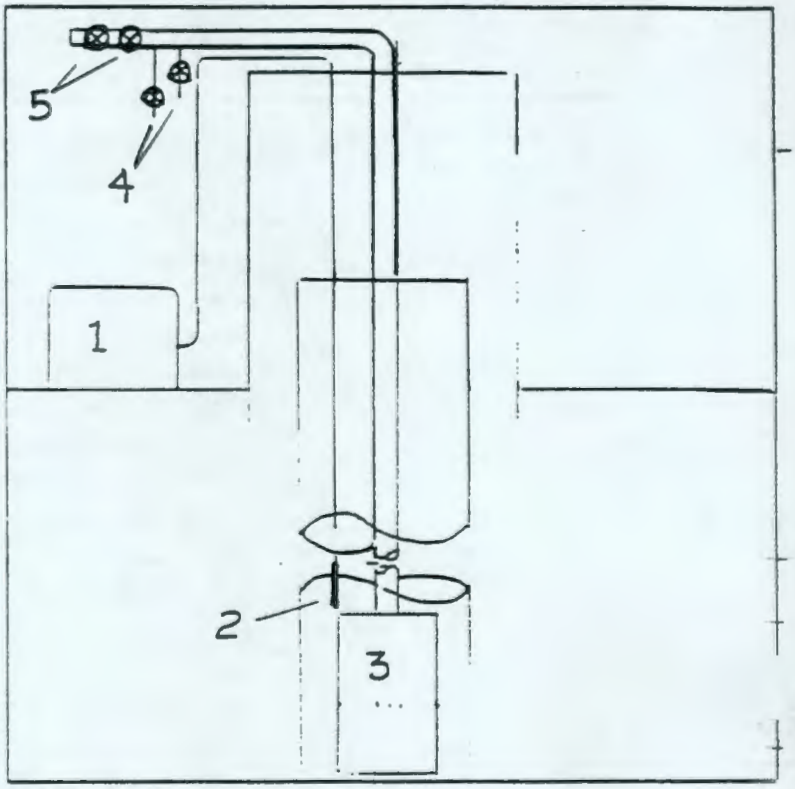
Well Designation 299-W6-8 Depth 254.4' BTOC

VALIDATE
KDR 3/18/92
SIGNATURE/DATE

Equipment Configuration

Item	Description
1	HERMIT DATA LOG. SN- NA
2	TRANSDUCER SN- NA
3	PUMP
4	SAMPLING PORTS
5	SHUT OFF VALVES

Diagram

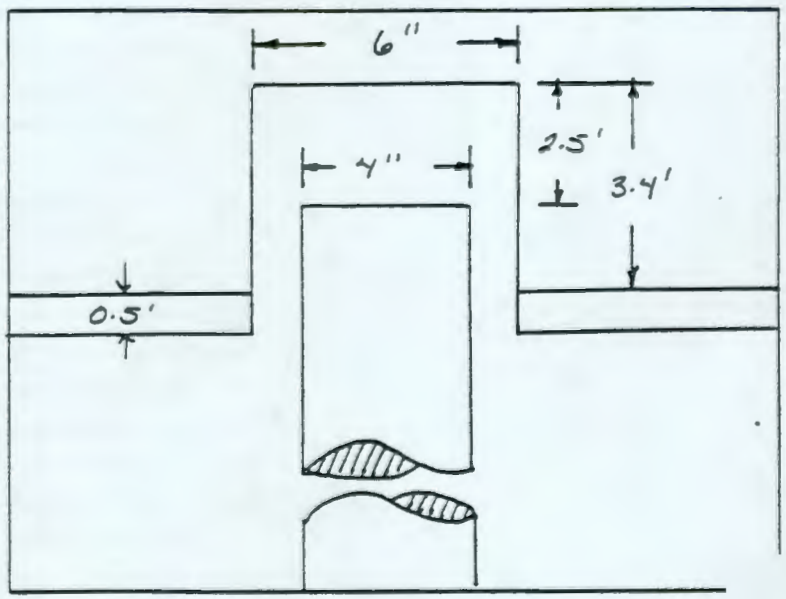


Well Head

Comments

Well was developed using a Hydrostar pump. Borehole casing collapsed during completion and will not accept regular development pump or test equipment. No data recorded.

Diagram



Signature of Recorder JAMES A. GATES JAMES A. GATES Date 12-16-91

A-6000-417 (08/89)

9313018.1907

WELL DEVELOPMENT FORM

Well Designation 299-W6-8 Well Depth 254.4' BTOC

Screened Interval _____ Date Well Development is Performed 11-26-91 / 11-27-91

BAILING

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

Type of Surge Block _____ Dimension of Surge Block _____

TD BEFORE	STROKE LENGTH	STROKE FREQUENCY	SURGE INTERVAL	SURGE TIME	TD AFTER	TD DIFFERENCE

AIRLIFT

Depth of Eductor Pipe _____ Airlift Start Time _____

Flow Rate _____ Accumulated Flow _____ Airlift Stop Time _____

Turbidity _____, _____, _____, _____, _____, _____, _____, _____

_____, _____, _____, _____, _____, _____, _____, _____

MECHANICAL PUMPING

Pumping Technique Positive Displacement Pump Depth 253.4' BTOC Pump Start Time 11-26-91 1555 | 11-27-91 0750

Flow Rate 11-26-91 4.2 GPM | 11-27-91 2.4 GPM Accumulated Flow 490 gal Pump Stop Time 1645 | 0947

Turbidity 51 NTU, 85 NTU, 21 NTU, 6.2 NTU, 3.8 NTU, -, -, -

-, -, -, -, -, -, -, -

Comments This well was developed with a Hydrostar Pump; a development pump could not be used because of collapsed in the borehole.

Signature of Recorder James A. Coates James A. Coates Date 12-16-91

Sign and Print Name

9313018.1995

DRAWDOWN/RECOVERY

Well Designation 299-W6-8 Date 11-26-91/11-27-91

Well Depth 254.44' BTOC Screened Interval 254.4-233.65' BTOC

Pumping Method ~~CONSTANT DISCHARGE~~ NA - NA

Equipment Used to Measure Water Level E-TAPE/TRANSDUCER S. N. ~~ET-NA~~ -NA- Calibration Due -NA-

Equipment Used to Measure Flow -NA- S. N. -NA- Calibration Due -NA-

Measuring Point TOP OF CASING 6" (T.O.C. 6") Pump Start Time -NA- Pump Stop Time -NA-

Time		Water Level		Discharge
Date	Time	Reading Unit:	Water Level Unit:	Reading Unit:
				BUCKET METHOD - w/ Hydrostar
				5 gal / 1min 11 sec = 4.26 GPM (11-26-91)
				5 gal / 2min 5sec = 2.4 GPM (11-27-91)
		Drawdown/Recovery tests not run.		
		Collapsed casing would not allow for		
		use of development pump or test equipment		

Signature of Recorder James A Coates James A. Coates Date 12-16-91

Sign and Print Name

A-6000-402 (03/90)

9313018.1905

SAMPLING PUMP INSTALLATION FORM

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

Project: W017 / LLBG

Well Number 299-N6-8

Pump Type HYDROSTAR

Pump Model 8001

Date Installed: 11/26/91

Installed by: B STRODE / M Anderson

Depth to water: 237.57

Depth to Bottom 254.44

Reported Depth to water: —

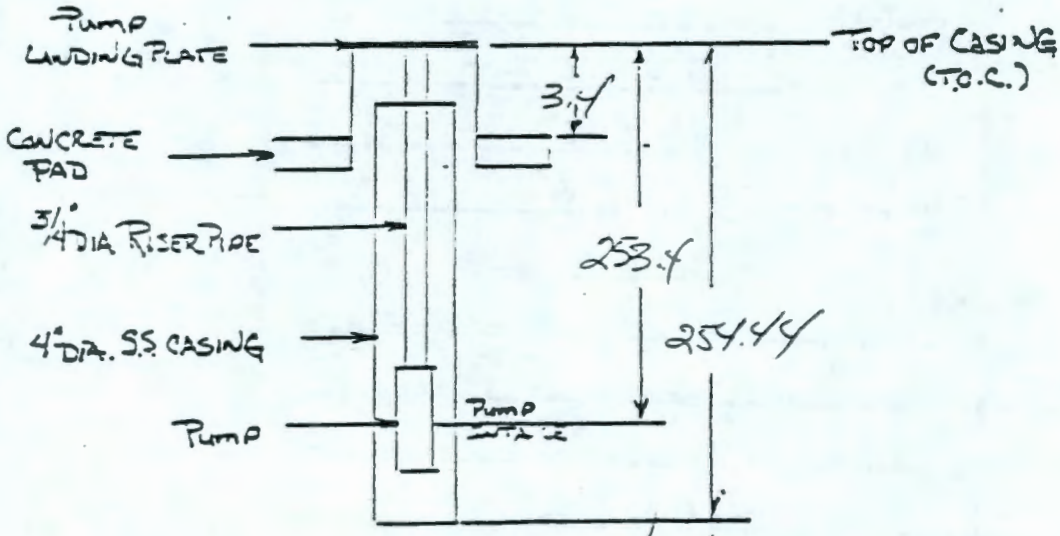
Screened Interval:

Pump/Riser Pipe Description:
pipe: 3/4" SS
pump length: 4.2
pump screen length 1.9
material cleaning: MANUFACTURER

Comments:

PUMP INSTALLATION SKETCH

Total material length 254.2
Loc. of pump intake: 253.4



Completed By: J A Gates

Date: 11/26/91

9313018.1920

BOREHOLE TEST INFORMATION

Borehole 299-W6-4 Borehole Diameter 4" Hanford Coordinates —NA—

VALIDATED KDR 3/18/92 SIGNATURE ON FILE

Interval Tested _____ Depth Interval _____

Test Type -NA- Borehole Depth 254.44' BTOC

Instruction Used WHC-CM-7-7-EII 10.1

EQUIPMENT

NAME	DESCRIPTION
ELECTRIC SOUNDER	SOUNST SN-NA
DATA LOGGER.	IN-SITU INC. SN.-NA-
PRESSURE TRANSDUCER	IN-SITU INC. S.N.-NA-
SLUGGING ROD	-NA-
STEEL MEASURING TAPE	500' GRADUATED STEEL TAPE

MEASUREMENT DATUM

Control Datum TOP OF CASING 6" (T.O.C. 6")

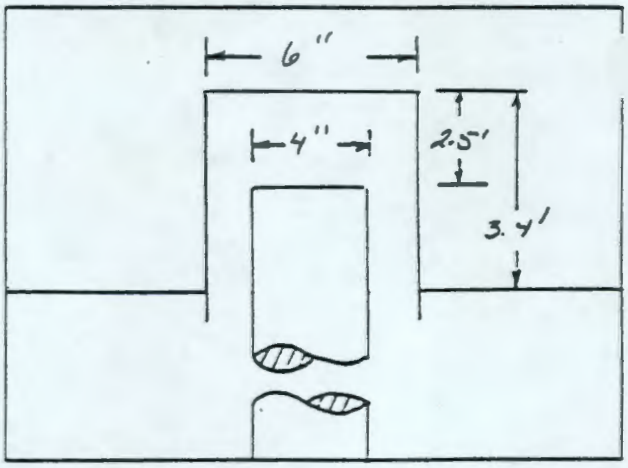
Elevation NA

Electric Sounder T.O.C. 6"

Steel Tape T.O.C. 6"

Pressure Transducer T.O.C. 6"

WELL HEAD DIAGRAM



COMMENTS

Borehole tests (instantaneous slug tests) not performed. Borehole casing collapsed and would not accept test equipment.

Recorded by: JAMES A. COATES JAMES A. COATES 12-K-91

Sign and Print Name Date

BD-6000-295 (05/89)

9313018.1930

INSTANTANEOUS SLUG TEST DATA SHEET

Borehole 299-W6-4

Interval Tested 254.4-233.65'

Depth to Water 237.57' BTOC

Date 11-26-91/11-27-91

Measured by James A. Coates

Slug Volume -NA- Barometer Reading (Beginning) -NA- (End) -NA-

Time -NA-

Transducer Measurement Units -NA-

Depth to Transducer -NA-

Initial Pressure (P_i) -NA-

Slug Level or Pressure (P_{max}) -NA-

Borehole Diameter 4"

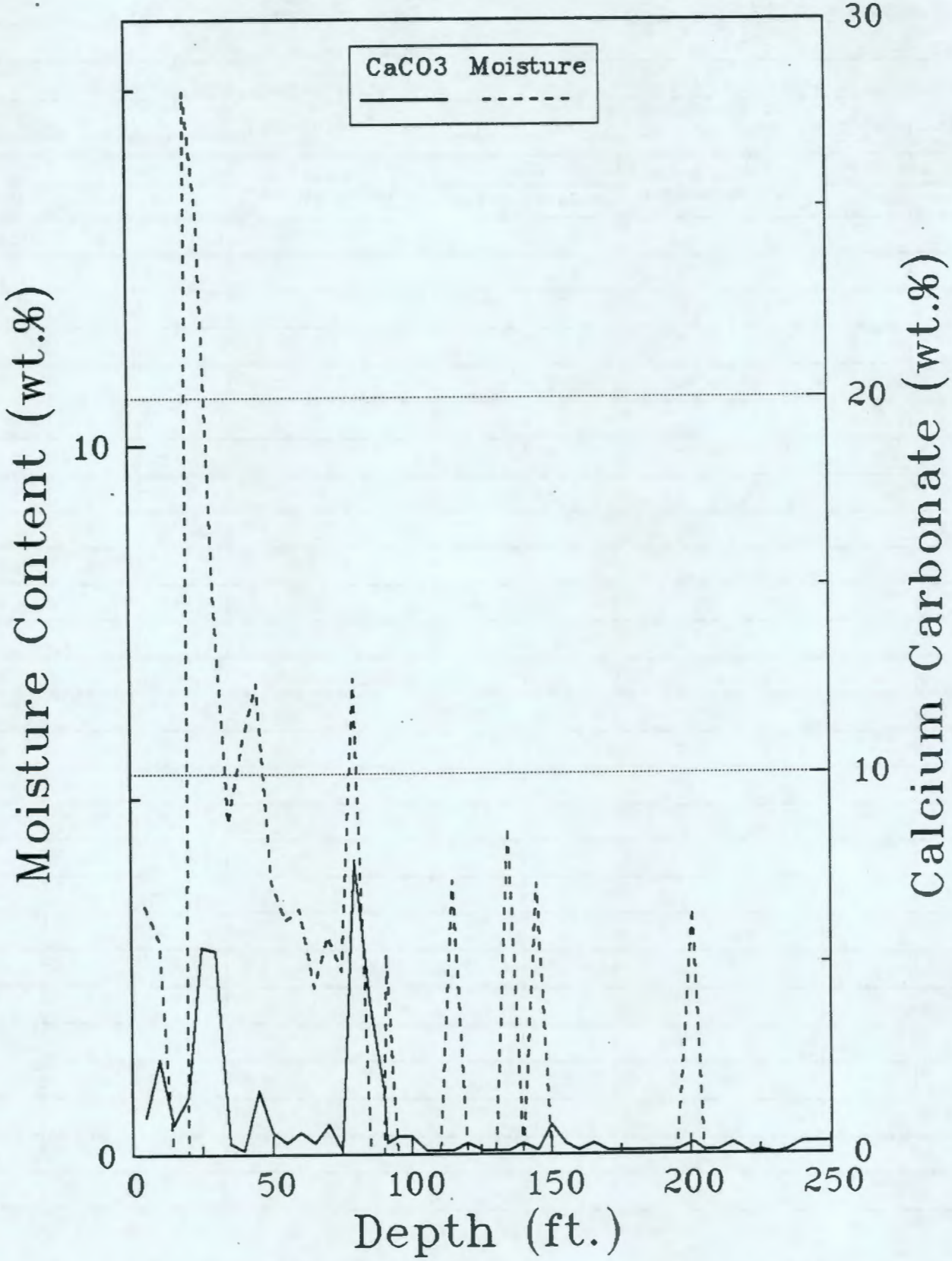
Time		Pressure Trans. Measurement	Time		Pressure Trans. Measurement	Time		Pressure Trans. Measurement
Observed	Elapsed		Observed	Elapsed		Observed	Elapsed	
		Borehole casing collapsed and would not accept test equipment. No data recorded.						

Recorded by James A. Coates (Sign and Print Name) 12-16-91 (Date)

9313018.1931

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

WELL 299-W6-8



9313018.1932

	A	B	C
1	WELL 299-W6-8		
2			
3	Depth	CaCO3	Moisture
4	ft.	Wt. %	Wt. %
5			
6	5	1	3.45
7	10	2.5	2.97
8	15	0.8	
9	20	1.5	
10	21	2	14.98
11	25	5.4	13.29
12	30	5.3	7.9
13	35	0.3	4.64
14	40	0.1	5.75
15	45	1.7	6.62
16	50	0.6	3.79
17	55	0.3	3.25
18	60	0.6	3.42
19	65	0.3	2.32
20	70	0.8	3.03
21	75	0.1	2.56
22	80	7.7	6.69
23	85	4	
24	90	1.7	
25	91	0.3	2.78
26	95	0.5	
27	100	0.5	
28	105	0.1	
29	110	0.1	
30	115	0.1	3.81
31	120	0.3	
32	125	0.1	
33	130	0.1	
34	135	0.1	4.56
35	140	0.3	
36	145	0.1	3.77
37	150	0.8	
38	155	0.3	
39	160	0.1	
40	165	0.3	
41	170	0.1	
42	175	0.1	
43	180	0.1	
44	185	0.1	
45	190	0.1	
46	195	0.1	
47	201	0.3	3.39

9313018.1929

	A	B	C
48	205	0.1	
49	210	0.1	
50	215	0.3	
51	221.5	0	
52	225	0.1	
53	230	0	
54	235	0.1	
55	240	0.3	
56	245	0.3	
57	250.5	0.3	

9313018.1934

VALIDATED
KDR 3/18/92
SIGNATURE/DATE

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 1 of 2

Tested by:	Phone No.	Well No.	Date:
		W6-8	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
5'	5.2.91	SOIL	5.2.91	0890.91	15.4	.3
10'	5			0891.91	20.0	.7
15'	5.6.91		5.8.91	0922.91	12.8	<0
20'	5.7.91			0926.91	16.9	<0
22.5	5.8.91			0939.91	13.0	.2
25				0940.91	12.4	.2
30'				0941.91	15.3	.5
35'				0942.91	13.7	.5
40'	5.9.91		5.9.91	0946.91	15.3	.5
45'				0947.91	7.1	.1
50'				0950.91	13.5	.2
55'				0951.91	16.4	.3
60'				0952.91	19.1	<0
65'	5.10.91		5.13.91	0964.91	16.5	<0
70'				0965.91	14.6	.2
75'	5.13.91		5.13.91	0974.91	3.6	.2
80'	5.15.91		5.15.91	0987.91	6.7	1.0
85'				0988.91	6.5	.2
90'				0989.91	2.4	<0
91'	5.16.91		5.16.91	0992.91	9.9	<0
95'	5.20.91		5.20.91	1001.91	12.4	.5
100	5.21.91		5.21.91	1008.91	10.9	.4
105'	5.23.91		5.23.91	1017.91	9.9	.1
110'				1021.91	21.3	.4
113-115'	5.24.91		5.31.91	1032.91	14.2	.4
120'	5.24.91			1053.91	9.6	.2
125	5.30.91		6.4.91	1106.91	16.9	.2
130'				1107.91	16.0	.3
133-135				1118.91	21.5	<0
140	5.31.91		6.5.91	1153.91	18.4	<0
43-145				1157.91	7.5	<0
150'	6.4.91			1202.91	14.8	.1

Performed By: _____

Date: _____

Page: _____ of _____

A-6000-829 (10/91)

9312018.199

ENVIRONMENTAL RESTORATION HEALTH AND SAFETY

Pg 2 of 2

Requested by:	Phone No.	Well No.	Date:
		W6-8	

Sample No. (Depth)	Sample Date	Sample Description	Analysis Date	Lab No.	Results Beta/Gamma (pCi/gr)	Results Alpha (pCi/gr)
155'	6.4.91	SOIL	6.10.91	1207.91	10.8	<0
160'	6.7.91		6.11.91	1230.91	11.1	.1
165'	6.12.91		6.17.91	1241.91	9.8	.4
170'				1300.91	13.6	.5
175'			6.19.91	1310.91	9.9	.2
179-180.5			6.20.91	1320.91	9.0	.1
185'	6.13.91			1337.91	17.8	1.1
190'	6.14.91			1355.91	4.5	<0
195'			6.21.91	1364.91	16.2	<0
199-201'				1370.91	17.1	.9
205'	6.17.91		6.24.91	1377.91	14.2	.2
210				1376.91	12.3	.2
215'				1383.91	16.9	.7
219.5				1384.91	12.9	.4
225'	6.19.91		6.25.91	1392.91	15.9	.2
230'				1393.91	12.1	.6
235'	6.20.91		6.26.91	1429.91	25.3	1.5
240'	6.21.91		6.28.91	1445.91	25.8	.9
245'				1460.91	8.5	.5
249-250'	6.21.91		6.24.91	1463.91	35.4	.2

Performed By: _____ Date: _____

Page: _____ of _____

9313018.1936

Westinghouse Hanford Company | LOG HEADER | Page 1 of

Well No. 299-W6-8 Area 200 West Date 6/5/91

Log Run #1 Log Type Gross Gamma

Elevation Datum NGVD29* Elevation 691.34' Brass Cap

Survey Coordinates 137638.8 N 567028.8

Log Measured From Ground Surface

Location Description North Perimeter of 200 West Area

Ground Surface Elevation 691.34' Brass Cap

Surface Temperature 13.3°C Weather Cloudy - Cool

BOREHOLE INFORMATION

Driller Mo Wraspir

Drill Rig Type Cable Tool | Bit Type/Diameter 10"/Hard Tool

Borehole Diameter(s)/Depth 12"/19.9' 10"/162.0

Depth Driller 162.0' | Depth Logger 162.0'

Liquid Level NA | Liquid Density NA

Temperature NA

CASING RECORD

Type 12" Carbon Steel Sch. 40 | Interval +0.5' - 19.88'

Type 10" Carbon Steel Sch. 40 | Interval +1.15' - 161.87'

Type | Interval

Type | Interval

Well Screen Interval NA

Comments: Return Error = +0.2' high

Centralizer was used.

~3.0' of Mud in bottom of borehole (162.0'-159.0')

* Survey Data from Kaiser 12/15/92 KDM

19-31/32

A-6000-

9313018.1940

LOG HEADER	Page 2 of 2

EQUIPMENT DATA

Logging Company	PNL		
Operator(s)	Alan Pearson		
Equipment Brand	MLS	Equipment Type	Analog
Tool Type	Gamma Ray	Serial No.	C627A97
Base Calibration Date	8/90	Calibration Reference	PNL-7460 UC-606
Calibration/Probe Factor	7.87×10^{-2} eU P/MC/S	Base Calibration Datum (eU): Position 1	291.4 eU Position 2 48.5 eU
Dead Time	17.8 usec.	Warm Up Time	>15 min

LOGGING INFORMATION

Log Interval From	162.0'	To	4.0'
Rerun(s)	65.0' to 15.0'		
Pre Survey Verification:	Position 1 276.6 eU	Position 2 48.8 eU	Background 60 c/s
Base Calibration Difference:	Position 1 14.8 eU	Position 2 0.3 eU	
Logging Speed	5 ft./min	Rerun Scales, CPS/in.	50 c/s/in
Start Time	1245	Completion Time	1445
Chart Speed(s), ft/in.	10 ft./in.		
Chart Recorder Horizontal Scale, CPS/in.	50 c/s/in.	Time Constant(s)	TC-1
Post Survey Verification:	Position 1 274.7 eU	Position 2 48.0 eU	Background 60 c/s

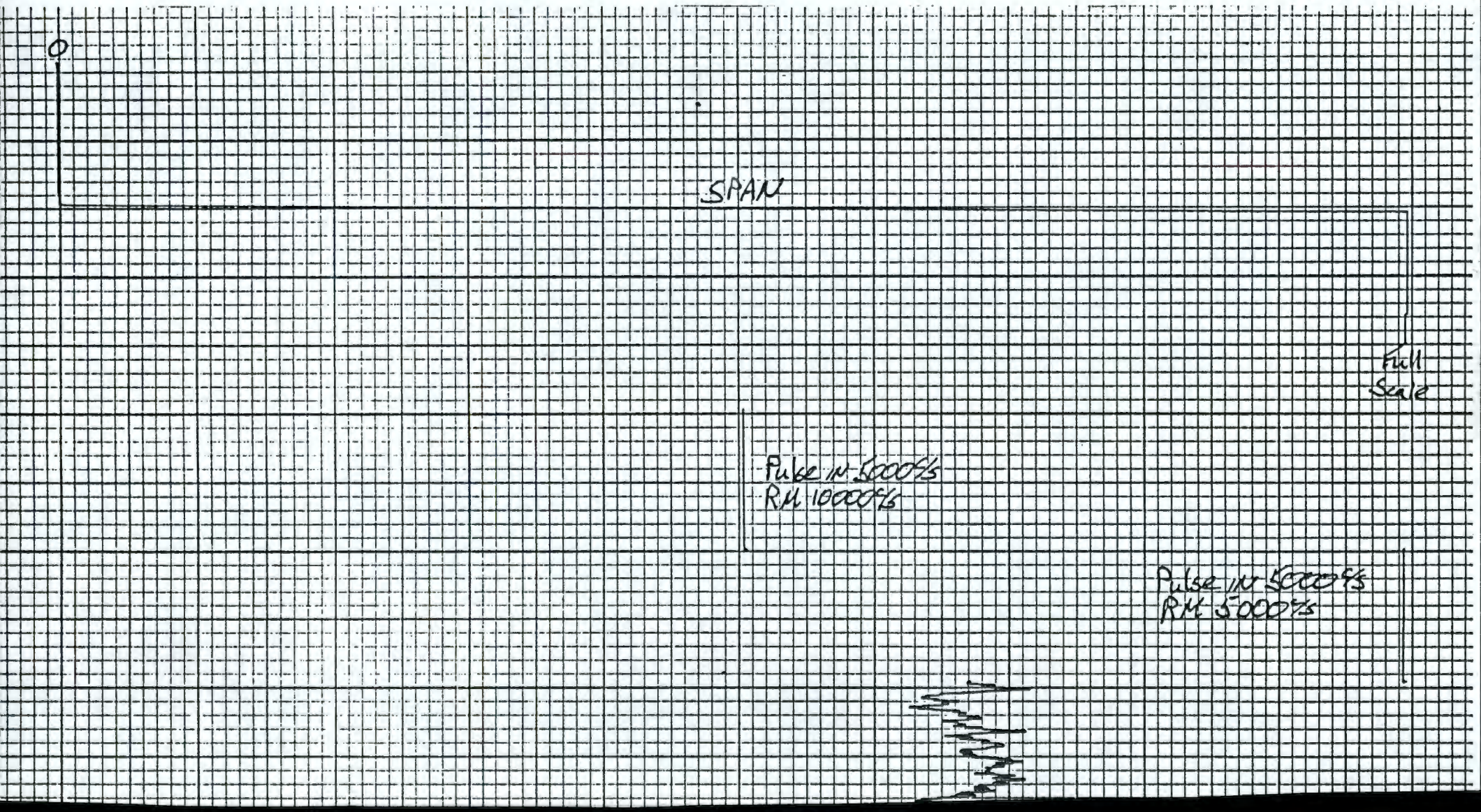
Percent Change: Position 1 0.7% Position 2 1.6%

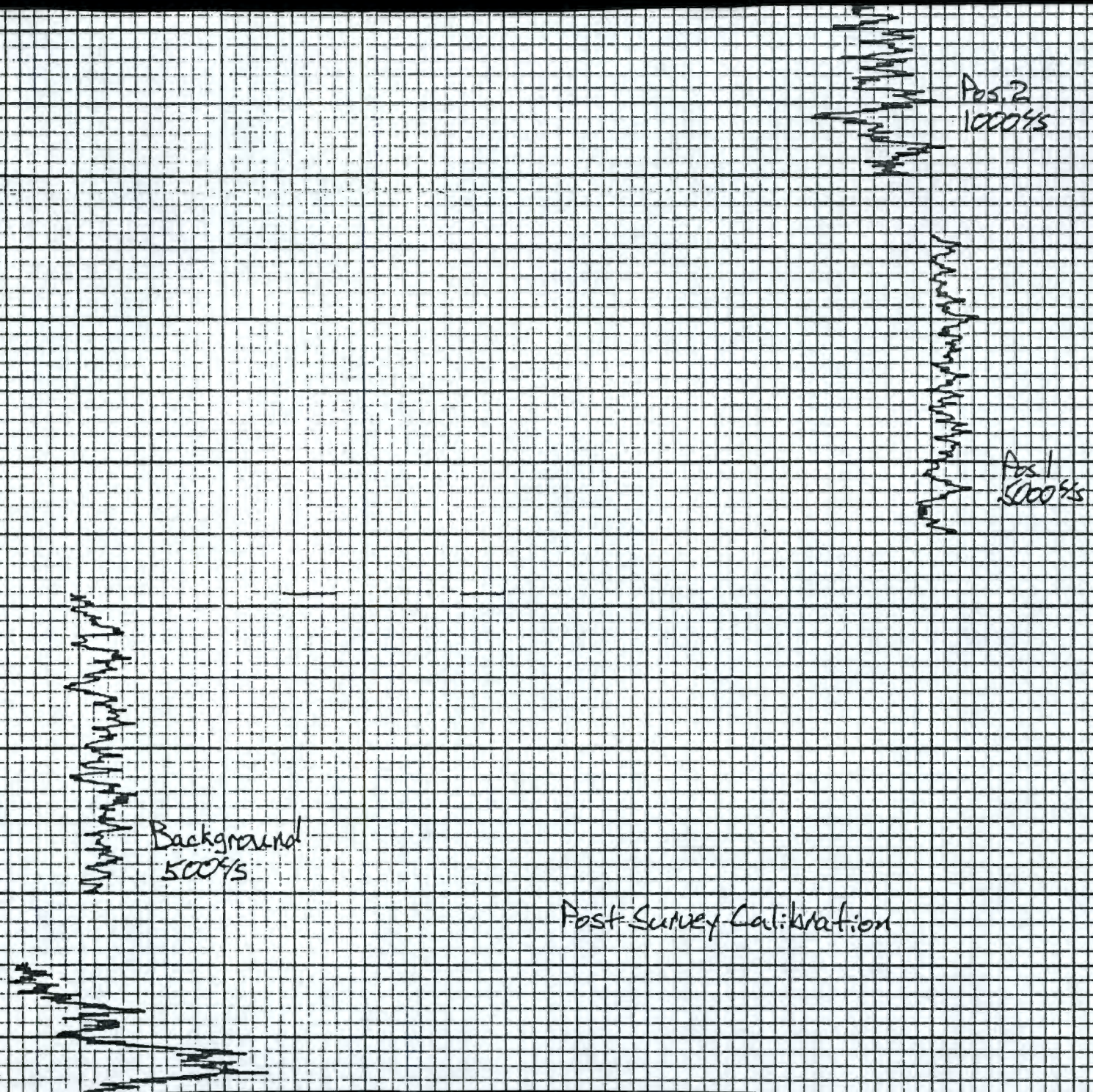
Comments Return Error = +0.2' high

Centralizer used.

Witnessed and Verified by: (sign and print name) Randall Price / RANDALL PRICE Date: 5 JUN 91

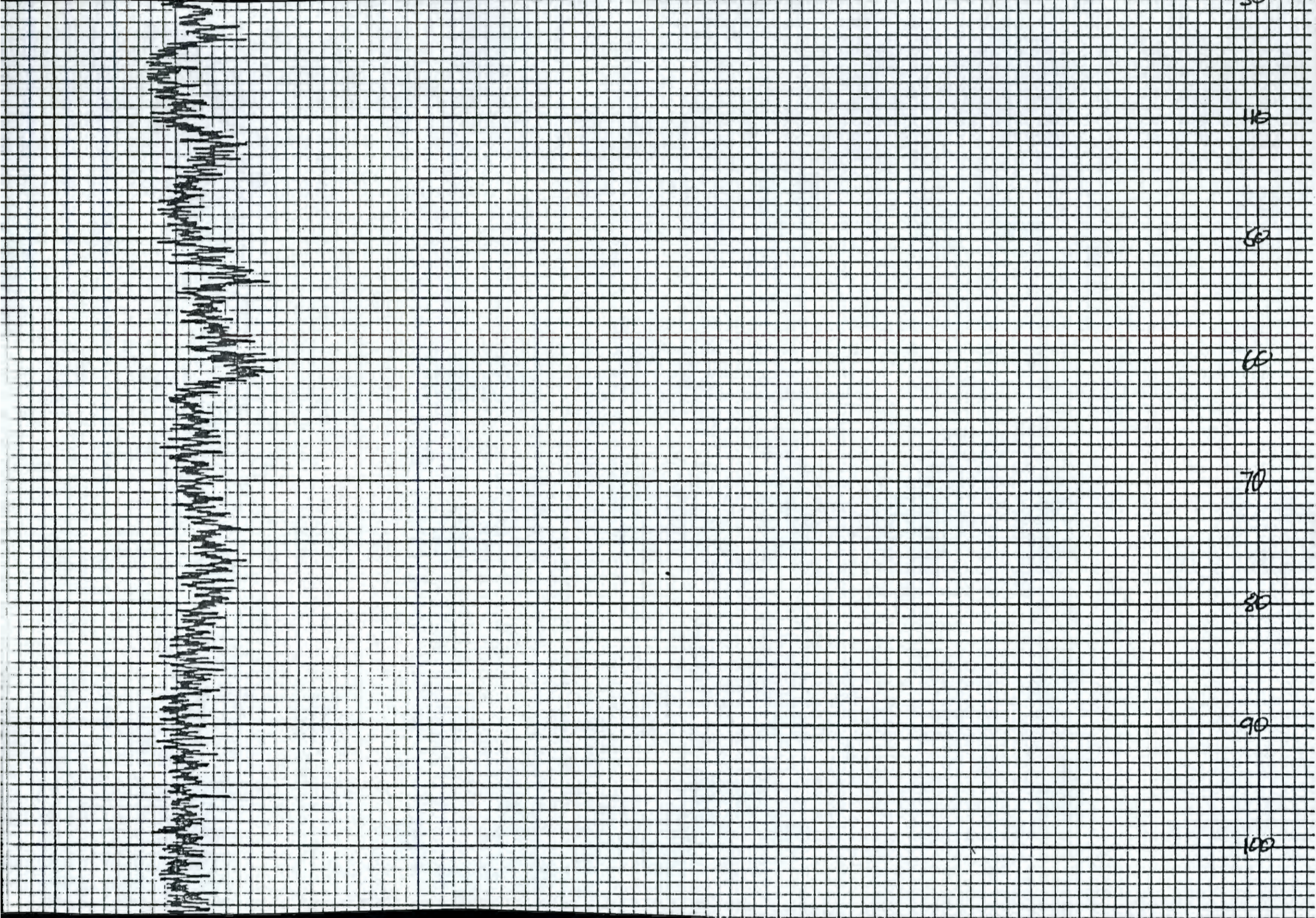
A-6000-520 (05/90)

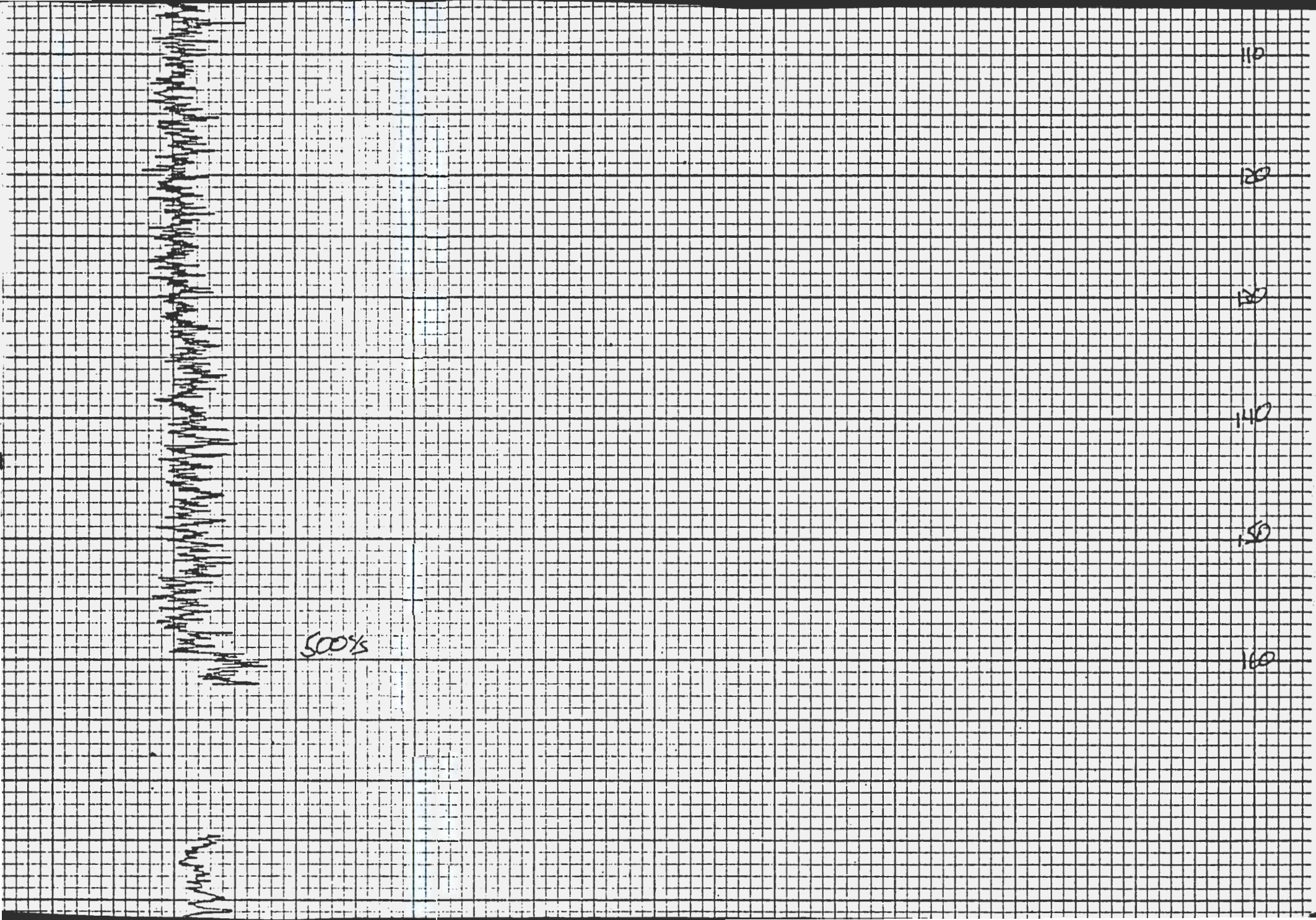


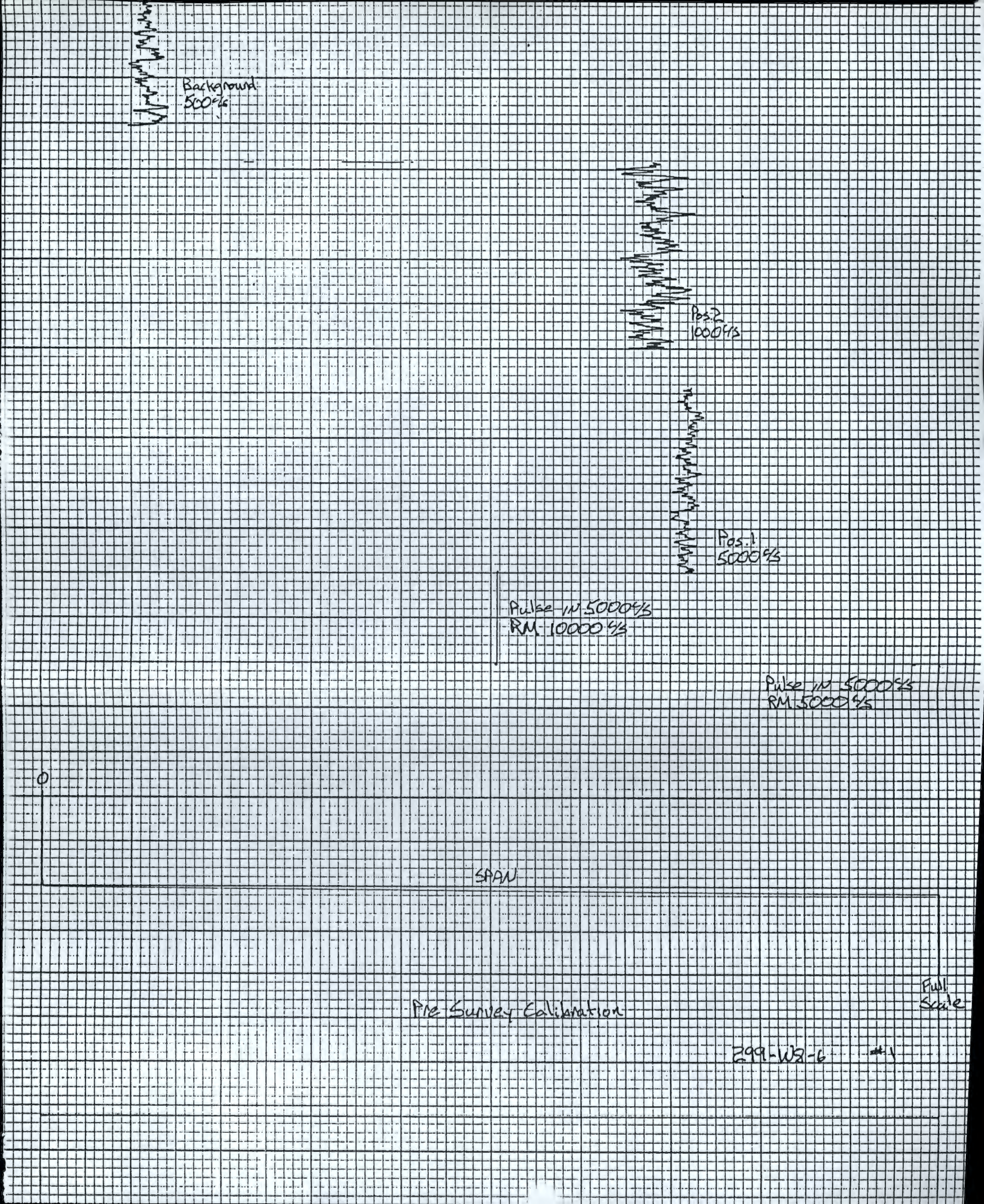


Post Survey Calibration

Repeat Section
500'S
30
40
50
60
10
20


50
40
60
60
70
80
90
100


110
120
130
140
150
160
500%


Background
500 °/s
Pos. 2
1000 °/s
Pos. 1
5000 °/s
Pulse IN 5000 °/s
RM 10000 °/s
Pulse IN 5000 °/s
RM 5000 °/s
0
SPAN
Full Scale
Pre Survey Calibration
299-W2-6 #1

Westinghouse Hanford Company	WHC-SD-EN-DP-044, Rev. 0 LOG HEADER	Run 2 of 2 Page 1 of 2

Well No. 299-W6-8 Area 200 West Date 6/24/91

Log Run #2 Log Type Gross Gamma

Elevation Datum NGVD29* Elevation 691.34' Brass Cap

Survey Coordinates 137638.8 N 567028.8

Log Measured From Ground Surface

Location Description North Perimeter Road of 200 West Area

Ground Surface Elevation 691.34' Brass Cap

Surface Temperature 16.0°C Weather Cloudy/Rain/Cool

BOREHOLE INFORMATION

Driller Mo Wraspir

Drill Rig Type Cable-Tool Bit Type/Diameter Hard Tool /8"

Borehole Diameter(s)/Depth 12"/19.9 10"/161.9' 8"/250.6'

Depth Driller 250.6' Depth Logger 249.5'

Liquid Level 213.6' Liquid Density Slightly Turbid

Temperature 17.7°C

CASING RECORD

Type 12" Carbon Steel Sch.40	Interval +0.5' - 19.88'
Type 10" Carbon Steel Sch.40	Interval +0.9' - 161.86'
Type 8" Carbon Steel Sch.40	Interval +2.6' - 251.71'
Type	Interval

Well Screen Interval NA

Comments: Return Error = +0.15' high

Centralizer was used.

* Survey data from Kaiser 12/15/92 RAM

19-35/36

A-6000-520

9313018.1939

LOG HEADER	Page 2 of 2

EQUIPMENT DATA

Logging Company: PNL

Operator(s): Alan Pearson

Equipment Brand: MLS — Equipment Type: Analog

Tool Type: Gamma Ray — Serial No. C627A97

Base Calibration Date: 8/90 — Calibration Reference: PNL-7460 UC-606

Calibration/Probe Factor: 7.87×10^{-2} eU P/M/CPS — Base Calibration Datum (eU): Position 1: 291.4 eU — Position 2: 48.5 eU

Dead Time: 17.8 μsec. — Warm Up Time: >15 min

LOGGING INFORMATION

Log Interval From: 249.5' — To: 130.0'

Rerun(s): 220.0' to 190.0

Pre Survey Verification: Position 1: 277.0 eU — Position 2: 48.8 eU — Background: 55 c/s

Base Calibration Difference: Position 1: 14.4 eU — Position 2: 0.3 eU

Logging Speed: 5 ft./min — Rerun Scales, CPS/in.: 50 c/s/in

Start Time: 0830 — Completion Time: 1015

Chart Speed(s), ft/in.: 10 ft./in.

Chart Recorder Horizontal Scale, CPS/in.: 50 c/s/in. — Time Constant(s): TC-1

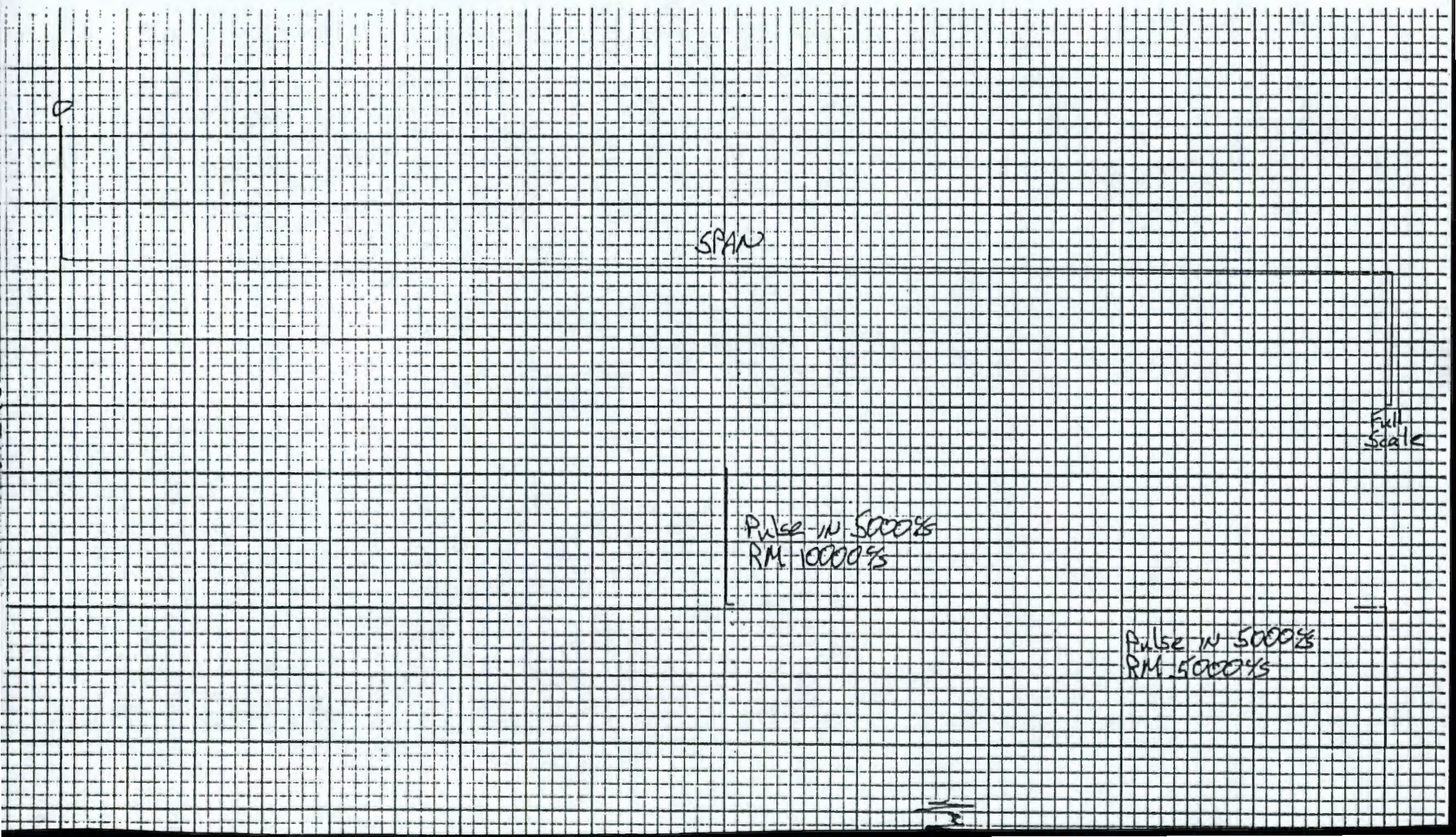
Post Survey Verification: Position 1: 277.0 eU — Position 2: 48.4 eU — Background: 55 c/s

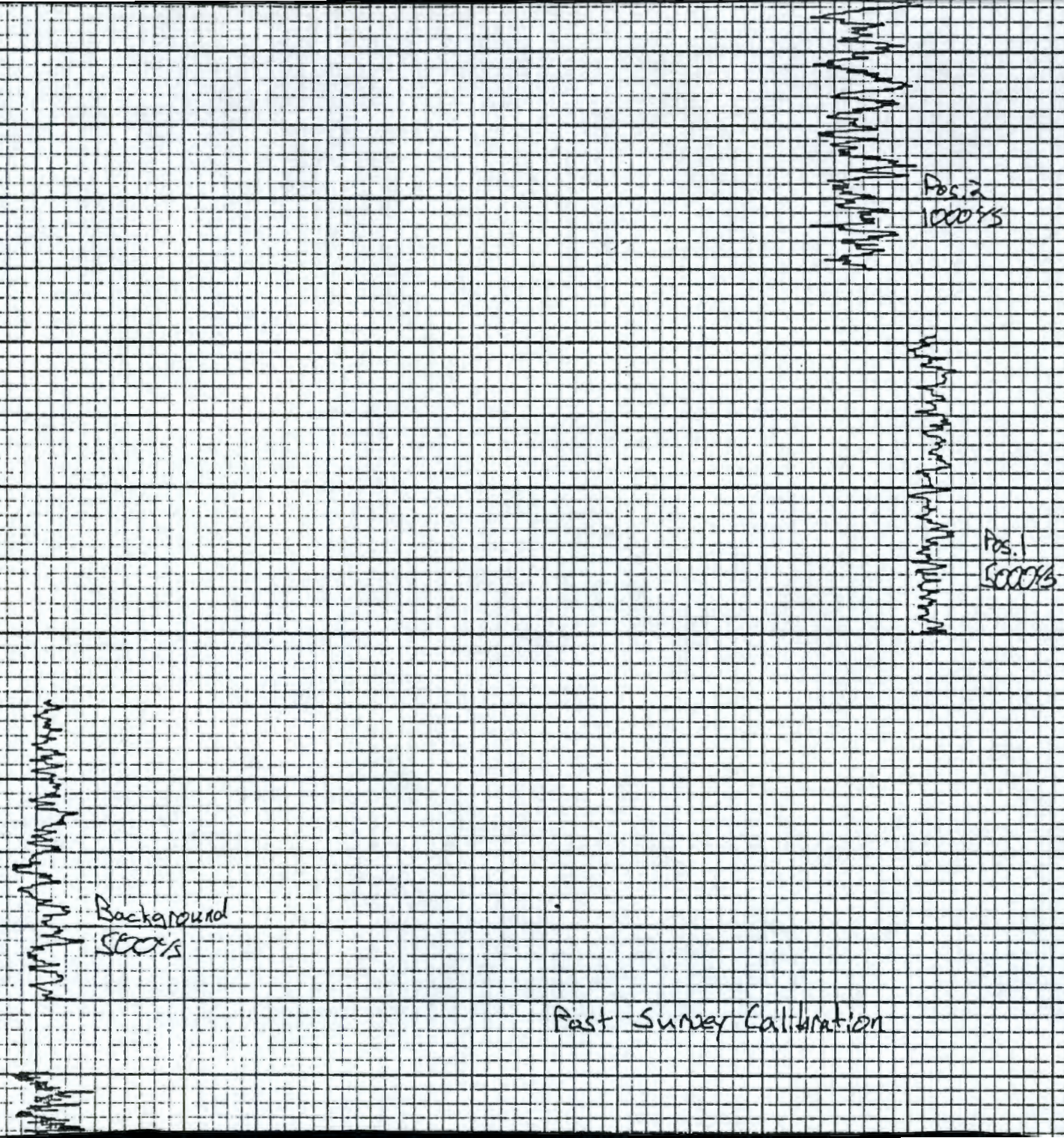
Percent Change: Position 1: 0.0% — Position 2: 0.8%

Comments Return Error = +0.15' high

Centralizer used.

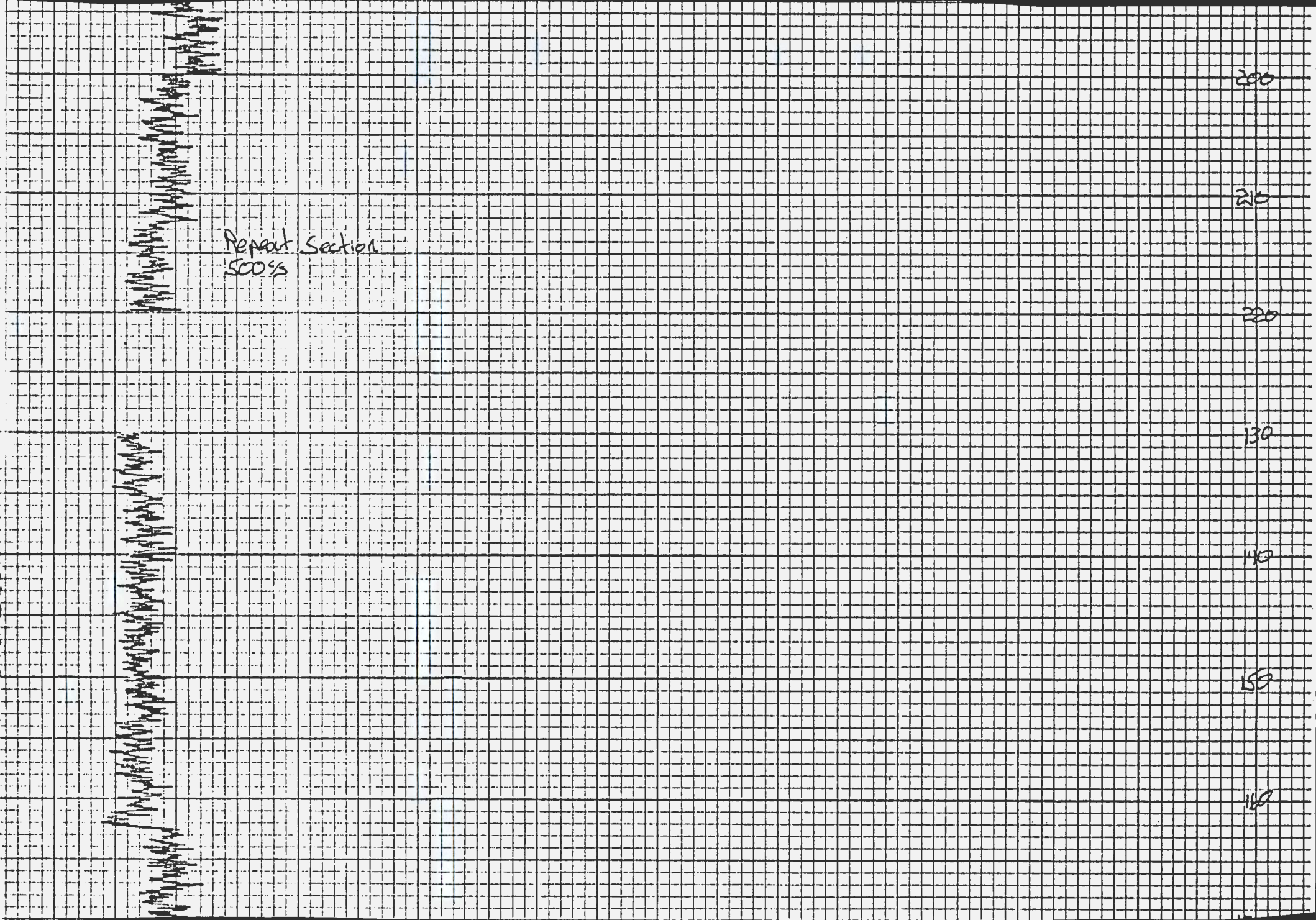
Witnessed and Verified by: (sign and print name) Steven E. Kos STEVEN E. KOS Date: 6/24/91



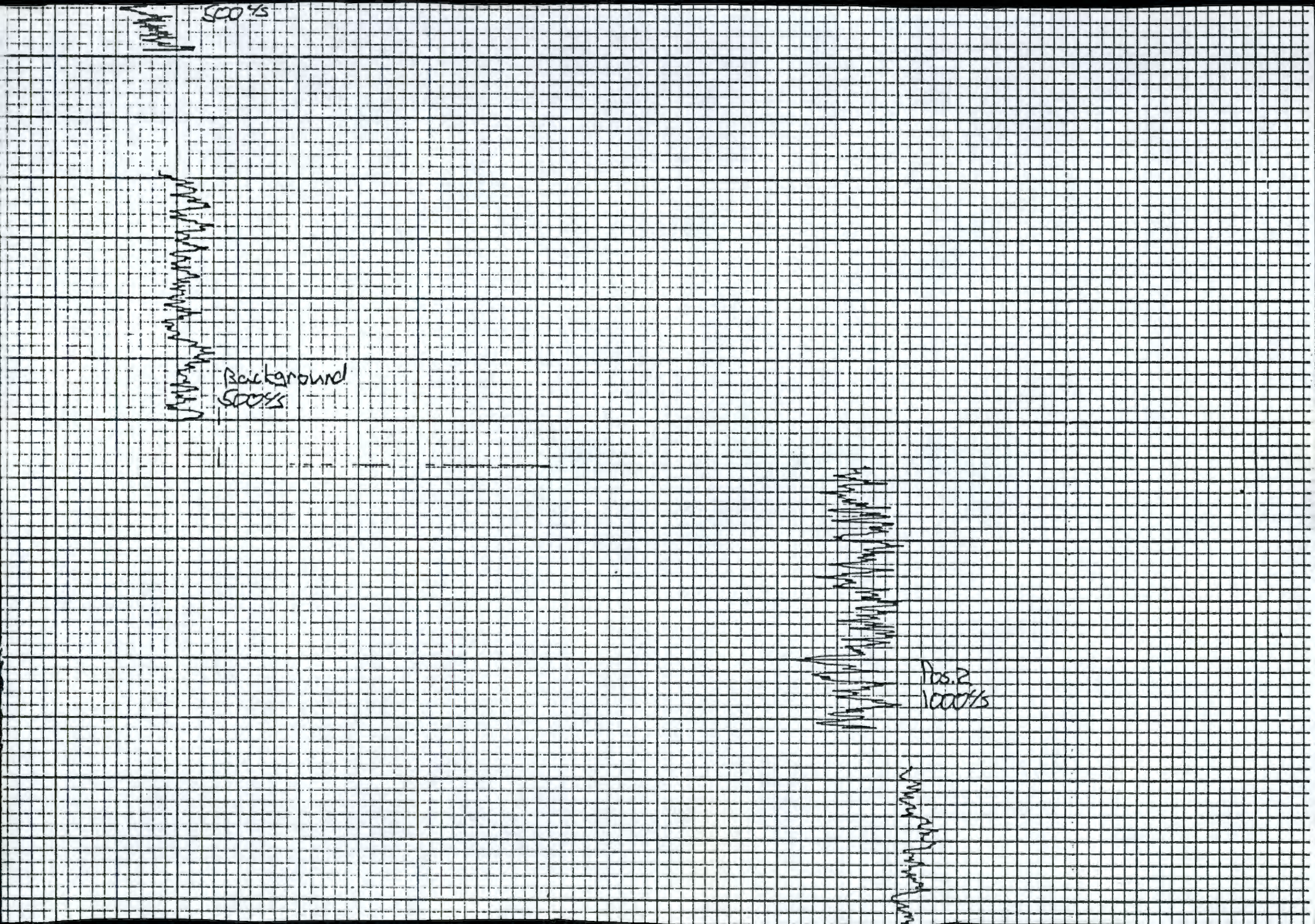


Post Survey Calibration

190


Repeat Section
500°/s
200
210
220
130
140
150
160

180
190
200
210
220
230
240


500 c/s
Background
500 c/s
Pos. 2
1000 c/s

Pos. 1
5000 °/s

Pulse IN 5000 °/s
RM 10000 °/s

Pulse IN 5000 °/s
RM 5000 °/s

0

SPAN

Full Scale

Pre Survey Calibration

299-W6-8 #2

20.0 REFERENCES

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Cooper, H. H., and C. E. Jacob, 1946, "A Generalized Graphical Method for Evaluating Formation Constants and Summarizing Well-Field History", *Transactions of the American Geophysical Union*, 17(IV):526-534.

Last, G.V., and B.N. Bjornstad, 1989, *Revised Groundwater Monitoring Plan for 200 Areas Low Level Burial Grounds*, WHC-SD-EN-AP-015 Rev 0, Westinghouse Hanford Company, Richland, Washington.

Last, G. V., B. N. Bjornstad, M. P. Bergeron, D. W. Wallace, D. R. Newcomer, J. A. Schramke, M. A. Chamness, C. S. Cline, S. P. Airhart, and J. S. Wilber, 1989, *Hydrogeology for the 200 Areas Low-Level Burial Grounds - An Interim Report*, PNL-6820, Pacific Northwest Laboratory, Richland, Washington.

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9313018.1541

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